June 10, 2021

Mark C. Draper, Chair
Board of Environmental Protection
17 State House Station
Augusta, Maine 04333-0017

RE: Notice of Appeal and Request for Public Hearing – Waste Management Disposal Services of Maine, Inc. Crossroads Landfill Phase 14 Expansion #S-010735-WD-YB-N (Approval with Conditions).

Dear Chair Draper:

By this letter, Conservation Law Foundation ("CLF") submits this Notice of Appeal of the above-referenced licensing decision ("License") for the Phase 14 Expansion of the Crossroads Landfill Facility ("Phase 14") issued by the Department of Environmental Protection ("DEP" or the "Department") on May 11, 2021, to Waste Management Disposal Services of Maine, Inc. ("WMDSM"), and in support thereof, provides the following information in accordance with the requirements of 38 M.R.S.A. § 341-D, and 06-096 CMR Ch. 2, § 24.

Appellant

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BACKGROUND

WMDSM owns and operates a 993-acre parcel known as the Crossroads Facility. The Crossroads Facility consists of several components such as a recycling transport center, a community transfer station, a tire beneficial reuse processing facility, a woodwaste recycling program, a landfill gas energy plant, and three separate landfills ("Crossroads Facility").

I. Permitting Process

On October 28, 2019, WMDSM filed an application with the Department to construct and operate a new, fourth landfill at the Crossroads Facility, which it calls Phase 14.[1] Phase 14 would be a 7.75 million cubic yard landfill on 48.6 acres.[2] Over the course of the landfill's life, it would accept an estimated 7.5 million tons of waste.[3] This development would extend the life of landfilling activities at the Crossroads Facility by approximately 17 years.[4]

The Department held two virtual public hearings on WMDSM's application on October 1, 2020.[5] At the afternoon session, WMDSM summarized their pre-filed exhibits, presented testimony, and were questioned by Department staff.[6] At the evening session, the Department took testimony from the public.[7] Thirteen persons testified during the evening session. Prior to the close of the administrative record, the Department received 35 written comments.[8] This included substantive comments from CLF opposing the application.

On April 23, 2021, the Department published a draft license approving Phase 14.[9] A total of 87 written comments, including comments from CLF, were received on the draft license prior

[1] Phase 14 Expansion License, p. 9.
[2] *Id.*
[3] *Id.*
[4] *Id.* at 6.
[5] *Id.* at 11.
[6] *Id.*
[7] *Id.*
[8] *Id.*
[9] *Id.* at 12.

to the end of the comment deadline on May 4, 2021.[10] CLF's comments reemphasized our previous concerns regarding the use of a single-liner system, the incompatibility of the project with Maine's Solid Waste Hierarchy, risk of groundwater and surface water contamination, the inadequate Fire Prevention Plan, and the lack standards and performance targets for the composting facility. On May 11, the Department published a final license authorizing the construction and operation of the Phase 14 Expansion.[11]

II. Phase 14 – The New Landfill

Despite characterizing Phase 14 as a "landfill expansion," the proposed development is not contiguous to any of the three existing landfills at the Crossroads Facility. In fact, Phase 14 is about a half-mile away from the operation portion of the first landfill.[12] The new landfill would allow 7.75 million cubic yards, or 7.65 million tons, of waste to be buried.[13] This capacity is expected to allow for continued landfilling operations at the Crossroads facility for 17 years.[14] However, there is no guarantee or promise that Phase 14 will provide 17 additional years of capacity. WMDSM did not suggest, and the Department has not required, a cap on the number of tons that can be buried annually. Thus, the entire 7.65 million tons of capacity could be used by WMDSM as quickly as practicable. In fact, if WMDSM buries waste at the rate it did in 2019 (more than 550,00 tons per year including alternative daily cover), the new landfill would be full

[10] *Id.*
[11] *Id.*
[12] Permit Application, Volume I, General Information, p. 2, 9. Although the Department's Solid Waste Management Rules prohibit the development of any commercial landfill expansion unless the new facility is contiguous with the existing facility, (06-096 CMR Ch. 400, § 2) the authorizing statute was amended in 2012 to allow for the development of a commercial landfill expansion so long as the new facility is located on property owned by the licensee prior to 1989 (38 M.R.S.A. § 1310-X). It is unclear and confusing why the Department's Rules, though revised in 2015, are not consistent with the statutory changes made in 2012. Even more worrisome is that the statutory changes made in 2012 undermine Maine's ban on the licensing of new commercial landfills, despite that ban being reemphasized as recently as the 2019 Maine Materials Management Plan.[12]
[13] Phase 14 Expansion License, p. 3.
[14] *Id.* at 6.

in just 14 years.[15] Additionally, the Department has not required any meaningful conditions to preserve the capacity of the landfill for Maine generated waste. Thus, the entire 7.65 million tons could consist entirely of waste that originates from out-of-state sources. In 2019, a third of what was buried at the Crossroads Facility was from out-of-state.[16]

III. Waste Management at Phase 14

The waste approved to be buried at the new landfill will be toxic. The approved waste consists of residential, commercial, municipal solid waste, construction and demolition debris, special waste, and materials or waste used as alternate daily cover. Much of this waste would not be accepted at other New England landfills.

Special Wastes: The Crossroads Facility is approved to accept special waste for disposal. Special waste includes municipal incinerator ash, wastewater treatment plant sludge, contaminated media, light industrial solid waste, and asbestos-containing waste.

Incinerator Ash: The solid waste incineration process produces two types of ash: fly ash from air pollution control equipment, and bottom ash, which is the non-combustible residue remaining after combustion. Fly ash has high concentrations of toxic compounds such as dioxins (recognized carcinogens), lead (known to inhibit child development), mercury (known for impacts to central nervous system and kidneys), as well as other compounds like polychlorinated biphenyls ("PCBs"), polychlorinated naphthalenes ("PCNs"), cadmium, and arsenic.

Asbestos Containing Waste: Asbestos-containing waste is especially dangerous, as asbestos can cause a variety of significant health issues, including scarring of the lung tissue and certain types of cancer.

[15] 2019 Annual Report, Crossroads Landfill, Norridgewock, Maine, February 2020, Appendix A, Wastes Managed Within On-Site Secure Landfill
[16] *Id.*

Construction and Demolition Debris ("CDD"): CDD is a varied waste stream that includes concrete, asphalt, wood, gypsum, and asphalt shingles generated from the construction, renovation, and demolition of buildings, roads, bridges, and dams. CDD often has toxic solvents, adhesives, pigments, and coatings present. Some of these chemicals include ethyl benzene, methylene chloride, and toluene. Mercury is often a persistent element in CDD.

Utility Poles: The Crossroads Facility manages utility poles which it processes into a soil like material for use as alternative daily cover ("ADC").[17] Utility poles are particularly toxic, as they are treated with dangerous pesticides and wood preservatives. The chemicals that treat the wood are often banned for other uses.

Contaminants of Emerging Concern at Landfills: In addition, the Crossroads Facility likely accepts waste sources that contain contaminants of emerging concern such as Per- and Polyfluoroalkyl Substances ("PFAS"). Landfills have been burying PFAS-containing waste for over sixty years.[18] PFAS are used in a wide variety of consumer products including electronics, microwave popcorn bags, carpet, upholstery, nonstick cookware, dental floss, and textiles.[19] WMDSM maintains contracts with Sappi North America (for up to 400,000 gallons per day), and the Anson-Madison Sanitary District (for up to 56,000 gallons per day) for the offsite management of leachate.[20] Both Sappi and the Anson-Madison Sanitary District discharge effluent into the Kennebec River. The Department is not requiring WMDSM to pretreat leachate

[17] Waste Management Disposal Services of Maine, Inc. Crossroads Facility Phase 14 Solid Waste Permit Application, Volume I, Appendix 8A: Fugitive Particulate Control Plan, p. 2.
[18] A. H. Huset, M. A. Barlaz, D. F. Barofsky, & J. A. Field. Quantitative determination of fluorochemicals in municipal landfill leachates, 82 Chemosphere 1380–1386 (2011).
[19] National Center for Environmental Health, An Overview of Perfluoroalkyl and Polyfluoroalkyl Substances and Interim Guidance for Clinicians Responding to Patient Exposure Concerns, Center for Disease Control (June 7, 2017), https://www.atsdr.cdc.gov/pfc/docs/pfas_clinician_fact_sheet_508.pdf; Johnsie R. Lang, B. McKay Allred, Jennifer A. Field, James W. Levis, and Morton A. Barlaz, National Estimate of Per- and Polyfluoroalkyl Substance (PFAS)
[20] Phase 14 Expansion License, p. 35.

onsite, a practice WMDSM currently implements at its Turnkey Landfill in Rochester, New Hampshire. Discharges of PFAS containing effluent are a significant concern. CLF and other commenters raised this concern throughout the public comment period.

Despite the toxicity and dangerous nature of the waste approved to be buried at the new landfill, the Department is only requiring WMDSM to utilize a single composite liner system for Phase 14.[21] This decision goes against the well-established industry standard of utilizing a dual composite liner system to better protect against eventual leachate leakage. In fact, Maine is the only state in New England that would approve a landfill authorized to accept these forms of waste with only a single liner.[22] Moreover, WMDSM has utilized a dual composite liner system for all previous phases of landfill development at the Crossroads Facility.

DISCUSSION

I. Request for Relief

CLF requests that the Board of Environmental Protection (the "Board") reverse the Commissioner's decision and rule that the License as drafted is unlawful, unsupported by substantial evidence on the whole record, and/or arbitrary, capricious, or characterized by an abuse of discretion.[23] Therefore, CLF requests the Board rule that Phase 14 of the Crossroads Facility cannot proceed under the License as drafted.

Specifically, CLF objects to the following findings and requests that the Board exercise its *de novo* review of the record in this matter to reverse these findings:[24]

[21] Phase 14 Expansion License, p. 14.
[22] See, U.S. Environmental Protection Agency, 1988, Federal Register, v. 53, no. 168, August 30, 1988, p. 33345, and Flawed Technology of Subtitle D Landfilling of Municipal Solid Waste, G. Fred Lee & Associates, p. 6. (Updated Jan. 2015).
[23] 5 M.R.S.A. § 11007(C).
[24] 38 M.R.S. § 341-D(4) states that "the board is not bound by the commissioner's findings of fact or conclusions of law but may adopt, modify or reverse findings of fact or conclusions of law established by the commissioner."

- Findings 18 and 19 – that Phase 14 meets the requirements of Maine's Solid Waste Management Hierarchy and Recycling Laws;
- Finding 15 – that Phase 14 will not pose an unreasonable risk of discharge to a significant groundwater aquifer;
- Finding 11(D) – that the Emergency Action Plan and Fire Prevention Plan procedures proposed by WMDSM are adequate to minimize the risk of fire as required by state law and regulation;
- Finding 26(A) – that the use of a single composite liner system meets the engineering and design standards; and
- Finding 12 – that the leachate management systems for Phase 14 will not unreasonably affect surface water quality.

Alternatively, should the Board not reverse the Commissioner's decision, CLF requests that the Board modify the License to include the following:

- Require WMDSM to provide recycling and composting services to all 55 communities from which it currently accepts waste;
- Require WMDSM to set specific targets for the composting facility;
- Require WMDSM to submit a plan detailing how it will collect and manage compostable waste;
- Require the Department to set a maximum fill rate for waste each year to preserve the life of the landfill for Maine generated waste;
- Require the Department to include enforcement mechanism on the condition that WMDSM "prioritize disposal of Maine generated solid waste," such as capping the amount of out-of-state waste WMDSM can bury in Phase 14 per year or reserving a specific amount of capacity for Maine generated waste;
- Require WMDSM to perform additional hydrogeological testing during non-drought conditions;
- Require WMDSM to develop a more robust Fire Prevention Plan;
- Require WMDSM to utilize a double liner system for Phase 14 as it has in all other Landfills at the Crossroads Facility, at its Turnkey Landfill in New Hampshire, and as would be required by all other New England states;
- Require WMDSM to utilize an electrical leak detection system for the entirety of Phase 14's operations; and
- Require WMDSM to pretreat leachate given the toxic nature of the waste it handles at the Crossroads Facility, and the likelihood of PFAS in the leachate.

II. Evidence Demonstrating CLF's Standing as an Aggrieved Party.

CLF has organizational standing to pursue this appeal and does so on behalf of its members. CLF is a non-profit member-supported organization incorporated under the laws of

Massachusetts with offices at 53 Exchange Street, Suite 200, Portland, in Cumberland County, Maine. CLF is a regional organization founded in 1966 with approximately 5,100 members, including approximately 388 members in Maine, and it is dedicated to the conservation and wise management and development of Maine and New England's natural resources.

CLF works to protect New England's environment for the benefit of all people, using the law, science, and the market to create solutions that preserve natural resources, build healthy communities, and sustain a vibrant economy. Through its Zero Waste Project, CLF aims to improve waste diversion, recycling, and composting programs and protect communities and our environment from polluting waste management practices such as incineration and landfilling.

A final decision by the Department may be appealed to the Board by those "who have standing as aggrieved persons."[25] An aggrieved person is any person who "may suffer particularized injury as the result of a licensing decision."[26] The Board will interpret the term "aggrieved person … consistent with Maine state court decisions that address judicial requirements for appeals of final agency action."[27] The requirement of a particularized injury is met when "the judgement adversely and directly affects the party's property, pecuniary or personal rights."[28] An association has standing to bring a suit on behalf of its members when "its members would otherwise have standing to sue in their own interest, the interests are germane to the organization's purpose, and neither the claim asserted, nor the relief requested requires participation of individual members in the lawsuit."[29]

[25] 06-096 CMR Ch. 2, § 24.
[26] 06-096 CMR Ch. 2, § 1(B).
[27] *Id.*
[28] Anderson v. Swanson, 534 A.2d 1286, 1288 (Me.1987).
[29] Friends of the Earth, Inc. v. Laidlaw Environmental Services. Inc., 528 U.S. 167, 180, (2000).

CLF has members who own property, reside, recreate, and/or work near the Crossroads Facility who will suffer particularized injuries as a result of the License decision. One member passes the Crossroads Facility twice a day on his commute to and from work, and frequently experiences noxious odor. He has expressed concern over the health impacts the landfill odor and gas may be causing him. This member also frequently kayaks in the Kennebec River, downstream of where leachate is discharged from the Anson-Madison Sanitary District. This member is concerned over the impact the leachate has on the water quality of the Kennebec River and is hesitant to continue kayaking in the river.

Another member is a citizen of the Odanak Abenaki First Nation and is Indigenous to the Kennebec River watershed. This member canoes on the Kennebec as her ancestors have done for generations. This member also enjoys swimming and eating fish harvested from the Kennebec. Moreover, this member and her family use the river regularly and participate in ceremonies near the river multiple times a year. This member is concerned about the impact Phase 14 will have on the Kennebec River and the overall water quality and air quality of the region.

Two additional CLF members live within approximately two miles of the Crossroads Facility. These members are concerned that Phase 14 will contaminate the aquifer which supplies their drinking water. Given their proximity to the Crossroads Facility, they are also concerned about the risk of fire. One of these members is an avid gardener who is concerned about the impact groundwater contamination will have on her ability to eat and grow her own food. The other member is an avid fisherman and is concerned about the impact eating fish from the Kennebec River, where WMDSM's leachate is discharged, may have on his health.

Another CLF member lives near the Crossroads Facility and is concerned about the destruction of wetlands and how this would impact the North Pond watershed. This member

recreates and enjoys the North Pond year-round and has developed a deep connection to the lake through her work as a Master Gardener. She fears the disruption of the watershed by Phase 14 will irrevocably harm the North Pond, undoing the seven-year process she undertook to achieve LakeSmart Certification for the area.

III. Request for Supplemental Evidence

CLF requests to introduce a portion of the 2019-2020 Surface Water Ambient Toxic Monitoring Program Final Report (the "2019-2020 SWAT Report") as supplemental evidence. The portion CLF requests to introduce relates to findings of a study on PFAS in fish from the Kennebec River above and below industrial treatment plants. This portion is included in this Notice of Appeal as Exhibit 2.

Maine regulations allow for supplemental evidence to be submitted at the discretion of the Board.[30] The Board may allow the record to be supplemented where it finds that the evidence offered is relevant and material and that (1) the appellant has shown due diligence to bring the evidence to the attention of the Department at the earliest possible time, or (2) the evidence is newly discovered and could not, by the exercise of reasonable diligence, have been discovered in time to be presented earlier in the licensing process.[31]

The 2019-2020 SWAT Report is relevant and material to this appeal. The report contains findings related to PFAS concentrations in fish in the Kennebec River. WMDSM is proposing to maintain contracts with Sappi North America and the Anson-Madison Sanitary District for offsite leachate management. Under the contracts, Sappi North America may accept up to 400,000 gallons of leachate per day, and the Anson-Madison Sanitary District may accept up to

[30] 06-096 CMR Ch. 2, § 24(D).
[31] 06-096 CMR Ch. 2, § 24(D)(2).

56,000 gallons per day.[32] Both facilities discharge treated effluent directly into the Kennebec River. The findings of this report are material to CLF's concerns over the impact Phase 14 will have on the water quality of the Kennebec. Specifically, the discharge of leachate which contains PFAS. The results of the report show that perfluorooctane sulfonate ("PFOS"), the most commonly prevalent form of PFAS, were elevated below industrial sources on the Kennebec River. PFOS were elevated in portions of the river below both the Sappi North America facility and the Anson-Madison Sanitary District.

The 2019-2020 SWAT Report is newly discovered and could not have been discovered through the exercise of reasonable diligence earlier in the licensing process. The 2019-2020 SWAT Report was published on June 2, 2021, after the Department had already issued the License for Phase 14. Therefore, the report could not have been referenced or introduce earlier in the process.

Given that the 2019-2020 SWAT Report meets the requirements of 06-096 CMR Ch. 2, § 24(D), CLF requests the Board introduce the report as supplemental evidence to the record.

IV. Concise Statement of Relief Sought and Basis for the Objections and Challenges.

As stated above, CLF requests that the Board reverse the Commissioner's decision and rule that the License as drafted is unlawful, unsupported by substantial evidence on the whole record, and/or is arbitrary, capricious, or characterized by an abuse of discretion.[33] Therefore, Phase 14 cannot proceed under the license as drafted. Specifically, CLF objects to the following findings.

[32] *Id.*
[33] 5 M.R.S.A. § 11007(C).

A. CLF Objects to Findings 18 and 19 – That the Proposed Phase 14 Expansion Meets the Requirements of the Solid Waste Management Hierarchy and Recycling Laws.

The decision to approve the Phase 14 Expansion of the Crossroads Facility undermines the requirements of Maine's Solid Waste Management Hierarchy, State Recycling Goals, and their implementing regulations.

The Department may only issue the License if the "purpose and practices of the solid waste facility [are] consistent with the State's solid waste management hierarchy set forth in 38 M.R.S.A. §2101."[34] 38 M.R.S.A. §2101 provides that it is the policy of the State to actively promote and encourage waste reduction measures and maximization of waste diversion efforts.[35] To carry out this policy, 38 M.R.S.A. §2101, requires the state to plan for and implement an integrated approach to solid waste management which must be based on the following order of priority: (a) reduction of waste generated at the source, including both amount and toxicity of the waste, (b) reuse of waste; (c) recycling of waste; (d) composting of biodegradable waste; (e) waste processing that reduces the volume of waste needing landfill disposal, including incineration; and (f) land disposal of waste.[36] 38 M.R.S.A. § 2132, established the goal of recycling or composting 50% of the municipal solid waste tonnage generated within Maine each year. According to the most recent data from the Department, Maine's recycling rate is 37.81%.[37]

As a threshold matter, building a new landfill does not incentivize reduction, prioritize reuse, develop recycling or composting programs as required by 38 M.R.S.A. §2101, or help the

[34] 06-096 C.M.R. ch. 400, § 4(N)(1)
[35] *Id.*
[36] 38 M.R.S.A. § 2101.
[37] Department of Environmental Protection, Maine Solid Waste Generation and Disposal Capacity Report for Calendar Years 2018 & 2019, p. 2. (January 2021). Available at https://www.nrcm.org/wp-content/uploads/2021/02/DEPwastereport2021.pdf

state in achieving its recycling and composting goals. In fact, the more cubic yards of landfill capacity there is in Maine, the more likely it is that waste will be buried.

As described in the License, WMDSM will continue to accept waste in the same quantity and from the same sources as they have during previous phases. The License will allow WMDSM to bury 7.65 million tons of waste over the course of the expansion.[38] The Department has taken little action to prove that this capacity is needed and that WMDSM will be taking action to reduce, reuse, recycling, or compost waste as required by law. As written, the License requires that WMDSM:

- May not dispose of marketable recyclables in Phase 14.[39] While CLF strongly supports this condition, it is unclear how the Department will enforce compliance. The Department cannot condition the approval of a solid waste facility on an unenforceable condition.

- "Prioritize disposal of Maine generated solid waste.[40] While CLF strongly supports the intention behind this condition, as currently drafted it is unreasonably ambiguous and will not ensure capacity is reserved for Maine generated waste. This condition contains no enforcement mechanisms or oversight. In fact, the entire 7.65 million tons of waste could all come from out-of-state sources. In 2019, a third of what was buried at Crossroads Landfill was from out-of-state sources.[41]

Moreover, the License as drafted does not contain a maximum fill rate for waste each year, which would preserve the life of the landfill. Without a maximum fill rate, WMDSM could fill the entire 7.65 million tons of capacity as quickly as possible. In fact, if WMDSM buries waste at the rate it did in 2019 (more than 550,000 tons, including alternative daily cover)[42], Phase 14 would be filled within 14 years.

[38] Phase 14 Expansion License, p. 6.
[39] Phase 14 Expansion License, p. 48.
[40] Phase 14 Expansion License, p. 48.
[41] 2019 Annual Report, Crossroads Landfill, Norridgewock, Maine, February 2020, Appendix A, Wastes Managed Within On-Site Secure Landfill. (Hereinafter, "2019 Annual Report").
[42] *Id.*

According to the License, WMDSM accepts waste from 55 Maine communities but only provides recycling service to 21 communities. Not only is WMDSM handling the recycling of very few Maine residents, but it is also not diverting much tonnage from those to whom it does offer recycling, and much of the diversion that is occurring is not recycling.[43] In 2019, WMDSM only handled a total of 2,986 tons of single stream recyclables, non-tire metal recycling, and cardboard, including the recyclables collected at the Airport Transfer Station.[44] In other words, in 2019 WMDSM only collected about 1.5% as much weight in recyclables as compared to the weight of municipal solid waste it buried at Crossroads Facility. Such a small percentage is not moving Maine anywhere near the goal of recycling and composting 50% of municipal solid waste. Additionally, WMDSM's other programs are also very limited. WMDSM only provides battery, E-waste, tire reuse, and hazardous material drop off for 9 communities, once a year.

The License indicates that WMDSM "intends to develop a composting operation at the Crossroads Landfill Facility to serve nearby communities and commercial entities"[45] and that the composting program must be implemented before the commencement of operations in the Phase 14 Expansion.[46] While CLF supports the development of a composting facility, the License as drafted provides few, if any, details about this program. Moreover, the License contains no metrics for success, deadlines for milestones, diversion targets, or information on how WMDSM will separate compostable waste from waste destined for landfilling.[47] Essentially, the License contains nothing other than a promise that a facility will be built. It provides no real

[43] In 2019 WMDSM handled 62,179 tons of whole and shredded tires. While some (about 1,600 tons) of the components, like rims, were recycled, more than 56,000 tons were reclaimed for fuel, not recycled. 2019 Annual Report, Appendix B and C.
[44] 2019 Annual Report, Appendix B and C.
[45] Phase 14 Expansion License, p. 44.
[46] Phase 14 Expansion License, p. 90.
[47] Waste Management Disposal Services of Maine, Inc., Crossroads Facility, Phase 14 Secure Landfill, Determination of Public Benefit Application, July 3, 2018, p. 34.

accountability of any sort. This is inadequate and it will not ensure the diversion of materials to the maximum extent practical as required by 38 M.R.S.A. §2101.

For these reasons, CLF strongly objects to Findings 18 and 19 of the License, and based on the record, the Department could not have reasonably found that WMDSM will meet the requirements of Maine's Solid Waste Management Hierarchy, State Recycling Goals, and their implementing regulations. Therefore, CLF requests that the Board reverse this finding and deny the License. In the alternative, CLF requests that the Board modify the license to require:

(1) WMDSM to provide recycling and composting services to all 55 communities from which it currently accepts waste;
(2) WMDSM to expand its battery, E-waste, tire reuse, and hazardous material drop off program to increase the number of participating communities and increase the availability of these services;
(3) WMDSM to set specific targets for the composting facility;
(4) WMDSM to submit a plan detailing how it will collect and manage compostable waste;
(5) The Department to set a maximum fill rate for waste each year to preserve the life of the landfill for Maine generated waste; and,
(6) The Department to include enforcement mechanisms on the condition that WMDSM "prioritize disposal of Maine generated solid waste," such as capping the amount of out-of-state waste WMDSM can bury in Phase 14 per year or reserving a specific amount of capacity for Maine generated waste.

B. <u>CLF Objects to Finding 15 – That the Phase 14 Expansion Will Not Pose an Unreasonable Risk of Discharge to a Significant Groundwater Aquifer.</u>

The Department may not issue a license for a solid waste disposal facility when it finds that the proposed facility poses an unreasonable threat to the quality of a significant sand and gravel aquifer,[48] or poses an unreasonable risk of discharge to a significant ground water aquifer.[49] Based on the evidence provided, the Department cannot conclude that Phase 14 meets these standards.

[48] 38 M.R.S. § 1310-N(2-A).
[49] 38 M.R.S. § 1310-N(2-F)(E).

The Department relied on a Geological and Hydrological Assessment Report prepared by Golder Associates to reach its conclusion for Finding 15.[50] According to the that assessment, "there is no hydraulic connection between groundwater in the Phase 14 area and the significant sand and gravel aquifers because groundwater flow in all hydro-stratigraphic units in the Phase 14 area is primarily to the south-southwest" and "not toward the aquifers."[51] CLF contests this conclusion.

During the application process, the Department correctly questioned the placement of the location of the water monitoring wells, stating that because of the planned locations for the wells, WMDSM would fail to detect a release.[52] The Department requested additional sampling of bedrock wells.[53] In response to the Department's concerns, WMDSM conducted a groundwater pumping test to assess hydraulic conductivity and connectivity across various geologic strata. The pumping test was performed in July 2020 and documented in a Supplemental Geologic and Hydrogeologic report dated July 31, 2020. During the pumping test, a bedrock well was pumped at a continuous rate of 1 gallon per minute (gpm) for a period of 72 hours. Groundwater level elevations in wells screened in bedrock, till and clay were continuously monitored prior to, during and after the pumping test.

The results of the pumping test revealed hydraulic connection in each of the hydrogeologic units, bedrock, till and clay, to an estimated distance of at least 1,500 feet from the bedrock well.[54] This indicates a hydrogeologic regime that is deeply integrated and highly

[50] See, Phase 14 Expansion License, p. 39-40.
[51] See, Phase 14 Expansion License, p. 39.
[52] Maine Department of Environmental Protection Comments. (June 22, 2020). For Exhibits if needed. 17(b) and 29.
[53] *Id.* for Exhibit – point 29.
[54] Supplemental Geologic and Hydrogeologic Report, Crossroads Landfill, Norridgewock, Maine. Golder. July 31, 2020.

sensitive to small system changes. The impacts from the construction and operation of an almost 50-acre landfill on this delicate system were not adequately addressed or quantified by WMDSM.

Furthermore, Golder Associate's assessment of hydrology was completed in 2017 and 2019, with limited testing in 2020, all periods of significant recorded drought in Kennebec County, Maine. According to data from the U.S. Drought Monitor, produced by the National Drought Mitigation Center, National Oceanic and Atmospheric Association, and U.S. Department of Agriculture, Kennebec County experienced significant levels of drought between 2017 and 2021.[55] In 2017, Kennebec County experienced drought effects ranging from Moderate Drought to Severe Drought, to Exceptional Drought.[56] Periods of Abnormally Dry Weather and Moderate Drought continued throughout 2018 and 2019.[57] Conditions of Significant Drought returned in 2020.[58] Testing during such conditions would likely not provide an accurate understanding of the hydraulic connectivity below the proposed landfill during normal or high water table conditions.

Given the Department's previous concerns, the results of the July 2020 pumping tests, and the fact that all hydrologic testing was performed in periods of significant recorded drought, Finding 15 is unsupported by substantial evidence on the whole record, and/or arbitrary, capricious, or characterized by an abuse of discretion. As such, CLF requests that the Board reverse this finding and deny the License, as the Department cannot reasonably conclude that Phase 14 meets the requirements of 38 M.R.S. § 1310-N(2-A), and 38 M.R.S. § 1310-N(2-F)(E).

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[55] U.S. Drought Monitor, Historical Conditions for Kennebec County 2000 – Present. Available at https://www.drought.gov/states/maine/county/kennebec

[56] *Id.*

[57] *Id.*

[58] *Id.*

In the alternative, the Board should – at a minimum – require WMDSM to perform additional testing during non-drought conditions to better evaluate the impact Phase 14 will have on groundwater resources.

C. CLF Objects to Finding 26(A) – Liner System Requirements

WMDSM is proposing to design a single-composite liner system over an in-situ and prepared clay footprint.[59] The thickness of the clay layer ranges from 2 feet to 18 feet thick.[60] In an effort to create a "homogenous low-permeability layer," WMDSM is proposing to excavate, scarify, and recompact areas of the clay.[61] All landfill liners ultimately fail to contain hazardous leachate, therefore it was unreasonable for the Department to require only a single liner.[62]

In 1991, the United States Environmental Protection Agency promulgated regulations for landfilling municipal solid waste ("MSW") as part of the Resource Conservation Recovery Act ("RCRA"), Subtitle D. Originally Subtitle D required a single composite (plastic sheeting and compacted clay/geosynthetic) liner, but it was eventually amended by many states to require two liner systems for all new landfill cells. In fact, the Department is the only state agency in New England that would permit a single composite liner over a layer of clay for the development of a new landfill.[63]

[59] Phase 14 Expansion License, p. 14.
[60] Phase 14 Expansion License, p. 52.
[61] Phase 14 Expansion License, p. 62.
[62] *See,* U.S. Environmental Protection Agency, 1988, Federal Register, v. 53, no. 168, August 30, 1988, p. 33345, and Flawed Technology of Subtitle D Landfilling of Municipal Solid Waste, G. Fred Lee & Associates, p. 6. (Updated Jan. 2015).
[63] *State of Connecticut*, Title 22a Section 22a-209-14 (1) and (1)(C)(i) "The liner system shall be a dual synthetic liner system," https://eregulations.ct.gov/eRegsPortal/Browse/getDocument?guid={F0DC9F57-0100-C7B7-BF07-DE0E453778A8}; *Commonwealth of Massachusetts*, "Double composite liner" required at 310 CMR 19.110(4)(a) https://www.mass.gov/doc/310-cmr-19000-solid-waste-management-facility-regulations/download; *State of New Hampshire*, Chapter 800, 805.05 (b), where the number of liner systems required depends on the waste to be contained there, and Env-Sw 805.12 required that MSW landfills "shall be designed as double-lined facilities" as shall incinerator ash landfills (805.13), and landfills accepting "other solid waste types" (805.15). Construction and Demolition Debris landfills are only required to have a single liner system in New Hampshire,

A significant justification for only utilizing a single liner is the presence of compacted clay at the site of the new landfill. However, the use of compacted clay as a liner has not been shown to be effective in long-term prevention of landfill leachate leaks. A 2003 study evaluated the integrity of a geomembrane-compacted clay composite liner system to contain landfill leachate for 14 years.[64] Field observations of the geomembrane revealed many defects, including holes, patches, and cracks.[65] Physical, chemical, and mechanical tests conducted on samples collected from five different locations of the liner suggest that samples continuously exposed to sunlight or high temperatures experienced the greatest degradation.[66] Contaminant modeling of the liner suggests that the geomembrane liner most likely stopped being effective as a contaminant barrier to ionic species sometime between 0 and 4 years after the installation.[67]

While all landfills are dangerous, two liner systems on top of the clay layer would be more protective, and thus reasonable. In fact, at the Crossroads Facility itself, Phases 7, 9 (constructed 2001), 10 (constructed 1995), 11 (constructed 1998), and 12 (constructed 2002) are all double composite lined landfill cells.[68] Only the very old landfill cells, and the cells constructed on top of other lined cells, have single liner systems at Crossroads Facility.[69]

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https://www.des.nh.gov/organization/commissioner/legal/rules/documents/env-sw800.pdf; *State of Rhode Island*, "Double composite liner" required at 250-RICR-140-05-2 A.1. https://rules.sos.ri.gov/regulations/part/250-140-05-2; *State of Vermont*, Section 6-606 Disposal Facilities (b)(2)(E)"All liner systems installed after February 7, 1989 shall be of double liner construction."
https://dec.vermont.gov/sites/dec/files/wmp/SolidWaste/Documents/SWRule.final_.pdf

[64] Rowe, R. K.; Sangam, H. P. and Lake, C. B., "Evaluation of an HDPE Geomembrane after 14 Years as a Leachate Lagoon Liner," Can. J. Geotech./Rev. Can. Geotech. 40(3): 536-550 (2003)

[65] *Id.*

[66] *Id.*

[67] *Id.*

[68] Phase 14 Solid Waste Permit Application – Volume V of VI: Site Operations Manual, Section III Leachate Management Plan, p. 4-8. https://www.maine.gov/dep/ftp/projects/crossroads-phase14/application/Ph14%20SW%20PermitApp_Vol.%20V%20Operations%20Manual.pdf

[69] *Id.*

Additionally, Waste Management, the parent company of WMDSM, is currently in the process of expanding the Turnkey Landfill in Rochester, New Hampshire. In their application, Waste Management confirmed that the expansion of the Turnkey Landfill will utilize a dual liner system.[70] In fact, Waste Management decided to utilize a double-liner system to assure that solid waste management activities "are conducted in a manner protective of human health and the environment."[71] When approving the expansion of the Turnkey Landfill, the New Hampshire Department of Environmental Services found that the expansion "will not result in adverse impacts to the environment or natural resources of the State, public health or safety because the facility will be constructed with a double liner system to protect groundwater resources."[72] Additionally, Waste Management stated in its application for the Turnkey Expansion that the dual liner system "serves as a leak detection system."[73] Similar to the Crossroads Facility, the Turnkey Landfill accepts MSW and CDD. However, the Turnkey Landfill accepts much less special waste than the Crossroads Facility.

Moreover, the leak detection measures in the License are inadequate. As proposed, Phase 14 will lack any ongoing electrical leak detection system. The license only requires leak detection prior to Phase 14 becoming operational.[74] Once waste materials are placed in the landfill, there will be no leak detection system in place.

[70] Waste Management of New Hampshire – Standard Permit Expansion TLR-III South, Permit No. DES-SW-SP-95-001, p. 4, (June 11, 2018).
[71] *Id.* at 26.
[72] *Id.* at 28-29.
[73] Waste Management of New Hampshire, Standard Permit Application for Solid Waste Management Facility – Volume 1: Sections 1-VI, p. 247 (May 2017).
[74] Golder Associates, Response to September 9, 2020, MEDEP Comments Phase 14 Solid Waste Permit Application # S-010735-WD-YB-N, p. 2. (September 23, 2020). "WMDSM agrees to perform electric leak detection survey testing for each cell of the Phase 14 liner system. The testing will be performed in general accordance with ASTM D 7007 after construction of the liner and leachate collection system and before waste placement in each cell."

Throughout the application process, the Department expressed concern with the lack of adequate leak detection measures. In their February 14, 2020 comments on the application, the Department questioned the absence of a liner leak detection system and whether the project could meet the requirements of 06-096 C.M.R. 401 without this system.[75] On March 31, 2020, WMDSM responded by stating that the proposal meets the requirements even without a liner leakage detection system.[76] The Department found this response to be "inadequate" and stated that the current measures "can't guarantee rapid transport [of leachate] will not occur across an aquitard."[77] WMDSM responded to these comments by noting that it will continue to discuss this issue with the Department.[78] On September 23, 2020, WMDSM agreed to utilize a electric leak detection system to survey each cell prior to beginning waste disposal operations.[79]

While this is a step in the right direction, the Department should have required WMDSM to perform ongoing leak detection throughout operations of Phase 14. A variety of leak detection systems are available and in use by the industry to monitor the liners for leaks after the landfill is in operation. Systems using electro-chemical sensing units for liner leak detection and location are able to monitor the liner 24/7 and notify the operator of leaks immediately. The decision to only utilize a leak detection system prior to operations will not provide for continued protection of the surrounding environment. To protect against risk of groundwater contamination by leachate, a leak detection system needs to be active through the life of the landfill.

[75] Maine Department of Environmental Protection, Comments on WMDSM Crossroads Landfill Proposed Phase 14, Volume 1, p. 5. (February 14, 2020).
[76] Internal Memorandum from Kathleen E. Tarbuck to Linda J. Butler: Waste Management Disposal Services of Maine, Phase 14 Expansion Application, Volume IV Engineering Review, p. 1. (April 24, 2020).
[77] Maine Department of Environmental Protection, Follow-Up Comments on WMDSM Crossroads Landfill Proposed Phase 14, Volume 1, p. 5. (April 13, 2020).
[78] Geosyntec Consultants, Response to MEDEP Comments Phase 14 Solid Waste Permit Application, p. 1 (May 27, 2020.)
[79] Golder Associates, Response to September 9, 2020, MEDEP Comments Phase 14 Solid Waste Permit Application # S-010735-WD-YB-N, p. 2. (September 23, 2020).

Given WMDSM's own statements about the effectiveness of the double-liner system, and the well-established understanding that the all liner systems will eventually break down and discharge polluting leachate, the Department's decision to only require a single-composite liner system – as well as the decision to not require continued use of an electric leak detection system is unreasonable, and unsupported by substantial evidence on the whole record. As such the Board should reverse this finding and rule that WMDSM has failed to meet the engineering design requirements for a proposed landfill. In the alternative, the Board should require:

- WMDSM to utilize a double liner system for Phase 14 as it has in all other Landfills at the Crossroads Facility, and at its Turnkey Landfill in New Hampshire.
- WMDSM to utilize an electrical leak detection system throughout the entire life of Phase 14.

D. CLF Objects to Finding 11(D) – That the Emergency Action Plan and Fire Prevention Plan Procedures Proposed by WMDSM Are Adequate to Minimize the Risk of Fire as Required by State law and Rules.

Maine regulation 06-096 C.M.R. ch. 401, § 4(C)(15) requires that an operator take suitable measures for the prevention and control of fires at the facility site by complying with ***at least*** the following requirements: (a) arrange with a nearby fire department to provide emergency services when called, (b) provide sufficient on-site equipment for minor fires, (c) maintain a soil stockpile sufficient to suppress small fires; and (d) observe the current applicable fire safety rules of the Maine Forest Service.[80] This regulation sets the minimum requirements for fire prevention plans and procedures. However, given the frequency of previous fires at the Crossroads Facility, the Department should have required WMDSM to implement additional protective measures.

WMDSM experienced two fires at the Crossroads Landfill facility in the three years prior to the submission of the proposed Phase 14 application.[81] Two acres of the northeast corner of

[80] 06-096 C.M.R. ch. 401, § 4(C)(15). Emphasis added.
[81] Phase 14 Expansion License, p. 34.

the Crossroads landfill caught fire in the summer of 2018. According to local reports, construction and demolition debris chips used as cover on a portion of the Crossroads landfill spontaneously combusted, requiring response from multiple departments and State helicopters, resulting in the injury of several local firefighters, and a plume of toxic smoke from the smoldering landfill for weeks. In the summer of 2020, there was another fire at the Crossroads landfill, reportedly in the same section of the landfill where the 2018 fire happened. WMDSM did not notify neighbors of this fire. According to both the Department and WMDSM, both fires were ignited by hot embers contained within inadequately quenched biomass ash received at the facility.[82]

The only additional fire prevention measure required by the Department outside of the minimum standards set in 06-096 C.M.R. ch. 401, § 4(C)(15), is for the "establishment of a hot load area."[83] The License does not include any additionally requirements to prevent fire. This is unacceptable. Drenching a large load of hot ash derived from burning biomass does not guarantee that a fire will not occur, especially if it later comes in contact with dry chips and waste piles. Moreover, placing the hot load on a concrete pad does not guarantee that sparks and debris will not become airborne and potentially ignite a nearby waste pile.

Additionally, expansion of the gas piping, processing, and storage infrastructure also increases the risk of explosions if fire spreads, and ongoing underground fires may damage liners and pipelines. Moreover, the Fire Prevention Plan does not address the increased volume of materials that will come with an increase in landfill size, including hot loads of ash and combustible construction and demolition debris waste. Increased gas generation will also increase the chance of fires occurring within the landfill.

[82] *Id.*
[83] *Id.*

Landfill fires are especially dangerous as they can emit harmful fumes from the wide array of materials contained in the landfill. This includes carbon monoxide, hydrogen sulfide, and volatile organics.[84] Particulate matter in the smoke from landfill fires can also exacerbate respiratory and other health complications in those responding to the fire.[85] Prevention is critical to managing landfill fires, and steps need to be taken at the outset of any new development of the landfill to best protect against both surface fires and subsurface fires.

The lack of an effective Fire Prevention Plan constitutes a hazard to the health of the communities around the landfill and an increased risk of air contamination. Given the previous fires at the facility, the Department should have required WMDSM to provide additional protections, including but not limited to, temperature monitoring of piles, isolation of potential ignition sources from combustible materials, and staff trainings. Therefore, CLF urges the Board to reverse this finding, and rule that the Fire Prevention Plan as drafted fails to adequately minimize the risk of fire as required by state law and regulation.

E. CLF Objects to Finding 12 – That the Leachate Management Systems for the Proposed Phase 14 Expansion Will Not Unreasonably Affect Surface Water Quality.

WMDSM proposed to continue to contract for the transportation of leachate to off-site wastewater treatment plants ("WWTP").[86] WMDSM maintains contracts with Sappi North America for up to 400,000 gallons per day and the Anson-Madison Sanitary District for up to 56,000 gallons per day.[87] Both facilities discharge treated effluent directly into the Kennebec River.

[84] Racheal Zimlich, Prevention is Key in Managing Landfill Fires, Waste Dive. (September 15, 2015). Available at https://www.waste360.com/nuisances/prevention-key-managing-landfill-fires.
[85] *Id.*
[86] Phase 14 Expansion License, p. 35.
[87] *Id.*

WWTPs generally are not required or equipped to remove all types of leachate contaminants from wastewater prior to discharge into surface waters. Sewage treatment is primarily focused on reducing wastewater discharges of so-called conventional pollutants: oil, grease, organics like nitrogen and phosphorous, total suspended solids, and settleable matter. U.S. Environmental Protection Agency National Pollution Discharge Elimination System discharge permits for a municipal wastewater treatment facility do not require monitoring or set limits for the long list of contaminants in leachate—PFAS, PBDEs, and other chemicals of concern—that have been found to be highly toxic to humans and other species, and persistent in the environment. According to a U.S. Geological Survey study, many leachate contaminants are therefore present after leachate is processed by a municipal wastewater treatment plant.[88]

PFAS are a significant concern throughout Maine and in the Kennebec River. PFAS are group of more than 4,000 chemicals identified as emerging contaminants which have been found to be toxic to human and ecological health at very low part-per-trillion levels. The leachate from the Crossroads Landfill likely contains high levels of PFAS as MWDSM accepts WWTP sludge for landfilling at the Crossroads Facility. WWTP sludge has been identified as a leading contributor of PFAS into the environment. As there are no NPDES permitting criteria for PFAS from either landfill leachate or municipal WWTP effluent, PFAS-containing waste disposed of at the Crossroads Facility and released into its leachate will threaten the water quality of the Kennebec River – a river the State of Maine has spent nearly 50 years resuscitating – and pose significant threats to the people and ecosystems who rely upon it.

[88] J.R. Masoner, D. W. Kolpin, E. T. Furlong, I. M. Cozzarelli, I.M., & J. L. Gray, J.L., Landfill leachate as a mirror of today's disposable society: Pharmaceuticals and other contaminants of emerging concern in final leachate from landfills in the conterminous United States, 35 Environmental Toxicology and Chemistry 906-918 (2015).

According to the 2019-2020 SWAT report, elevated levels of PFOS, the most commonly detected PFAS, were found in fish downstream from both Sappi North American and the Anson-Madison Sanitary District. Additionally, PFOA were found in smallmouth bass at 28 ng/g in the Kennebec River at Waterville, which is also downstream from both points of discharge.

Leachate is currently not pretreated at the Crossroads Facility, nor did WMDSM or the Department discuss requiring pretreatment. However, Waste Management is required to pretreat leachate at the Turnkey Landfill in New Hampshire. Waste Management operates an on-site leachate treatment plan at the Turnkey facility.[89] This on-site facility includes biological and chemical treatment which occurs in a Sequencing Membrane Batch Reactor and physical treatment by reverse osmosis membrane separation process to remove inorganic and organic constituents.[90] At a minimum, the Department should have required WMDSM to pretreat leachate given the toxic nature of the waste it handles at the Crossroads Facility, and the likelihood of PFAS in the leachate.

V. Request for a Public Hearing

As part of its *de novo* review of the Department's Licensing decision, the Board is authorized to conduct a public hearing, and CLF requests that the board do so.[91] A hearing is warranted based on the significance of this project and the need for the public to be offered an opportunity to voice their concerns on the project. No public hearing was held after the draft license was published. However, there was clear public interest in the project, with 87 written

[89] Waste Management of New Hampshire – Standard Permit Expansion TLR-III South, Permit No. DES-SW-SP-95-001, p. 26, (June 11, 2018).
[90] Waste Management of New Hampshire – Facility Operating Plan: TRL-III Refuse Disposal Facility, p. 13 (May 2017).
[91] See, 06-096 CMR Ch. 2, § 7(B), and 06-096 CMR Ch. 2 § 24(B)(4).

comments being submitted in a little over a week before the close of the deadline.[92] A significant portion of these comments address the same concerns CLF is raising in this appeal. Namely, impacts to groundwater and surface water, concerns over the adequacy of the fire prevention plan, the lack of safeguards to ensure capacity for Maine generated waste, impacts to the Kennebec River, PFAS pollution, and the incompatibility of the proposal with Maine's solid waste management laws and goals.

Moreover, much of the licensing decision process, including the public hearing on the application, occurred during the time the State has been in a Civil Emergency as a result of the ongoing COVID-19 pandemic. Thus, members of the public had only a limited ability to meaningfully participate. The Public Hearing on this license was held on October 1, 2020, with no publicity, other than the required listing in the Public Notices section of one semi-local paper. To participate in the hearing, people were required to participate using Zoom with a video feed. If speakers did not have the bandwidth/technology to join the hearing via video in Zoom, the Town of Norridgewock offered the option that people could call in advance and get approved to come in to the (small) town office and participate using the town internet connection. Due to this lack of opportunity for meaningful public participation throughout the permitting process by those at risk of harm from the proposed landfill operations, a public hearing is needed.

Additionally, as the 2019-2020 SWAT Report was previously not publicly accessible but has a significant bearing on the Licensing decision, a public hearing would allow for additional public comment on the impacts WMDSM's proposed leachate management practices will have on the Kennebec River and wildlife.

[92] Phase 14 Expansion License, p. 12.

VI. Conclusion and Remedy Sought.

CLF strongly urges the Board to accept this appeal and perform a *de novo* review of the Department's Licensing decision. Additionally, we urge the Board to both supplement the record with the recent 2019-2020 SWAT Report and conduct a public hearing as part of this appeal. For the reasons stated above, CLF requests that the Board rule that the License as drafted is unlawful, unsupported by substantial evidence on the whole record, and/or arbitrary, capricious, or characterized by an abuse of discretion. The Board should reverse the Department's decision and find that Phase 14 cannot proceed under the License as drafted.

Alternatively, should the Board not reverse the Department's Licensing decision, CLF requests that the Board modify the License to require:

- WMDSM to provide recycling and composting services to all 55 communities from which it currently accepts waste;
- WMDSM to expand its battery, E-waste, tire reuse and hazardous material drop off program to increase the number of participating communities and increase the availability of the service;
- WMDSM to set specific and enforceable targets for the proposed composting facility;
- WMDSM to submit a plan detailing how it will collect and manage compostable waste;
- The Department to set a maximum fill rate for waste each year in order to preserve the life of the landfill for Maine generated waste;
- The Department to include enforcement mechanism on the condition that WMDSM "prioritize disposal of Maine generated solid waste," such as capping the amount of out-of-state waste WMDSM can bury in Phase 14 per year or reserving a specific amount of capacity for Maine generated waste;
- WMDSM to perform additional testing during non-drought conditions;
- WMDSM to develop a more robust Fire Prevention Plan;
- WMDSM to utilize a double liner system for Phase 14 as it has elsewhere at the Crossroads Facility, at its Turnkey Landfill in New Hampshire, and as would be required by all other New England state;
- WMDSM to utilize an electrical leak detection system for the entirety of Phase 14's operations; and
- WMDSM to pretreat leachate given the toxic nature of the waste it handles at the Crossroads Facility, and the likelihood of PFAS in the leachate.

Thank you for your time and consideration of this Appeal.

SIGANTURE PAGES

June 10, 2021

_____ _____

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SIGANTURE PAGES

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ATTACHMENT A

Exhibit List
CLF Appeal of Phase 14 License

1. Phase 14 Expansion License

2. 2019-2020 Surface Water Ambient Toxic Monitoring Program Final Report, Section 3.2: Fish Contaminants – PFAS in Fish

EXHIBIT 1

Waste Management Disposals Services of Maine, Inc., Crossroads Landfill Phase 14 Expansion - #S-010735-WD-YB-N (Approval With Conditions).

Summary:

This is the final license issued by the Department on May 11, 2021. This evidence is already in the administrative record.

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
17 STATE HOUSE STATION AUGUSTA, MAINE 04333-0017

DEPARTMENT ORDER

IN THE MATTER OF

WASTE MANAGEMENT DISPOSAL	)	MAINE HAZARDOUS
SERVICES OF MAINE, INC.	)	WASTE, SEPTAGE AND
CROSSROADS LANDFILL	)	SOLID WASTE
PHASE 14 EXPANSION	)	MANAGEMENT ACT
NORRIDGEWOCK	)	
SOMERSET COUNTY, MAINE	)	
#S-010735-WD-YB-N	)	
(APPROVAL WITH CONDITIONS)	)	NEW LICENSE

TABLE OF CONTENTS

WASTE MANAGEMENT DISPOSAL	2	MAINE HAZARDOUS
SERVICES OF MAINE, INC.	)	WASTE, SEPTAGE AND
CROSSROADS LANDFILL	)	SOLID WASTE
PHASE 14 EXPANSION	)	MANAGEMENT ACT
NORRIDGEWOCK	)	
SOMERSET COUNTY, MAINE	)	
#S-010735-WD-YB-N	)	
(APPROVAL WITH CONDITIONS)	)	NEW LICENSE

The numerical locations listed above refer to the specified Finding in the Findings of Fact narrative portion of the license. Conclusions and Conditions are listed separately at the end of the license.

WASTE MANAGEMENT DISPOSAL	3	MAINE HAZARDOUS
SERVICES OF MAINE, INC.	)	WASTE, SEPTAGE AND
CROSSROADS LANDFILL	)	SOLID WASTE
PHASE 14 EXPANSION	)	MANAGEMENT ACT
NORRIDGEWOCK	)	
SOMERSET COUNTY, MAINE	)	
#S-010735-WD-YB-N	)	
(APPROVAL WITH CONDITIONS)	)	NEW LICENSE

Pursuant to the provisions of the *Maine Hazardous Waste, Septage and Solid Waste Management Act*, 38 Maine Revised Statutes (M.R.S.) §§ 1301 to 1319-Y; *Solid Waste Management Hierarchy*, 38 M.R.S. § 2101; the *Rule Concerning the Processing of Applications and Other Administrative Matters*, 06-096 Code of Maine Rules (C.M.R.) ch. 2 (last amended June 9, 2018); and the *Solid Waste Management Rules: General Provisions*, 06-096 C.M.R. ch. 400 (as amended April 6, 2015), *Landfill Siting, Design and Operation,* 06-096 C.M.R. ch. 401 (last amended April 12, 2015), and *Water Quality Monitoring, Leachate Monitoring, and Waste Characterization*, 06-096 C.M.R. ch. 405 (last amended April 12, 2015) (collectively, the Rules), the Department has considered the application of WASTE MANAGEMENT DISPOSAL SERVICES OF MAINE, Inc. - CROSSROADS LANDFILL ("WMDSM"), with all supportive data, agency review comments, and other related materials on file, and FINDS THE FOLLOWING FACTS:

APPLICATION OVERVIEW AND PROCEDURAL HISTORY

1. APPLICATION SUMMARY

A. Application

WMDSM has applied for approval to construct a 7.75-million cubic yard expansion at the site of the existing WMDSM landfill, located in Norridgewock, Maine.

B. History

WMDSM owns and operates a commercial non-hazardous solid waste landfill known as the Crossroads Landfill. Several landfill phases have been developed over time on the same site (a composite of several parcels of land purchased at differing times). Licensing actions relevant to this approval include:

(1) Board of Environmental Protection ("Board") Order #L-010735-07-A-N, dated July 24, 1985 and issued to then owner/operator Consolidated Waste Services ("CWS"), approved the construction and operation of the first secure landfill for the disposal of special wastes (Phases 1 through 6) and a leachate storage pond. These phases were closed in accordance with Department License #S-010735-WN-IK-N, dated July 26, 1995.

(2) Waste Management, Inc. ("WMI"), the parent company of WMDSM, purchased all properties and assets of CWS and received approval for the transfer of all licenses on October 10, 1990 (Board Order #S-010735-WR-EB-T).

(3) On July 22, 1992, WMDSM received approval for the construction and operation of another secure special waste landfill, Phase 7 (Board Order #S-010735-07-P-N). Phase 7 was closed in accordance with Department License #S-010735-WN-QH-N, dated April 14, 1997).

(4) A Leachate Storage Tank facility was licensed on May 5, 1993 (Department License #S-010735-WH-HU-N) to replace the leachate holding pond. Operation of the Leachate Storage Tank facility began on April 1994 and the leachate holding pond was subsequently decommissioned.

(5) On May 10, 1995, WMDSM received approval (Board Order #S-010735-WD-IF-N) for the construction and operation of another secure special waste landfill, Phase 10, a horizontal expansion adjacent to Phases 1 through 6. This expansion was closed in accordance with Department License #S-010735-WN-XT-N, dated May 9, 2016.

(6) On October 16, 1997, WMDSM received approval for the construction and operation of another secure special waste landfill, Phases 9, 11 and 12 (Department License #S-010735-WD-OK-N). Final closure of the northern portion of Phase 9 was approved in Department License #S-010735-WD-XS-C, dated April 10, 2015. Phases 11 and 12 were closed in accordance with Department Licenses #S-010735-WN-XW-N, dated May 3, 2018 and #S-010735-WN-XT-N, dated May 9, 2016 respectively.

(7) On March 29, 2001, the Department issued a Public Benefit Determination (Department License #S-010735-W5-UP-N) concluding that the development of the proposed Phase 8 secure landfill would provide a substantial public benefit provided WMDSM addressed in-state capacity needs as its highest priority.

(8) Board Order #S-010735-WD-UW-N, dated August 31, 2002, approved the construction and operation of Phase 8. Phase 8 is divided into operational sub-units referenced as 8A, 8B, 8C' and 8C". Portions of Phase 8 overlay the Phases 1 through 6, 7 and 9 landfills. Phases 1 through 6 have an overfill liner system separating the Phase 8 waste from the Phases 1 through 6 waste, whereas the Phase 8 liner system ties into the Phases 7 and 9 liner systems. Collectively, these areas are referred to as the Phase 8 landfill. WMDSM is currently filling in this Phase.

(9) On December 21, 2018, the Department issued a Public Benefit Determination (Department License #S-010735-W5-XY-N) for a proposed expansion (Phase 14) at the Crossroads Landfill.

C. Terms and Acronyms

The following terms and acronyms can be found in this license and are listed in Table 1 for ease of reference:

Table 1: License Terms and Acronyms

ADC	Alternate Daily Cover
ACOE	United States Army Corps of Engineers
Applicant (WMDSM)	Refers to Waste Management Disposal Services of Maine, Inc.
Board	Board of Environmental Protection
CDD	Construction and Demolition Debris
C.M.R.	Code of Maine Rules
CLF	Conservation Law Foundation
dBA	Decibels Adjusted for Frequency Extremes
Department	Maine Department of Environmental Protection
GCL	Geosynthetic Clay Liner
HDPE	High-Density Polyethylene
MDIFW	Maine Department of Inland Fisheries and Wildlife
MDOT	Maine Department of Transportation
MNAP	Maine Natural Areas Program, Department of Agriculture, Conservation and Forestry
M.R.S.	Maine Revised Statutes
MSE	Mechanically Stabilized Earth
MSW	Municipal Solid Waste
NAVD88	North American Vertical Datum of 1988
NRPA	Natural Resource Protection Act
PBD	Public Benefit Determination License
PIR	Preliminary Information Report
Rules	The Department's Solid Waste Management Rules, including 06-096 C.M.R. chs. 400, 401, and 405
State Plan	Maine Materials Management Plan: 2014 State Waste Management and Recycling Plan Update [1] & 2016 Waste Generation and Disposal Capacity Report, January 2018, prepared by the Maine Department of Environmental Protection

[1] The 2014 Maine Materials Management Plan is being referenced as this plan was the most current at the time of the Department's decision on the Public Benefit Determination License #S-010735-W5-XY-N. The 2019 Maine Materials Management Plan has since been published.

WASTE MANAGEMENT DISPOSAL	6	MAINE HAZARDOUS
SERVICES OF MAINE, INC.	)	WASTE, SEPTAGE AND
CROSSROADS LANDFILL	)	SOLID WASTE
PHASE 14 EXPANSION	)	MANAGEMENT ACT
NORRIDGEWOCK	)	
SOMERSET COUNTY, MAINE	)	
#S-010735-WD-YB-N	)	
(APPROVAL WITH CONDITIONS)	)	NEW LICENSE

D. Summary of Proposal

The application is for the construction and operation of a 7.75 million cubic yard expansion on 48.6 acres at WMDSM's Crossroads Landfill site. The proposed expansion, designated as Phase 14, would extend the life of the landfill by approximately 17 years.

The proposed Phase 14 expansion design consists of various engineered systems for the construction and operation of the landfill including a perimeter mechanically stabilized earth ("MSE") berm. Landfill gas will be conveyed to the on-site landfill gas-to-energy facility or combusted by two on-site flares as necessary. The leachate from the expansion will be treated off-site, as is the current practice.

The requested wastes to be placed in the proposed Phase 14 expansion are similar to the accepted wastes currently allowed in the existing Phase 8 landfill. The proposed wastes include only non-hazardous waste, consisting primarily of the following: (a) special wastes generated by sources other than household and typical commercial establishments that exist in such an usual quantity or in such a chemical or physical state, or any combination thereof, that may disrupt or impair effective waste management or threaten the public health, safety or the environment and requires special handling, transportation, and disposal procedures (i.e., ash, sludge, contaminated soils, asbestos containing wastes); (b) alternate daily cover ("ADC") including approved special waste streams and chipped utility poles; (c) municipal solid waste sourced from households and commercial businesses ("MSW"); and (d) construction and demolition debris ("CDD").

The application was subject to review under regulations of the Natural Resources Protection Act ("NRPA"), United States Army Corps of Engineers ("ACOE"), and Maine Department of Inland Fisheries and Wildlife ("MDIFW") for proposed wetland and significant wildlife impacts and by the Maine Natural Areas Program ("MNAP") within the Maine Department of Agriculture, Conservation and Forestry for review of potential for any rare and endangered plant species impacts.

The solid waste application was accepted as complete for processing on November 18, 2019. The Department commented on various aspects of the application and received subsequent responses from the applicant. These include, but are not limited to, the following: Department comments dated February 14, 2020, April 13, 2020, April 15, 2020, June 22, 2020, August 10, 2020 and September 9, 2020, and the applicant's response to comments dated March 31, 2020, May 27, 2020, May 29, 2020, June 1, 2020, August 20, 2020, September 23, 2020 and September 29,

2020. The applicant also submitted a pumping test work plan, dated May 29, 2020 and revised June 4, 2020, and a Supplemental Geologic and Hydrogeologic Report, dated July 31, 2020.

2. PUBLIC PARTICIPATION

A. Pre-Application Requirements

(1) Preliminary Information Report

A Preliminary Information Report ("PIR") is required by 06-096 C.M.R. ch. 401, § 1(E). The PIR, prepared by Geosyntec Consultants, was submitted to the Department on July 2, 2018 for the proposed Phase 14 expansion. Through the submission of the PIR, an applicant must demonstrate that none of the prohibitive licensing criteria of 06-096 C.M.R. ch. 400, § 1(C)(2) would prohibit development and preliminarily identify restrictive siting criteria of 06-096 C.M.R. ch. 400, § 1(C)(3), for which a variance may be necessary. As a part of its review process, the Department provided two memoranda to WMDSM containing review comments and requesting additional information, dated January 29, 2017 and February 26, 2018. WMDSM submitted a revised PIR, dated December 2017, together with a supplemental workplan, entitled *Workplan for Additional Geologic and Hydrogeologic Investigation*, dated February 20, 2018 as revised. The Department evaluated the information resulting from the additional hydrogeologic investigation proposed in the Workplan to determine if those restrictive siting criteria identified for further analysis had been met, or whether variances must be sought by WMDSM in the license application.

(2) Determination of Environmental Feasibility

The Department issued a letter addressing the PIR on March 12, 2018, stating that the proposed Phase 14 expansion was conditionally environmentally feasible and that the siting criteria of 06-096 C.M.R. ch. 401, § 1(C)(2) did not prohibit the proposed expansion.

(3) Public Benefit Determination

Prior to submitting an application to the Department under 38 M.R.S. § 1310-N for a license for a new or expanded solid waste disposal facility, an applicant must apply to the Commissioner for a determination of whether

the proposed facility provides a substantial public benefit. New or expanded solid waste disposal facilities may not be licensed by the Department unless the requirements of 38 M.R.S. § 1310-AA are met by the applicant, whereupon the Department makes a positive determination of substantial public benefit. The Department issued a public benefit approval with conditions, #S-010735-W5-XY-N on December 21, 2018. Pursuant to 38 M.R.S. 1310-N(3-A)(B), the Commissioner's decision is not subject to review by the Department or Board as part of the facility licensing process. However, a public benefit determination may be revised by the Department in accordance with 06-096 C.M.R. ch. 400, § 5(H) "if the Department finds that a material change in the underlying facts or circumstances upon which a public benefit determination was based has occurred or is proposed, including, but not limited to a change related to disposal capacity or a change of the owner or operator of a facility." See Finding 20 of this license for more detail on the public benefit determination decision.

(4) Pre-Application and Pre-Submission Meetings

The Department's rule at 06-096 C.M.R. ch. 2, § 10 includes requirements for pre-application and pre-submission meetings. A pre-application meeting occurred on February 21, 2019 with the Department, WMDSM and its technical consultants including Normandeau Associates, Golder Associates, and Geosyntec Consultants. The technical consultants are further described in Finding 7 of this license. A natural resources site walk occurred on June 25, 2019 with the Department, WMDSM, ACOE, and Normandeau Associates in attendance.

A pre-submission meeting occurred on August 15, 2019 with the Department, WMDSM, Golder, and Geosyntec Consultants in attendance. A second pre-submission meeting occurred on September 25, 2019 with the Department, MDIFW, WMDSM, Normandeau Associates, and Geosyntec Consultants in attendance.

B. Public Informational Meeting

A public informational meeting was held by WMDSM in the evening of September 19, 2019 in the Town of Norridgewock, as required by 06-096 C.M.R. ch. 2, § 13. WMDSM mailed notice of the public informational meeting to the abutters and the Norridgewock municipal office. The notice was published in the Morning Sentinel on September 7, 2019. WMDSM and its technical consultants presented

information on general topic areas including landfill design, hydrogeology, natural resources and facility operations and responded to questions from the public about ground water, liner design, water quality, leachate control and treatment, composting, wetland mitigation and odor control. The Department's fact sheet explaining public participation in the licensing process was made available to attendees. Fourteen members of the public attended the meeting.

C. Notice of Intent to File

A Notice of Intent to File an application was published in the Morning Sentinel on September 7, 2019 and again on October 16, 2019 in addition to being mailed to abutters, and the Town of Norridgewock municipal office. The published notice and mailing of the notice fulfilled the public and local participation requirements of 38 M.R.S. § 1310-S(1), and the public notice requirements of 06-096 C.M.R. ch. 2, § 14.

D. Public Hearing Requests

The Department received three timely requests in December 2019 for a public hearing. State law at 38 M.R.S. § 1310-S(2) stipulates that the Department shall hold an adjudicatory public hearing on an application for a new or expanded commercial or state-owned solid waste disposal facility that accepts special waste upon request from a resident or a property owner in the municipality in which the proposed facility is located. The Commissioner designated Ms. Susanne Miller, an employee of the Department, as the Presiding Officer for the purpose of carrying out a public hearing on the application.

E. Petitions to Intervene

Intervenor status was requested by the Town of Norridgewock on August 21, 2019. State law at 38 M.R.S. § 1310-S(3) provides municipal intervenor status, if requested, for the municipality in which the facility would be located. The Town of Norridgewock participated as an intervenor in the licensing proceeding.

A *Notice of Opportunity to Intervene* was published in the Kennebec Journal and Morning Sentinel on March 2, 2020, stating a deadline of March 16, 2020 for "a person who is or may be substantially and directly affected by the proposed project, or that the petitioner is an agency of federal, state or local government" to request intervenor status. No petitions for intervenor status were received from interested persons.

F. Public Hearing Process

The adjudicatory public hearing was conducted in accordance with the requirements of the *Maine Administrative Procedure Act*, 5 M.R.S. §§ 9051 to 9064 and the *Rules Governing the Conduct of Licensing Hearings*, 06-096 C.M.R. ch. 3 (last amended February 16, 2015).

G. Procedural Orders

The Department issued three Procedural Orders prior to the public hearing and one Procedural Order following the public hearing:

(1) The First Procedural Order, issued on April 24, 2020, addressed the designation of intervenors as described in Finding 2(E) of this license.

(2) The Second Procedural Order, issued June 9, 2020, documented the pre-hearing conference held virtually on May 28, 2020. The pre-hearing conference included a review of the procedural rules in preparation for, and during, the hearing; the roles and responsibilities of WMDSM, intervenors, and Department staff; and the relevant licensing criteria, which was distributed to all interested parties on May 21, 2020. The Second Procedural Order also established dates and times for submission of pre-filed exhibits and the hearing.

(3) The Third Procedural Order, issued August 24, 2020, documented the decisions with respect to matters discussed at the second pre-hearing conference held virtually on August 21, 2020. Parties discussed preferences for a virtual hearing and how best to make the hearing accessible to the public and allow for public participation. The Department designated a staff person to coordinate the hearing. The Town of Norridgewock agreed to prepare a space for members of the public to present testimony. A schedule to provide notice of the hearing to the public was established.

(4) The evidentiary record was re-opened by a Fourth Procedural Order, dated October 26, 2020, subsequent to the hearing. This was done in response to an October 21, 2020 motion by WMDSM's counsel to reopen the proceeding record for the limited purpose of allowing the applicant to respond to post-hearing comments filed by Conservation Law Foundation ("CLF") on October 13, 2020 just prior to closing of the comment period.

WASTE MANAGEMENT DISPOSAL	11	MAINE HAZARDOUS
SERVICES OF MAINE, INC.	)	WASTE, SEPTAGE AND
CROSSROADS LANDFILL	)	SOLID WASTE
PHASE 14 EXPANSION	)	MANAGEMENT ACT
NORRIDGEWOCK	)	
SOMERSET COUNTY, MAINE	)	
#S-010735-WD-YB-N	)	
(APPROVAL WITH CONDITIONS)	)	NEW LICENSE

H. Public Hearing

The Department held a virtual public hearing on the proposed Phase 14 expansion application on October 1, 2020 beginning at 1:00 pm pursuant to 5 M.R.S §§ 9051 to 9064; *Public and Local Participation,* 38 M.R.S. § 1310-S; and 06-096 C.M.R. ch. 3. Notice of the public hearing was published in the Kennebec Journal and Morning Sentinel on September 1, 2020; mailed to abutters, intervenors, the Town of Norridgewock municipal office, legislators of the geographic area affected by the proposed licensing matter and interested persons on September 1, 2020; posted on the Department's website on August 31, 2020; and sent by electronic mail to subscribers of the Department's electronic delivery service on August 31, 2020. At the hearing, the witnesses for the parties summarized their pre-filed exhibits, presented testimony on the topic areas, and were subject to cross-examination by the other parties and questioning by Department staff, the Department's counsel and the Presiding Officer.

The Department also held an evening session on October 1, 2020 beginning at 6:00 pm to receive testimony from members of the general public. The Town of Norridgewock provided space for members of the public, who did not have the capability to join the meeting virtually, to testify. Thirteen persons testified during the evening session. Prior to the close of the evidentiary record, the Department received 35 written comments from the general public. The testimony and written comments by the general public included opposition to, and support for, the proposed Phase 14 expansion.

Issues addressed during testimony, and post-hearing briefs included, but were not limited to, ground water aquifer protection, visibility of the landfill, noise, odors, landfill operations and solid waste management and recycling.

Issues raised in testimony by the general public in opposition to the project were relevant to both the license application and the Department's Pubic Benefit Determination Process as discussed in Finding 20 of this license, for which a decision was issued by the Department on December 21, 2018. As noted above in Finding 2(A)(3) of this license, the Commissioner's decision is not subject to review by the Department or Board as part of the facility licensing process pursuant to 38 M.R.S. 1310-N(3-A)(B). Relevant to the topics of the hearing, concerns were raised about the level of treatment provided by the facilities that process the landfill leachate at their off-site locations, potential impacts to regional water quality and wetlands on-site, and landfill fires impacting air quality. Comments were also

offered regarding potential visibility of landfill operations, odor, noise and recycling.

Issues raised in testimony by the general public in support of the project were presented by organizations representing a total of 115 municipalities, businesses, environmental and sportsmen's alliances, and one State agency representative, all of whom supported the project for stabilizing waste management options regionally and statewide, and for supporting the efforts of communities and alliances to keep Maine's environment clean.

The hearing transcript and hearing documents are included in the record on file. Additional discussion of testimony and other comments received during the processing of the application are addressed in the findings of fact of this license, as appropriate.

Post-hearing comments were filed prior to the close of the initial public comment period on October 13, 2020. Subsequently, the record was reopened for limited response to November 5, 2020 through the Fourth Procedural Order, allowing the applicant and the parties to respond to a specific set of post-hearing comments and to allow the Department to seek clarification from WMDSM on issues raised during the hearing and in post-hearing comments.

I. Draft License Comment Period

A draft license was made available for comment on April 23, 2021 through notification to WMDSM, intervenors, and interested persons. The draft license was posted on the Department's website with an initial 5 working day comment period closing on April 30, 2021. The deadline for receipt of comments was extended to May 4, 2021 based on several requests. A total of 87 written comments were received on the draft license prior to the deadline of May 4, 2021. All of the comments were reviewed and given consideration in relation to the relevant statutory and regulatory review criteria.

Issues raised by the commentors included, but were not limited to, lack of testing the leachate for PFAS; lack of an adequate fire prevention plan; risks to ground and surface water quality; the lack of public benefit; impacts to wetlands; receipt of out-of-state waste; medical waste; air pollution; inadequate liner and leak detection systems; and lack of clear metrics for the proposed compost facility. Based on comments received, minor clarifications and revisions were made to the draft license that address the relevant review criteria and issues raised within the purview

of the Department's authority. The revisions include, but are not limited to, general clarification language; a requirement to notify the community of the odor complaint response procedure; clarification about where visual berms will be installed; a definition of unacceptable waste; language stating that the proposed liner system design meets the requirements of the rules; clarification of parameters required for leachate characterization; and clarification that land clearing and soil stockpile removal can occur with Department approval through a letter prior to review and approval of the detailed construction contract bid documents. The Department received several comments on the draft license decision pertaining to the lack of public benefit to the State of Maine. As noted in Finding 20 of this license, a public benefit approval with conditions was already issued on December 21, 2018. Additional comments were received noting that WMDSM should be prohibited from taking out-of-state waste. The Department notes that WMDSM is a commercial landfill facility as defined by 38 M.R.S. § 1303-C and is allowed to take non-hazardous out-of-state waste without restriction; however, as noted in Finding 20 of this license, WMDSM has committed to prioritizing for disposal Maine generated solid waste. Lastly, the Department expects to require testing of landfill leachate for PFAS statewide and will be addressing this through revisions to facility Environmental Monitoring Programs.

All comments received by the Department are part of the record and were posted on the Department's website.

3. PROJECT DESCRIPTION AND SITE DESIGN

The proposed 7.75 million cubic yard expansion of the existing Crossroads Landfill will occupy a footprint of 48.6 acres and be located within the 721-acre site in Norridgewock. Five cells, Phases 14A through 14E, are proposed to be constructed and filled over a period of approximately 17 years, in a phased manner. The construction is projected to begin in 2021 with Phase 14A and is proposed to begin receiving waste in the fall of 2023. Phase 14 will utilize existing on-site infrastructure, with additional stormwater control structures and the landfill perimeter berm that, as proposed, will immediately surround the proposed landfill expansion. The proposed peak elevation as measured relative to the North American Vertical Datum of 1988 ("NAVD88") of Phase 14 is 470 feet which is approximately 150 to 250 feet above surrounding terrain depending upon approach. This compares to the existing closed landfills Phase 9 at 316 feet, Phase 11 at 338 feet, and Phase 12 at 310 feet. The proposed Phase 14 expansion sideslopes are designed at 3 horizontal to 1 vertical ("H:V").

The proposed Phase 14 expansion design includes a base liner system over an in-situ and prepared clay footprint, leachate collection and off-site leachate treatment, landfill gas collection and control infrastructure including flares and a gas-to-energy facility, stormwater management, a water quality monitoring network, and access road. Similar types of non-hazardous waste generated largely within the State, as currently placed in existing landfill cells, are proposed for disposal in the proposed Phase 14 expansion, including special wastes, ADC, CDD, and MSW.

The application for the proposed Phase 14 expansion includes the permanent impact of 10.273 acres of freshwater wetlands, none of which are considered wetlands of special significance. A total of 0.005 acres of freshwater wetlands are proposed to be temporarily impacted due to the proposed installation of an underground stormwater conveyance pipe through a narrow portion of the wetlands. Additionally, 0.004 acres of intermittent stream are proposed to be permanently impacted due to the proposed installation of a culvert under the access road. A combined license, #L-18323-TG-K-N and #L-18323-L6-L-N, dated September 25, 2020, was issued by the Department's Bureau of Land Resources approving the impacts and mitigation of these impacts.

GENERAL SOLID WASTE PROVISIONS

4. HOST COMMUNITY AGREEMENTS AND MUNICIPAL INTERVENOR GRANTS

A. Host Community Agreement

State law at 38 M.R.S. § 1310-N and the Department's rule at 06-096 C.M.R. ch. 400, § 7(A)(1) requires that host community agreements be in place with all applicable communities prior to issuing a license to a commercial solid waste disposal facility. A copy of the host community agreement with the Town of Norridgewock was submitted with the application (Volume I of the application, Appendix 18A). The agreement was executed on October 16, 2019.

B. Municipal Intervenor Grants

The Department's rule at 06-096 C.M.R. ch. 400, § 7(B) establishes procedures for the use of funds by a municipality that has requested intervenor status, pursuant to 38 M.R.S. § 1310-S(4), for an expanded solid waste disposal facility proposed to be located in that municipality. A municipal intervenor may request financial assistance to pay for direct expenses associated with its substantive participation in the application review process.

The Town of Norridgewock requested, and was automatically granted, intervenor status on August 21, 2019. The Town of Norridgewock meets the eligibility requirements to receive financial grants to support participation in the licensing process. A grant not to exceed $50,000 was made available to the Town of Norridgewock for assistance during its participation in the licensing process.

5. TITLE, RIGHT OR INTEREST

WMDSM must demonstrate adequate title, right, or interest in all of the property which is proposed for development or use pursuant to 06-096 C.M.R. ch. 400, § 4(A). WMDSM has provided evidence of title to the property pursuant to the Rules by submitting a copy of warranty deeds to the collective parcels of land, totaling 721-acres on which the proposed Phase 14 expansion will be located. The deeds for the parcels are recorded in Book 1116, Pages 71 through 74; Book 1116, Page 79; Book 1206, Pages 266 through 268; Book 1511, Page 89; Book 1581, Pages 215 through 217; Book 5174, Pages 341 through 344; and Book 5398, Pages 244 through 245 at the Somerset County Registry of Deeds.

Pursuant to 38 M.R.S. § 1310-X(3), the Department may license an expansion of a commercial solid waste disposal facility after September 30, 1989, in part, if the Department determines that the proposed expansion is contiguous with the existing facility and is located on property owned by the licensee. In a March 14, 2017 letter to WMDSM's attorney, the Department concluded that the parcels of land proposed for development are contiguous to the existing facility and that there is no requirement that a new landfill disposal unit be physically connected to or touching an existing landfill disposal unit.

The Department finds that WMDSM has demonstrated adequate title, right, or interest in the property proposed for the Phase 14 expansion.

6. FINANCIAL ABILITY AND FINANCIAL ASSURANCE

State law at 38 M.R.S. § 1310-N(2-F)(A), Siting Standards, requires that WMDSM have the financial ability to develop the project in a manner consistent with state environmental standards and the provisions of the statute. State law at 38 M.R.S. § 1310-Y, Financial Assurance, requires WMDSM to provide assurance of its financial ability to satisfy the estimated costs for corrective action and assurance of financial capacity to satisfy the estimated costs of closure and post-closure care and maintenance at the facility for a period of at least 30 years after closure. The Department's rules at 06-096 C.M.R. ch. 400, § 4(B)(1) and § 11 require financial ability and financial assurance adequate to ensure that funds are available to pay for the anticipated costs of the design, construction, operation, maintenance, closure and post-closure care (including post-closure maintenance,

monitoring, and necessary corrective action) of a proposed solid waste facility. WMDSM maintains financial assurance as required and as described below.

A. Financial Ability: Design, Construct, Operate, Maintain, Close, and Post-Closure Care

WMDSM is an indirect subsidiary of Waste Management Inc. ("WM") and the owner and operator of the Crossroads Landfill facility. Submitted with the application, was WM's most recent annual report filed with the U.S. Securities and Exchange Commission as of December 31, 2018 (Volume I of the application, Appendix 3A). Permitting, design, construction, operation, and closure of the Crossroads Landfill facility and the proposed Phase 14 expansion are funded by WM. WMDSM represented that the annual report demonstrates the ability of WMDSM and its ultimate parent company, WM, to fund the proposed Phase 14 expansion of the Crossroad's Landfill.

Table 2 includes the estimate of proposed Phase 14 expansion costs submitted by WMDSM (Volume I of the application, page 4, revised in a March 31, 2020 Applicant Response to Department Comments, page 2). The application included a total estimated cost of the proposed Phase 14 expansion project of $80,500,000.

Table 2: Estimate of Phase 14 Expansion Costs

Activity	Estimated Cost ($)
Design and Permitting	5,300,000
Construction	23,000,000
Operations and Closure	41,600,000
Post-Closure Care	10,600,000

Notes:
1. All estimated costs are in 2019 dollars.
2. The estimated cost per acre for the proposed Phase 14 expansion is $1.66 million.
3. Post-closure care includes costs to conduct environmental monitoring, maintain control systems and provide reporting for a 30-year post-closure period in 2019 dollars.

The Department finds, based on the annual report filed with the U.S. Securities and Exchange Commission, that financial ability is maintained by WMDSM as the owner and operator of the Crossroads Landfill to design, operate, maintain, close, and accomplish post-closure care in a manner consistent with applicable State law and Rule requirements.

B. Financial Assurance

WMDSM maintains a surety bond as financial assurance for final closure costs and post-closure care costs for the entire developed site for a 30-year period. WMDSM will update its surety bond prior to construction of each phase of the proposed Phase 14 expansion. The closure and post-closure care cost estimates are updated yearly. Costs are estimated by an independent third party and the documentation of any changes made to the surety bond is submitted as part of the facility's Annual Report. As part of the application, WMDSM submitted updated surety bond documentation to the Department in a January 21, 2020 letter with attachments.

The Department finds that adequate financial assurance is maintained by WMDSM as the owner and operator of the Crossroads Landfill for closure and post-closure care provided that WMDSM reviews and submits updates to its financial assurance to the Department annually in accordance with the Rules including costs for any new Phase 14 cells to be constructed and operated during that year, either by incorporation in the annual financial assurance submittal or as a separate financial assurance update provided prior to waste placement in any new Phase 14 cell.

7. TECHNICAL ABILITY

WMDSM must have the technical ability to develop the project in a manner consistent with State environmental standards in accordance with the 38 M.R.S. § 1310-N (2-F)(A), Siting Standards, and must submit evidence that affirmatively demonstrates the technical ability to design, construct, operate, maintain, close, and accomplish post-closure care, as well as meeting civil or criminal record standards as stated in 06-096 C.M.R. ch. 400, § 4(C)(1).

A. Technical Experience

(1) WMDSM is certified by the Maine Secretary of State as a duly organized business corporation in good standing, with a date of incorporation of December 22, 1983. WMDSM purchased the Crossroads Landfill site in 1990 and has operated the facility since that time. WMDSM employs qualified management and staff at the facility, along with utilizing qualified consultants for design, construction, operations, maintenance, closure and post-closure. The application includes descriptions and responsibilities of key personnel, along with their resumes (Volume I of the application, Appendices 4A through 4E). WMDSM's parent company, WM, is also available to provide technical expertise in solid waste management, recycling, and resource management. WM operates the largest network of

solid waste landfills in North America and manages the disposal of nearly 100 million tons of waste annually (Volume I of the application, page 5).

(2) The specific consultants retained for the proposed expansion include:

a. Geosyntec Consultants, Inc. of Acton, Massachusetts as the primary consultant with expertise in geotechnical, hydrogeological, and solid waste management engineering; Geosyntec also prepared the visual assessment;

b. Golder Associates, Inc. of Manchester, New Hampshire for geological and hydrogeological analysis;

c. SCS Engineers of Suffern, New York for air emissions and gas collection and control design;

d. Bodwell EnviroAcoustics, LLC of Brunswick, Maine for noise assessment; and

e. Normandeau Associates of Bedford, New Hampshire for wetland and other natural resources assessments.

The Department finds that WMDSM personnel and the specific consultants retained by them have the technical ability to design, construct, operate, maintain, close, and accomplish post-closure care of the proposed Phase 14 expansion in a manner consistent with the applicable State law and Rule requirements.

B. Civil or Criminal Record

Finding 23 of this license contains information on civil and criminal disclosure.

8. PROVISIONS FOR TRAFFIC MOVEMENT

WMDSM must make adequate provisions for safe and uncongested traffic movement of all types into, out of, and within the proposed solid waste facility as set forth in the 38 M.R.S. § 1310-N(2-F)(B), Siting Standards, and in 06-096 C.M.R. ch. 400, § 4(D)(1).

The primary waste haul route to the Crossroads Landfill facility is along U.S. Route 2 with a secondary access drive on Airport Road. These haul routes are to remain unchanged. New internal access roads required for the proposed Phase 14 expansion have been

designed for continuous traffic flow to minimize conflict with other vehicles and located to minimize impact to natural resources on site and provide safe traffic movement. Truck staging and vehicle parking will remain unchanged, as will the location of the scale house. The primary access and internal site roads are maintained by WMDSM, including winter plowing and summer dust control.

WMDSM submitted a traffic assessment prepared by Casey and Godfrey Engineers of Gardiner, Maine, dated December 12, 2001, that was initially prepared to support the licensing of the Phase 8 expansion. The applicant notes that waste tonnage, traffic volume, type of hauling vehicles, and routes taken by waste hauling vehicles to and from the Crossroads Landfill facility have not significantly changed and are consistent with the Phase 8 expansion (Volume I of the application, page 7). Updated information from the Maine Department of Transportation's Public Crash Query Tool was provided. As noted in the application, none of the high crash locations in the Town of Norridgewock between 2016 and 2019 are located within a quarter mile of the Crossroads Landfill facility (Volume I of the application, page 7).

In addition, WMDSM has established a transporter management program. The program requires transporters to comply with all local, state and federal laws and sets stringent requirements specific to the Crossroads Landfill facility. The program serves to minimize and eliminate truck lineup prior to opening time, designates travel routes to and from the facility, and imposes measures to prohibit engine braking and ensure loads are secure to minimize and prevent any impacts to the local community. The applicant states that the transporter management program is enforced on a daily basis with consequences such as a two-week ban from the facility for non-compliance (Volume I of the application, page 8).

The Department finds that WMDSM has demonstrated that the roads and intersections in the vicinity of WMDSM have the ability to safely and appropriately handle all of the traffic attributable to the proposed Phase 14 expansion into, out of, and within the facility pursuant to 38 M.R.S. § 1310-N(2-F)(B) and 06-096 C.M.R. ch. 400, § 4(D)(1).

9. FITTING THE SOLID WASTE FACILITY HARMONIOUSLY INTO THE NATURAL ENVIRONMENT

In accordance with 38 M.R.S. § 1310-N(2-F)(C), Siting Standards, WMDSM must make adequate provisions for fitting the proposed solid waste facility harmoniously into the existing natural environment. Pursuant to the requirements in 06-096 C.M.R. ch. 400, § 4(E)(1), WMDSM must have buffer strips of sufficient size and quality to adequately protect aquatic and wildlife habitat and the natural environment; and may not unreasonably adversely affect protected natural resources and rare, threatened and endangered plant and

animal species. The buffer must be a minimum of 100 feet between the facility site and the listed locations and habitats, unless otherwise approved or required.

The 721-acre site currently supports an active secure solid waste landfill (Phase 8) constructed primarily as a vertical increase above Phases 1 through 6, 7 and 9, and several closed secure solid waste landfills (Phases 10, 11 and 12). Infrastructure associated with the site includes a system of access roads, stormwater control structures, an inactive commercial transfer station, an active residential transfer station, an active material recovery facility, an active tire processing facility, an active wood waste recycling operation, active container storage areas, an active leachate storage tank facility, an active scale house and an operational landfill gas-to-energy facility.

Other uses in the surrounding area include a municipal airport located to the west of the site, residential development to the east and north, and forest and agricultural activities dominate to the south and west. The proposed Phase 14 project area consists primarily of previously disturbed land formerly used for soil borrow activities and subsequently graded and restored as meadow, along with existing roads, stormwater control basins and storage areas. Less disturbed forested areas and old field and early successional forested areas including forested wetlands are common within the proposed Phase 14 project area. Emergent wetlands have developed within the previously disturbed areas and are seasonally mowed to prevent intrusion of woody vegetation. Shrub-scrub wetland areas are also present.

WMDSM retained Normandeau Associates to identify and inventory the presence of wetlands; streams and drainages; significant wildlife habitats; unusual natural areas; vernal pools; and rare, threatened, and endangered species on the proposed Phase 14 project site. Normandeau Associates conducted field studies, reviewed applicable records and contacted MDIFW, ACOE, MNAP and U.S. Fish and Wildlife Service. Together with the Department's Bureau of Land Resources, staff of other agencies including the MDIFW and the ACOE visited the site on November 16, 2017 and June 25, 2019 prior to application submittal and reviewed the proposal once submitted.

Wetland boundaries were delineated according to the ACOE Wetland Delineation Manual. Impacts to wetlands were minimized to the maximum extent practicable. The impact to 10.273 acres of wetlands are proposed to be mitigated through preservation of other wetland resources within the region. Streams and drainages were mapped during the wetland delineations. The Department received two public comments with respect to potential impact to surface water resources, as proposed by WMDSM. Finding 13 of this license further addresses impacts to freshwater wetlands and compliance with the NRPA and associated rules.

The proposed Phase 14 expansion area is more than 100 feet from all streams and drainages on the site, with the exception of one unavoidable intermittent stream crossing by the proposed Phase 14 access road (Volume I of the application, page 12). The culvert crossing will meet applicable Department and ACOE design criteria and standards for aquatic organism passage and hydraulic passage as recommended by the MDIFW. The infrastructure of a nearby existing crossing of the same stream will be removed, and the area restored to eliminate a sharp corner unnavigable by large trucks. The proposed Phase 14 expansion project meets the additional setbacks required pursuant to both the prohibitive and restrictive siting criteria of 06-096 C.M.R. ch. 401, §§ 1(C)(2) and (3) as noted in Finding 10(E) of this license.

In an April 8, 2019 letter from the MNAP to Normandeau Associates submitted in Volume II of the application, MNAP noted that according to the information currently in their Biological and Conservation Data System files, there are no rare or unique botanical features documented within the project area or vicinity. Rare and unique botanical features include the habitat of rare, threatened, or endangered plant species and unique or exemplary natural communities. Further, Geosyntec Consultants notes that a review of the U.S. Fish and Wildlife Service's Information for Planning and Consultation system did not identify any threatened or endangered plant species (Volume I of the application, page 13).

There is no significant wildlife habitat within or proximate to the proposed Phase 14 project area; however, there is a mapped Deer Wintering Area classified as a candidate area which has not been ground surveyed by staff of the MDIFW. The area was mapped by MDIFW in 1993 through an aerial survey. This area, a portion of which would be impacted by the proposed project location, was qualitatively assessed by Normandeau Associates using MDIFW survey guidelines and methods. No qualifying current deer sign was observed during the survey. The assessment determined that the portion of Deer Wintering Area within the proposed Phase 14 expansion footprint would receive a quality rating of low and would not be considered a Significant Wildlife Habitat (Volume II of the application, Attachment 9, Appendix E).

In its October 29, 2020 Environmental Permit Review comments provided to the Department, the MDIFW stated that any impacts associated with the proposed Phase 14 expansion to fisheries will be minimal. Further, WMDSM will purchase approximately 822 acres of mitigation land, that will serve as mitigation for wetlands impacted as well as provide a high-quality deer wintering area. The mitigation parcel will be incorporated into the Chesterville Wildlife Management Area for preservation under the protection and management of the MDIFW. The purchase meets both NRPA, ACOE and MDIFW requirements.

The Department finds that the proposed Phase 14 expansion will have adequate buffers to adequately protect aquatic life and wildlife habitat and the natural environment; and that there will be no unreasonable adverse effects to protected natural resources and rare, threatened and endangered plant and animal species pursuant to 38 M.R.S. § 1310-N(2-F)(C) and 06-096 C.M.R. ch. 400, § 4(E)(1).

10. NO UNREASONABLE ADVERSE EFFECT ON EXISTING USES AND SCENIC CHARACTER

The solid waste facility may not unreasonably adversely affect exiting uses and scenic character as set forth in the 38 M.R.S. § 1310-N(2-F)(C), Siting Standards, and in 06-096 C.M.R. ch. 400, § 4(F)(1), including consideration of bird hazard to aircraft, historical sites, established public viewing areas, excessive noise at the property boundary or at any protected location, or existing uses of neighboring property.

A. Bird Hazard to Aircraft

Applicants for new or expanded landfill licenses with waste handling areas that are located within 10,000 feet of any airport runway used by turbojet aircraft or within 5,000 feet of any airport runway used by piston-type aircraft only must demonstrate that the landfill will be designed and operated so the landfill does not pose a hazard to aircraft pursuant to the performance standards of 06-096 C.M.R. ch. 401, § 1(C)(1). Additionally, applicants must notify the affected airport and the Federal Aviation Administration ("FAA") whenever a new landfill or expansion of an existing landfill is proposed within a five-mile radius of any airport runway, in accordance with 06-096 C.M.R. ch. 401, § 1(D)(4). WMDSM notified the Central Maine Regional Airport of the intent to file a solid waste permit application for Phase 14 on September 7, 2019 and re-notified the Central Maine Regional Airport on October 16, 2019. WMDSM submitted the Notice of Proposed Construction or Alteration to the FAA on October 4, 2019 (Volume I of the application, Appendix 7A).

In a November 12, 2019 letter to WMDSM, the FAA presented their Determination of No Hazard to Air Navigation based on their aeronautical study (Study No. 2019-ANE-5657-OE). The aeronautical study determined that the proposed Phase 14 expansion does not exceed obstruction standards and would not be a hazard to air navigation provided the FAA is notified within five days after the landfill reaches its greatest height. Further, the FAA determined that marking and lighting are not necessary for aviation safety.

The closest point of the proposed Phase 14 expansion is located 5,800 feet from the nearest runway of the Central Maine Regional Airport, which is 4,700 feet further away than Phase 8. WMDSM has followed a stringent bird control program at the Crossroads Landfill since acquiring the site in 1990. The bird control program is implemented in accordance with the Federal Migratory Bird Depredation Permit (# MB724868-0), issued by the U.S. Fish and Wildlife Service, and Permit # REGION D -- 2019-1 issued by MDIFW. The program includes primarily non-lethal bird control measures known as deterrents and permitted depredation measures, which are employed as a last resort. Existing bird control programs have been effective and no bird hazards to aircraft have been reported during the current and previous Phase 8 landfill operations.

Based on the increased distance to the Central Maine Regional Airport from the proposed Phase 14 expansion, as compared with Phase 8, WMDSM's established bird control program and its success, the Department finds that the proposed Phase 14 expansion is not expected to pose a bird hazard to aircraft provided that the bird control program is continued during active operations of the proposed Phase 14 expansion.

B. Historical Site Preservation

In a letter dated June 18, 2019, received from the State Historic Preservation Officer of the Maine Historic Preservation Commission, it was concluded that there would be no historic properties (archaeological or architectural) affected by the proposed Phase 14 expansion, as defined by Section 106 of the National Historic Preservation Act (Volume I of the application, Appendix 7B).

The application also included a summary of notifications made to various Tribal Historic Preservation Officers and their subsequent responses. No impacts to tribal lands or interests were noted.

The Department finds that the proposed Phase 14 expansion will not unreasonably adversely affect historic properties.

C. Visual Assessment

A visual assessment dated October 2019 was prepared for WMDSM by Geosyntec Consultants to evaluate whether the proposed Phase 14 expansion will unreasonably interfere with views from established public viewing areas (Volume I of the application, Appendix 7C). Previous visual assessments conducted by

Mitchell and Associates for Phases 9, 11 and 12 in 1996 and by Geosyntec Consultants in 2001 for Phase 8 were also referenced. Public viewing area is defined in 06-096 C.M.R. ch. 400, § 1(Ll) as "an area designated for the public to view scenic areas, historical sites, unusual natural features or public monuments. These areas include but are not limited to scenic highways; public easements; scenic turnouts; public monuments; and national, state or municipal parks." The Rules require the submittal of descriptions of protected locations and established public viewing areas within 2,000 feet of the proposed Phase 14 expansion. 06-096 C.M.R. ch. 400, § 4(F)(l) establishes the standards with respect to unreasonable adverse effects and states, in relevant part, the solid waste facility may not unreasonably adversely affect existing uses and scenic character and may not unreasonable interfere with views from established public viewing areas or unreasonably adversely affect existing uses of property neighboring the proposed solid waste facility.

The visual assessment describes existing site characteristics immediately around the facility (local visual assessment) and within the wider study area (regional visual assessment) and provides computer-generated images of the proposed Phase 14 expansion at final grades from different vantage points within the study area. The distance from the proposed Phase 14 boundary is approximately 3,000 feet south to U.S. Route 2; 880 feet east to Airport Road; 5,720 feet west to the nearest runway of the Central Maine Regional Airport; and 4,200 feet southwest to Fredricks Corner Road. Elevations of these locations range from 220 to 320 feet NAVD88. The proposed Phase 14 expansion will be filled to a final elevation of 470 feet NAVD88.

Development of the proposed Phase 14 expansion will take place over approximately 17 years. Waste placement operations will commence at approximately 275 to 295 feet NAVD88 with the majority of waste filling operations at or below the existing level of trees and vegetation. The top of the proposed Phase 14 expansion may become more visible from some locations during the final approximately five years of filling operations. No public viewing areas were identified within 2,000 feet of the proposed Phase 14 expansion. However, views were also considered from hills in or near the Town of Norridgewock and the local area including roadways that surround the existing facility. Predominant high points within four miles of the site include Oak Hill, Wilder Hill, Mt. Tom, Ross Hill, Dodling Hill and Burrill Hill. Public access is only available on Oak Hill, Wilder Hill and Burrill Hill and views from these locations were found to be consistently blocked by vegetation. The topographic high is Mount Tom which is approximately 3.5 miles from the Crossroads Landfill facility at 740 feet above

mean sea level (Applicant's Response to the Post-Hearing Comments of CLF, Exhibit E).

During the public hearing, the Department requested additional information about Mt. Tom and its uses. Geosyntec Consultants responded that it is likely one could see the 3.5 miles to the Crossroads Landfill facility, but it was unknown whether the solid waste boundary or solid waste operations would be visible. Additionally, the uses of Mt. Tom as a recreational area were unknown at the time. In a November 5, 2020 post-hearing brief, the applicant provided additional information about Mt. Tom. The applicant noted that the proposed Phase 14 expansion will not adversely impact views from Mount Tom as Mount Tom is not a significant recreational resource; does not have designated hiking trails or parking areas; has a summit that is wooded in all locations except for a small clearing with a communications tower; and is not a public viewing area (Applicant's Response to the Post-Hearing Comments of CLF, pages 17-18).

The visual assessment concluded that the proposed Phase 14 expansion will not have an adverse effect on current scenic character. Geosyntec Consultants notes that "[d]uring the majority of filling operations of the landfill, the color and texture of the landfill will be either black or dark earth cover, which will be effectively screened by surrounding vegetation" and "[t]he potential visual impact of the Phase 14 landfill will be limited to a relatively short duration as the landfill reaches its final stage of filling" (Volume I of the application, Appendix 7C, page 7). Further, WMDSM notes that "[o]nly during the final years of operation, and only from limited vantage points, will Phase 14 be visible to the surrounding area. WMDSM's use of daily cover materials and incremental construction of the final vegetated cover system will further minimize any visual impacts within the final stages of filling" (Volume I of the application, pages 15-16). WMDSM notes in the Visual Impact Assessment Report that the Phase 14 expansion may be visible from Vantage Points 1, 2 and 5 as the landfill is approaching its final height during the last approximately five years of filling (Volume I of the application, Appendix 7C, page 6).

The Department requested additional information in its February 14, 2020 comments to WMDSM regarding the application including: (1) a discussion of the visibility of the landfill in the winter as compared to in the summer; (2) an evaluation of the view from the Norridgewock Elementary School and Sunset View Cemetery area; and (3) a discussion of WMDSM's ability to construct and maintain visual barriers in certain locations and whether they propose to do so, especially during the final years of operation of the proposed Phase 14 expansion.

WMDSM provided responses to comments, dated March 31, 2020, as follows: (1) photographs of the same locations as submitted with the application were taken in March of 2020 revealing that the visual screening provided by vegetation in the winter is not significantly different than that presented in the late fall photographs; (2) based on computer modeling, the proposed Phase 14 expansion will be visible in its later years of development from the school/cemetery area along U.S. Route 2 during which time the landfill will be incrementally covered with a vegetated final cover system; and (3) WMDSM proposes to add visual barriers to gaps in previously constructed barriers on the facility property along U.S. Route 2 and the entrance to the landfill facility to ensure they provide an adequate visual barrier at the appropriate time they are needed to screen the proposed Phase 14 expansion as it reaches its final stages of filling. In a pre-filed exhibit WMDSM specified that it "will construct additional visual barriers at Vantage Points 1 and 2." (Phase 14 Development and Visibility Assessment, page 28).

The Department finds that the design of the proposed Phase 14 expansion takes into account the surroundings and when completed, capped, and vegetated, the expansion will not have an unreasonable adverse effect on the scenic character of the surrounding area as required pursuant to 38 M.R.S. § 1310-N(2-F)(C), Siting Standards, and 06-096 C.M.R. ch. 400, § 4(F)(1), provided that WMDSM adds visual barriers at Vantage Point 1 near the site entrance and at Vantage Point 2 which is located near the Baker Farm at the appropriate time to ensure they provide an adequate visual barrier at the time they are needed to screen the proposed Phase 14 expansion as it reaches its final stages of filling.

D. Noise

Pursuant to 06-096 C.M.R. ch. 400, § 4(F)(1)(d), a solid waste facility may not generate excessive noise at the property boundary or at any protected location and must meet the sound level limits of 06-096 C.M.R. ch. 400, § 4(F)(2). Table 3 includes the sound level limit standards of 06-096 C.M.R. ch. 400, § 4(F)(2) where dBA corresponds to decibels adjusted to reflect the ear's response to different frequencies of sound.

Table 3: Sound Level Limit Standards

Sound Level Limit (dBA)	**Applicable Hours** Daytime: 7:00 am to 7:00 pm Nighttime: 7:00 pm to 7:00 am	**Location**
75	Daytime and Nighttime	Facility property boundary
60	Daytime	Protected location zoned or usage not predominantly commercial or industrial (i.e., residential areas)
50	Nighttime	

The application includes a sound level study, dated December 14, 2001, prepared by Resource Systems Engineering for the Phase 8 landfill expansion (Volume I of the application, Appendix 7F). Geosyntec Consultants notes that "[s]ources, scope and extent of sound generating activities (e.g., use of dozers, compactors, trucks, excavators, etc.) are expected to be similar to what has occurred for Phase 8, and therefore the modeling and monitoring done for Phase 8 is applicable to the Phase 14 project" (Volume I of the application, page 16). Additionally, Geosyntec Consultants specifies that the distances between the activities associated with the proposed Phase 14 expansion and the nearest regulated receptor are significantly further than the closest receptor to Phase 8 where sound monitoring was conducted during operations in 2016 and the regulatory-based sound level limits were met. Further, Geosyntec Consultants notes that "in contrast to the area where sound levels were measured as part of the Phase 8 activities, substantial vegetation is prevalent around the Phase 14 perimeter" (Volume I of the application, page 17).

The December 2001 sound level study concluded that the highest estimated sound levels were 68 dBA at the nearest property boundary. WMDSM conducted sound monitoring during operations of Phase 8 to verify that actual sound levels achieved the applicable sound level limits. The results presented in Appendix 7E of Volume I of the application indicate that actual sound levels were less than the highest predicted level of 68 dBA. Additionally, monitoring indicated that all but two hourly sound levels were below 60 dBA and that these were due to 1-minute sound level spikes in both cases. If the 1-minute sound level spikes were excluded, Geosyntec Consultants notes that the adjusted hourly sound levels are estimated to be 51 dBA and 56 dBA on June 3, 2016 and June 21, 2016, respectively (Volume I of the application, page 17).

In its comments of February 14, 2020, the Department asked WMDSM to describe the sound impacts on the surrounding receptors when the proposed Phase 14 operations rise above the vegetation. The Department also requested that WMDSM reassess the sound level data without eliminating the observed sound level spikes. In response, WMDSM submitted a sound level analysis report, dated May 2020, prepared by Bodwell EnviroAcoustics, LLC to evaluate anticipated sound levels specifically from the proposed Phase 14 expansion.

Bodwell EnviroAcoustics created a sound model utilizing three-dimensional sound propagation computer modeling software (CadnaA® by DataKustik of Germany) to develop detailed recommendations specific to the development and operations of the proposed Phase 14 expansion. Sound levels were calculated in general conformance with ISO 9613-2, an international standard for calculating outdoor sound propagation. The analysis considered area terrain without attenuation from

foliage or vegetation, standard atmospheric conditions, existing land uses, and varying source heights under different modeling scenarios with respect to the nearest protected locations (i.e., residential properties) and the facility property boundary. Dwelling locations were mapped through use of aerial photography and field verification. Pursuant to 06-096 C.M.R. ch. 400, § 4(F)(2)(e), routine engine sounds from registered and inspected motor vehicles and vehicle warning signals and alarms (i.e., back-up alarms) are exempt from the sound level limits. The Department received one public comment concerning the potential for extended operations, based on the assumption that there would be an increase in the rate of waste acceptance by the facility. WMDSM has not proposed to change hours of operation or to accelerate current rates of waste acceptance. Current hours of operation are typically 7:15 am to 5:30 pm Monday through Friday. However, as specified in the October 16, 2019 Host Community Agreement with the Town of Norridgewock, "WMDSM will not admit vehicles transporting solid waste to its Facility at Norridgewock, Maine, before 6:30 A.M., and not later than 6:30 P.M., and transporting vehicles shall not be permitted to park outside the Facility during the off hours" (Volume I of the application, Appendix 18A, page 3).

The May 2020 sound level analysis concluded that "there is potential for operating sound levels to exceed the applicable daytime 60 dBA sound limit at the property line of the nearest protected location [a residential property on Airport Road which is 315 feet from the proposed Phase 14 operating boundary] east of Phase 14A" (May 29, 2020 Applicant Response to Department Comments, Attachment RTC2#7-1, page 10). To mitigate sound levels at this location, WMDSM proposes to construct sound attenuation berms ranging from 10 to 25 feet high along the eastern portion of the Phase 14 expansion, until operations move away from the protected location at least 750 to 900 feet depending on the type of equipment utilized, at approximately a waste grade elevation of 390 feet above mean sea level. The proposed berms would be constructed of waste material types currently accepted including, but not limited to, daily cover materials placed over an inner core of MSW. WMDSM proposes to construct the berms with select waste material using a single CAT D6T bulldozer, which is the lowest rated of the proposed Phase 14 landfill equipment in relation to sound (May 29, 2020 Applicant Response to Department Comments, Attachment RTC2#7-1, page 10). Predictive modeling of the CAT D6T operating alone indicates that sound levels during construction of the sound attenuation berms will be at or near the daytime sound limits of 60 dBA. Based on this, WMDSM will need to restrict the use of the CAT D6T to a 70 percent ("%") operating time within a given hour when operating near the east boundary of the proposed Phase 14 expansion until the CAT D6T is more than 415 feet away from the protected location (i.e., the property line east of Phase 14A).

Alternatively, a bulldozer having a 2 dBA lower sound rating than the CAT D6T could be utilized without restriction of the hourly operation (May 29, 2020 Applicant Response to Department Comments, Attachment RTC2#7-1, page 11).

WMDSM proposes to continue to maintain buffer vegetation between the proposed Phase 14 expansion and the facility property lines to minimize sound levels from the landfill facility. The proposed pump stations and other mechanical structures will be constructed on the west side of the landfill which is farther away from the nearest protected location.

The Department finds that the proposed Phase 14 expansion will not generate excessive noise at the property boundary or at any protected location as defined by the Rules provided that WMDSM submits for review by the Department at least 60 days prior to waste placement operations in the first cell, a modified Operations Manual to include: (1) construction of sound attenuation berms with select waste material along the eastern portion of the proposed Phase 14 expansion, specifically, Phase 14A, using a single CAT D6T bulldozer limiting the duration of its operation in any given hour to 70% operating time, within 415 feet of the closest protected location with a procedure to ensure compliance with this operational limitation, or using a bulldozer having a 2 dBA lower sound rating than the CAT D6T without restriction; and (2) a plan to conduct periodic sound level monitoring until operations occur at least 750 feet to 900 feet from the closest protected location depending on the equipment being used.

E. Neighboring Property

Pursuant to 06-096 C.M.R. ch. 400, § 4(F)(1)(e), a solid waste facility may not unreasonably adversely affect existing uses of property neighboring the proposed solid waste facility. The portions of the 721-acre parcel to be developed will be a continuation of the existing site use, with setbacks as required by 06-096 C.M.R. ch. 401, §§ 1(C)(2) and (3). Existing land in the vicinity of the Crossroads Landfill facility is subject to local zoning ordinances. The following setbacks from the solid waste boundary in comparison to the Rule requirements are provided in Volume I of the application, pages 45-48:

WASTE MANAGEMENT DISPOSAL SERVICES OF MAINE, INC. CROSSROADS LANDFILL PHASE 14 EXPANSION NORRIDGEWOCK SOMERSET COUNTY, MAINE #S-010735-WD-YB-N (APPROVAL WITH CONDITIONS)	30)))))))	MAINE HAZARDOUS WASTE, SEPTAGE AND SOLID WASTE MANAGEMENT ACT NEW LICENSE

Table 4: Proposed Expansion Setbacks

Setbacks from the Solid Waste Boundary to:	Actual Proposed (feet)	Rule Setback Requirement (feet)
Prohibitive Siting Criteria		
Class AA or Class SA Waters	>23 miles	1,000
Significant sand and gravel aquifer	2,470 None identified on the 721-acre parcel	300
Fault displaced in Holocene time	None identified on the 721-acre parcel	200
Restrictive Siting Criteria		
Nearest public road	880	300
Property boundary	330	300
Nearest residence	1,100	1,000
Stratified sand and gravel deposit	None identified on the 721-acre parcel	100
Classified surface water	150	100
Water supply spring or water supply well not owned by the applicant	1,100	1,000

The Department finds that the proposed Phase 14 expansion will not unreasonably adversely affect existing uses of property neighboring the proposed expansion.

11. NO UNREASONABLE ADVERSE EFFECT ON AIR QUALITY

A solid waste facility may not unreasonably adversely affect air quality pursuant to the siting standards of 38 M.R.S. § 1310-N(2-F)(C) and 06-096 C.M.R. ch. 400, § 4(G)(1). The facility must obtain an air emission license, if required; control fugitive dust and nuisance odor; and prohibit open burning of solid waste other than clean or painted wood waste.

A. Air Emission License

Air emission license renewal with amendment #A-816-70-C-R/A was issued on July 18, 2014 and was most recently amended April 1, 2019 for the existing Crossroads Landfill facility. The license renewal with amendment concludes that emissions from the landfill will receive Best Practical Treatment, will not violate applicable emissions standards, and will not violate applicable ambient air quality standards in conjunction with emissions from other sources. The air emission license renewal with amendment includes State and federal emission limits and operational requirements associated with landfill gas collection and control, as well as monitoring and reporting requirements.

The 2014 air emission license renewal with amendment addresses management of landfill gas emissions through the use of a landfill gas-to-energy plant consisting of two internal combustion engines which fire landfill gas; two flares (Flare #1 and Flare #3); and three backup emergency generators. A third landfill gas-fired internal combustion engine was licensed but has not been installed.

A Phase 14 Landfill Gas Collection and Control System Design Report, dated October 16, 2019 and prepared by SCS Engineers (Volume IV of the application, Appendix IV(g)) includes estimates of existing and future landfill gas generation, descriptions of the proposed gas collection and control system including provisions for condensate management, provisions for staged installation and operations and odor control. Preliminary drawings are also provided illustrating proposed extraction well locations, gas header locations, and construction details for the installation of header piping, extraction wells, condensate traps, surface collectors and other gas collection and control system appurtenant structures.

SCS Engineers estimates that the potential facility-wide (including Phase 14) landfill gas collection flow rate will peak at approximately 2,400 standard cubic feet per minute (scfm) at 50% methane in 2042, which is less than the total combined capacity of the two existing internal combustion engines and two existing flares of approximately 5,700 scfm. A third internal combustion engine will provide an additional 350 scfm when installed.

The Department finds that WMDSM has an air emission license, as required by State law and the Rules.

B. Fugitive Dust

A Fugitive Particulate Matter Control Plan, dated October 2019, prepared by SCS Engineers was submitted as part of the application (Volume I of the application, Appendix 8A). The Fugitive Particulate Matter Control Plan describes potential sources of dust and measures to control dust at the landfill facility. Measures to control dust will include utilizing water spray trucks to wet secondary roads during dry weather, paving the primary access road to the proposed Phase 14 expansion, and making use of a road sweeper to remove dirt buildup on paved roadways. In addition, WMDSM requires that, as much as practical, their customers use a pressure washer to clean waste and soil from the undercarriage and wheels of vehicles before exiting the active landfill to prevent tracking of waste and soil materials onto primary access roads and public roads (Volume I of the application, Appendix 8A, page 3).

To minimize dust during waste placement activities, the Fugitive Particulate Matter Control Plan specifies that WMDSM will employ best management practices such as watering the dry and dusty loads of waste; pushing smaller quantities of waste with equipment at a slower pace during placement; and creating a low spot or barrier within the waste to act as a wind buffer to minimize and contain dust in the active areas. Additionally, the Site Operations Manual notes that wind susceptible loads such as ashes could be covered with wetter waste streams or daily cover. Further, if wastes cannot be placed safely, "the driver and/or generator will be notified and other arrangements made, such as rescheduling, disposal elsewhere, or temporary storage in the Container Storage Area (Volume V of the Application, Section II, Part A, page 9).

The Department finds that the dust control measures proposed by WMDSM are adequate to control fugitive dust as required by State law and the Rules.

C. Nuisance Odor

WMDSM identified two potential primary sources of odor at the landfill facility: waste disposal operations and landfill gas. WMDSM proposes to conduct inspections for potential odor on a regular basis (i.e., during normal operations) in the areas of active waste disposal in the proposed Phase 14 expansion. This odor monitoring will be conducted to ensure the effectiveness of the gas collection and control system and to ensure operational odor controls are effective. Provisions for odor control include: installation of daily and intermediate cover to minimize exposed waste surfaces; installation and operation of an active landfill gas management system in waste areas; regular monitoring, maintenance, and adjustments to the gas management system to ensure it is functioning as designed; and the use of water misting and/or odor neutralizing agents, if necessary (Volume IV of the application, Appendix IV(g), page 12). Additionally, WMDSM requires waste hauling vehicles to be covered to further reduce odor emissions.

WMDSM proposes to incrementally install an active gas collection and control system as waste is placed within the proposed Phase 14 expansion, similar to current operations in Phase 8. Landfill gas, which is produced from the organic decomposition of wastes and may contain odor-causing compounds, will be collected and conveyed to either the existing landfill gas-to-energy plant for combustion or to on-site flares for its destruction. Operations and maintenance of the existing on-site gas collection and control system is discussed in the Site Operations Manual (Volume V of the application, Section VI, Part B). Prior to the commencement of waste placement within the proposed Phase 14 expansion,

WMDSM will update its Site Operations Manual to incorporate specifics regarding the Phase 14 landfill gas collection and control system (Volume IV of the application, Section 3.7, page 21).

Landfill personnel routinely monitor for odors as they travel local roads to the facility each morning and while on site. WMDSM noted at the public hearing that personnel meet daily and that odor is a standing discussion item. Any odor concerns raised by personnel during these meetings are investigated and mitigating actions taken as quickly as possible (Public Hearing Transcript, pages 108 and 109). This practice and a subsequent odor complaint response procedure have not yet been formalized in the Site Operations Manual. If odors are detected, the gas collection and control system is inspected and monitored to ensure its effective operation. WMDSM utilizes a LANDTEC GEM™5000 to measure the percent by volume of methane, carbon dioxide, hydrogen sulfide, and oxygen at approved locations including within collection manholes and soil gas probes surrounding the landfill units. A defined calibration and maintenance schedule are followed to ensure the accuracy of the data. Permanent on-site structures utilized for work-related activities (i.e., Commercial Transfer Station/ Material Recovery Facility) are also monitored by continuously read combustible gas monitors. Leachate pump vaults are equipped with dedicated combustible gas and hydrogen sulfide meters.

The Department finds that WMDSM has proposed odor control mechanisms adequate to control nuisance odors from the proposed Phase 14 expansion as required by State law and the Rules provided that the Site Operations Manual is revised and submitted to the Department prior to waste placement in the proposed Phase 14 expansion to include provisions for conducting odor inspections within the community, routine discussions regarding odor concerns if any, and an odor complaint response procedure including provisions for notifying the community of the procedure.

D. Open Burning and Fire Prevention

06-096 C.M.R. ch. 400, § 4(G)(1)(c) prohibits the open burning of solid waste other than clean or painted wood waste. WMDSM does not open burn solid waste. In conformance with 06-096 C.M.R. ch. 401, § 4(C)(15), WMDSM maintains an emergency action plan and has outlined fire prevention procedures in its Site Operations Manual (Volume V of the application, Section I, Part E). Specifically, 06-096 C.M.R. ch. 401, § 4(C)(15) requires an operator to arrange with a nearby fire department to provide emergency services when called; provide sufficient on-site equipment for minor fires such as detachable extinguishers, maintained in

working order; maintain a soil stockpile sufficient to suppress small fires; and observe the current applicable fire safety rules of the Maine Forest Service. The Department received six public comments regarding the impacts of landfill fires to local and regional air quality and potential safety of landfill gas infrastructure during a fire. The Department notes that WMDSM experienced two fires at the landfill facility within the three years prior to the submittal of the proposed Phase 14 expansion application. WMDSM determined that these fires were both ignited by hot embers contained within inadequately quenched biomass ash received at the facility, that originally appeared quenched when delivered. The facility responsible for generation of the ash was notified and was required by WMDSM to improve their ash quenching procedures. WMDSM has established a hot loads area on a paved section of the Phase 12 east perimeter berm (Volume V of the application, Section II, Part A, page 8). Hot loads will be directed to this area to be allowed to sufficiently cool and be further assessed. The Department also received several comments on the draft license decision that WMSDM's fire prevention plan is inadequate; however, the Department notes that the plan meets the criteria outlined in 06-096 C.M.R. ch. 401, § 4(C)(15).

The Department finds that the emergency action plan and fire prevention procedures proposed by WMDSM are adequate to minimize the risk of fire as required by State law and the Rules.

12. NO UNREASONABLE ADVERSE EFFECT ON SURFACE WATER QUALITY

In accordance with the 38 M.R.S. § 1310-N(2-F)(C), Siting Standards, and the requirements of 06-096 C.M.R. ch. 400, § 4(H)(1), a solid waste facility: may not discharge any water pollutants, directly or indirectly, that affect the state classification of a surface water body, as specified in *Classification of Maine Waters*, 38 M.R.S. § 464; may not discharge any pollutant without first obtaining a license pursuant to *Waste Discharge Licenses*, 38 M.R.S. § 413; may not degrade water quality by contributing to the phosphorous concentrations in "waterbodies most at risk from new development" as defined in *Direct Watersheds of Lakes Most at Risk from New Development, and Urban Impaired Streams,* 06-096 C.M.R. ch. 502 (last amended May 23, 2018); and may not cause the discharge of a nonpoint source of pollution to waters of the United States that violates any requirement of an area-wide or State-wide water quality management plan that has been approved in compliance with Section 319 of the *Federal Water Pollution Control Act*, as amended.

WMDSM notes that the proposed Phase 14 expansion area is not located in the direct watershed of waterbodies most at risk from new development; surface water runoff will be

managed in accordance with *Stormwater Management*, 06-096 C.M.R. ch. 500 (last amended August 12, 2015); on-site surface water quality will be monitored in accordance with an approved plan; and there will be no discharge of wastewater from the proposed Phase 14 expansion development (Volume I of the application, page 21). WMDSM provided a Stormwater Pollution Prevention Plan (Volume V of the application, Section V) and an Erosion Control Plan (Volume V of the application, Section IX) in its Site Operations Manual. The plans outline potential pollutant sources, stormwater and erosion and sediment control measures, and provisions for inspection and maintenance. WMDSM's permanent best management infrastructure includes sedimentation and infiltration basins with filter berms and multi-stage outlets, riprap inlet and outlet structures, vegetated swales, stormwater diversion control structures, catch basins, and wooded buffers. The landfill facility holds a Multi-Sector General Stormwater Permit from the Department (#MER05B470) for the discharge of stormwater associated with industrial activity for Sector L: landfills. Further, WMDSM maintains a Spill Prevention, Control, and Countermeasure Plan that establishes preparedness, prevention, planning, spill response, and spill notification procedures (Volume V of the application, Section IV).

The proposed Phase 14 expansion includes a leachate collection and transport system for the management of precipitation that contacts waste (Volume V of the application, Section III). The generation of leachate is minimized through the use of diversion berms and intermediate and final cover systems. Stormwater runoff from active waste placement areas is controlled to prevent the migration of surface water leachate from active areas. Leachate will be conveyed from the proposed Phase 14 leachate vaults through a new buried double-containment high-density polyethylene ("HDPE") forcemain to an existing pump station and subsequently to the existing on-site storage tanks. The new leachate transfer pipe will be pressure tested during installation to ensure integrity of containment when conveying leachate. In the unlikely scenario of a breach in the inner pipe during its service life, leachate will remain contained inside the outer containment pipe as it is conveyed to the nearest leak-detection manhole, which will be located at intervals of approximately every 1,000 feet along the forcemain pipe.

WMDSM proposes to continue to contract for the transport via tanker trucks of leachate from the storage tanks to off-site wastewater treatment plants. WMDSM maintains contracts with Sappi North America for up to 400,000 gallons per day and the Anson-Madison Sanitary District for up to 56,000 gallons per day. The existing leachate storage tanks and truck loadout areas are located within concrete secondary containment structures to further reduce any risk of discharge to the surrounding environment. Further, measures to minimize overfills during leachate transfer are implemented including programming a maximum load-out volume for each pump cycle to prevent overfilling of tanker trucks. Leachate management is described in more detail in Findings 26 and 27 of this license.

The Department received comments of concern for the water quality of Mill Stream, a Class B waterbody, which flows through the site. As part of its Water Quality Monitoring Program, WMDSM samples ten surface water sampling points (three background and seven downgradient locations) on a tri-annual basis. Data is provided to the Department after each sampling round with a water quality monitoring summary report provided with the facility annual report. In a Department review memorandum dated August 6, 2019, the Department noted some exceedances; however, it is noted that "[t]he concentrations do not increase downgradient, so the exceedances are probably not the result of the landfill." Additionally, "[i]n general, there is little change in concentrations over long periods of time."

The Department also received comments of concern about the off-site treatment of leachate and the subsequent discharge of treated wastewater to the Kennebec River. As noted in Findings 26 and 27 of this license, WMDSM maintains current contracts with Sappi North America for the treatment of 400,000 gallons per day of landfill leachate and the Anson-Madison Sanitary District for up to 56,000 gallons per day of landfill leachate. Updated contracts were submitted in an August 20, 2020 Applicant Response to Department Comments. Both Sappi North America and the Anson-Madison Sanitary District hold current wastewater licenses from the Department, as required by the *Federal Water Pollution Control Act*, 33 U.S.C, § 1251; *Pollution Control*, 38 M.R.S. §§ 411 to 424-B; and applicable Department rules.

The Department finds that the stormwater and leachate management systems for the proposed Phase 14 expansion meet the applicable State laws and Rules and are designed to prevent the discharge of sediment and other contaminants conveyed by stormwater from polluting the waters of the State and otherwise unreasonably affecting surface water quality.

13. NO UNREASONABLE ADVERSE EFFECT ON OTHER NATURAL RESOURCES

The solid waste facility may not unreasonably adversely affect other natural resources in the municipality or in neighboring municipalities pursuant to 38 M.R.S. § 1310-N(2-F)(C) and 06-096 C.M.R. ch. 400, § 4(I). The facility must conform to the standards of the *Natural Resources Protection Act*, 38 M.R.S. §§ 480-A to 480-Z, if proposed to be located in, on, over, or adjacent to a protected natural resource; and must be permitted by the federal government for any activities that require a Federal Wetlands permit. Required submissions in support of a solid waste facility application include: (a) evidence that a NRPA application has been submitted or will be obtained when required, and (b) information as to whether a Federal Wetlands Permit is required and whether a Federal Wetlands Permit application has been submitted.

To identify and assess impacts to protected natural resources, WMDSM submitted a natural resources assessment for the proposed Phase 14 expansion prepared by Normandeau Associates. Normandeau Associates evaluated the functions and values of the impacted wetlands and prepared a Wetlands Compensation Plan, which was submitted in support of its NRPA application. The Wetlands Compensation Plan addresses wildlife habitat including wetland natural community types and other observed land use information under the jurisdiction of MDIFW. No significant vernal pools are present within the proposed Phase 14 expansion area (Volume II of the application, page 1).

The application for the proposed Phase 14 expansion includes the permanent impact of 10.273 acres of freshwater wetlands and temporary or secondary impact to 0.005 acres. The permanent wetlands impacts are associated with the installation of fill material required to construct the landfill and access roads while the temporary impacts are associated with the installation of an underground stormwater conveyance pipe through a portion of forested wetland. A combined license #L-18323-TG-K-N and #L-18323-L6-L-N, dated September 25, 2020, was issued by the Department approving the impacts and mitigation of these impacts. WMDSM will purchase approximately 822 acres of mitigation land in Chesterville which will be transferred directly to MDIFW and managed by them as part of the existing Chesterville Wildlife Management Area. Condition 4 of combined license #L-18323-TG-K-N and #L-18323-L6-L-N requires the submittal of evidence of the deed transfer to MDIFW to the Department's Bureau of Land Resources for review prior to the start of any construction in wetland areas. Within the Wildlife Management Area, MDIFW will designate an area of at least 82.2 acres as wetland compensation area to compensate for wetland impacts at the required 8:1 ratio. Evidence of submittal of an application for a Federal Wetland Permit (COE Project #: NAE-2019-01231) to the ACOE was provided in Volume II of the application

The Department finds that a Natural Resource Protection Act license was issued to WMDSM by the Department's Bureau of Land Resources and that WMDSM provided evidence that an application for a Federal Wetlands Permit to the ACOE was submitted. The Department further finds that, the Phase 14 expansion, as proposed, will not unreasonably adversely affect other natural resources in the municipality or in neighboring municipalities pursuant to the standards of 38 M.R.S. § 1310-N(2-F)(C) and 06-096 C.M.R. ch. 400, § 4(I).

14. SOIL TYPES THAT ARE SUITABLE AND WILL NOT CAUSE UNREASONABLE EROSION

In accordance with 38 M.R.S. § 1310-N(2-F)(D), Siting Standards, and 06-096 C.M.R. ch. 400, § 4(J), the solid waste facility must be located on soil types suitable to the nature of

the undertaking and the facility must not cause unreasonable erosion of soil or sediment. A site-wide Erosion Control Plan is contained in Section IX of the Site Operations Manual, last updated in 2016 (Volume V of the application). The Erosion Control Plan outlines temporary erosion and sediment control measures (i.e., hay bales, silt fence, erosion control mix) to be implemented, provides an overview of permanent erosion control structures (i.e., sedimentation and infiltration basins) established at the facility, provides provisions for monitoring and maintenance of both temporary and permanent erosion control measures, and outlines the personnel responsible for implementing the Erosion Control Plan. Project-specific erosion and sediment control plans are prepared for each major construction project.

The predominant soil types underlying the landfill facility are primarily fine-grained silt and clay and uniform fine sand. In general, silt and clay soils are highly susceptible to erosion and, once in suspension, difficult to remove. Further, these soils typically have a high runoff potential and low infiltration rates. The Erosion Control Plan specifies that the most effective method of control "is to prevent and minimize the suspension of material by stabilizing work sites as soon as practicable" (Volume V of the application, Section IX, page 2). The Erosion Control Plan is based on Maine's Erosion and Sediment Control Best Management Practices Manual, most recently updated in March 2015 for Contractors and in October 2016 for Designers and Engineers.

An Erosion Control Plan specific to the proposed Phase 14 expansion was submitted as part of the application (Volume VI of the application) and includes provisions for field evaluation of temporary erosion controls during construction, specifications for material installation, procedures for monitoring and maintenance, and provisions for removal once permanent stabilization has been achieved. Since the Phase 14 expansion is proposed to be implemented over a several year period, involving the construction of five discrete phases, WMDSM proposes to revise and/or refine the Erosion Control Plan as necessary to accommodate construction activities associated with each landfill cell (Volume I of the application, p. 23).

The Department finds that the construction and operation of the proposed Phase 14 expansion will not cause unreasonable sedimentation or erosion of soil and that suitable soil types underlie the landfill, meeting the applicable State laws and Rules, provided that the erosion control plan is implemented as proposed, incorporating revisions resulting from the Department's review and approval of each new phase construction as detailed in a specific design package.

WASTE MANAGEMENT DISPOSAL	39	MAINE HAZARDOUS
SERVICES OF MAINE, INC.	)	WASTE, SEPTAGE AND
CROSSROADS LANDFILL	)	SOLID WASTE
PHASE 14 EXPANSION	)	MANAGEMENT ACT
NORRIDGEWOCK	)	
SOMERSET COUNTY, MAINE	)	
#S-010735-WD-YB-N	)	
(APPROVAL WITH CONDITIONS)	)	NEW LICENSE

15. NO UNREASONABLE RISK THAT A DISCHARGE TO A SIGNIFICANT GROUND WATER AQUIFER WILL OCCUR

Pursuant to 38 M.R.S. § 1310-N(2-A), the 38 M.R.S. § 1310-N(2-F)(E), Siting Standards, and 06-096 C.M.R. ch. 400, § 4(K), the proposed solid waste facility may not: overlie any significant sand and gravel aquifers; pose an unreasonable threat to the quality of a significant sand and gravel aquifer; pose an unreasonable threat to the quality of an underlying fractured bedrock aquifer; or pose an unreasonable risk that a discharge to a significant ground water aquifer will occur. Significant ground water aquifer is defined in 06-096 C.M.R. ch. 400, § 1(Ccc) as "a porous formation of ice-contact and glacial outwash sand and gravel supplies or fractured bedrock that contains significant recoverable quantities of water likely to provide drinking water supplies" with a similar definition found in 38 M.R.S. § 1310-N(2-A).

The application includes a Geologic and Hydrogeologic Assessment Report, prepared by Golder Associates, dated October 2019, that identifies site characteristics and sensitive receptors; presents the results of site-specific geologic, hydrogeologic, and geotechnical investigations; assesses ground water time of travel; and proposes a water quality monitoring program (Volume III of the application, Supplemental Geologic and Hydrogeologic Report and applicable Responses to Comments). The Geologic and Hydrogeologic Assessment Report includes a site location map illustrating significant sand and gravel aquifers in the vicinity of the proposed Phase 14 expansion (Volume III of the application, Figure 1). The identified significant sand and gravel aquifers are located north and east of the proposed Phase 14 expansion area.

Golder Associates notes that "[t]here is no hydraulic connection between groundwater in the Phase 14 area and the significant sand and gravel aquifers because groundwater flow in all hydrostratigraphic units in the Phase 14 area is primarily to the south-southwest," and not towards the aquifers. Further, the proposed Phase 14 expansion is "located in an area where the Maine Geological Survey identified surficial deposits with 'less favorable aquifer characteristics', which are described by the Maine Geological Survey as 'areas with moderate to low or no potential groundwater yield (includes areas underlain by till, marine deposits, eolian deposits, alluvium, swamps, thin glacial sand and gravel deposits, or bedrock)' (Maine Geological Survey, Open-File No. 00-26-2000)" (Volume I of the application, page 25). Based on this information, the proposed Phase 14 expansion does not overlie any significant sand and gravel aquifers.

As specified in Volume III of the application, the Supplemental Geologic and Hydrogeologic Report and applicable Reponses to Comments, WMDSM conducted investigations to determine whether the proposed Phase 14 expansion would pose a risk or

affect the quality of a significant sand and gravel aquifer or a bedrock aquifer. There are no public water supplies or wellhead protection areas in the immediate vicinity of the proposed Phase 14 expansion or the landfill facility. The closest water supply well is WMDSM's office well which was identified as a potential sensitive receptor for purposes of the time-of-travel calculation. Streams mapped in the area of the proposed Phase 14 expansion are classified by the Department as Class B streams. Normandeau Associates field-delineated five intermittent Class B streams in the vicinity of the proposed Phase 14. Two of these streams are interpreted to be downgradient of the proposed Phase 14 expansion footprint and are identified as potential sensitive receptors. There are no great ponds in the area of the proposed Phase 14 expansion.

The applicant notes that "[t]he risk posed to bedrock underlying Phase 14 is minimal due to: the thoroughly engineered multi-layered liner system that will be installed; the natural geologic conditions beneath Phase 14; and the proposed groundwater monitoring program" (Volume I of the application, pages 25-26). The potential for contamination of the identified sensitive receptors was evaluated through analysis in the event of releases of contaminants to ground water beyond engineered systems. These analyses are described in more detail in Findings 25 and 28, of this license, respectively.

The Department finds that the proposed Phase 14 expansion will not be located over a significant sand and gravel aquifer and that the facility poses no unreasonable risk to a significant sand and gravel aquifer or underlying fractured bedrock aquifer, as required by State law and the Rules. Adequate protection of water quality will be provided by the soils under the proposed Phase 14 expansion, the design of the proposed expansion, the ground water flow conditions, and implementation of the Water Quality Monitoring Program discussed further in Finding 32 of this license.

16. ADEQUATE PROVISION FOR UTILITIES AND NO UNREASONABLE ADVERSE EFFECT ON EXISTING OR PROPOSED UTILITIES

The applicant shall provide for adequate utilities, including adequate water supplies and appropriate sanitary wastewater disposal, and the facility may not have an unreasonable adverse effect on existing or proposed utilities in the municipality or area served by those utilities, in accordance with 38 M.R.S. § 1310-N(2-F)(F), Siting Standards, and 06-096 C.M.R. ch. 400, § 4(L). The landfill facility is currently served by two water wells that are located on the facility property. The water use requirements for the proposed Phase 14 expansion are not expected to vary from current conditions.

Sanitary wastewater from the office, maintenance facility and scale house are discharged to permitted on-site septic systems that are located within the landfill facility property. The

landfill facility does not connect to any off-site water or wastewater systems. Water for dust control and other maintenance needs of the facility will continue to be met by the existing on-site water supplies. The leachate generated by the landfill facility will continue to be collected and stored on-site and treated off-site.

The Department finds that WMDSM has provided for adequate utilities and the proposed facility will not have an unreasonable adverse effect on existing or proposed utilities in the municipality or area served by the utilities, pursuant to the applicable State law and Rules.

17. NOT UNREASONABLY CAUSE OR INCREASE FLOODING

A solid waste facility may not unreasonably cause or increase flooding on-site or on adjacent properties nor create an unreasonable flood hazard to a structure pursuant to the 38 M.R.S. § 1310-N(2-F)(G), Siting Standards. As set forth in 06-096 C.M.R. ch. 400, § 4(M)(1), the facility may not be located in a 100-year flood plain or restrict the flow of a 100-year flood. In addition, the facility must include a stormwater management system that controls run-on and run-off; and infiltrates, detains, or retains precipitation falling on the facility site during a storm of an intensity up to and including a 25-year, 24-hour storm, such that the rate of flow of stormwater from the facility after construction does not exceed the rate of outflow of stormwater from the facility site prior to the construction of the facility.

WMDSM provided a site plan featuring flood hazard zones for the area surrounding the landfill facility including the proposed Phase 14 expansion (Volume I of the application, Appendix 1B, Figure S1-1). Flood hazard information was obtained from the Federal Emergency Management Agency's Flood Insurance Rate Maps (Panels 230178004C, 2301780008C, 2301780015C, and 2301780016C, all effective May 6, 1996). The site plan and flood hazard information show that the proposed Phase 14 expansion is not located within a 100-year flood zone (i.e., a 1% annual chance flood hazard).

A Stormwater Management Plan prepared by Geosyntec Consultants and submitted with the application includes pre- and post-development stormwater analyses for storm events up to and including a 25-year, 24-hour storm event (Volume IV of the application, Appendix IV(f)). Stormwater will be managed during the active and post-closure periods of the proposed Phase 14 expansion using final cover system benches, rip-rap lined downchutes, catch basins, swales, pipes and erosion control structure basins.

Geosyntec Consultants utilized U.S. EPA's Stormwater Management Model (EPA, August 2016) to conduct the hydrologic modeling for the proposed stormwater management system. The model used the Soil Conservation Service Curve Number methodology.

Stormwater conveyances (i.e., channels, downchutes, ditches and swales) were designed using FlowMaster software to not overtop during a peak flow discharge rate associated with the 100-year, 24-hour design storm. Erosion control structure basins were sized to completely retain the 25-year, 24-hour design storm runoff volume and dewater this volume over a period of 72 hours. The basin's outlet riser structures include grated horizontal orifices which were sized to pass the 25-year 24-hour peak flowrate without activating the basin's emergency spillway. Each emergency spillway is sized to pass the 100-year, 24-hour design storm peak discharge without overtopping the erosion control structure basins.

Geosyntec Consultants divided the post-closure landfill surface into four sub-catchment areas with each sub-area draining to a separate erosion control basin. Four erosion control basins (upgraded existing Basins 22A and 23, along with new Basins 32 and 33) are proposed to manage peak storm flows. The results of the analyses provided demonstrate that the post-construction discharge rate does not exceed the rate of outflow of stormwater from the landfill site prior to the construction of the proposed Phase 14 expansion during a storm intensity up to and including a 25-year, 24-hour design storm.

The Department finds that the proposed Phase 14 expansion will not be located in a 100-year flood plain and that adherence to the facility's stormwater management plan will control run-on and run-off; and will infiltrate, detain, or retain water falling on the facility site during a storm of an intensity up to and including a 25-year, 24-hour storm, such that post-development stormwater flows from the facility are below pre-development stormwater flows from the facility site. These findings meet the applicable requirements of State law and the Rules.

18. SOLID WASTE MANAGEMENT HIERARCHY

As stated in 38 M.R.S. § 1310-N(1)(D) and 06-096 C.M.R. ch. 400, § 4(N)(1), the purpose and practices of a solid waste facility must be consistent with the State's solid waste management hierarchy set forth in 38 M.R.S. § 2101(1), which reads as follows:

> Priorities. It is the policy of the State to plan for and implement an integrated approach to solid waste management for solid waste generated in the State and solid waste imported into this State, which must be based on the following order of priority:
>
> A. Reduction of waste generated at the source, including both amount and toxicity of the waste;
> B. Reuse of waste;

C. Recycling of waste;
D. Composting of biodegradable waste;
E. Waste processing that reduces the volume of waste needing land disposal; including incineration; and
F. Land disposal of waste.

For the purpose of 06-096 C.M.R. ch. 400, § 4(N):

> reducing, reusing, recycling, composting and/or processing waste to the "maximum extent practicable" prior to disposal means handling the greatest amount of waste possible through means as high on the solid waste management hierarchy as possible, resulting in maximizing waste diversion and minimizing the amount of waste disposed, without causing unreasonable increases in facility operating costs or unreasonable impacts on other aspects of the facility's operation. Determination of the "maximum extent practicable" includes consideration of the availability and cost of technologies and services, transportation and handling logistics, and overall costs that may be associated with various waste handling methods.

In addition, 38 M.R.S. § 2101(2) establishes that "it is the policy of the State to actively promote and encourage waste reduction measures from all sources and maximize waste diversion efforts by encouraging new and expanded uses of solid waste generated in the State as a resource."

The Department's rule at 06-096 C.M.R. ch. 400, § 4(N)(2)(a) states that for a solid waste disposal facility, the applicant must affirmatively demonstrate consistency with the hierarchy, including the following:

> that the waste has been reduced, reused, recycled, composted, and/or processed to the maximum extent practicable prior to incineration or landfilling, in order to maximize the amount of material recycled and reused, and to minimize the amount of waste being disposed. Such evidence shall include, but is not limited to, a description of the reduction, reuse, recycling, composting and/or processing programs/efforts that the waste is or will be subject to, and that are adequately within the control of the applicant to manage or facilitate, including relevant metrics to evaluate effectiveness; and a description of ongoing efforts to increase the effectiveness of these programs/efforts.

WASTE MANAGEMENT DISPOSAL	44	MAINE HAZARDOUS
SERVICES OF MAINE, INC.	)	WASTE, SEPTAGE AND
CROSSROADS LANDFILL	)	SOLID WASTE
PHASE 14 EXPANSION	)	MANAGEMENT ACT
NORRIDGEWOCK	)	
SOMERSET COUNTY, MAINE	)	
#S-010735-WD-YB-N	)	
(APPROVAL WITH CONDITIONS)	)	NEW LICENSE

In its Determination of Public Benefit Application, dated July 2, 2018, WMDSM provided information on the wastes proposed to be disposed in the Phase 14 expansion and the viable management options for these wastes, as related to the solid waste management hierarchy and potential and marketability for recycling, that are adequately within the control of WMDSM to accomplish or facilitate. The types of waste and relative percentages of total waste tonnage proposed to be accepted by WMDSM is expected to be unchanged with development of the Phase 14 expansion. Since 2004, approximately 27% of the wastes managed at the Crossroads Landfill facility have been special wastes, 25% have consisted of ADC, and 24% have constituted CDD which includes oversized bulky items. The balance, 24%, is MSW. WMDSM notes that "the vast majority of wastes [special waste, ADC and CDD] accepted at the Crossroads Landfill cannot be incinerated and have been processed, recycled or reduced to the maximum extent practicable" (Volume I of the application, page 31).

WMDSM operates a Single-Sort Recycling Program that provides recycling services to nearly 30 communities, businesses and institutions. A table of these entities are provided as Table S15-1 in Volume I of the application, page 29 and a figure depicting the regions within Maine served by WMDSM is provided as Figure S15-1 in Volume I of the application, page 30. In addition to its Single-Sort Recycling Program, WMDSM administers a waste evaluation and consulting program to reduce waste generation at its source, a battery and e-waste diversion program, a partnership with BDS Waste Disposal to beneficially reuse tires and blasting mats, a corrugated cardboard recycling program, and a landfill gas renewable energy plant (Volume I of the application, page 31).

To further reduce waste, WMDSM launched an Organics Diversion Program to assist large-volume businesses and institutions in diverting organic materials from the MSW stream. In 2018, WMDSM partnered with the Town of Farmington to develop and operate a composting facility. WMDSM also intends to develop a composting operation at the Crossroads Landfill facility to serve nearby communities and commercial entities.

The Department finds that WMDSM has active recycling and reuse programs that divert waste from the Crossroads Landfill facility. The Department further finds that WMDSM's purpose and practices of the proposed Phase 14 expansion are consistent with the applicable State laws and Rules relating to the solid waste management hierarchy provided that WMDSM submits with each facility Annual Report, beginning after the commencement of operations in the Phase 14 expansion, a summary of the steps taken in the reporting year to continue to meet the solid waste management hierarchy, a description of ongoing efforts to increase the effectiveness of these programs/efforts, and any additional pertinent information relating to meeting the solid waste management hierarchy.

WASTE MANAGEMENT DISPOSAL	45	MAINE HAZARDOUS
SERVICES OF MAINE, INC.	)	WASTE, SEPTAGE AND
CROSSROADS LANDFILL	)	SOLID WASTE
PHASE 14 EXPANSION	)	MANAGEMENT ACT
NORRIDGEWOCK	)	
SOMERSET COUNTY, MAINE	)	
#S-010735-WD-YB-N	)	
(APPROVAL WITH CONDITIONS)	)	NEW LICENSE

19. RECYCLING

In addition to demonstrating compliance with the State's solid waste management hierarchy, State law at 38 M.R.S. § 1310-N(5-A) requires WMDSM to demonstrate that the proposed Phase 14 expansion will accept solid waste that is subject to recycling and source reduction programs, voluntary or otherwise, at least as effective as those in the statute and other provisions of State law; and WMDSM has shown consistency with the recycling provisions of the State Plan. Similarly, 06-096 C.M.R. ch. 400, § 6(B) requires a determination by the Department that the volume of the waste and the risks related to its handling and disposal have been reduced to the maximum practical extent by recycling and source reduction prior to being landfilled or incinerated, consistent with state recycling programs and the State Plan.

WMDSM has operated a Single-Sort Recycling Program within its disposal territory since 2010. As stated in the application, WMDSM provides recycling services to nearly 30 communities, businesses and institutions. From 2015 to 2017, WMDSM's Single-Sort Program, including cardboard, diverted 17,516.07 tons of recycled material from disposal (Volume I of the application, page 30). As stated in Finding 18 above, WMDSM also administers a waste evaluation and consulting program to reduce waste generation at its source, a battery and e-waste diversion program, a partnership with BDS Waste Disposal to beneficially reuse tires and blasting mats, a corrugated cardboard recycling program, and a landfill gas renewable energy plant (Volume I of the application, page 31). Further, WMDSM plans to significantly enhance its Airport Road Transfer Station to better divert a range of materials including recyclables, organics, textiles, household hazardous materials, electronic wastes, and clean wood wastes. Additional detail regarding these efforts can be found in Finding 20 of this license.

The Department finds that WMDSM has demonstrated that material proposed to be landfilled in the proposed Phase 14 expansion has been reduced to the maximum practical extent by recycling and source reduction prior to being landfilled provided that WMDSM collect and report with each Annual Report data on the amount of waste received, the sources of the wastes, and the estimated recycling rates associated with waste received from each of the nine-member communities that utilize WMDSM's Airport Road Transfer Station in accordance with Condition 3(E) of Department License #S-010735-W5-XY-N.

20. PUBLIC BENEFIT DETERMINATION

Pursuant to the provisions of 38 M.R.S. § 1310-AA and in accordance with 06-096 C.M.R. ch. 400, § 5, proposals for new or expanded solid waste disposal facilities must be found by the Commissioner to provide a substantial public benefit. The Department issued a

WASTE MANAGEMENT DISPOSAL	46	MAINE HAZARDOUS
SERVICES OF MAINE, INC.	)	WASTE, SEPTAGE AND
CROSSROADS LANDFILL	)	SOLID WASTE
PHASE 14 EXPANSION	)	MANAGEMENT ACT
NORRIDGEWOCK	)	
SOMERSET COUNTY, MAINE	)	
#S-010735-WD-YB-N	)	
(APPROVAL WITH CONDITIONS)	)	NEW LICENSE

Public Benefit Determination decision to WMDSM on December 21, 2018 (License #S-010735-W5-XY-N). As part of its Determination of Public Benefit Application, WMDSM proposes to expand and reconfigure its Airport Road Transfer Station; construct and operate a compost facility; develop and implement a textile diversion and reuse program; host an annual household hazardous materials collection event; and host a series of informational meetings to gather recycling data, identify barriers and explore steps to increase recycling. WMDSM must implement all proposed reuse, reduction, recycling and composting programs proposed in Department License #S-010735-W5-XY-N (Condition 3(C)) on or before the commencement of operations in Phase 14. In its February 14, 2020 comments to WMDSM on Volume I of the application, the Department requested a status update on these initiatives.

(1) Expansion of Airport Road Transfer Station

WMDSM notes that it anticipates construction of the upgraded Airport Road Transfer Station will take place within 24 months of obtaining all necessary regulatory permits for the proposed Phase 14 expansion and is expected to have construction completed prior to beginning operation of Phase 14 (March 31, 2020 Applicant Response to Department comments, page 11). WMDSM plans to develop and provide educational materials to its customers associated with the launch of the upgraded Airport Road Transfer Station. In the meantime, WMDSM is providing its municipalities and commercial customers with educational materials associated with recycling best practices.

Further, WMDSM notes that it has operated a targeted initiative for the past year that is aimed at reducing contamination within its Single-Sort Recycling Program. WMDSM personnel inspects each load of recyclable materials entering the Crossroads Material Recovery Facility to determine general contamination levels. Loads with significant amount of contamination are flagged and photographed for documentation purposes which enables WMDSM to identify municipalities and commercial customers with routinely high contamination rates. WMDSM then works with identified customers to develop a strategy for reducing contamination in future recycling loads. WMDSM comments that their decontamination initiative has proven highly effective and it has seen significant improvements in contamination rates from recycling loads (March 31, 2020 Applicant Response to Department comments, page 12).

(2) Organics Diversion and Reuse

WMDSM notes that it anticipates construction of its organics facility will take place within 24 months of obtaining all necessary regulatory permits for the proposed Phase 14 expansion and is expected to have construction completed prior to beginning operation of Phase 14. Further, WMDSM continues to work closely with the Farmington Compost Cooperative to facilitate its organics program. Organic material was temporarily staged at the Crossroads Landfill facility in 2018 and 2019 to assist with this effort. In addition, WMDSM purchased finished compost product from the Farmington Compost Cooperative and offered it to customers utilizing the Airport Road Transfer Station free of charge. Finally, WMDSM donated a vehicle to the Farmington Compost Cooperative to assist with its compost collection efforts (March 31, 2020 Applicant Response to Department comments, page 12).

(3) Textile Diversion and Reuse

WMDSM specifies that it anticipates launching its Textile Diversion and Reuse program with the opening of the upgraded Airport Road Transfer Station and anticipates developing a specific location within the upgraded Airport Road Transfer Station to facilitate collection of textiles. Educational materials will be prepared and provided by WMDSM for the launch of the upgraded Airport Road Transfer Station and will highlight textile collection capabilities and the general importance of keeping textiles out of the MSW stream (March 31, 2020 Applicant Response to Department comments, page 12).

(4) Household Hazardous Materials Collection and Reuse Program

WMDSM held a Household Hazardous Materials Collection Event on August 24, 2019 as part of its proposed Phase 14 Expansion Hazardous Materials Diversion Program. Residents of the nine member communities were encouraged to participate in the event free of charge. Further, WMDSM notes that it planned to hold a second collection event on August 8, 2020. WMDSM will engage a licensed hazardous materials management company to plan and implement the events (March 31, 2020 Applicant Response to Department comments, page 13).

(5) Informational Meetings

As noted above, WMDSM is currently engaged in informational discussions with its customers regarding recycling best practices. WMDSM seeks feedback from its customers regarding the challenges faced by their recycling programs. WMDSM

specifies that its "customers cite the same central and critical challenge: the astronomical price increases within the recycling market" (March 31, 2020 Applicant Response to Department comments, page 13).

WMDSM notes that it "remains committed to assisting recycling programs within its disposal network through circulation of educational materials, cost-effective rates and its affirmative efforts to minimize recycling contamination to abate the fees that its customers would otherwise be assessed" (March 31, 2020 Applicant Response to Department comments, page 13).

The Department determined in the Public Benefit Determination for the proposed Phase 14 expansion that WMDSM provides a critical role in maintaining competitive markets for solid waste services in Maine beyond the year 2024; meets capacity needs of the relevant local communities and the region; and meets the State waste management goals provided that it meet certain conditions. These conditions include, but are not limited to, that (1) the Department be notified in advance to identify alternatives to landfilling if exceptional circumstances arise requiring out-of-state MSW to be disposed of in Phase 14; (2) no disposal of marketable recyclables in Phase 14; (3) all proposed reuse, reduction, recycling and composting programs be implemented on or before commencement of operations in Phase 14; (4) for all municipalities and communities utilizing landfilling at the Crossroads Landfill as their primary option for disposal of MSW, continue to provide the infrastructure and services necessary to reduce the waste landfilled to the maximum extent practicable; (5) WMDSM collect and report data on the amount of waste received, sources of the wastes, and estimated recycling rates associated with waste received for each of the communities that utilize WMDSM's Airport Road Transfer Station; (6) WMDSM report the amount and type of waste received from both in-state and out-of-state generators; (7) WMDSM notify the Department if the amount of non-remediation special waste accepted from out-of-state generators is more than 25% of the annual total of waste disposed in the proposed Phase 14 or that the amount of all wastes accepted from out-of-state generators is more than 35% of the annual total of waste disposed at the facility; and (8) that WMDSM prioritize for disposal Maine generated solid waste.

Based on the ongoing review of the out-of-state generator data, the Department specifies that it may require WMDSM to make adjustments to ensure it continues to provide a substantial public benefit for the disposal of Maine-generated wastes. Further, WMDSM must prioritize for disposal of Maine-generated solid waste provided that the waste meets the facility's waste acceptance criteria as approved by the Department and the waste conforms to WMDSM's established business, administrative, and safety requirements.

The conditions of the Public Benefit Determination License #S-010735-W5-XY-N are included in the conditions of this license.

21. HAZARDOUS AND SPECIAL WASTE HANDLING AND EXCLUSION PLAN

Pursuant to 06-096 C.M.R. ch. 400, § 9(A), only permitted non-hazardous wastes may be accepted for handling at a solid waste facility; the operator shall comply with all applicable Federal and State laws regarding the detection, identification, handling, storage, transportation and disposal of special wastes, biomedical wastes and hazardous wastes; and the operator shall develop and implement a Hazardous and Special Waste Handling and Exclusion Plan for the detection, identification, handling, storage, transportation and disposal of any and all wastes that may be delivered to the facility. Consistent with WMDSM's current license and operations, only non-hazardous waste will be allowed to be accepted in the proposed Phase 14 expansion.

A Hazardous and Special Waste Handling and Exclusion Plan is appended to the Site Operations Manual (Volume V of the application, Section I, Part B, Appendix A) and included in Volume I of the application, Appendix 20A. The Hazardous and Special Waste Handling and Exclusion Plan includes provisions for characterizing and screening wastes prior to acceptance at the landfill facility, initial and ongoing staff training, inspections and reporting, and waste handling, storage, transportation and disposal.

WMDSM notes that nearly all MSW and CDD haulers and generators are bound by preexisting service agreements that prohibit disposal of hazardous materials and that haulers and generators without preexisting service agreements must characterize the contents of loads for review by WMDSM personnel prior to disposal (Volume I of the application, page 38). Further, WMDSM notes that special waste customers must also characterize their waste materials though an interactive web-based computer program. Special waste customers answer a series of questions about their waste stream in order to generate a characterization report. The characterization report is used to determine the proper disposal location for the waste material. Approved special wastes are assigned a unique profile number that must be included on shipping documents and presented to the facility scale operator at the time of arrival. Waste haulers lacking proper profile numbers are not allowed entry to the facility.

WMDSM personnel also carefully observe waste streams during unloading and placement within the landfill. Random inspections are also conducted on the landfill working face to provide more focused observations. WMDSM maintains a log of the results of these random inspections including a list of any unacceptable waste that was identified.

The Department finds that the facility is licensed to accept non-hazardous waste and has an appropriate Hazardous and Special Waste Handling and Exclusion Plan for the detection, identification, handling, storage, transportation and disposal of delivered wastes, pursuant to 06-096 C.M.R. ch. 400, § 9(A).

22. LIABILITY INSURANCE

The Department's rule at 06-096 C.M.R. ch. 400, § 10 requires a solid waste disposal facility, except public entities, to submit proof of liability insurance for the active life and closure of the solid waste disposal facility. WMDSM is a corporate entity and is subject to the liability insurance requirements of 06-096 C.M.R. ch. 400, § 10. WMDSM has submitted evidence of liability insurance coverage for sudden and accidental occurrences of bodily injury and property damage. The certificate of liability insurance is provided in Volume I of the application, Appendix 21A. WMDSM proposes to provide updates to its liability coverage with the annual report throughout the active life and closure period of Phase 14. The level of coverage must be maintained at a minimum of $1,000,000 general liability per occurrence and $2,000,000 annual aggregate. WMDSM's current coverage levels exceed this minimum.

The Department finds that WMDSM is subject to the liability insurance requirements of 06-096 C.M.R. ch. 400, § 10 of the Rules; and that WMDSM has provided evidence of liability insurance coverage for sudden and accidental occurrences of bodily injury and property damage, in accordance with the Rules.

23. CRIMINAL OR CIVIL RECORD

In accordance with 38 M.R.S. § 1310-N(7) and 06-096 C.M.R. ch. 400, § 12, a license for a solid waste facility or activity may be denied if the owner or the operator or any person having a legal interest in the applicant or the facility has been convicted of any criminal law or adjudicated or otherwise found to have committed any civil violation of environmental laws or rules of the State, other states, the United States, or another country.

WMDSM is a corporation in good standing with the Maine Secretary of State, incorporated in December 22, 1983. WMDSM has provided a civil and criminal disclosure statement in accordance with 06-096 C.M.R. ch. 400, § 12 (Volume I of the application, Appendix 23). The disclosure statement identifies Waste Management Holdings, Inc. as having a 25% or greater financial interest in WMDSM and at least a 5% equity interest in WMDSM and numerous other companies in related waste industries.

WMDSM, those having a 25% or greater financial interest in WMDSM, and its officers and directors have not been the subject of any administrative consent agreements or consent decrees or had any administrative orders directed at them for violations of environmental laws or rules administered by the Department, the State, other states, the United States or another country in the 5 years preceding the filing of this license application. Those listed have not been convicted of any criminal violations.

The Department finds that WMDSM, those having a 25% or greater financial interest in WMDSM, and its officers and directors have not been convicted of any criminal violations nor been the subject of any administrative consent agreements, consent decrees, or had any administrative orders directed at them for violations of environmental laws or rules administered by the Department, the State, other states, the United States or another country in the 5 years preceding the filing of this license application.

The Department further finds that WMDSM filed complete disclosure statements as required by applicable State law and Rule. Based on the disclosure statements submitted and the evaluation criteria contained in 06-096 C.M.R. ch. 400, § 12(B), the Department finds no basis for denying the license.

24. VARIANCES

Pursuant to 06-096 C.M.R. ch. 400, § 13, an applicant may seek a variance to the requirements of the Rules for establishing, altering, operating or closing a solid waste facility or handling solid waste provided the applicant demonstrates that its proposal will comply with the intent of State laws and the Rules.

In a September 23, 2020 Response to Department Comments and based on conversations with the Department, WMDSM requested a variance, for limited portions of the Phase 14 expansion footprint, from the Restrictive Siting Criteria of 06-096 C.M.R. ch. 401, § 1(C)(3)(b) which requires that the area within the solid waste boundary be located on soils that contain sufficient fines and clay-size particles to minimize infiltration of leachate. The in-situ soils must have an undisturbed hydraulic conductivity of less than or equal to 1×10^{-5} cm/sec. Small areas within the footprint of the proposed Phase 14 expansion, estimated to be about 5.9% in total, have a limited extent of in-situ clay soils. In support of its variance request, WMDSM proposes to add a silt-clay layer with a hydraulic conductivity of 1×10^{-5} cm/sec in accordance with the provisions outlined in Finding 26(B) of this license.

The Department finds that the applicant has presented clear and convincing evidence that the intent of State laws and the purpose and intent of Rules will be met with the addition

of a silt-clay layer with a hydraulic conductivity of 1×10^{-5} cm/sec within a limited extent of the proposed Phase 14 expansion area.

SOLID WASTE SITING, DESIGN, AND OPERATION

25. SITE ASSESSMENT: GEOLOGIC AND HYDROGEOLOGIC

In accordance with 06-096 C.M.R. ch. 401, § 2(B) and (C), an applicant must submit the results of site investigations and assessments performed to properly describe the surficial stratigraphy and bedrock beneath and adjacent to the proposed solid waste boundary; ground and surface water investigations performed to determine water table information and horizontal and vertical ground water flow gradients and for phreatic surface (water table) observations; and geotechnical investigations to support the stability and settlement assessments. WMDSM submitted a Geologic and Hydrogeologic Assessment as Volume III of the application, prepared by Golder Associates. WMDSM must demonstrate that the proposed Phase 14 expansion meets the performance standards and siting criteria in 06-096 C.M.R. ch. 401, § 1(C).

Department staff reviewed the geological and hydrogeological aspects of the proposed Phase 14 expansion prior to the hearing and submitted comments to WMDSM in several memoranda. WMDSM addressed staff comments, completed additional investigations, and made a number of adjustments to the application in response to those comments.

A. <u>General Site Geology Description</u>

The landfill facility is located in an area that includes “till on top of the bedrock surface, followed by overlying glaciofluvial deposits, glaciomarine bottom sediments, proglacial fluvial or nearshore marine sediments, windblown sand, and river terrace deposits as well as recent alluvium along the major river valleys” (Volume III of the application, page 6). There are also local accumulations of windblown sand and silt. Silty fine sand was encountered at or within approximately 6 inches of the ground surface in most borings completed within the proposed Phase 14 expansion area. Beneath the sand, silt and clay interpreted to be of the Presumpscot Formation was found in all borings completed within the proposed Phase 14 expansion footprint. There are two silt and clay units described separately as stiff upper clay and soft lower clay, ranging in thickness from 2 to 3 feet in the northwest portion to 18 feet along the southwest and southeast perimeter of the proposed Phase 14 expansion footprint. No soft clay was encountered in the northern portion of the proposed Phase 14 expansion area. Where both types of clay are present, contact between the layers transition between one to five feet, also

north to south. Moist to wet glacial till with a medium density and a thickness of 8.3 to 20.6 feet within the Phase 14 footprint underlies the Presumpscot silt and clay. Bedrock comprised of metasedimentary rock of the Sangerville Formation and intrusive igneous rock was encountered underlying the glacial till. The top of bedrock slopes from an elevation of approximately 280 feet above mean sea level on the north-northeast side of the proposed expansion to less than 250 feet above mean sea level on the south-southeast side. The proposed base grades of the Phase 14 expansion are generally coincident with the top of the Presumpscot clay.

Hydraulic conductivities were measured during previous WMDSM investigations and submitted with Volume III of the application and the Supplemental Geologic and Hydrogeologic Report requested by the Department, having the following results: clay ranges from 1.3×10^{-7} to 1.9×10^{-5} centimeters per second ("cm/sec"); glacial till ranges from 1.9×10^{-7} to 2.3×10^{-2} cm/sec and bedrock ranges from 9.8×10^{-7} to 2.8×10^{-4} cm/sec. Vertical hydraulic conductivity across the clay-till interface ranged from 3.1×10^{-7} to 4.1×10^{-6} cm/sec, within the till ranged from 2.1×10^{-8} to 6.4×10^{-7} cm/sec and within the bedrock ranged from 1.6×10^{-8} to 4.2×10^{-7} cm/sec, respectively.

Based on the information in the application and supporting documents in the record, the Department finds that WMDSM characterized the site geology in accordance with the requirements of 06-096 C.M.R. ch. 401, § 2(B)(1).

B. General Site Ground and Surface Water Description

Water levels were measured on multiple occasions in various soil units and at several stream locations between 2017 and 2019 with the data presented in Volume III of the application, Tables 2, 3a and 3b. Measurements indicate that the silty fine sand is only seasonally saturated in some areas. The silty fine sand will be removed from the base portion of the proposed Phase 14 expansion footprint as part of construction. A continuous phreatic surface is present in the Presumpscot clay layer with the approximate seasonal high phreatic surface within the proposed Phase 14 expansion footprint ranging from an elevation of 290 feet above mean sea level in the north to approximately 275 feet above mean sea level along the south side of Phase 14. The contractor will be required to control ground water locally near the excavation while establishing the liner system subgrade. The direction of ground water flow in the glacial till in the area of the proposed Phase 14 expansion ranges from the northeast to the southwest and from the northwest to the southeast. The overall direction of ground water flow in bedrock is from the north to the south. Golder Associates notes that "[t]he presence of [a] groundwater divide precludes

groundwater flow from Phase 14 to the "Significant Sand and Gravel Aquifer" located along the banks of the Kennebec River, the Town of Norridgewock water supply well, and the Kennebec River. Groundwater east of the divide flows away from Phase 14 and towards the Kennebec River" (Volume III of the application, page 19). Seasonal high phreatic surface maps and seasonal high potentiometric maps for glacial till and bedrock are provided in Volume III of the application.

Ground and surface water levels were measured at seven stream locations. The streams are identified as intermittent Class B streams; two of which are identified as potential sensitive receptors. In general, these water level measurements indicate that the streams in the area of the proposed Phase 14 expansion footprint are either losing streams where surface water recharges ground water or areas where surface water is perched on top of Presumpscot clay.

Based on the information in the project record, the Department finds that WMDSM characterized the site hydrogeology in accordance with the requirements of 06-096 C.M.R. ch. 401, § 2(B)(2).

C. Site Investigations and Proposed Expansion Area Specifics

WMDSM submitted data and summaries of site-specific subsurface investigations conducted in the area of the proposed Phase 14 expansion in 2017 through 2019. Information from historic investigations conducted within the landfill facility were also included as applicable. The subsurface investigations included both information obtained by Golder Associates and Geosyntec Consultants and information obtained from supplemental investigations subsequent to submittal of the Phase 14 expansion application derived from the following:

(1) Installation of 64 overburden monitoring wells and piezometers;

(2) Installation of 4 bedrock monitoring wells;

(3) Installation of 7 piezometers/staff gauges to measure stream flow;

(4) Collection of 25 soil samples for laboratory testing of grain size, Atterberg limits and/or permeability;

(5) Slug testing of 40 monitoring wells and piezometers;

(6) Completion of 29 rounds of water level measurements;

(7) Piezocone penetration testing at 46 locations;

(8) Completion of 22 geotechnical borings;

(9) Installation of 14 vibrating wire piezometers and 6 standpipe piezometers;

(10) Completion of a bedrock pumping test and installation of two additional piezometers for evaluation of the hydraulic properties of Presumpscot clay; and

(11) Water quality testing of the background ground water.

The information collected, specific methods used, and the results of the investigations were included in the application. The results of the investigations were utilized to understand and evaluate the site characteristics and as a basis for the engineering design of the proposed Phase 14 expansion. Over the course of the review and comment period on the application, the Department requested the collection of supplemental data, most significantly a pumping test in the proposed Phase 14 expansion area to assess vertical hydraulic conductivity. WMDSM provided, in the application, the results of 1991 and 1992 pumping tests conducted in other areas of the landfill facility site to support previous expansions. While these previous pumping tests provided vertical hydraulic conductivity estimates, the Department noted that the soft gray clay only and not the stiff brown clay was tested. As justification for an additional pumping test, the Department noted that the soft clay tested at the other landfill phases varies from 21.5 to 78.0 feet thick, much greater than the 0 to 17.2 feet thickness within the proposed Phase 14 expansion footprint.

In response to the Department's request to conduct a pumping test, WMDSM submitted a detailed plan, dated May 29, 2020 and revised based upon Department comments, to conduct a pumping test at the proposed Phase 14 expansion area. The plan included pumping one monitoring well and observation of the response in two observation wells installed and screened in the till and clay nearby together with five other previously installed piezometers and eleven other monitoring wells representative of all geologic units. The Department approved the plan on June 5, 2020. Results of the pumping test were reported in a Supplemental Geologic and Hydrogeologic Report submitted to the Department on July 31, 2020.

D. Time-of-Travel Calculations

The Rules at 06-096 C.M.R. ch. 401, § 2(C)(2), in part, require a calculation of ground water time of travel from the bottom of the landfill to all identified sensitive receptors. The time of travel from the bottom of the landfill to sensitive receptors must be greater than 6 years. In-situ hydraulic conductivity test results must be utilized in the calculation.

Golder Associates used average values for input parameters in the time-of-travel analysis to reflect the range of values that exist over an extended flow pathway. The Department commented that the highest vertical hydraulic conductivity values observed should be used in the analysis as a conservative approach. The estimates of vertical hydraulic conductivity submitted were based on laboratory measurements and yielded results with differences in hydraulic conductivity between the field-measured slug test results and the laboratory tests. The Department concluded that undetected fractures in the clay can allow rapid transport of contaminants to aquifers beneath the clay and additional information about the vertical hydraulic conductivity of the clay was needed (Department April 15, 2020 Memorandum, page 5). The pumping test described in the July 31, 2020 Supplemental Geologic and Hydrogeologic Report revealed vertical hydraulic conductivity values less than those derived from laboratory tests. The Department notes that although these results don't preclude the presence of fractures in the clay, they support the claim that vertical hydraulic conductivity in the clay is less than the horizontal hydraulic conductivity. Golder Associates provided supplemental time-of-travel calculations, which used the 95% upper confidence limit of hydraulic conductivity values as specified in their Supplemental Geologic and Hydrogeologic Report.

The Rules at 06-096 C.M.R. ch. 401, § 2(G) require a thorough analysis of the proposed site and the adjacent area that could be affected during operation and after closure of the landfill in the event of releases of contaminants to ground water beyond engineered systems. The purpose of this analysis is to identify the potential for an unreasonable threat to all identified sensitive receptors and to identify any operational or monitoring measures needed to ensure protection of the sensitive receptors. A sensitive receptor is defined in 06-096 C.M.R. ch. 400, § 1(Aaa) as public and private water supply aquifers and wellhead protection zones; public and private drinking water supplies; significant ground water aquifers and primary sand and gravel recharge areas; sand and gravel deposits; and Class AA, A and B surface water bodies and great ponds. Golder Associates identified potential pathways from theoretical release points to three identified potential sensitive receptors (two

Class B streams downgradient of the proposed Phase 14 expansion and the new on-site office well).

For each of the identified potential sensitive receptors, the closest leachate sump within the proposed Phase 14 expansion is identified as the theoretical discharge point where leachate could theoretically accumulate enough to create hydraulic head on the liner sufficient for a leachate release to occur. These pathways included:

(1) Pathway 1 - Cell 14E sump to the stream west of Phase 14 (near stream gauge/piezometer S-5);

(2) Pathway 2 - Cell 14A sump to the stream south-southeast of Phase 14 (near stream gauge/piezometer S-4); and

(3) Pathway 3 - Cell 14A sump to WMDSM's new office well.

In its review comments of June 22, 2020, the Department requested that consideration be given to two alternative pathways: (1) a vertical path through the clay, then a horizontal path through the glacial till (referred to by Golder Associates as MEDEP Pathway 1); and (2) a short-circuited path through the clay through fractures (referred to by Golder Associates as MEDEP Pathway 2).

WMDSM provided results of the time-of-travel calculations for all identified pathways, including those requested by the Department. The analysis also incorporated results from the pumping test and evaluation of travel times using a range of input values to assess the sensitivity of the calculations to more conservative input parameters. The results are presented in the table below. Calculations for each of the flow paths were made by calculating a seepage velocity for each component of the flow pathway and multiplying the seepage velocity by the length of the pathway. Time-of-travel values as submitted in the application were based upon average hydraulic conductivity and horizontal hydraulic gradient values. Golder Associates used site-specific values for input parameters to the time-of-travel analysis to reflect the range of values that exist over an extended flow pathway through different geologic units.

The following table summarizes the time-of-travel analysis results based on both average and high-end conditions. Average conditions are based on a geometric mean vertical hydraulic conductivity of 1.87×10^{-7} cm/sec based on individual permeameter and pumping test results while high-end conditions are based on the

95% upper confidence level of the same data which equals 8.99 x 10^{-7} cm/sec (Supplemental Geologic and Hydrogeologic Report, Golder Associates, page 20).

Table 5: Time-of-Travel Results

	Time-of-Travel for Average Conditions	**Time-of-Travel for High-end Conditions**
Pathway Name	Time of Travel (years)	
Pathway 1	955	44
Pathway 2	2,050	95
Pathway 3	111	6.8
MEDEP Pathway 1	115	16
MEDEP Pathway 2	190	27.4

Based on the information in the record, the Department finds that WMDSM has submitted a site assessment report and subsequent information satisfactorily addressing Department review comments, identified the site characteristics and recommendations for landfill design and construction, identified sensitive receptors, and estimated ground water flow time of travel as required by 06-096 C.M.R. ch. 401, §§ 2(B) and (C). See Finding 32 of this license for further discussion regarding the Water Quality Report and Ground Water Monitoring Program. The Department further finds that WMDSM meets the Rule requirements for ground water time of travel from the bottom of the landfill liner system to all identified sensitive receptors.

E. Geotechnical Investigation

WMDSM submitted the results of its geotechnical investigations as part of Volume IV of the application. Based on that information including published data, on-site field and laboratory data, and specific seismic information, the Department finds that WMDSM gathered adequate information to support the stability and settlement assessments described in Findings 27A and B of this license, as required by 06-096 C.M.R. ch. 401, § 2(B)(3).

26. DESIGN STANDARDS: ENGINEERING

The Department's rule at 06-096 C.M.R. ch. 401, § 2(D) requires an engineering design for a proposed landfill to meet specific design and performance standards. WMDSM submitted engineering design information in support of the proposed Phase 14 expansion (Volume IV of the application). As noted previously, a number of comments and responses

occurred between Department staff and WMDSM on the technical aspects of the proposed expansion design.

In general, WMDSM's design of the proposed Phase 14 expansion consists of a composite liner system, leachate and gas collection and control systems, and intermediate and final cover systems. The outer side slopes are designed at 3H:1V, with a maximum final elevation of 470 feet NAVD88. Five operational cells (Phases 14A though 14E) are proposed. WMDSM submitted a detailed engineering design including calculations, drawings, contract administrative documents, technical specifications and a construction quality assurance plan with the application. Similar detailed engineering designs are required to be submitted for Department review and approval prior to the first and each subsequent cell's construction.

A. Liner System Requirements

The proposed liner system consists of a composite liner system consisting of a 60-mil HDPE textured geomembrane, a geosynthetic clay liner ("GCL"), and a 12-inch compacted clay layer with a hydraulic conductivity less than or equal to 1 x 10^{-7} cm/sec. A few commentors on the draft license decision noted that all liners leak and that an adequate leak detection system is not included in the design of the proposed Phase 14 expansion. The Department's rules at 06-096 C.M.R ch. 401, § 2(D)(1) require that a liner system include at least a composite liner consisting of a geomembrane and a barrier soil layer with a minimum thickness of 24 inches. A GCL may substitute for up to 12 inches of the barrier soil layer component of the liner system. Additionally, a dedicated leak detection system is not required by 06-096 C.M.R ch. 401.

WMDSM proposes to conduct an Electrical Leak Location Survey at the completion of each cell's construction to verify the integrity of the geomembrane liner following installation and prior to waste disposal, providing added post-construction quality control (September 23, 2020 Applicant Response to Department Comments). The survey utilizes electrical conductivity techniques to detect leaks in the geomembrane and will be conducted once the leachate collection system has been placed on top of the geomembrane but prior to waste placement. The Department notes that this is the most appropriate time period for the assessment of potential damage to a geomembrane as waste materials will not be placed in contact with the geomembrane. The survey will address the performance standards of 06-096 C.M.R. ch. 401, § 1(C)(a) to ensure that the proposed landfill expansion does not contaminate ground water outside the solid waste boundary.

The Department received eleven comments during the public hearing concerning the potential that the liner systems will eventually leak and potentially impact ground water. The construction process will include an electrical leak location survey of the geomembrane to verify the integrity of the geomembrane after it has been installed; the specifications for the geomembranes require compliance with American Society for Testing and Materials ("ASTM") standards including stress cracking standards; construction specifications and practices will mitigate pressure points beneath the geomembrane that could lead to stress cracks; the proposed expansion design eliminates liner penetrations for piping; and limits hydraulic pressure on the liner by following the natural sloping contour of the land to the leachate sump. The potential for impacts from environmental exposure will be mitigated by covering of the geomembrane with a drainage geocomposite and sand layer. Further, continuous site inspections will be conducted by qualified construction quality assurance personnel separate from the owner/operator and contractor during liner system construction. Thus, the potential for leakage is unlikely.

The Department finds that the liner system proposed by WMDSM was designed in accordance with 06-096 C.M.R ch. 401, § 2(D)(1). The Department also finds that the geomembranes, GCLs, drainage geocomposites, and soils proposed will meet the performance requirements of the Rules, including material characteristics (i.e., Geosynthetic Research Institute standards and ASTM standards) and installation requirements. Further, WMDSM will be required to submit detailed design packages including the engineering design, drawings, contract administrative documents, technical specifications and a construction quality assurance plan to the Department for review and approval prior to the construction of each phase.

B. Base Preparation Below Liner Systems

The Department's rules at 06-096 C.M.R. ch. 401, §§ 1(C)(3)(b) and 2(D)(3)(d) require base materials to contain sufficient fines to result in an undisturbed hydraulic conductivity of less than or equal to 1×10^{-5} cm/sec. Within the proposed Phase 14 expansion footprint, the subsurface stratigraphy, from top to bottom, consists of undifferentiated surficial soils (i.e., topsoil and stockpiled materials), Eolian silty fine sand ranging in thickness from zero feet in the central portion to 18 feet in the southeast portion of the proposed Phase 14 expansion footprint; Presumpscot clay ranging in thickness from 2 to 3 feet in the northwest portion to 18 feet along the southwest and southeast perimeter of the proposed Phase 14 expansion footprint; Glacial till ranging in thickness from 2 feet in the central portion to 16 feet in the western portion of the proposed Phase 14 expansion

footprint and bedrock (September 23, 2020 Applicant Response to Department Comments, Attachment B, page 2). Eolian silty sand will be removed from the base portion of the proposed Phase 14 expansion footprint prior to placement of the liner system. The silty sand will be replaced with compacted silty clay material having a hydraulic conductivity of less than or equal to 1×10^{-5} cm/sec, where needed, to achieve the required subgrade elevations (Volume IV of the application, page 4).

At the location of the proposed Phase 14 landfill expansion, the clay typically consists of two types: a stiff upper clay transitioning to and underlain by a soft lower clay. This is true in much of the Phase 14 area with the exception of the north-northwest portion of the proposed Phase 14 expansion and in isolated areas near the southwest end of the proposed Phase 14D expansion area and the south perimeter of the proposed Phase 14C expansion area where stiff upper clay is present without the lower soft clay (Volume III of the application, Section 4.2, pages 13-14). In Department comments dated September 9, 2020, the Department requested that WMDSM propose a method or methods to address the areas with limited extent of the soft clay within the footprint of the proposed Phase 14 expansion.

WMDSM proposes to excavate the surface to the depth of the liner system subgrade in areas of the base of the landfill where there is no soft lower clay and where excavation to the liner system subgrade elevation will terminate within the stiff upper clay. The clay will then be scarified to a depth of approximately eight inches and recompacted using a pad-foot compactor to produce the kneading action that will result in a homogeneous low-permeability layer. Compaction criteria for the recompacted in-situ clay layer will be established based on pre-construction density and permeability testing of remolded soil. Thin-walled tube samples from the recompacted soil layer will be obtained at a frequency of one per acre and sent to a geotechnical laboratory to verify that the soil has achieved the required hydraulic conductivity of 1×10^{-5} cm/sec. After the confirmation testing is complete demonstrating that the 1×10^{-5} cm/sec criterion has been achieved, the 1-foot thick 1×10^{-7} cm/sec compacted clay component of the proposed liner system will be constructed directly on the recompacted in-situ clay surface (September 23, 2020 Applicant Response to Department Comments, Attachment B, pages 3-4).

Where there is no soft lower clay and where over-excavation is needed to remove the Eolian silty fine sand within the base of the landfill down to the surface of the stiff upper clay, the surface of the stiff upper clay will be scarified prior to placement and compaction of silt-clay layer up to the liner system subgrade

elevation. Compaction criteria for the clay backfill will be established by pre-construction density testing and permeability testing of remolded soil. After the confirmation testing is complete demonstrating that 1×10^{-5} cm/sec criterion has been achieved, the 1-foot thick 1×10^{-7} cm/sec compacted clay component of the proposed liner system will then be constructed directly on the compacted clay layer. In areas under the liner system sideslopes where there is no soft lower clay and where the liner system subgrade will terminate in the in-situ Eolian silty fine sand slope excavation and/or where the sideslopes will be created by the inner structural fill-slope of the MSE berm, WMDSM will remove an additional 1-foot of the sand and replace it with a 1-foot thick compacted silt-clay layer and/or on the excavated portion of the sideslope will leave the inner fill sideslope of the MSE berm 1-foot low and will place an extra 1-foot thick compacted silt-clay layer on that portion of the sideslope (September 23, 2020 Applicant Response to Department Comments, Attachment B, page 4).

Based on the information provided by WMDSM, the Department finds that the base preparation below the liner system proposed by WMDSM was designed in accordance with 06-096 C.M.R. ch. 401, § 2(D)(3) and that the materials proposed for placement will meet the performance criteria in the Rules, including gradation, moisture content, density, and hydraulic conductivity.

C. Leachate Conveyance System and Storage Structure Standards

WMDSM submitted leachate collection and conveyance system designs for the proposed Phase 14 expansion to handle the predicted leachate and landfill gas condensate flows. The leachate management system components include leachate collection, landfill gas condensate collection, leachate transport from the landfill to on-site storage, and the on-site leachate storage tank. The leachate collection and gas condensate systems include pumping systems and force mains to pump flows from each collection point to the tank. The design of the piping system for collection and conveyance accounts for the stresses due to dynamic and static loading conditions and climate effects anticipated over the life of the landfill. System designs also address filter criteria such as sizing of piping perforations, soil gradation, and component interfaces, so that clogging of the systems will be minimized. The systems were designed for use during operations, closure, and post-closure. All piping components are designed with access for inspection and cleaning.

(1) Leachate Collection System

The leachate collection system was designed to allow all leachate to drain to a collection sump at the low point of the individual cells of each landfill phase. Each proposed landfill phase will have multiple 8-inch diameter perforated HDPE lateral collection pipes spaced approximately 120 feet apart that convey leachate to a header pipe which discharges to a collection sump. Components of the leachate collection system include collection piping, 12 to 24 inches of sand with a hydraulic conductivity greater than or equal to 1×10^{-2} cm/sec, a non-woven geotextile, 1.5-inch crushed stone around the piping, and a drainage geocomposite.

WMDSM used the U.S. Environmental Protection Agency Hydrogeologic Evaluation for Landfill Performance (HELP) Model, Version 3.07, to estimate leachate generation rates for the proposed Phase 14 expansion. Analyses were conducted using four representative waste placement conditions and considered the effects of reduced transmissivity of the drainage geocomposite with increased waste load and possible chemical and biological clogging. The peak monthly leachate generation was calculated to be 29,695 gallons per day per acre which corresponded to the 10-foot waste lift with daily cover condition (Volume IV of the application, Appendix IV(e)(i), page 4). Under that condition, the peak leachate depth over the liner system was calculated to be 11 inches which is less than the 12 inches required in 06-096 C.M.R. ch. § 2(D)(4), except for in collection sumps. The leachate levels within each leachate collection sump will be monitored using pressure transducers.

The leachate collection sump pipes will accommodate a primary submersible sump pump and an auxiliary submersible pump. The pumps will have a flow capacity greater than the estimated peak leachate generation rate of each landfill phase. Leachate from the proposed Phase 14 expansion will be conveyed from each sump to the existing South Central Pump Station.

The Department finds the leachate collection system proposed by WMDSM was designed in accordance with 06-096 C.M.R. ch. 401, § 2(D)(4).

(2) Leachate Recirculation

WMDSM intends to recirculate leachate from the proposed Phase 14 expansion to enhance degradation of the waste placed in Phase 14. WMDSM specifies that "[t]he recirculation approaches and methodologies will be consistent with those approved by MEDEP for the Phase 8 landfill" (Volume IV of the application, Section 3.6.3, page 19). A Leachate Recirculation Plan was submitted in Volume IV of the Application, Appendix IV(i), Appendix A. The Leachate Recirculation Plan describes the method of leachate recirculation, allowable leachate recirculation quantity, limitations, performance monitoring, training, and reporting. The quantity of leachate recirculated will be determined based on site-specific factors such as efficiency of the leachate collection system, performance of the landfill gas collection and control system, landfill stability, and the anticipated schedule for final cover system construction. A summary of leachate recirculation activities occurring throughout the year will be provided with each facility Annual Report.

In support of its alternative final cover system design, WMDSM specifies that leachate recirculation "will enhance and accelerate waste degradation, reduce the amount of leachate treated and disposed offsite, and will facilitate more efficient generation of landfill gas that is used to generate electricity at the on-site LFGTE facility" (Volume IV of the application, Appendix IV(i), page 11). Performance monitoring to assess the effectiveness of leachate recirculation will include an ongoing trend assessment of landfill gas constituents (i.e., oxygen, methane, and carbon dioxide); the ratio of biological oxygen demand to chemical oxygen demand in leachate; temperature, pH and chloride concentrations in leachate; and waste density.

The Department finds that WMDSM has proposed to recirculate leachate as a leachate management method and has met the submission requirements of 06-096 C.M.R. ch. 401, § 2(F)(5) with the submission of a Leachate Recirculation Plan provided that ongoing performance monitoring data to assess the effectiveness of leachate recirculation is provided to the Department with each facility annual report.

(3) Landfill Gas Condensate System

The proposed Phase 14 expansion will be designed such that the Phase 14 expansion gas loop header pipe will be sloped at approximately greater than five percent in the landfill areas to allow condensate to drain into the wells or cleanouts as applicable by gravity and subsequently flow into the leachate collection system.

The Department finds that WMDSM has appropriately addressed collection of landfill gas condensate as required by 06-096 C.M.R. ch. 401, § 2(D)(4).

(4) Leachate Transport

Leachate will be conveyed from the proposed Phase 14 expansion leachate vault through a buried double-containment HDPE transport pipe to the existing South Central Pump Station where it will be conveyed to the on-site leachate storage tank facility. The transport pipe will consist of an 8-inch carrier pipe inside a 14-inch containment pipe, installed at a minimum slope of 0.005 foot per foot. Leachate from any potential breach in the 8-inch carrier pipe would flow through the outer 14-inch containment pipe to the nearest downslope leak-detection manhole, which will be located at an interval of approximately every 1,000 feet along the forcemain pipe.

The Department finds WMDSM has appropriately addressed the transport of leachate pursuant to 06-096 C.M.R. ch. 401, § 2(D)(4).

(5) Leachate Storage

WMDSM maintains an on-site leachate storage tank facility consisting of two aboveground glass-lined steel tanks, a secondary concrete containment area, and a concrete-paved truck loading area. The main tank has a capacity of 948,000 gallons and the reserve tank has a capacity of 91,000 gallons. A 15-horsepower pump transfers the leachate from the operating tank to the load-out facility. Pumping automatically stops if the leachate level drops below the pump inlet. A 7.5 horsepower pump is used to circulate leachate inside the main tank to minimize the potential for freezing during cold weather. A flowmeter in the load-out pipe measures the amount of leachate pumped.

The truck load-out station allows for the filling of one 8,000-gallon truck every 20 minutes. The leachate transfer process includes measures to minimize tanker overfills such that a maximum load-out volume is programmed for each pump cycle. WMDSM subcontracts with a transportation company to transfer and transport the leachate to approved wastewater treatment facilities. The company has the capability to run multiple trucks 24 hours per day, 7 days per week. WMDSM maintains contracts for off-site leachate treatment with Sappi North America for up to 400,000 gallons per day and the Anson-Madison Sanitary District for up to 56,000 gallons per day.

The leachate storage tank facility is inspected periodically by WMDSM's operational personnel. Inspections include visual checks around the base of the storage tanks and the piping within the containment area for any leaks or malfunctions. Annual inspections of the concrete containment areas for potential cracks are also conducted.

The Department finds WMDSM has appropriately addressed on-site leachate storage and off-site treatment and subsequent disposal in accordance with 06-096 C.M.R. ch. 401, § 2(D)(4).

D. Seismic Impact Zone

Information in the application shows that the proposed expansion is located in a seismic impact zone as identified by U.S.G.S. Seismic Hazard Maps. The facility's structures, including liner systems, leachate collection systems, and surface water control systems for the proposed Phase 14 expansion were designed to withstand the maximum horizontal acceleration identified by the Hazard Maps. Additional discussion regarding seismic analyses can be found in Finding 27(B) of this license.

Based on information in the record, the Department finds that the proposed Phase 14 expansion has been designed to meet the seismic requirements of 06-096 C.M.R. ch. 401, § 2(D)(5).

E. Phased Operations

As set forth in the application, the proposed Phase 14 expansion was designed for phased construction, taking into account waste operations and cover placement, stormwater run-on and run-off, leachate management, protection of the liner system from freeze and thaw effects, and stability. Final cover will be installed in a phased

manner as landfilling progresses within each phase. Additional discussion on cell development is presented in Finding 27(H) of this license

The Department finds that the proposed Phase 14 expansion will be constructed in a phase manner to meet the requirements of 06-096 C.M.R. ch. 401, § 2(D)(6).

27. ENGINEERING REPORT

The Department's rule at 06-096 C.M.R. ch. 401, § 2(F) requires WMDSM to submit an engineering report detailing the basis for engineering design and the proposed construction procedures, utilizing site specific factors and analyzing potential modes and significance of failures in engineered system. The application and subsequent information submitted by WMDSM addressing Department review comments, included data, calculations, assumptions, and evaluations for the following aspects of the proposed Phase 14 expansion:

A. Mechanically Stabilized Earth Perimeter Berm

The perimeter berm surrounding the proposed Phase 14 expansion will consist of a mechanically stabilized earth ("MSE") berm with reinforcement to allow a steeper exterior slope than would be possible with unreinforced soil. The average height of the MSE berm will be 27.5 feet, and the total length will be approximately 6,000 feet. Details of the MSE berm are shown on Sheets 20, 21, and 22 of the permit drawings provided in Volume IV of the application. A 24-foot wide access road will be constructed on top of the perimeter berm, and an MSE ramp will be constructed to provide access for the waste hauling trucks and operational vehicles up onto the perimeter berm (Volume IV of the application, Sheets 14 and 21 of the permit drawings). Results of a static and seismic stability analysis for a cross-section across the proposed MSE ramp were provided in Volume IV of application and are summarized below in Finding 27(B) of this license.

The Department finds that the proposed MSE perimeter berm will function as designed and will meet the required factors of safety for stability in the Rules.

B. Stability Assessment

The application included a slope stability assessment, prepared by Geosyntec Consultants, which analyzed static and seismic loads during the construction and post-closure periods (Volume IV of the application, Appendix IV(c)). The stability evaluation included eight representative cross-sections of the proposed Phase 14 expansion. Cross-sections I through VII represent conditions around the perimeter

of the proposed Phase 14 expansion footprint while cross-section VIII represents the access ramp up to the proposed Phase 14 expansion. The construction condition considers the slope geometry and material strengths immediately following soil excavation and construction of the MSE perimeter berm adjacent to the excavation area. The post-closure condition represents the design grades at the top of the proposed 2-foot thick final cover system at the peak elevations of each cross-section.

Geosyntec Consultants used four potentiometric surfaces in its assessment of landfill stability based on the following: water level in the clay layer, water level in the sand layer, potentiometric surface in the till layer, and leachate elevations coinciding with the top of the proposed leachate collection system layer. Four stability modes of failure were considered that included a global circular surface passing through the waste, berm and/or foundation; a global non-circular block surface passing through the waste, berm and/or foundation; a non-circular surface along the liner system and the horizontal sliding of the MSE berm.

The site-specific material data and design parameters are provided in the application. Geosyntec Consultants used Slide® computer software, Version 8.028 developed by Rocscience to analyze the slope stability. The resultant calculated factors of safety met or exceeded the minimum acceptable values required by the Rules, demonstrating that in-place waste and foundation soils beneath and adjacent to the waste can support the proposed Phase 14 expansion loads. The results of the stability assessment and comparison to the applicable safety factor requirements are presented in Tables 9 and 10 (Volume IV of the application, Appendix 4(c), Tables 3 through 6).

Table 9: Stability Assessment Result Summary
Calculated Factors of Safety for Construction Condition

Cross-Section	**Static Condition**, Rule Minimum = 1.3				**Seismic Condition**, Rule Minimum = 1.1			
	Inward Circular	**Inward Non-Circular**	**Outward Circular**	**Outward Non-Circular**	**Inward Circular**	**Inward Non-Circular**	**Outward Circular**	**Outward Non-Circular**
I	2.4	3.0	2.3	2.4	2.0	2.6	2.2	1.9
II	2.6	2.8	4.8	3.5	2.2	2.4	3.7	3.2
III	2.3	2.4	1.3	1.4	1.9	2.0	1.2	1.3
IV	2.2	2.1	1.8	1.8	1.8	1.6	1.6	1.6
V	1.7	1.6	1.3	1.5	1.4	1.3	1.3	1.4
VI	2.1	2.1	1.6	1.8	1.8	1.7	1.4	1.5
VII	1.8	2.1	1.3	1.4	1.5	1.8	1.2	1.4
VIII	2.2	1.6	1.6	1.4	1.8	1.7	1.4	1.3

Table 10: Stability Assessment Result Summary
Calculated Factors of Safety for Post-Closure Condition

Cross-Section	**Static Condition**, Rule Minimum = 1.5				**Seismic Condition**, Rule Minimum = 1.0			
	Global Circular	**Global Non-Circular**	**Liner Waste Block**	**Sliding of MSE Berm**	**Global Circular**	**Global Non-Circular**	**Liner Waste Block**	**Sliding of MSE Berm**
I	1.9	2.4	1.7	2.0	1.4	1.7	1.2	1.5
II	1.9	2.5	1.7	1.9	1.4	1.8	1.2	1.4
III	1.6	1.7	1.7	2.1	1.1	1.2	1.2	1.5
IV	1.6	1.6	1.7	2.1	1.1	1.1	1.2	1.5
V	1.6	1.7	1.8	2.3	1.1	1.1	1.2	1.6
VI	1.7	1.7	1.8	2.2	1.2	1.1	1.3	1.6
VII	1.6	2.2	1.7	2.2	1.3	1.5	1.2	1.6
VIII[1]	2.2	1.9	-	-	1.8	1.4	-	-
	1.7	1.6	-	-	1.3	1.3	-	-

[1]For cross-section VIII, the first listed factors of safety represent a failure from right to left while the second factors of safety represent a failure from left to right.

Based on the information provided in the application, the Department finds that WMDSM has met the requirements in 06-096 C.M.R. ch. 401, § 2(F)(1) for static and seismic stability factors of safety, as demonstrated in the slope stability assessment for static and seismic loads during the construction and post-closure periods.

C. Settlement Assessment

WMDSM submitted a settlement assessment to predict total and differential settlements of the landfill liner and leachate management systems (Volume IV of the application, Appendix IV(d)). Settlement of the foundation clay was calculated at 18 locations (a minimum of 3 locations in each phase; specifically, 3 locations in Phase 14A, 3 locations in Phase 14B, and 4 locations in each of Phases 14C, 14D, and E) to be between 0.1 to 0.7 feet. The results show that the leachate collection pipe will maintain positive drainage following both primary and secondary settlement under the load of the final waste elevations. The maximum calculated tensile strain in the geomembrane liner system is 0.01%, which is less than the generally allowable strain of 4 to 5%.

The Department finds that WMDSM has met the settlement requirements in 06-096 C.M.R. ch. 401, § 2(F)(2), confirming future predicted settlement will not adversely affect the landfill liner and leachate collection systems.

D. Stability and Settlement Monitoring Plan

A Stability and Settlement Monitoring Plan is provided in Appendix IV(h) of Volume IV of the application. The plan establishes specific monitoring procedures including frequency of monitoring, action thresholds for interpreting monitoring data, and response actions. The applicant notes that the plan will be incorporated into the Site Operations Manual and forwarded to the Department prior to waste disposal in the proposed Phase 14 expansion (Volume IV of the application, page 13).

The applicant plans to install slope inclinometers, shape accelerometer arrays, vibrating wire piezometers and settlement sensors to monitor landfill stability as waste filling progresses. The approximate instrument locations are illustrated in Figure 1 of Appendix IV(h) of Volume IV of the application. Stability and settlement data are evaluated on an ongoing basis. Notification is made to the Department if established action levels have been exceeded.

The Department finds that the Stability and Settlement Monitoring Plan submitted by WMDSM meets the requirements of 06-096 C.M.R. ch. 401, § 2(F)(3) and that WMDSM must include the results of the geotechnical inspections and evaluations in a geotechnical report submitted in the Annual Report.

E. Water Balance

EPA's Hydrologic Evaluation of Landfill Performance (HELP) Model, Version 3.07, was used to evaluate the rates and volumes of leachate, including consolidation water, to be generated by the landfill during operations, closure, and post-closure periods. The model results identified the most critical leachate generation conditions over the life of the proposed Phase 14 expansion and were used to design the leachate collection system. Leachate generation was evaluated under four conditions: an initial 10 feet of waste with daily cover; 40 feet of waste with daily cover; 40 feet of waste with daily cover and long-term geomembrane cover; and 186 feet of waste with final cover. Peak daily leachate flows ranged from 29,695 gallons per acre under the initial 10 feet of waste with daily cover condition to a peak daily flow of 1 gallon per acre under the final cover condition.

The Department finds that WMDSM has met the requirements in 06-096 C.M.R. ch. 401, § 2(F)(4) for adequately designing the leachate collection system to convey the predicted leachate flow from the proposed Phase 14 expansion.

F. Leachate Management

The Rules require a leachate management submission including a description of the leachate management method selected, a design for the leachate conveyance system, a design for any on-site recirculation systems, an evaluation of leachate quality, and require a leachate management plan. In accordance with 06-096 C.M.R. ch. 401, § 2(F)(5), leachate management options available to WMDSM include on-site leachate recirculation and off-site transport to a licensed wastewater treatment facility for treatment and disposal. WMDSM proposes to continue leachate recirculation to enhance degradation of waste and will continue to convey leachate to the on-site storage tanks prior to transportation to off-site treatment facilities. WMDSM currently maintains contracts for off-site leachate treatment with Sappi North America for up to 400,000 gallons per day and the Anson-Madison Sanitary District for up to 56,000 gallons per day. Both Sappi North America and the Anson-Madison Sanitary District hold current wastewater licenses from the Department, as required by the Rules.

The design calculations and drawings for the proposed leachate collection and transport system were submitted with the application and are further described in Finding 26(C) of this license. WMDSM employs several leachate reduction practices including the use of temporary geomembrane covers and stormwater diversion berms. Leachate recirculation methodologies will be conducted consistent with current practices for the active Phase 8 landfill. A leachate recirculation plan for the proposed Phase 14 expansion is provided in Volume IV of the application, Appendix IV(i), Appendix A. Leachate will be applied evenly to the active waste surface by spraying using a pump and spray nozzle system mounted on a tanker truck dedicated to leachate recirculation. Leachate will not be applied during freezing conditions. Procedures for leachate recirculation including quantity, limitations, performance monitoring and documentation are provided in the leachate recirculation plan.

The volume of leachate generated will be measured through the use of flow meters at each pump station and leachate vault. WMDSM maintains an automated control system that displays real-time information at a central location such as leachate flow data, leachate levels, pump run time and alarm status. Leachate quality will be monitored in accordance with the facility's Water Quality Monitoring Plan, as

described in Finding 32 of this license. The leachate management system will be maintained, inspected, and cleaned periodically, as specified in the Site Operations Manual (Volume V of the application, Section III). WMDSM currently uses an acid flushing procedure to mitigate calcium carbonate scaling from the leachate collection system.

The quality of the leachate to be taken off-site and treated is expected to be consistent with the current leachate quality since there is no change in accepted waste types proposed. WMDSM's current leachate disposal agreements do not require pretreatment of the leachate. Leachate samples will be routinely collected from the leachate collection sumps for characterization. The leachate will be analyzed for the parameters specified in Table 10 of the Water Quality Monitoring Plan (Volume I of the application, Section X). These parameters include, but are not limited to, field parameters (i.e., pH, turbidity, temperature, specific conductance, dissolved oxygen); indicator parameters (i.e., ammonia, nitrate, alkalinity, sulfate, chemical oxygen demand); inorganic parameters (i.e., aluminum, arsenic, chromium, lead); and organic parameters (i.e., volatile organic compounds). Leachate characterization data will be provided to the Department in triannual reports with a summary of leachate quality and quantity provided in each annual report.

The Department finds that WMDSM has met the applicable requirements in 06-096 C.M.R. ch. 401, § 2(F)(5) for leachate management, based on the submitted leachate management design plans and utilization of Department-licensed wastewater treatment facilities for the treatment of the collected leachate; provided that WMDSM maintains a valid leachate disposal contract(s) with licensed wastewater treatment facility(ies) for the treatment and disposal of leachate from the proposed expansion.

G. Gas Management

An active gas collection and control system will be installed incrementally as waste is placed within the proposed Phase 14 expansion. The gas collection and control system will consist of vertical gas extraction wells connected to a main header pipe which will convey gas to the existing on-site landfill gas-to-energy plant. The main header pipe will also be tied into the existing flare station that will provide supplemental capacity, if needed. As described in Finding 11A of this license, calculations provided with the application demonstrate that the two existing internal combustion engines as part of the landfill gas-to-energy plant and two existing

flares have sufficient combined capacity to manage the peak gas flow rates. A third internal combustion engine has been licensed but not installed.

For landfill gas modelling purposes, SCS Engineers assumed that the waste to be landfilled in the proposed Phase 14 expansion consists of 28% MSW, 22% CDD and 9% sludge with the remainder considered inert waste that would not contribute to gas generation (Volume IV of the application, Appendix IV(g), page 2). Landfill gas recovery rates were estimated using the EPA's Landfill Gas Emission Model ("LandGEM"). The LandGEM results indicate that the proposed landfill gas collection and control system can recover about 2,250 scfm of landfill gas at 50% methane in 2042 from Phase 14. The existing on-site landfill gas-to-energy plant has a capacity of 1,550 scfm which means that the excess gas flow of 700 scfm would be flared.

Details for the incremental installation of vertical gas extraction wells and related gas collection and control system components are illustrated on the Phase 14 Landfill Gas System Permit Drawings provided in Volume IV of the application, Appendix IV(g).

The Department finds that WMDSM has met the requirements in 06-096 C.M.R. ch. 401, § 2(F)(6) for landfill gas collection and control based on the submitted landfill gas design report and associated drawings.

H. Cell Development Plan

A Cell Development Plan was submitted with the application that illustrates the sequential stages of site development for the proposed Phase 14 expansion (Volume IV of the application, Appendix IV(a), Drawings 8 through 12). Table 11 includes general cell development information along with incremental and cumulative disposal capacity. Approximate years for development and phased final cover installation were provided in a May 27, 2020 Applicant Response to Department Comment Letter from Geosyntec Consultants. The applicant notes that final cell development plans will be provided within the site-wide Annual Report once waste filling activities commence (Volume IV of the application, page 21).

Table 11: Proposed Cell Development Plan Summary

Phase Number	Size (acres)	Disposal Capacity (cubic yards)	Cumulative Disposal Capacity (cubic yards)
14A	7.5	376,000	376,000
14B	9.0	1,116,500	1,492,500
14C	11.3	1,965,000	3,457,500
14D	12.5	2,374,000	5,831,500
14E	8.4	1,925,500	7,757,000

The Department finds that WMDSM has provided a cell development plan in accordance with 06-096 C.M.R. ch. 401, § 2(F)(7). The Department further finds that WMDSM shall update the cell development plan on an annual basis with the facility's annual report as the proposed Phase 14 expansion is developed.

I. Phased Final Cover System Proposal

WMDSM proposes to install a phased final cover system in incremental stages as waste filling operations occur within the proposed Phase 14 expansion. The proposed final cover system consists of the following from top to bottom: 6 inches of topsoil, 12 inches of protective cover soil, a drainage geocomposite, a 40-mil HDPE textured geomembrane, and a GCL. In support of the proposed final cover system, the applicant submitted an *Alternative Final Cover System Engineering Report for Phase 14*, dated October 2019 and prepared by Geosyntec Consultants (Volume IV of the application, Appendix IV(i)).

06-096 C.M.R. ch. 401, § 5(G)(2) requires final cover for secure landfills to consist of a geomembrane and 24 inches of barrier soil. A GCL may be used as a substitute for up to 12 inches of barrier soil. In support of the alternative final cover system, the applicant provided a demonstration of the performance of the proposed final cover system along with a discussion of its benefits, drawbacks, and constructability. The applicant notes that "the alternate cover coupled with leachate recirculation will result in equal or better performance in comparison to the [final cover system required by 06-096 C.M.R. ch. 401, § 5(G)(2)]" (Volume IV of the application, Appendix IV(i), page 2). The Leachate Recirculation Plan and proposed performance monitoring to assess the effectiveness of leachate recirculation is discussed in Finding 26 (C)(2) of this license.

Prior to each phase of final cover system construction, an engineering report; construction contract bid documents, including drawings, technical specifications and contract administrative documents; and a quality assurance plan and erosion and sedimentation control and stormwater management plans will be submitted to the Department for review and approval. WMDSM states that phased final cover system construction is projected to occur in 2032, 2037 and 2042 (May 27, 2020 Applicant Response to Department Comments, page 3).

The Department finds that WMDSM has met the requirements in 06-096 C.M.R. ch. 401, § 2(F)(8) for a phased alternative final cover system provided that an engineering report; construction contract bid documents, including drawings, technical specifications, and contract administrative documents; and a quality assurance plan and erosion and sedimentation control and stormwater management plans are submitted to the Department for review and approval at least four months prior to each proposed application of a phased final cover system and data from ongoing performance monitoring of leachate recirculation indicates that leachate recirculation is effective in accelerating waste degradation. Further, the Department finds that an application for final closure must still be made at least one year prior to the anticipated final closure of the landfill in accordance with 06-096 C.M.R. ch. 401, § 5(B)(3). As specified in 06-096 C.M.R. ch. 401, § 2(F)(8), a phased final cover system documented to have been constructed in accordance with the approved plans and specifications will be accepted as the cover system element of final closure provided that the facility is not posing an unreasonable risk to public health or the environment at the time of final closure, as documented in the Site Assessment Report required by 06-096 C.M.R. ch. 401, § 5(F).

J. Waste Storage, Staging, and Burn Areas Design

WMDSM has not proposed additional waste storage and staging areas outside of the solid waste boundary, or a burn area for wood waste or CDD. Rather, WMDSM proposes to continue use of the existing permitted wood waste storage and processing area adjacent to Phase 8C".

The Department finds that WMDSM is not proposing additional waste storage and staging areas outside of the solid waste boundary, or a burn area for wood waste or CDD and will utilize the existing permitted wood waste processing area. Therefore, the provisions requiring submittal of a design and operating plan in accordance with 06-096 C.M.R. ch. 401, § 2(F)(9) do not apply to the proposed Phase 14 expansion; however, the facility shall continue to operate the existing storage and processing area in accordance with the applicable operating requirements.

K. Waste Characterization and Design Compatibility

The Department's rule at 06-096 C.M.R. ch. 401, § 2(F)(10) requires that the wastes proposed to be accepted at the expansion must be characterized to enable the Department to determine that the wastes to be landfilled are non-hazardous and suitable for disposal in accordance with the proposed design, and to support the analytical parameters proposed in the environmental monitoring plan.

The procedures for the characterization, testing and acceptance of waste at WMDSM are included in the facility's Waste Characterization/Acceptance Plan in its Site Operations Manual, Section I, Part B (Volume V of the application). The wastes proposed to be accepted in the expansion are similar in character and physical properties to the wastes currently approved for WMDSM and as described in Finding 18 of this license. Additionally, WMDSM states that the containment system materials proposed for the Phase 14 expansion are the same as has been used for several of the previous phases at the landfill facility.

The Department finds that WMDSM has provided appropriate waste characterization procedures for the proposed Phase 14 expansion as required by 06-096 C.M.R. ch. 401, § 2(F)(10).

L. Surface Water Control Plans

The Department's Rules at 06-096 C.M.R. ch. 401, § 2(F)(11) require that an applicant submit two surface water control plans: an erosion and sedimentation control plan which meets the standards and submission requirements of 06-096 C.M.R. ch. 400, § 4(J) and a stormwater management plan which meets the standards and submission requirements of 06-096 C.M.R. ch. 400, § 4(M). WMDSM's Erosion and Sedimentation Control Plan and the Stormwater Management Plan are described in Findings 14 and 17 of this license.

The Department finds that WMDSM has submitted the two required surface water control plans required by 06-096 C.M.R. ch. 401, § 2(F)(11) and that these plans meet the requirements of 06-096 C.M.R. ch. 400, §§ 4(J) and 4(M) as set forth in Findings 14 and 17 of this license.

M. Test Pad Submission

The Department's Rules at 06-096 C.M.R. ch. 401, § 2(F)(12) state that applicants may propose a barrier soil test pad program to demonstrate that the proposed barrier

soil material and construction methods will result in barrier soil meeting the standards of 06-096 C.M.R. ch. 401, § 2(D)(1). WMDSM notes in Section 3.13 of Volume IV of the application that a test pad program may be implemented. Further, "[i]f WMDSM decides to implement a test pad program (as has been done for previous landfill units at Crossroads and most recently conducted for the Phase 8C" landfill cell construction (Geosyntec 2019)), then a detailed work plan will be submitted to [the Department] with the construction documents for the applicable Phase 14 cell(s)" (Volume IV of the application, page 22).

The Department finds that WMDSM may propose a test pad program as specified by 06-096 C.M.R. ch. 401, § 2(F)(12). The test pad program must be approved by the Department prior to the start of the test pad construction. Demonstration of the success of the test pad program in consistently achieving the required standards may allow the applicant to reduce the reliance on in-place hydraulic conductivity testing.

N. Special Construction Requirements

In accordance with 06-096 C.M.R. ch. 401, § 2(F)(13), at facilities where ground water monitoring in bedrock is anticipated or is being conducted, the applicant must submit information on all measures to be taken to minimize the disturbance of soil material within five feet of the bedrock surface. WMDSM specifies that the proposed liner system will be vertically no closer than five feet from the bedrock surface and therefore, special construction requirements relative to bedrock do not apply (Volume IV of the application, page 22).

Earthwork construction for the proposed Phase 14 expansion will involve the excavation of in-situ eolian sand from within the landfill footprint. In some areas, the selected contractor will be required to control the ground water locally near the excavation, with specific requirements to maintain the lower potentiometric head until after the proposed liner system is constructed and some waste has been initially placed within the landfill cells. Since ground water levels fluctuate seasonally, WMDSM notes that additional ground water level measurements will be obtained prior to construction to assess the need for ground water control during construction, such that the specific requirements can be incorporated into the construction documents for the applicable cells as needed (Volume IV of the application, page 22).

The Department finds that WMDSM has submitted measures to minimize soil disturbance that meet the 5 feet to bedrock separation requirement in 06-096 C.M.R. ch. 401, § 2(F)(13).

28. CONTAMINANT TRANSPORT ANALYSIS

In accordance with 06-096 C.M.R. ch. 401, § 2(G), an applicant is required to provide a thorough analysis of the proposed site and the adjacent area that could be affected during operation and after closure of the landfill in the event of releases of contaminants to ground water beyond engineered systems. The purpose of the analysis is to assess the potential for an unreasonable threat to sensitive receptors and to identify any operational or monitoring measures needed to ensure protection of sensitive receptors. As defined in the Rules, the potential for an unreasonable threat to a sensitive receptor is an arrival time of less than six years from the landfill or less than three years from leachate storage structures and pump stations of a concentration of a pollutant which would result in contamination of that sensitive receptor. No new leachate storage structures or pump stations are proposed as part of the Phase 14 expansion; therefore, the three-year travel time analysis does not apply. Leachate from the proposed Phase 14 expansion will be conveyed to existing leachate management structures near Phase 12.

Sensitive receptors and potential pathways from theoretical release points are discussed in Finding 25D of this license. Time-of-travel calculations for each of the potential pathways were performed by calculating a seepage velocity for each component of the flow pathway and multiplying the seepage velocity by the length of the pathway. The time-of-travel values calculated are based on average and high-end conditions as revised in the Golder Associates Supplemental Geologic and Hydrogeologic Report. An effective porosity of 10% was used as required in 06-096 C.M.R. ch. 401, § 2(C)(2).

Based on information in the application, the Department finds that under the hypothetical failure scenarios, the results of the analysis showed that sensitive receptors in the vicinity of the proposed Phase 14 expansion will not be unreasonably threatened by releases of contaminants; the proposed monitoring locations and monitoring frequency will be adequate to detect changes in water quality from potential failures; and the currently proposed design will provide greater than six years travel time from the landfill's base liner system to the sensitive receptors.

The Department further finds that WMDSM provided an analysis of potential releases of contaminants to ground water that meets the requirement of the 06-096 C.M.R. ch. 401, § 2(G) and has demonstrated that the proposed Phase 14 expansion will not pose unreasonable threats to sensitive receptors.

29. PLAN VIEW AND PROFILE VIEW DRAWINGS

The Department's rules at 06-096 C.M.R. ch. 401, § 2(H) require that an applicant submit plan and profile drawings that provide information specified in the rule. Draft plan and profile view drawings are provided in Volume IV of the application, Appendix IV(a).

The Department finds that WMDSM submitted the plan and profile view drawings required in 06-096 C.M.R. ch. 401, § 2(H), including the drawings for existing site conditions, site development, site base grading, leachate management systems, the gas collection and control system, surface water management structures, final site development, landfill cross-sections, and specific details of engineered systems.

30. QUALITY ASSURANCE PLAN

The Department's rules at 06-096 C.M.R. ch. 401, § 2(I) requires that an applicant submit a Quality Assurance Plan to assure that design specifications and performance requirements for all facility components are met during construction. A draft Quality Assurance Plan for liner system construction was submitted in Volume VI, Appendix VI(a) of the application while a draft Quality Assurance Plan for cover system construction was submitted in Volume VI, Appendix VI(b) of the application. The Quality Assurance Plans include quality assurance measures to be implemented; the relationship between the Quality Assurance Plan, construction quality control, and the construction contract bid documents; responsible authorities and a resolution process; qualifications of quality assurance personnel and testing laboratories; inspections and tests to be performed for construction conformance; sampling details; recordkeeping and reporting requirements; and a list and description of all items requiring quality assurance certification.

The Department finds that WMDSM has submitted Quality Assurance Plans that address the items required by 06-096 C.M.R. ch. 401, § 2(I) to verify conformance with construction design specifications and performance requirements.

31. CONSTRUCTION CONTRACT BID DOCUMENTS

Pursuant to 06-096 C.M.R. ch. 401, § 2(J), an applicant is required to submit construction bid document, including drawings, technical specifications, and the contract administrative documents. The applicant may submit draft documents at the time the application is filed, and subsequently submit final detailed construction contract bid documents to the Department for review and approval on a schedule approved by the Department.

The application included draft construction bid documents for the proposed Phase 14 expansion consisting of contract administrative documents, technical specifications, and drawings. Draft technical specifications for both liner system construction and cover system construction were submitted in Volume VI of the application, Appendices IV(c) and (d). Draft drawings are provided in Volume IV of the application, Appendix IV(a).

The Department finds that WMDSM provided the construction contract bid documents for the proposed Phase 14 expansion in accordance with the Rules. Prior to the construction of individual cells (Phases 14A through 14E), detailed construction contract bid documents, including drawings, technical specifications, and the contract administrative documents, shall be submitted to the Department for review and approval four months prior to commencing construction activities at each phase. Initial site preparation including land clearing, soil stockpile relocation, and construction of visual berms may occur following written notice to, and approval by, the Department in the form of a letter approval prior to review and approval of the detailed construction contract bid documents.

32. WATER QUALITY MONITORING

In accordance with 06-096 C.M.R. ch. 401, § 2(K), an applicant is required to provide a water quality report addressing the site characterization requirements of 06-096 C.M.R. ch. 405, including a water quality monitoring program. WMDSM has a current Department-approved Water Quality Monitoring Plan, Revision 6.4, dated October 31, 2019 (Section X of its Site Operations Manual). WMDSM proposes to characterize ground water quality in the vicinity of Phase 14 and conduct a Department-approved sampling and analysis program prior to waste placement in the proposed Phase 14 landfill expansion.

The proposed ground water monitoring program submitted with the application (Volume III of the application, Section 7.0) includes one upgradient monitoring location of nested wells to monitor glacial till and bedrock, and five downgradient monitoring locations all of which would monitor the glacial till. Water levels at each ground water sampling location will also be monitored. Surface water, including water levels at stream staff gauges, and streams located upgradient and downgradient of the proposed Phase 14 expansion footprint to be monitored include: upgradient location SW14-07 at stream piezometer/staff gauge S-7; upgradient location SW14-02 at stream piezometer/staff gauge S-2; downgradient location SW14-05 at stream piezometer/staff gauge S-5; and downgradient location SW14-08 at a new location downstream of existing piezometer/staff gauges S-1 and S-4 (Volume III of the application, Section 7.0, page 29).

Department Rule at 06-096 C.M.R. ch. 405, § 2(A)(1)(b) requires that each hydrogeologic unit be monitored, both upgradient and downgradient of the landfill. In its review

comments of April 15, 2020, the Department requested that WMDSM provide locations for at least two downgradient bedrock monitoring wells and demonstrate that the potential release of contaminants associated with operation of the proposed Phase 14 expansion into water would be intersected by these wells.

In its June 1, 2020 response to Department comments, Golder Associates on behalf of WMDSM noted that "[a]ny release from the landfill would be detected in the till before being detected in the bedrock" and "it would take a very long time for a release from the landfill to be detected in the bedrock" (June 1, 2020 Applicant Response to Department Comments, page 19). Based on this, the monitoring of bedrock was not included in the water quality monitoring program and Golder Associates notes that bedrock water quality monitoring is not necessary. Instead, Golder Associates suggested that the existing bedrock monitoring wells which were utilized for site investigation could be maintained, such that if a release were to be detected or suspected based on monitoring results from the phreatic wells and/or the till wells, monitoring of bedrock water quality could be conducted.

In its June 22, 2020 review of WMDSM's response to comments, the Department concluded that given their location, it is unlikely the currently installed bedrock wells would intercept ground water coming from Phase 14, estimating that bedrock wells installed 50 to 100 feet away from the landfill would be better situated to intercept ground water flowing from the landfill. The Department agreed that any contaminants associated with operation of the landfill would first be detected in the till wells and it wouldn't be necessary, after characterization, to sample bedrock wells unless a problem arises in the till wells. 06-096 C.M.R. ch. 405, § 2(A)(1)(b) requires that "[v]ertical well locations must be chosen to ensure that each hydrogeologic unit is monitored." Further, the Department noted in its June 22, 2020 memorandum that background water quality data is needed for the bedrock wells prior to the deposition of the waste in the landfill to establish background conditions before any problem may arise.

The Department reiterated that WMDSM must include two bedrock monitoring wells in its proposed water quality monitoring program in a September 9, 2020 memorandum to WMDSM and proposed locations for consideration that include one well screened to monitor bedrock and one well screened to monitor the till. In its September 23, 2020 response to Department comments, WMDSM agreed to install the new wells in the locations identified by the Department. The Department further concludes that it is necessary to collect at least six rounds of data at the bedrock wells, after which time the bedrock wells would not need to be sampled, unless the till wells indicate a possible release of contaminants from the landfill. This will provide sufficient data for comparison to any

later monitoring results. Any other wells that are not proposed to be retained in the monitoring program should be properly decommissioned in accordance with the Rules.

As proposed in the application, the site characterization monitoring program including ground water and surface water, would comprise a total of four independent samples from each identified location and, in accordance with 06-096 C.M.R. ch. 405, § 2(C)(1)(d), all samples would be analyzed for the required Column 2 parameters in two sampling events. Samples collected during the subsequent sampling rounds would be analyzed for the Column 1 parameters and any Column 2 parameters detected in the first two sampling rounds. Four sampling rounds are proposed for the site characterization monitoring, but 06-096 C.M.R. ch. 405, § 2(C) states that, the actual number of samples required depends on the rate of ground water flow, data quality and variability of results, thus this may need to be adjusted. The Department concludes that, completing two years of three sampling rounds for a total of six rounds of data would provide a better understanding of the natural data variability at the site, prior to any adjustment based upon results. The proposed water quality monitoring program may be adjusted annually based on the operational status of the cells, development at the facility, the previous year's water quality evaluation, and the results of the Department's annual review of the water quality data.

In accordance with the provisions of 38 M.R.S. § 1310-N(10), upon written request to the Department from the owner of any property abutting a commercial solid waste disposal facility that accepts special waste for landfilling and that meets the criteria set forth in 38 M.R.S. § 1310-N(10), the Department shall require WMDSM to have conducted biannual sampling and analysis of a private water supply well used by the requestor for drinking water. WMDSM shall provide owners of property abutting the landfill facility with written notice of their rights under this subsection on a form prepared by the Department.

The Department finds that WMDSM has proposed an adequate water quality monitoring program consistent with 06-096 C.M.R. ch. 401, § 2(K) provided that WMDSM submits for Department review, a water quality report that both characterizes the existing site and proposes revisions to its Site Water Quality Monitoring Program to (1) include two downgradient bedrock wells and one downgradient till well positioned to intercept ground water coming from the proposed Phase 14 expansion and located 50 to 100 feet away from the landfill from which at least six rounds of data will be collected, after which time the bedrock wells would not need to be sampled, unless the till wells indicate a possible release; (2) provide for two years of three sampling rounds each; and (3) submit an Annual Water Quality Report evaluating WMDSM's water quality and an assessment of ground water flow directions as the proposed Phase 14 expansion is developed as part of the facility's Annual Report. Thereafter, proposed changes to the water quality monitoring program shall require Department approval. Further, the Department finds that WMDSM will

provide owners of abutting property with written notice of their rights under 38 M.R.S. § 1310-N(10) and conduct biannual sampling and analysis of the abutters drinking water upon request to the Department from the owner.

33. OPERATIONS MANUAL

In accordance with 06-096 C.M.R. ch. 401, § 2(L), a copy of the facility's operations manual must be submitted as part of the application. WMDSM submitted its existing Site Operations Manual, last revised December 2016, as Volume V of the application. The Site Operations Manual was prepared in accordance with 06-096 C.M.R. ch. 401, § 4(A). WMDSM proposes to update the Site Operations Manual to address specific operating provisions for the proposed Phase 14 expansion and to include any specific requirements of this license. As required, the Site Operations Manual will be reviewed annually by WMDSM and will be updated as necessary.

The Department finds that WMDSM has an existing operations manual that satisfactorily addresses current operations at its Crossroads Landfill facility provided that at least 60 days prior to the commencement of operations in Phase 14, WMDSM submits for the Department's review a revised Site Operations Manual to include specific operating provisions for the proposed Phase 14 expansion and any specific requirements of this license.

34. CONSTRUCTION

The proposed expansion is subject to the requirements of 06-096 C.M.R. ch. 401, § 3 during construction, as summarized below:

A. Preconstruction Conference

Unless waived by the Department, a pre-construction conference will be held between WMDSM and/or the agents of WMDSM and the Department, with at least a 7-day advance notice given to the Department.

B. Quality Assurance Plan

The Quality Assurance Plan (QAP) must be implemented at the beginning of construction. Construction Quality Assurance (CQA) must include continuous site inspections by the CQA personnel. Geosynthetics and barrier soil layers must be inspected, tested, and certified by qualified CQA personnel separate from the owner/operator and contractor.

C. Liner Installation

Before installation of any type of liner system, WMDSM must evaluate the impacts of climatic conditions, proposed installation procedures, and the proposed installation schedule on liner system integrity. Results and recommendations from the test pad program, if applicable, must be submitted to the Department for review and approval. Liner systems (i.e., barrier soil, GCL's and geomembranes) may be installed only between April 15 and November 1, and only when the ambient temperature exceeds 32 degrees Fahrenheit, unless a specific cold weather installation plan is submitted to the Department for review and approval.

D. Changes from Approved Plans and Specifications

Prior to implementing any changes to the approved landfill design, the leachate management systems, or project specifications, WMDSM must receive approval from the Department through an amendment or minor revision, or through a change order approval. The Department must issue a response to a change order request within five working days, or approval of the change order is automatically granted.

E. Weekly Inspection Reports

The CQA team responsible for construction inspection at the landfill must keep daily and weekly construction inspection reports and provide a copy to the Department within one week after each construction week.

F. Photographic Documentation

In the final construction report, WMDSM must provide the Department with representative photographic documentation of each stage of construction.

G. Record Drawings

WMDSM must provide record drawings, signed and stamped by a State of Maine Licensed Professional Engineer, to the Department within 45 days after construction completion of each phase.

H. Final Construction Report and Commencement of Operations

WMDSM must submit a written request that the Department conduct an inspection of the completed construction for a finding of compliance with the facility license.

WMDSM may commence operations of the landfill upon Departmental approval or ten working days after submitting the written certification stating that the project was constructed in accordance with the approved plans and specifications, and after the Department conducts or waives the need for a final construction inspection. The Department may delay commencement of operations pending resolution of issues identified during its inspection and/or during review of the written certification.

WMDSM must submit a final construction report to the Department within 45 days following construction completion of each phase which includes the items specified in the Rules. The written certification is required as part of the final construction report and may be submitted prior to the final construction report in order to expedite approval for commencement of operations.

The Department finds that WMDSM must follow the applicable requirements of 06-096 C.M.R. ch. 401, § 3 during construction of each phase of the proposed Phase 14 landfill expansion.

35. OPERATIONS

The proposed Phase 14 expansion is subject to the regulatory requirements of 06-096 C.M.R. ch. 401, § 4 during landfill operations, as summarized below.

A. Operations Manual

The Site Operations Manual must be reviewed annually by the operator and updated as necessary. These updates shall be distributed to the entities holding certified copies, including the Department and key operating and management personnel of the landfill. The landfill operator shall familiarize operating personnel with relevant sections of the Site Operations Manual. A certified copy of the Site Operations Manual must be available for use at the facility at all times.

B. Operator Training and Certification Program

At least two key personnel must be trained in the operation of, and regulatory requirements for, the landfill.

C. Operating Requirements

The policy and procedures utilized by WMDSM to meet the operating requirements in the Rules are addressed in the facility's Site Operations Manual. These operating requirements include but are not limited to: (1) reviewing the Site Operations Manual on an annual basis and updating as necessary; (2) accepting only wastes allowed by the facility's licenses and characterizing these wastes appropriately; and (3) providing for facility inspection and maintenance on a regular basis. Requirements for utilization of an approved cell development plan, environmental monitoring and the appropriate installation of daily, intermediate and final cover are also to be outlined in the Site Operations Manual.

D. Annual Report

Pursuant to 38 M.R.S. § 1310-N(6-D) and as stated in 06-096 C.M.R ch. 401, § 4(D), an Annual Report and fee shall be submitted to the Department in the timeframe stated in the Rules, currently by April 30 of each year. The Annual Report must contain the applicable information required by the Rules. The operator must keep copies of the Annual Reports submitted to the Department throughout the operational and the post-closure care period of the landfill.

The Department finds that WMDSM has submitted its Site Operations Manual and, as proposed, will revise it to include specific operating provisions for the proposed Phase 14 expansion and any specific requirements of this license.

36. ACCEPTABLE WASTES

A Waste Characterization/Acceptance Plan is provided as Section I, Part B of the Site Operations Manual provided as Volume V of the application. WMDSM is currently licensed to accept non-hazardous waste generated within the State and non-remediation non-hazardous waste from any source. The proposed Phase 14 expansion will be licensed to accept similar waste types as described in Findings 3 and 18, of this license. In addition, WMDSM may accept individually approved wastes after obtaining a separate special waste license from the Department. Unacceptable wastes include, but are not limited to, hazardous wastes, liquid wastes, medical wastes, radioactive wastes and non-Department approved wastes (Volume V of the application, Section I, Part B, Section 3.4.2, page 5).

The Department finds that all waste streams accepted at the facility must be characterized and accepted following the procedures in the facility's Waste Characterization/Acceptance

WASTE MANAGEMENT DISPOSAL	87	MAINE HAZARDOUS
SERVICES OF MAINE, INC.	)	WASTE, SEPTAGE AND
CROSSROADS LANDFILL	)	SOLID WASTE
PHASE 14 EXPANSION	)	MANAGEMENT ACT
NORRIDGEWOCK	)	
SOMERSET COUNTY, MAINE	)	
#S-010735-WD-YB-N	)	
(APPROVAL WITH CONDITIONS)	)	NEW LICENSE

Plan. For actual delivery onto WMDSM's site, waste haulers must have the proper documentation as required in the Site Operations Manual.

BASED on the above Findings of Fact, and subject to the Conditions listed below, the Department makes the following CONCLUSIONS:

1. WMDSM has submitted evidence that the proposed expansion will not pollute any water of the State, contaminate the ambient air, constitute a hazard to health or welfare, or create a nuisance pursuant to 38 M.R.S. § 1310-N(1)(A) and 06-096 C.M.R. ch. 400, § 3(D) provided that the Conditions attached to this license are met.

2. WMDSM has complied with the public and local participation and notification requirements pursuant to 38 M.R.S. §§ 1310-S(1) and 1310-N(12) and 06-096 C.M.R. ch. 2, §§ 10, 13, and 14.

3. WMDSM has demonstrated adequate title, right, or interest in all of the property which is proposed for development or use pursuant to 06-096 C.M.R. ch. 400, § 4(A). The proposed Phase 14 expansion is contiguous to the existing facility and meets the requirements of 38 M.R.S. § 1310-X(3).

4. WMDSM has provided an adequate demonstration of financial ability and assurance for the permitting, design, construction, operation, closure, and post-closure care of the proposed Phase 14 landfill expansion pursuant to 38 M.R.S. §§ 1310-N(2-F)(A) and § 1310-Y, and 06-096 C.M.R. ch. 400, § 4(B)(1), provided that WMDSM reviews and submits updates to their financial assurance to the Department annually in accordance with the Rules including costs for any new Phase 14 cells to be constructed and operated during that year, either by incorporation in the annual financial assurance submittal or as a separate financial assurance update provided prior to waste placement in any new Phase 14 cell.

5. WMDSM has provided adequate evidence of technical ability to design, construct, operate, maintain, close, and accomplish post-closure care of the proposed Phase 14 expansion as required in 38 M.R.S. §§ 1310-N(2-F)(A) and 06-096 C.M.R. ch. 400, § 4(C)(1).

6. WMDSM has provided a civil/criminal disclosure statement demonstrating that the entities are not in violation of environmental or criminal law pursuant to 38 M.R.S. § 1310-N(7) and 06-096 C.M.R. ch. 400, §§ 4(C)(1)(b) and § 12 and the Department finds no basis for denying the license based on the disclosure statements.

WASTE MANAGEMENT DISPOSAL	88	MAINE HAZARDOUS
SERVICES OF MAINE, INC.	)	WASTE, SEPTAGE AND
CROSSROADS LANDFILL	)	SOLID WASTE
PHASE 14 EXPANSION	)	MANAGEMENT ACT
NORRIDGEWOCK	)	
SOMERSET COUNTY, MAINE	)	
#S-010735-WD-YB-N	)	
(APPROVAL WITH CONDITIONS)	)	NEW LICENSE

7. WMDSM has demonstrated that the roads and intersections in the vicinity of WMDSM have the ability to safely and appropriately handle all of the traffic attributable to the proposed Phase 14 expansion into, out of, and within the facility pursuant to 38 M.R.S. § 1310-N(2-F)(B) and 06-096 C.M.R. ch. 400, § 4(D)(1).

8. WMDSM has adequately provided for fitting the proposed Phase 14 expansion harmoniously into the existing natural environment; has provided buffer strips of adequate size and quality to adequately protect aquatic and wildlife habitat and the natural environment; and will not unreasonably adversely affect protected natural resources and rare, threatened and endangered plant and animal species pursuant to 38 M.R.S. § 1310-N(2-F)(C) and 06-096 C.M.R. ch. 400, § 4(E)(1).

9. WMDSM has adequately demonstrated that the proposed Phase 14 expansion will not unreasonably adversely affect existing uses and scenic character, including bird hazard to aircraft, historical sites, established public viewing areas, excessive noise at the property boundary or at any protected location, or existing uses of neighboring property pursuant to 38 M.R.S. § 1310-N(2-F)(C) and 06-096 C.M.R. ch. 400, § 4(F)(1); provided that:

   A. The currently employed bird control program is continued during active operations of the proposed Phase 14 expansion;

   B. WMDSM adds visual barriers at Vantage Point 1 near the site entrance and at Vantage Point 2 which is located near the Baker Farm at the appropriate time to ensure they provide an adequate visual barrier at the time they are needed to screen the proposed Phase 14 expansion as it reaches its final stages of filling; and

   C. WMDSM submits for review by the Department at least 60 days prior to waste placement operations in the first cell, a modified Site Operations Manual to include: (1) construction of sound attenuation berms with select waste material along the eastern portion of the Phase 14 expansion, specifically Phase 14A, using a single CAT D6T bulldozer limiting the duration of its operation in any given hour to 70% operating time, within 415 feet of the closest protected location with a procedure to ensure compliance with this operational limitation, or substitution of a bulldozer having a 2 dBA lower sound rating than the CAT D6T without restriction; and (2) a plan to conduct periodic sound level monitoring until operations occur at least 750 feet to 900 feet depending on the equipment being used.

WASTE MANAGEMENT DISPOSAL	89	MAINE HAZARDOUS
SERVICES OF MAINE, INC.	)	WASTE, SEPTAGE AND
CROSSROADS LANDFILL	)	SOLID WASTE
PHASE 14 EXPANSION	)	MANAGEMENT ACT
NORRIDGEWOCK	)	
SOMERSET COUNTY, MAINE	)	
#S-010735-WD-YB-N	)	
(APPROVAL WITH CONDITIONS)	)	NEW LICENSE

10. WMDSM has an air emissions license from the Department's Bureau of Air Quality and has adequately demonstrated that the proposed Phase 14 expansion will not unreasonably adversely affect air quality pursuant to 38 M.R.S. § 1310-N(2-F)(C) and 06-096 C.M.R. ch. 400, § 4(G)(1) provided that the Site Operations Manual is revised to include provisions for conducting odor inspections within the community, routine discussions regarding odor concerns if any, and an odor complaint response procedure including provisions for notifying the community of the procedure at least 60 days prior to waste placement operations in the first cell of the proposed Phase 14 expansion and submitted for Department review.

11. WMDSM has adequately demonstrated that the proposed Phase 14 expansion will not unreasonably adversely affect surface water quality or cause an unreasonable threat to the quality of a classified body of surface water pursuant to 38 M.R.S. §§ 1310-N(2-F)(C) and 1310-N(1-A) and 06-096 C.M.R. ch. 400, § 4(H)(1).

12. WMDSM has been issued a NRPA license from the Department's Bureau of Land Resources and WMDSM has provided evidence that an application for a Federal Wetlands Permit to the ACOE was submitted. The proposed landfill will not unreasonably adversely affect other natural resources in the municipality or in neighboring municipalities pursuant to the standards of 38 M.R.S. § 1310-N(2-F)(C) and 06-096 C.M.R. ch. 400, § 4(I).

13. WMDSM has adequately demonstrated that the proposed Phase 14 expansion will not overlie any significant sand and gravel aquifers; pose an unreasonable threat to the quality of a significant sand and gravel aquifer; pose an unreasonable threat to the quality of an underlying fractured bedrock aquifer; or pose an unreasonable risk that a discharge to a significant ground water aquifer will occur, pursuant to 38 M.R.S. §§ 1310-N(2-A) and 1310-N(2-F)(E), and 06-096 C.M.R. ch. 400, § 4(K).

14. WMDSM has made adequate provisions for utilities, including adequate water supplies and appropriate sanitary wastewater disposal, and adequately demonstrated that the facility will not have an unreasonable adverse effect on existing or proposed utilities in the municipality or area served by those utilities, pursuant to 38 M.R.S. § 1310-N(2-F)(F) and 06-096 C.M.R. ch. 400, § 4(L).

15. WMDSM has adequately demonstrated that the proposed Phase 14 expansion will be located on soil types suitable to the nature of the undertaking and the facility will not cause unreasonable erosion of soil or sediment pursuant to 38 M.R.S. §§ 1310-N(2-F)(D) and 1310-N(1-A)(A) and 06-096 C.M.R. ch. 400, § (4)(J) provided that the erosion and sedimentation control plan is implemented as proposed, incorporating revisions resulting

from the Department's review and approval of each new phase construction as detailed in a specific design package.

16. WMDSM has adequately demonstrated that the proposed Phase 14 expansion will not unreasonably cause or increase flooding on-site or on adjacent properties nor create an unreasonable flood hazard to a structure pursuant to 38 M.R.S. §§ 1310-N(2-F)(G) and 06-096 C.M.R. ch. 400, § 4(M).

17. WMDSM has adequately demonstrated that the purpose and practices for the proposed Phase 14 expansion are consistent with the solid waste management hierarchy pursuant to 38 M.R.S. §§ 2101 and 1310-N(1)(D) and 06-096 C.M.R. ch. 400, § 4(N)(1).

18. WMDSM has adequately demonstrated that the proposed Phase 14 expansion will accept solid waste that is subject to recycling and source reduction programs, voluntary or otherwise, at least as effective as those in the statute and other provisions of State law; the volume of the waste and the risks related to its handling and disposal have been reduced to the maximum practical extent by recycling and source reduction prior to being landfilled; and WMDSM has shown consistency with the recycling provisions of the State plan pursuant to 38 M.R.S. § 1310-N(5-A) and 06-096 C.M.R. ch. 400, § 6(B) provided that:

    A. WMDSM's proposed reuse, reduction, recycling and composting programs begin on or before the commencement of operations in the Phase 14 expansion;

    B. WMDSM continues to provide the infrastructure and services necessary to all municipalities and communities utilizing the Crossroads Landfill as their primary option for MSW disposal to reduce the waste landfilled to the maximum extent practicable; and

    C. WMDSM collects and reports in each Annual Report to the Department, data on the amount of waste received, the sources of the wastes, and estimated recycling rates associated with waste received for each of the nine-member communities that utilize WMDSM's Airport Road Transfer Station.

19. In accordance with Public Benefit Determination License #S-010735-W5-XY-N, WMDSM must:

    A. Notify the Department in advance to identify and evaluate alternatives to landfilling if exceptional circumstances arise requiring out-of-state MSW to be disposed of in the Phase 14 expansion;

B. Not dispose of marketable recyclables in the Phase 14 expansion. For the purposes of this license, "marketable recyclables" are defined as set forth in Department License #S-010735-W5-XY-N;

C. Submit in each Annual Report documentation of the amount and type of waste received from both in-state and out-of-state generators, the in-place density of the landfilled waste, the volume of airspace utilized during the reporting period, and the estimated remaining permitted disposal capacity expressed in cubic yards;

D. Notify the Department if the amount of non-remediation special waste accepted from out-of-state generators is more than 25% of the annual total of waste disposed in Phase 14, or that the amount of all wastes accepted from out-of-state generators is more than 35% of the annual total of waste disposed at the facility; and

E. Prioritize for disposal at the Crossroads Landfill Maine generated solid waste.

20. The facility is licensed to accept non-hazardous waste and has an appropriate Hazardous and Special Waste Handling and Exclusion Plan for the detection, identification, handling, storage, transportation and disposal of delivered wastes.

21. WMDSM has provided evidence of liability insurance coverage for sudden and accidental occurrences of bodily injury and property damage, in accordance with 06-096 C.M.R. ch. 400, §10.

22. WMDSM has clearly and convincingly demonstrated the intent of State laws and the purpose and intent of the Rules will be met with the addition of a silt-clay base layer with a hydraulic conductivity of 1×10^{-5} cm/sec within a limited extent of the proposed Phase 14 expansion area.

23. WMDSM has submitted a site assessment report, identified the site characteristics and recommendations for landfill design and construction, identified sensitive receptors, and estimated ground water flow time of travel as required by 06-096 C.M.R. ch. 401, §§ 2(B) and (C) and WMDSM meets requirements of ground water time of travel from the bottom of the landfill liner system to all identified sensitive receptors, pursuant to 06-096 C.M.R. ch. 401, § 1(C) and 06-096 C.M.R. ch. 401, § 1(C)(1)(c).

24. WMDSM has submitted a quality assurance plan and construction contract bid documents including drawings, technical specifications, and contract administrative documents for the proposed Phase 14 expansion in accordance with 06-096 C.M.R. ch. 401, § 2 (I) and (J).

WASTE MANAGEMENT DISPOSAL	92	MAINE HAZARDOUS
SERVICES OF MAINE, INC.	)	WASTE, SEPTAGE AND
CROSSROADS LANDFILL	)	SOLID WASTE
PHASE 14 EXPANSION	)	MANAGEMENT ACT
NORRIDGEWOCK	)	
SOMERSET COUNTY, MAINE	)	
#S-010735-WD-YB-N	)	
(APPROVAL WITH CONDITIONS)	)	NEW LICENSE

25. WMDSM has proposed an expansion design meeting the requirements of the Rules, provided that, an engineering report, construction contract bid documents, including drawings, technical specifications, and contract administrative documents, a quality assurance plan and erosion and sedimentation control and stormwater management plans are submitted to the Department for review and approval at least four months prior to the commencement of construction activities within each phase cell (Phases 14A through 14E) of the proposed expansion; ongoing performance monitoring data to assess the effectiveness of leachate recirculation is provided with each facility annual report; and WMDSM maintains a valid leachate disposal contract(s) with licensed wastewater treatment facility(ies) for the treatment and disposal of leachate from the proposed expansion. Initial site preparation including land clearing, soil stockpile relocation, and construction of visual berms may occur following written notice to, and approval by, the Department in the form of a letter approval prior to review and approval of the detailed construction contract bid documents.

26. WMDSM has submitted a phased alternative final cover system proposal meeting the intent of the Rules provided that an engineering report; construction contract bid documents, including drawings, technical specifications, and contract administrative documents; and a quality assurance plan and erosion and sedimentation control and stormwater management plans are submitted to the Department for review and approval at least four months prior to the proposed application of a phased final cover system and data from ongoing performance monitoring of leachate recirculation indicates that leachate recirculation is effective in accelerating waste degradation.

27. WMDSM has an adequate site-wide water quality monitoring program consistent with 06-096 C.M.R. ch. 401, § 2(K) provided that WMDSM submits for Department review, a water quality report that both characterizes the existing site and proposes revisions to its Site Water Quality Monitoring Program to:

    A. Include two downgradient bedrock wells positioned to intercept ground water coming from the proposed Phase 14 expansion and located 50 to 100 feet away from the landfill from which at least six rounds of data will be collected, after which time the bedrock wells would not need to be sampled, unless the till wells indicate a possible release;

    B. Provide for two years of three sampling rounds each for site characterization monitoring; and

    C. Submit an Annual Water Quality Report evaluating WMDSM's water quality and an assessment of ground water flow directions as the proposed Phase 14 expansion

is developed as a part of the facility's Annual Report. Thereafter, proposed changes to the water quality monitoring program shall require Department approval.

28. Provide written notice to abutting property owners of their rights under 38 M.R.S. § 1310-N(10) to have their drinking water sampled and analyzed biannually as needed. Conduct biannual sampling and analysis of an abutting property owner's water supply well based on the owner's request to the Department.

29. WMDSM has submitted a Site Operations Manual that meets the operating requirements of 06-096 C.M.R. ch. 401, § 2(L) provided that it is revised to include specific operating provisions for the proposed Phase 14 expansion and any specific requirements of this license.

THEREFORE, the Department APPROVES WMDSM's request for a variance to 06-096 C.M.R. ch. 401, § 1(C)(3)(b) of the Rules and APPROVES the above noted application of WMDSM, SUBJECT TO THE ATTACHED CONDITIONS, and all applicable standards and regulations:

1. The Standard Conditions of Approval for Solid Waste, copy attached.

2. Severability. The invalidity or unenforceability of any provisions, or part thereof, of this license shall not affect the remainder of the provision or any other provision. This license shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.

3. Financial Assurance. WMDSM shall in accordance with 38 M.R.S. §§ 1310-N(2-F)(A) and § 1310-Y, and 06-096 C.M.R. ch. 400, § 4(B)(1) submit updates to its financial assurance on an annual basis including costs for any new Phase 14 cells to be constructed and operated during that year, either by incorporation in the annual financial assurance submittal or as a separate financial assurance update provided prior to waste placement in any new Phase 14 cell.

4. Site Management. WMDSM shall pursuant to 38 M.R.S. § 1310-N(2-F)(C) and 06-096 C.M.R. ch. 400, § 4(F)(1):

   A. Continue the currently employed bird control program during the active operations of the proposed Phase 14 expansion;

   B. Add visual barriers at Vantage Point 1 near the site entrance and at Vantage Point 2 which is located near the Baker Farm at the appropriate time to ensure they

provide an adequate visual barrier at the time they are needed to screen the proposed Phase 14 expansion as it reaches its final stages of filling; and

C. Submit for review by the Department at least 60 days prior to waste placement operations in the first cell, a modified Site Operations Manual to include:

(1) Construction of sound attenuation berms with select waste material using a single CAT D6T bulldozer limiting the duration of its operation in any given hour to 70% operating time, within 415 feet of the closest protected location with a procedure to ensure compliance with this operational limitation, or substitution of a bulldozer having a 2 dBA lower sound rating than the CAT D6T without restriction;

(2) A plan to conduct periodic sound level monitoring until operations occur at least 750 feet to 900 feet depending on the equipment being used; and

(3) Provisions for conducting daily odor surveys within the community, daily discussions regarding odor concerns if any, and an odor complaint response procedure including provisions for notifying the community of the procedure.

5. Operating Requirements. WMDSM shall meet the operating requirements of 06-096 C.M.R. ch. 401, § 4 for the proposed Phase 14 landfill expansion, including, but not limited to: reviewing and updating the Site Operations Manual as applicable; training and certifying key personnel; operating the facility per the Rule requirements; and submitting an Annual Report and associated fee.

6. Annual Reporting of Waste Management Data. Pursuant to 38 M.R.S. §§ 2101 and 1310-N(1)(D) and 06-096 C.M.R. ch. 400, § 4(N)(1), WMDSM shall include as part of each Annual Report:

A. In accordance with Condition 3(E) of Department License #S-010735-W5-XY-N, collect and report data on the amount of waste received, the sources of the wastes, and the estimated recycling rates associated with waste received from each of the nine-member communities that utilize WMDSM's Airport Road Transfer Station; and

B. In accordance with Condition 4(A) of Department License #S-010735-W5-XY-N, collect and report in each Annual Report data on the amount and type of waste received from both in-state and out-of-state generators, the in-place density of the

landfilled waste, the volume of airspace utilized during the reporting period and the estimated remaining capacity expressed in cubic yards.

7. Public Benefit Determination. In accordance with Public Benefit Determination License #S-010735-W5-XY-N, WMDSM shall:

   A. Implement the proposed reuse, reduction, recycling and composting programs on or before the commencement of operations in the proposed Phase 14 expansion;

   B. Continue to provide the infrastructure and services necessary to all municipalities and communities utilizing the Crossroads Landfill as their primary option for MSW disposal to reduce the waste landfilled to the maximum extent practicable;

   C. Notify the Department in advance to identify and evaluate alternatives to landfilling if exceptional circumstances arise requiring out-of-state MSW to be disposed of in the Phase 14 expansion;

   D. Not dispose of marketable recyclables in the Phase 14 expansion. For the purposes of this license, "marketable recyclables" are defined as set forth in Department License #S-010735-W5-XY-N;

   E. Notify the Department if the amount of non-remediation special waste accepted from out-of-state generators is more than 25% of the annual total of waste disposed in Phase 14, or that the amount of all wastes accepted from out-of-state generators is more than 35% of the annual total of waste disposed at the facility; and

   F. Prioritize for disposal at the Crossroads Landfill Maine generated solid waste.

8. Construction Submittals for each Phase. WMDSM shall submit to the Department for review and approval at least four months prior to the commencement of construction activities within each phase (Phases 14A through 14E) of the proposed Phase 14 expansion, an engineering report, construction contract bid documents, including drawings, technical specifications, and contract administrative documents, a quality assurance plan and erosion and sedimentation control and stormwater management plans. Initial site preparation including land clearing, soil stockpile relocation, and construction of visual berms may occur following written notice to, and approval by, the Department in the form of a letter approval prior to review and approval of the detailed construction contract bid documents.

WASTE MANAGEMENT DISPOSAL	96	MAINE HAZARDOUS
SERVICES OF MAINE, INC.	)	WASTE, SEPTAGE AND
CROSSROADS LANDFILL	)	SOLID WASTE
PHASE 14 EXPANSION	)	MANAGEMENT ACT
NORRIDGEWOCK	)	
SOMERSET COUNTY, MAINE	)	
#S-010735-WD-YB-N	)	
(APPROVAL WITH CONDITIONS)	)	NEW LICENSE

9. Water Quality Monitoring. WMDSM shall, consistent with 06-096 C.M.R. ch. 401, § 2(K), submit to the Department for review a water quality report that both characterizes the existing site and proposes revisions to its Site Water Quality Monitoring Program to:

   A. Include two downgradient bedrock wells positioned to intercept ground water coming from Phase 14 and located 50 to 100 feet away from the landfill from which at least 6 rounds of data will be collected, after which time the bedrock wells would not need to be sampled, unless the till wells indicate a possible release; and

   B. Provide for two years of three sampling rounds each for site characterization monitoring.

10. Off-site Water Quality Sampling and Analysis. Prior to construction of Phase 14A, WMDSM shall provide written notice to abutting property owners of their rights under 38 M.R.S. § 1310-N(10) to have their drinking water sampled and analyzed biannually as needed. Upon notification from the Department, WMDSM shall conduct biannual sampling and analysis of an abutting property owner's water supply well based on the owner's request to the Department.

11. Leachate Recirculation. WMDSM shall provide a demonstration of the ongoing effectiveness of leachate recirculation with each annual report.

12. Leachate Disposal Contracts. WMDSM shall maintain valid leachate disposal contract(s) with licensed wastewater treatment facility(ies) for the treatment and disposal of leachate from the proposed expansion. A contingency plan for leachate disposal limitations at contracted treatment facilities shall be in place, including a letter of intent or service contracts for such proposed contingencies. Subsequent updates to the leachate disposal documentation shall be submitted to the Department to demonstrate compliance with the leachate management requirements of the Rules.

13. Acceptable Waste. Prior to accepting any waste for disposal not listed or referenced in the application and previously licensed as acceptable waste, WMDSM shall submit an application for the new waste to the Department, for review and approval.

14. Phased Final Cover. WMDSM shall submit to the Department for its review and approval at least 4 months prior to each proposed application of final cover, the engineering report, construction contract bid documents, consisting of technical specifications, drawings, and contract administrative documents, a quality assurance plan and erosion and sedimentation control and stormwater management plans for the placement of phased final cover. The

WASTE MANAGEMENT DISPOSAL SERVICES OF MAINE, INC. CROSSROADS LANDFILL PHASE 14 EXPANSION NORRIDGEWOCK SOMERSET COUNTY, MAINE #S-010735-WD-YB-N (APPROVAL WITH CONDITIONS)	97)))))))	MAINE HAZARDOUS WASTE, SEPTAGE AND SOLID WASTE MANAGEMENT ACT NEW LICENSE

ongoing effectiveness of leachate recirculation in accelerating waste degradation must be demonstrated prior to installation of the phased alternative final cover system.

DONE AND DATED AT AUGUSTA, MAINE THIS 11th DAY OF May, 2021.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: _____
Melanie Loyzim, Commissioner

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES.

Date of initial receipt of application: October 28, 2019
Date of application acceptance: November 18, 2019

Date filed with the Board of Environmental Protection:

XLB85263

FILED
MAY 11, 2021
State of Maine
Board of Environmental Protection

Appendix A

STANDARD CONDITIONS
TO ALL SOLID WASTE LANDFILL LICENSES

STRICT CONFORMANCE WITH THE STANDARD AND SPECIAL CONDITIONS OF THIS APPROVAL IS NECESSARY FOR THE PROJECT TO MEET THE STATUTORY CRITERIA FOR APPROVAL. VIOLATIONS OF THE CONDITIONS UNDER WHICH A LICENSE IS ISSUED SHALL CONSTITUTE A VIOLATION OF THAT LICENSE AGAINST WHICH ENFORCEMENT ACTION MAY BE TAKEN, INCLUDING REVOCATION.

1. **Approval of Variations from Plans.** The granting of this approval is dependent upon and limited to the proposals and plans contained in the application and supporting documents submitted and affirmed by the license. Any consequential variation from these plans, proposals, and supporting documents is subject to review and approval prior to implementation.

2. **Compliance with All Applicable Laws.** The licensee shall secure and comply with all applicable federal, state, and local licenses, permits, authorizations, conditions, agreements, and orders prior to or during construction and operation, as appropriate.

3. **Compliance with All Terms and Conditions of Approval.** The licensee shall submit all reports and information requested by the Department demonstrating that the licensee has complied or will comply with all terms and conditions of this approval. All preconstruction terms and conditions must be met before construction begins.

4. **Transfer of License.** The licensee may not transfer the solid waste facility license or any portion thereof without approval of the Department.

5. **Initiation of Construction or Development Within Two Years.** If the construction or operation of the solid waste facility is not begun within two years of issuance of within 2 years after any administrative and judicial appeals have been resolved, the license lapses and the licensee must reapply to the Department for a new license unless otherwise approved by the Department.

6. **Approval Included in Contract Bids.** A copy of the approval must be included in or attached to all contract bid specifications for the solid waste facility.

7. **Approval Shown to Contractors.** Contractors must be shown the license by the licensee before commencing work on the solid waste facility.

8. **Background of key individuals.** A licensee may not knowingly hire as an officer, director or key solid waste facility employee, or knowingly acquire an equity interest or debt interest in, any person convicted of a felony or found to have violated a State or federal environmental law or rule without first obtaining the approval of the Department.

9. **Fees.** The licensee must comply with annual license and annual reporting fee requirements of the Department's rules.

10. **Recycling and Source Reduction Determination for Solid Waste Disposal Facilities.** This condition does not apply to the expansion of a commercial solid waste disposal facility that accepts only special waste for landfilling.

The solid waste disposal facility shall only accept solid waste that is subject to recycling and source reduction programs, voluntary or otherwise, at least as effective as those imposed by 38 M.R.S. Ch. 13.

11. **Deed Requirements for Solid Waste Disposal Facilities.** Whenever any lot of land on which an active, inactive, or closed solid waste disposal facility is located is being transferred by deed, the following must be expressly stated in the deed:

A. The type of facility located on the lot and the dates of its establishment and closure.

B. A description of the location and the composition, extent, and depth of the waste deposited.

C. The disposal location coordinates of asbestos wastes must be identified.

DEP INFORMATION SHEET

Appealing a Department Licensing Decision

Dated: November 2018 **Contact: (207) 287-2452**

SUMMARY

There are two methods available to an aggrieved person seeking to appeal a licensing decision made by the Department of Environmental Protection's (DEP) Commissioner: (1) an administrative process before the Board of Environmental Protection (Board); or (2) a judicial process before Maine's Superior Court. An aggrieved person seeking review of a licensing decision over which the Board had original jurisdiction may seek judicial review in Maine's Superior Court.

A judicial appeal of final action by the Commissioner or the Board regarding an application for an expedited wind energy development (35-A M.R.S. § 3451(4)) or a general permit for an offshore wind energy demonstration project (38 M.R.S. § 480-HH(1)) or a general permit for a tidal energy demonstration project (38 M.R.S. § 636-A) must be taken to the Supreme Judicial Court sitting as the Law Court.

This information sheet, in conjunction with a review of the statutory and regulatory provisions referred to herein, can help a person to understand his or her rights and obligations in filing an administrative or judicial appeal.

I. ADMINISTRATIVE APPEALS TO THE BOARD

LEGAL REFERENCES

The laws concerning the DEP's *Organization and Powers*, 38 M.R.S. §§ 341-D(4) & 346; the *Maine Administrative Procedure Act*, 5 M.R.S. § 11001; and the DEP's *Rules Concerning the Processing of Applications and Other Administrative Matters* ("Chapter 2"), 06-096 C.M.R. ch. 2.

DEADLINE TO SUBMIT AN APPEAL TO THE BOARD

The Board must receive a written appeal within 30 days of the date on which the Commissioner's decision was filed with the Board. Appeals filed more than 30 calendar days after the date on which the Commissioner's decision was filed with the Board will be dismissed unless notice of the Commissioner's license decision was required to be given to the person filing an appeal (appellant) and the notice was not given as required.

HOW TO SUBMIT AN APPEAL TO THE BOARD

Signed original appeal documents must be sent to: Chair, Board of Environmental Protection, 17 State House Station, Augusta, ME 04333-0017. An appeal may be submitted by fax or e-mail if it contains a scanned original signature. It is recommended that a faxed or e-mailed appeal be followed by the submittal of mailed original paper documents. The complete appeal, including any attachments, must be received at DEP's offices in Augusta on or before 5:00 PM on the due date; materials received after 5:00 pm are not considered received until the following day. The risk of material not being received in a timely manner is on the sender, regardless of the method used. The appellant must also send a copy of the appeal documents to the Commissioner of the DEP; the applicant (if the appellant is not the applicant in the license proceeding at issue); and if a hearing was held on the application, any intervenor in that hearing process. All of the information listed in the next section of this information sheet must be submitted at the time the appeal is filed.

INFORMATION APPEAL PAPERWORK MUST CONTAIN

Appeal materials must contain the following information at the time the appeal is submitted:

1. *Aggrieved Status*. The appeal must explain how the appellant has standing to maintain an appeal. This requires an explanation of how the appellant may suffer a particularized injury as a result of the Commissioner's decision.
2. *The findings, conclusions, or conditions objected to or believed to be in error.* The appeal must identify the specific findings of fact, conclusions regarding compliance with the law, license conditions, or other aspects of the written license decision or of the license review process that the appellant objects to or believes to be in error.
3. *The basis of the objections or challenge.* For the objections identified in Item #2, the appeal must state why the appellant believes that the license decision is incorrect and should be modified or reversed. If possible, the appeal should cite specific evidence in the record or specific licensing requirements that the appellant believes were not properly considered or fully addressed.
4. *The remedy sought.* This can range from reversal of the Commissioner's decision on the license or permit to changes in specific permit conditions.
5. *All the matters to be contested.* The Board will limit its consideration to those matters specifically raised in the written notice of appeal.
6. *Request for hearing.* If the appellant wishes the Board to hold a public hearing on the appeal, a request for public hearing must be filed as part of the notice of appeal, and must include an offer of proof in accordance with Chapter 2. The Board will hear the arguments in favor of and in opposition to a hearing on the appeal and the presentations on the merits of an appeal at a regularly scheduled meeting. If the Board decides to hold a public hearing on an appeal, that hearing will then be scheduled for a later date.
7. *New or additional evidence to be offered.* If an appellant wants to provide evidence not previously provided to DEP staff during the DEP's review of the application, the request and the proposed evidence must be submitted with the appeal. The Board may allow new or additional evidence, referred to as supplemental evidence, to be considered in an appeal only under very limited circumstances. The proposed evidence must be relevant and material, and (a) the person seeking to add information to the record must show due diligence in bringing the evidence to the DEP's attention at the earliest possible time in the licensing process; or (b) the evidence itself must be newly discovered and therefore unable to have been presented earlier in the process. Specific requirements for supplemental evidence are found in Chapter 2 § 24.

OTHER CONSIDERATIONS IN APPEALING A DECISION TO THE BOARD

1. *Be familiar with all relevant material in the DEP record.* A license application file is public information, subject to any applicable statutory exceptions, and is made easily accessible by the DEP. Upon request, the DEP will make application materials available during normal working hours, provide space to review the file, and provide an opportunity for photocopying materials. There is a charge for copies or copying services.
2. *Be familiar with the regulations and laws under which the application was processed, and the procedural rules governing your appeal.* DEP staff will provide this information on request and answer general questions regarding the appeal process.
3. *The filing of an appeal does not operate as a stay to any decision.* If a license has been granted and it has been appealed, the license normally remains in effect pending the processing of the appeal. Unless a stay of the decision is requested and granted, a license holder may proceed with a project pending the outcome of an appeal, but the license holder runs the risk of the decision being reversed or modified as a result of the appeal.

WHAT TO EXPECT ONCE YOU FILE A TIMELY APPEAL WITH THE BOARD

The Board will formally acknowledge receipt of an appeal, and will provide the name of the DEP project manager assigned to the specific appeal. The notice of appeal, any materials accepted by the Board Chair as supplementary evidence, any materials submitted in response to the appeal, and relevant excerpts from the DEP's application review file will be sent to Board members with a recommended decision from DEP staff. The appellant, the license holder if different from the appellant, and any interested persons are notified in advance of the date set for Board consideration of an appeal or request for public hearing. The appellant and the license holder will have an opportunity to address the Board at the Board meeting. With or without holding a public hearing, the Board may affirm, amend, or reverse a Commissioner decision or remand the matter to the Commissioner for further proceedings. The Board will notify the appellant, the license holder, and interested persons of its decision.

II. JUDICIAL APPEALS

Maine law generally allows aggrieved persons to appeal final Commissioner or Board licensing decisions to Maine's Superior Court (see 38 M.R.S. § 346(1); 06-096 C.M.R. ch. 2; 5 M.R.S. § 11001; and M.R. Civ. P. 80C). A party's appeal must be filed with the Superior Court within 30 days of receipt of notice of the Board's or the Commissioner's decision. For any other person, an appeal must be filed within 40 days of the date the decision was rendered. An appeal to court of a license decision regarding an expedited wind energy development, a general permit for an offshore wind energy demonstration project, or a general permit for a tidal energy demonstration project may only be taken directly to the Maine Supreme Judicial Court. See 38 M.R.S. § 346(4).

Maine's Administrative Procedure Act, DEP statutes governing a particular matter, and the Maine Rules of Civil Procedure must be consulted for the substantive and procedural details applicable to judicial appeals.

ADDITIONAL INFORMATION

If you have questions or need additional information on the appeal process, for administrative appeals contact the Board's Executive Analyst at (207) 287-2452, or for judicial appeals contact the court clerk's office in which your appeal will be filed.

Note: The DEP provides this INFORMATION SHEET for general guidance only; it is not intended for use as a legal reference. Maine law governs an appellant's rights.

EXHIBIT 2

2019-2020 Surface Water Ambient Toxics Monitoring Program. Maine Department of Environmental Protection. May 2021.

Summary:

This evidence is offered into the record as supplemental evidence pursuant to 06-096 CMR Ch. 2, § 24(D). The Department published and provided CLF with a copy of the report on June 2, 2021. CLF requests that the Board introduce the following portions of the larger report into the record as supplemental evidence: (1) the Executive Summary, and (2) Section 3.2 Fish Contaminants – PFAS in Fish into the record.

Report to the Joint Standing Committee on Environment and Natural Resources
130th Legislature, First Session

Surface Water Ambient Toxics Monitoring Program 2019-2020

May 2021

Contact: Don Witherill, Director
Division of Environmental Assessment
Bureau of Water Quality
donald.t.witherill@maine.gov

MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION
17 State House Station | Augusta, Maine 04330-0017
www.maine.gov/dep

EXECUTIVE SUMMARY

Maine's Surface Water Ambient Toxics (SWAT) monitoring program was established in 1993 (38 MRSA §420-B) and administered by the Department of Environmental Protection to determine the nature, scope and severity of toxic contamination in the surface waters and fisheries of the State. The authorizing statute states that the program must be designed to comprehensively monitor the lakes, rivers and streams, and marine and estuarine waters of the State on an ongoing basis. The program must incorporate testing for suspected toxic contamination in biological tissue and sediment; may include testing of the water column; and must include biomonitoring and the monitoring of the health of individual organisms that may serve as indicators of toxic contamination. The program must collect data sufficient to support assessment of the risks to human and ecological health posed by the direct and indirect discharge of toxic contaminants.

The Commissioner of the Department of Environmental Protection (DEP) must prepare a five-year conceptual work plan in addition to annual work plans which are each reviewed by a Technical Advisory Group (TAG). The TAG is composed of 12 individuals, including two representatives with scientific backgrounds representing each of five various interests (business, municipal, conservation, public health and academic), and two legislators.

The SWAT program is divided into four modules: 1) Marine and Estuarine, 2) Lakes, 3) Rivers and Streams, and 4) Special Studies. This biennial report follows the goals of the 2019-2023 five-year conceptual plan, which are generally to continue to monitor previously identified and new toxic issues in the marine environment, lakes and ponds, and rivers and streams, including but not limited to providing baseline data for use by the Department of Marine Resources (DMR) in evaluating and assessing shellfish harvesting areas; providing fish and shellfish contaminants data to the Maine Center for Disease Control and Prevention (MECDC) for use in revising Maine's fish consumption advisories; and continuing biological assessment of rivers' and streams' attainment of Maine's Water Quality Standards.

This report more specifically presents the findings of the 2019 and 2020 annual work plans recommended by the SWAT TAG in meetings May 30, 2019 and May 20, 2020. The 2019 and 2020 work plans focused on monitoring of contaminants in shellfish from known or suspected contaminated marine areas, cyanotoxins in Harmful Algal Blooms, perflourinated alkyl substances (PFAS) in rivers below industrial treatment plants and biosolids spreading sites as requested by MECDC, biomonitoring of aquatic life in rivers and streams in the St. John River watershed and in Southern Maine. Following is a summary of key findings from the 2019 and 2020 SWAT programs for each of the modules.

- **MARINE AND ESTUARINE**

    - Blue mussels collected from all ten sites had mean mercury, nickel, zinc, silver, cadmium, and lead concentrations below Maine Center for Disease Control (MCDC) fish tissue action levels (FTALs).
    - Softshell clams collected from all five sites had mean mercury, nickel, zinc, silver, cadmium, and lead concentrations below MCDC FTALs in edible clam tissue. Testing of clams from Pottle and Hilton coves, Wiscasset, and Holbrook and Ram islands, Castine, (areas requested by Maine Dept. of Marine Resources (DMR) indicate metals concentrations in edible clam tissue support human consumption within limits of existing FTALs.
    - Softshell clam edible tissue from the one site tested, Dennys River, Edmunds Twp., contained no detectable perfluorinated alkyl substances (PFAS) (33 compounds included in analysis). No PFAS were detected in clam tissue at any site in previous testing.
    - Blue mussel tissue from several sites tested contained very low levels of ten different PFAS (just above reporting limits).
    - Blue mussel tissue from nine of 23 sites tested had perfluorooctanesulfonamide (PFOSA) concentrations in all replicates at very low levels (just above reporting limits). PFOSA remains the most commonly detected PFAS in mussel tissue.
    - Blue mussel tissue from inner Fore River, Portland/S. Portland, had perfluorooctanesulfonate (PFOS) concentrations in all replicates above the reporting limit but at a level approximately two orders of magnitude below the MCDC FTAL for PFOS. No other mussel sites tested had detectable levels of PFOS.

- **LAKES**

    - Since 2014, 382 samples have been tested from 126 lakes in a probability-based study of lakes >150 acres in surface area located in populated regions of the state, and, 487 samples have been tested from 12 lakes in the time-series study of lakes known to support algal blooms.
    - Maine DEP has established the capacity to analyze microcystin using the enzyme-linked immunosorbent assay (ELISA) Method.
    - The time-series results and results from the probabilistic study suggest that relatively few Maine lakes produce microcystin concentrations that exceed EPA guidelines, but those few lakes that support severe, chronic algal blooms are very likely to exceed EPA guidelines.
    - Algal scums that accumulate on downwind shorelines may have very high concentrations of microcystin.

- **RIVERS AND STREAMS**

  - In 2019, the Biological Monitoring Unit sampled macroinvertebrate communities at forty-two stations focusing in the Aroostook and St. John basins to determine attainment of Maine's aquatic life use criteria. Thirty-two stations met the aquatic life criteria for their legislatively assigned water quality class, 9 stations did not attain criteria for their assigned class, and one station had an indeterminate result.
  - In 2020, the Biological Monitoring Unit focused macroinvertebrate sampling in the Southern Maine basin. A total of forty-six stations were sampled. Due in part to contractor delays related to the COVID-19 pandemic, data for 2020 samples are not yet all available. Attainment results for available macroinvertebrate data are summarized in Table 3.1.1b. Samplers at two stations were disturbed and no macroinvertebrate data were obtained, however field data are included in this report.
  - In 2019, study of perfluorinated alkyl substances (PFAS) in fish from the Androscoggin River, Kennebec River, Halfmoon Stream, and Kennebunk River above and below industrial treatment plants found primarily perfluorooctanesulfonate (PFOS) at measurable levels. Concentrations were elevated below some industrial discharges and biosolids spreading sites but well below the Maine Center for Disease Control (MeCDC) and Prevention's Fish Tissue Action Level (FTAL).
  - In 2020 study of PFAS in fish from the Penobscot River and the St Croix River above and below former or current industrial treatment plants found primarily PFOS at barely measurable levels. Concentrations were elevated below farm biosolids spreading sites on Halfmoon Stream and the Kenduskeag River and below a municipal wastewater treatment plant on the Salmon Falls River, but well below the MeCDC FTAL. PFOS was also elevated in white perch and more so in smallmouth bass from China Lake, still well below the MeCDC FTAL. PFOS exceeded the MeCDC FTAL in fish from the Presumpscot River below Westbrook. Repeat study of fish from the Mousam River confirmed previous results showing negligible PFOS in the headwaters in Mousam Lake, elevated levels in Number One Pond in downtown Sanford, and levels exceeding the MeCDC FTAL in both largemouth bass and white perch from Estes Lake in the Mousam River below Sanford.

3.2 FISH CONTAMINANTS

PRINCIPAL INVESTIGATOR	Barry Mower
TECHNICAL ASSISTANTS	Joseph Glowa Josh Noll
SPECIAL THANKS	Jim Stahlnecker

3.2.1 PFAS in Fish Tissue (requested by Maine Center for Disease Control and Prevention)

Background

PerFluoroAlkyl Substances (PFAS) are a large (>5000) class of highly persistent and mobile chemicals composed of fully fluorinated straight or branched carbon chains with different functional groups at one end. Consequently, they may be hydrophilic, hydrophobic, and/or lipophilic. They have many specialized industrial and commercial uses for products that resist heat, stains, water, oil and grease, including hair conditioners, non-stick coatings, wetting agents, insulation, dust repellants, cleaners, anti-static agents, antifogging agents, and fire-fighting foams among others (Qi et al., 2011; Yingling, 2013).

PFAS are continuously emitted into the environment from point and nonpoint sources such as industrial or municipal wastewater treatment plants (WWTPs) and atmospheric deposition, respectively (Ahrens and Bundschuh, 2014). In a study of sources of PFAS in major rivers of the world, Kimacjeva et al. (2012) found higher levels in industrial areas than in non-industrial areas. The most commonly detected PFAS are perfluorooctane sulfonate (PFOS) and to a lesser extent perfluorooctanoic acid (PFOA). Beginning in 2002, PFOS has been phased out in the US, Canada, and Europe, but its use has been increasing in China (Yingling, 2013).

PFAS have been found in humans and wildlife all over the world including the artic and deep seas (Yingling, 2013), which suggests atmospheric sources (Houde et al., 2011). They have been correlated with increased cancers, thyroid disease, interference with normal growth and development, and endocrine disruption in humans (Yingling, 2013). There are also reports in the literature of high concentrations in invertebrates, fish, reptiles, and marine mammals worldwide (Houde et al. 2011). Laboratory animal studies on the toxic effects of PFAS (primarily PFOS and PFOA) show various effects on development, reproduction, and immune function of birds, fish, and mammals (Murphy et al., 2012 as cited by Stahl et al. 2014).

PFAS with 8 or more carbons are considered bioaccumulative with sulfonates (e.g. PFOS) having a greater bioaccumulation rate than PFOA and other PFAS, indicating that the functional group is also important (Martin et al., 2013). Bioaccumulation of PFOS is considered similar to that of a moderately lipophilic substance (Houde et al., 2011). Bioaccumulation is higher in some tissues than others (liver>kidneys>whole blood>gill>carcass) but bioaccumulation factors in the carcass

range up to ~2400 (Sharpe et al., 2010). PFC concentrations have been reported as high as 1900 ng/g wet wt. (Houde et al., 2011). Adverse effects in fish are not well known, but mortality, decreased fecundity, and histopathological alterations have been reported (Ahrens and Bundschuh, 2014; Sharpe et al. 2010).

MeCDC derived human health risk-based screening levels for PFOS and PFOA in 2014, updated them in 2016 following new toxicological data published by EPA, and modified them again in 2018 for development of Remedial Action Guidelines (RAGs) for cleanup of hazardous waste sites in Maine. RAGS were developed for exposures to soil, sediment, groundwater, surface water, and for the ingestion of fish. In 2019 MECDC updated its fish tissue action levels (FTAL =34.1 ug/kg for protection of sensitive populations, 79.0 ug/kg for protection of the general population) using some different factors for use in evaluating the need for Fish Consumption Advisories.

In a Maine study of streams near Loring Air Force Base (LAFB), where fire-fighting foams have been used, DEP found brook trout to have concentrations of PFOS ranging from 41-1080 ng/g wet wt. in exposed sites, all of which exceed MECDC's FTAL for sensitive populations. Concentrations of PFOS in some brook trout (0-43 ng/g) exceeded the FTAL at a reference site (Akladiss, 2014).

In 2014, to gather data from more reference sites and from other species, DEP collected six to ten brook trout, smallmouth bass, and brown bullhead from each of three lakes or ponds, which receive no direct discharges of pollutants. Fish were combined into two composites of three to five fish each and analyzed for a suite of PFAS. Results showed that concentrations of most PFAS were undetected. PFOS and perfluoroundecanoate were the most commonly detected, at four and five of nine sites respectively. Both compounds were detected at one or two of the three sites for all three species. PFOS concentrations (1-4.7 ng/g) were well below MECDC's FTAL and the concentrations found near LAFB. The magnitude of detected concentrations was no greater in the benthic omnivorous species brown bullhead (BBH) than in the pelagic predators brook trout (BKT) and smallmouth bass (SMB).

High levels of PFAS have been found in surface waters near wastewater treatment plants and urban centers (Zushi et al. 2012 as cited in Stahl et al. 2014). In U.S. Environmental Protection Agency's (EPA's) 2008–2009 National Rivers and Streams Assessment (NRSA) and the Great Lakes Human Health Fish Tissue Study component of the 2010 EPA National Coastal Condition Assessment, analyses of PFAS in fish from randomly selected locations in the US (164 urban river sites and 157 nearshore Great Lake sites) showed that PFOS dominated in frequency of occurrence, followed by three other longer-chain PFAS (perfluorodecanoic acid, perfluoroundecanoic acid, and perfluorododecanoic acid) (Stahl et al. 2014). Maximum PFOS concentrations were 127 and 80 ng/g in urban river samples and Great Lakes samples, respectively.

As part of the Maine study, single composite samples of up to 5 fish each from three urban rivers in Maine were analyzed. No PFAS were detected in chain pickerel from the Saco River above Saco, but concentrations of PFOS in smallmouth bass were 16 ng/g in the Androscoggin River at Lisbon and 28 ng/g in the Kennebec River at Waterville. There were a few other PFAS detected at lower concentrations at both sites.

In 2015, in order to more fully assess the occurrence of PFAS in Maine, DEP targeted ten samples of both predator and omnivore fish for collection from five rivers below major municipal wastewater treatment plants (WWTPs). The results show that concentrations of PFAS were low (1 ng/g or less) similar to levels found in fish from lakes and ponds with no discharges in 2014 except for perflourooctane sulfonate (PFOS). PFOS was well below MECDC's FTAL for all samples except for white perch in the Mousam River below Sanford where the mean concentration exceeded the FTAL. The ratio of the WWTP discharge to size of the river is much larger for Sanford than any of the other rivers in this study, which may explain these results.

In 2016, to confirm the elevated level in the Mousam River fish with respect to consumption by anglers, ten white perch and ten bass from Estes Lake were collected and analyzed as two composites of five fish each for PFAS. In addition, given recent detection of PFAS in groundwater nearby, the same species of fish were also to be sampled from stations upstream at Number One Pond in downtown Sanford, a popular fishing spot above the WWTP and at Mousam Lake, the headwater of the Mousam River upstream of Sanford. Results showed that concentrations of PFAS in white perch from Estes Lake were similar to those from 2015 Concentrations of most congeners were undetected. PFOS was the only congener detected at significant levels. Concentrations of PFOS in white perch in the Mousam River below Sanford were similar to those from 2015 exceeding MECDC's FTAL. Concentrations in largemouth bass from the same site were similar to those of the white perch. Concentrations of PFOS were much lower in largemouth bass from Number One Pond in downtown Sanford, and even lower above Sanford at Mousam lake in Acton, well below MECDC's FTAL. The variance between the two composites at each site was small and there was no relationship between fish PFC concentrations and fish size

In 2017, elevated levels of PFAS were found in a Maine municipal water supply well and were traced to biosolids (sludge) from industrial and municipal WWTPs that had been spread on farm field in the watershed. Subsequently, PFAS have been found in biosolids from other WWTPs and in receiving farm fields in Maine.

Methods

In 2019 and 2020, following SWAT standard operating procedure for collection and handling to prevent contamination of samples, fish were captured by angling or gill nets from several rivers and streams at popular fishing sites, historic sampling stations above and below industrial and municipal WWTPs, and above and below farms where elevated levels of PFAS have been found in soils treated with biosolids from industrial and or municipal WWTPs (Table 3.2.1). Some sites were resampled from previous years as noted.

The target was 10 fish to be combined into 2 composites of 5 fish each. Upon capture, fish were rinsed in site water and stored in a clean garbage bag on ice until transfer to the DEP. At the lab the fish were immediately measured and weighed for length and weight, rinsed in tap water, wrapped in new aluminum foil (shiny side out), labelled with site and species codes and date, aggregated by site and species in new garbage bags, and frozen. After all fish were collected, they were shipped overnight to the lab, SGS AXYS in British Columbia, Canada, for analyses.

Immediately after capture, fish were euthanized and stored in a clean plastic garbage bag on ice until transported back to the lab where they were weighed and measured, rinsed in tap water, wrapped in aluminum foil (shiny side out), labeled and placed in a clean garbage bag in the freezer. After all fish were collected, they were shipped frozen overnight to SGS AXYS in British Columbian, Canada for analysis. All fish were analyzed as skinless filets for several PFAS compounds.

Table 3.2.1. 2019-2020 PFAS fish samples				
YEAR/WATER	Location	CODE	SPECIES	COMMENT
2019				
Androscoggin R	Rumford Point	ARP	SMB, RBT	below NH paper mill, WWTPS, and farms, SMB =smallmouth bass, RBT= rainbow trout
	Rumford	ARF	SMB	below Rumford pulp/paper mill and Rumford-Mexico WWTP
	Jay	ARY	SMB	above Riley Dam, below farms
	Livermore	ALV	SMB	below Jay pulp/paper mill
	Auburn	AGI	SMB	Gulf Island Pond, below farms
	Lisbon	ALS	SMB	below Lewiston-Auburn WWTP
Halfmoon Str	Knox	HMK	BKT	above farm, BKT= brook trout
	Thorndike	HMT	BKT	below farm
Kennebec R	Madison	KMD	SMB, WHS	above Madison, WHS= white sucker
	Norridgewock	KNW	SMB	below Anson Madison WWTP
	Skowhegan	KSK	SMB	below Weston dam near Skowhegan WWTP
	Fairfield	KFF	SMB, WHS	below Shawmut Dam and Hinkley pulp/paper mill
	Sidney	KSD	SMB, WCF	below Waterville WWTP at Sidney boat ramp, WCF= white catfish
	Gardiner	KGD	SMB, WCF	below Augusta WWTP
Kennebunk R	Days Mill, Arundel	KND	BKT, EEL	above farm, EEL= American eel
	Rt 1 Arundel	KNA	BNT, EEL	below farm
2020				
China L	China	China L	SMB, WHP	public water supply, history of PFAS
Mousam R	Mousam L - Acton	Mousam L	LMB	Mousam River headwaters, this site and next two repeat sampling from 2016
	Number One Pond- Sanford	No. 1 P	LMB	Mousam River in downtown Sanford, below historical mills
	Estes L- Sanford	Estes L	LMB, WHP	Mousam River impounded lake, below Sanford WWTP
Halfmoon Str	Knox	HMK	BKT	above farm, repeat from 2019
	Thorndike	HMT	BKT	below farm, repeat from 2019
Kenduskeag Str	Kenduskeag	KRK	SMB	below farms
Penobscot R	E Br Grindstone	PBG	SMB	East Branch, background
	Medway	PBW	SMB	Mattaseunk Impoundment, below former pulp/paper mills and current WWTP
	Lincoln	PBL	SMB	below former Lincoln pulp/paper mill and Lincoln WWTP at boat ramp
	Veazie	PBV	SMB	below Old Town pulp/paper mill and mumicipal WWTPs
Preumpscot R	Windham	PWD	SMB	above Westbrook
	Westbrook	PWB	SMB	below Westbrook paper mill and Westbrook WWTP
St Croix R	Woodland	SCW	SMB	Woodland impoundment above pulp/paper mill
	Baring	SCB	SMB	River below pulp/paper mill and Baileyville WWTP
Salmon Falls R	Great East Lake	Great East L	LMB	Salmon Falls River headwaters
	South Berwick	SFS	LMB	Salmon Falls River below municipal WWTPs

Results and Discussion

In 2019, the target of 10 fish at each site was achieved for most of the sites; exceptions were 1 large rainbow trout (hatchery brood fish) from the Androscoggin River at Rumford Point (ARP), 2 composites from 8 smallmouth bass at Androscoggin River below Rumford (ARF), 2 composites from 9 smallmouth bass from the Kennebec River above Madison, (KMD), 1 large stocked and one composite of 2 wild brook trout, and 1 large eel from the Kennebunk River at Days Mill above the farm (KND), and composites of 2 brown trout and 9 small eel from the Kennebunk River below the farm at Rt 1 (KNA).

Results show that PFOS was the compound detected most often and at the highest level, with lower amounts of PFOSA, PFDoDA, and PFUnA (Appendix 1). Concentrations of PFOS were well below MeCDC's FTAL (34.1 ng/g) for all samples but were elevated below industrial sources on the Androscoggin River (at Livermore (ALV), downstream in Gulf Island Pond in Auburn (AGI), and Lisbon (ALS) and Kennebec River at Fairfield (KFF), downstream in Sidney (KSD), and Gardiner (KGD) (Figures 3.2.1 and 3.2.2). PFOS levels were relatively low but elevated below the farm in Knox on Halfmoon Stream in Thorndike (HMT) (Figure 3.2.3). Both brook trout and brown trout are stocked by the Department of Inland Fisheries and Wildlife into the Kennebunk River in April and May. Both the brown trout at KNA and the largest brook trout at KND are believed to be stocked fish but had been in the river until caught in September and October, and therefore were exposed to any PFAS in the river for several months. Nevertheless, concentrations cannot be compared across species and therefore between these 2 sites based on trout. American eel were caught at both sites, but were a composite of small eels at KNA and 1 large eel at KND, making any comparison weak (Figure 3.2.4). The Kennebunk River will be resampled to try to collect the same species and size at both sites to facilitate comparison.

Figure 3.2.1. PFOS & PFOSA in smallmouth bass from the Androscoggin River, 2019

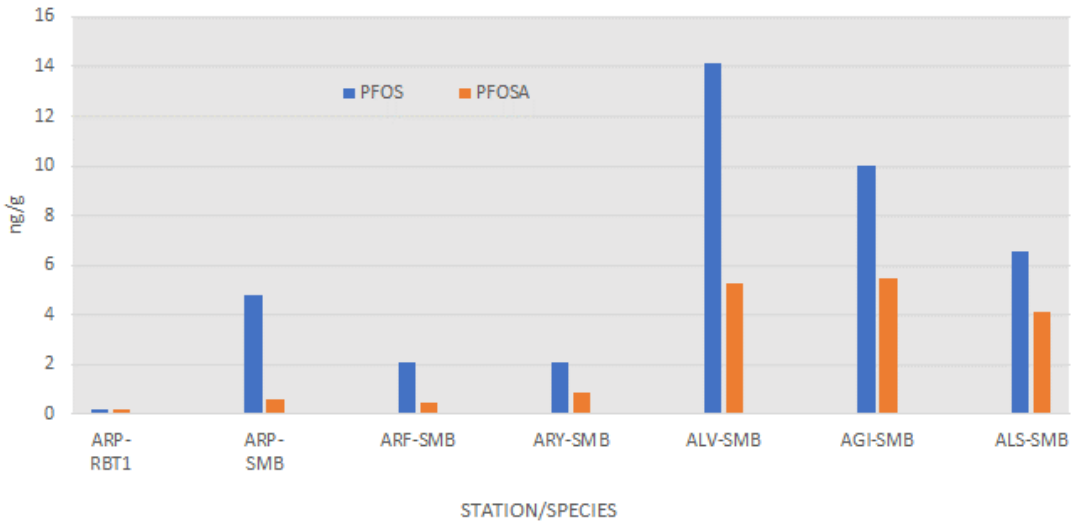


Figure 3.2.2. PFOS & PFOSA in fish from the Kennebec River, 2019

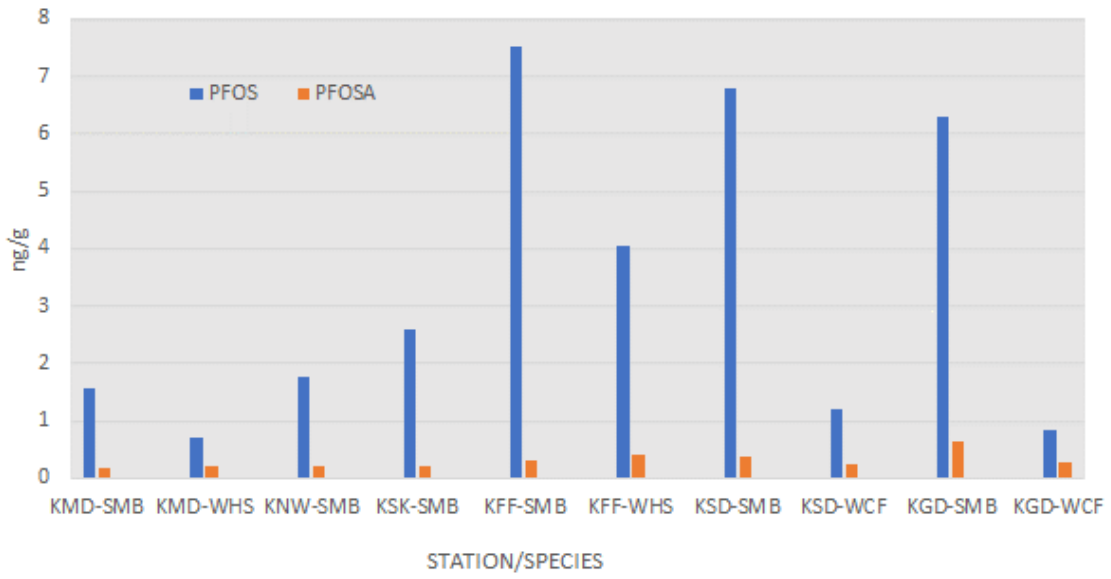
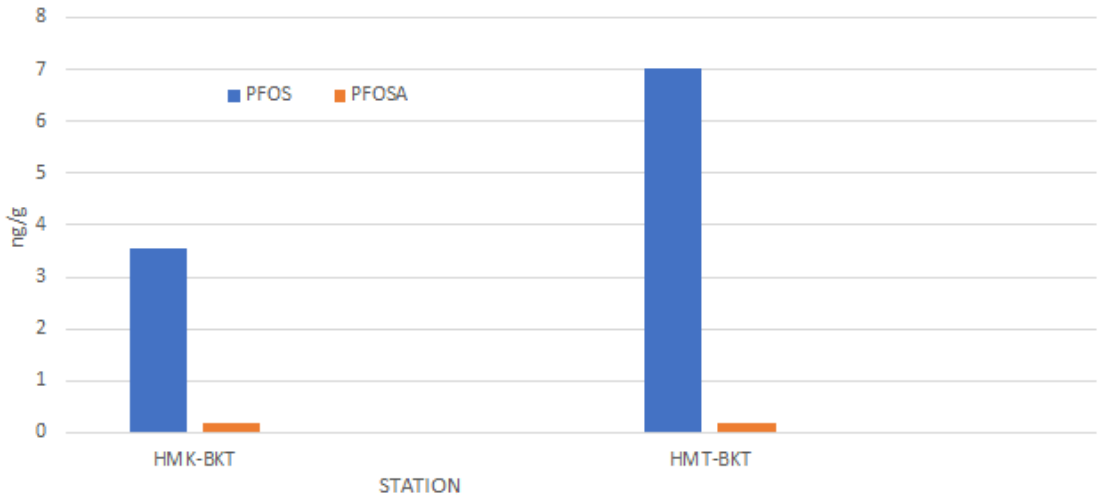
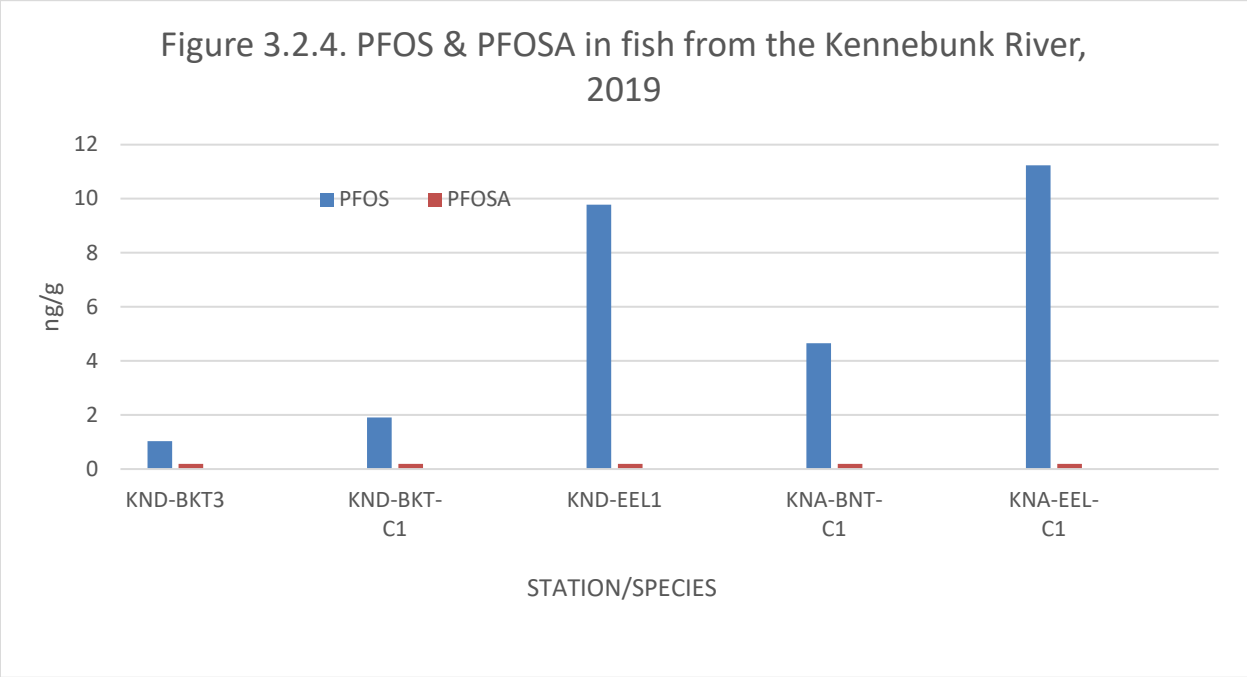


Figure 3.2.3. PFOS & PFOSA in brook trout from Halfmoon Stream, 2019





In 2020, the target of 10 fish from each site was achieved except for Great East Lake and the Salmon Falls River where only 9 largemouth bass were sent to the lab, and the Kennebunk River where no fish were captured due to sampling restrictions because of Covid-19. As in previous years, the results showed that PFOS was the most commonly measured compound, with insignificant amounts of PFUnA and others (Appendix 1). Concentrations were elevated below some farms and industrial and municipal discharges but remained below MeCDC's FTAL (34.1 ng/g), while exceeding the FTAL below other industrial and municipal discharges as noted below.

As in 2016, PFOS increased from a barely detectable amount in largemouth bass from the headwaters of the Mousam River at Mousam Lake, to elevated levels still below the FTAL in largemouth bass at Number One Pond in Downtown Sanford, and elevated levels above the FTAL in both largemouth bass and white perch from the Mousam River at Estes Lake below the Sanford WWTP (Figure 3.2.5). Concentrations were also elevated in both smallmouth bass and white perch from China Lake, although well below the FTAL. PFAS compounds have been found in China Lake, which is the source of drinking water for several towns, but sources are unknown.

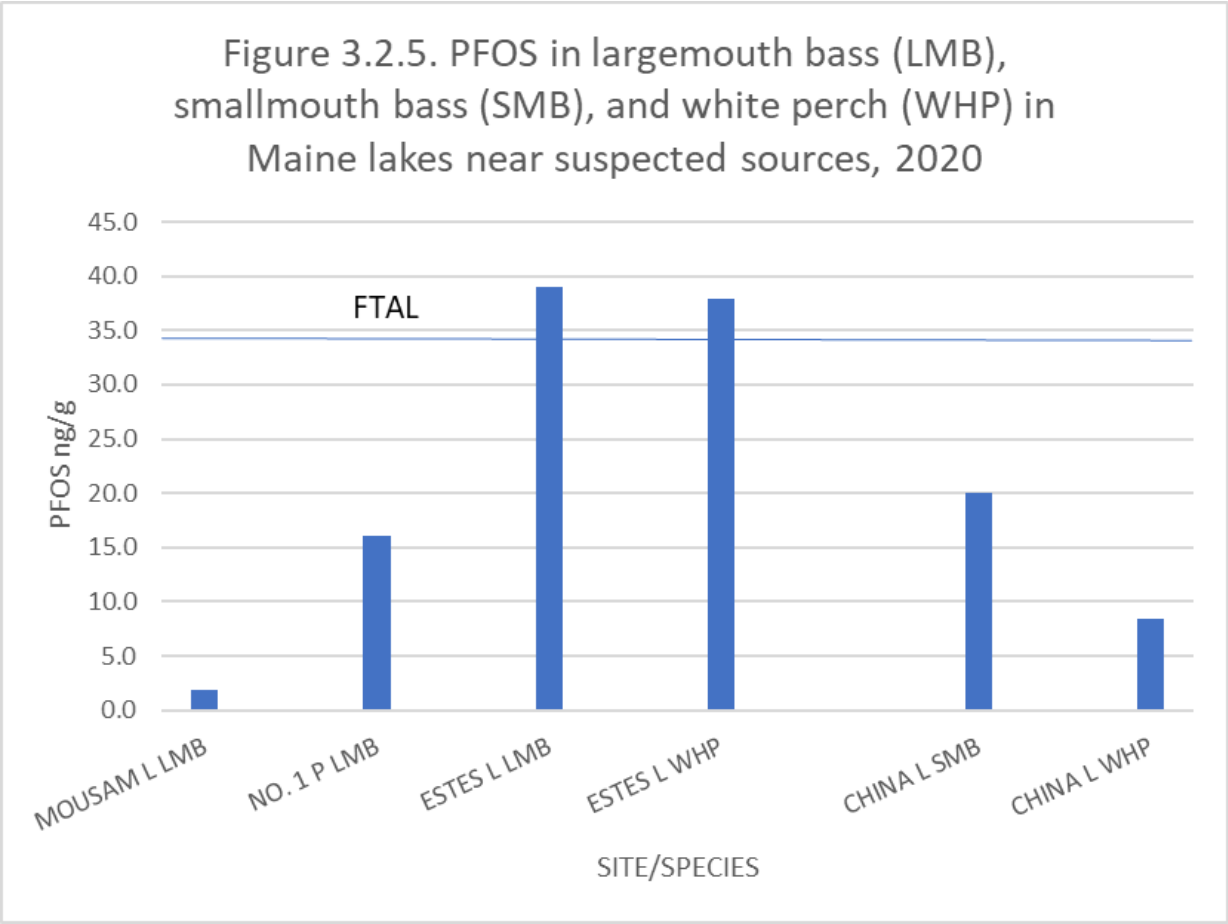
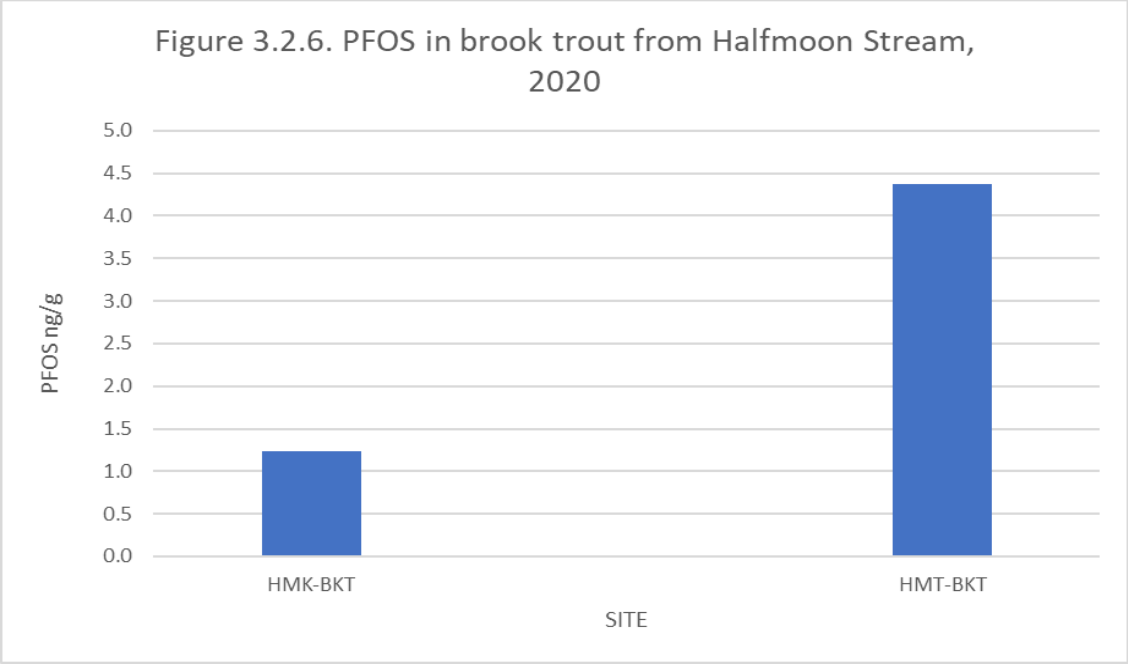
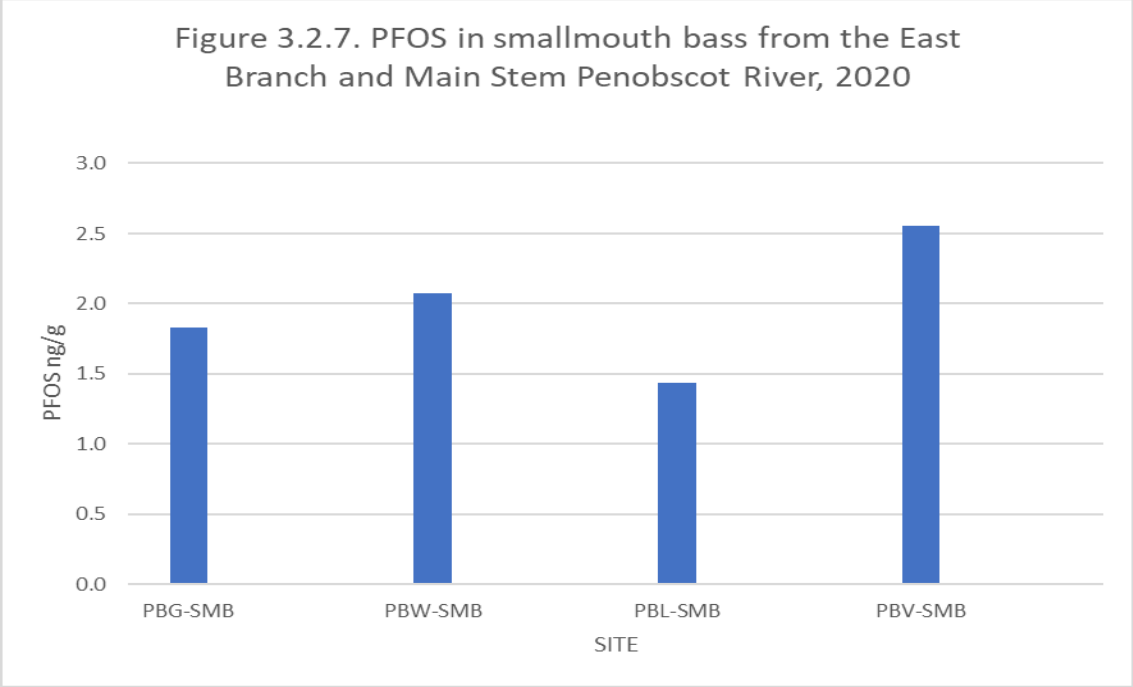


Figure 3.2.5. PFOS in largemouth bass (LMB), smallmouth bass (SMB), and white perch (WHP) in Maine lakes near suspected sources, 2020
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
PFOS ng/g
FTAL
MOUSAM L LMB
NO. 1 P LMB
ESTES L LMB
ESTES L WHP
CHINA L SMB
CHINA L WHP
SITE/SPECIES

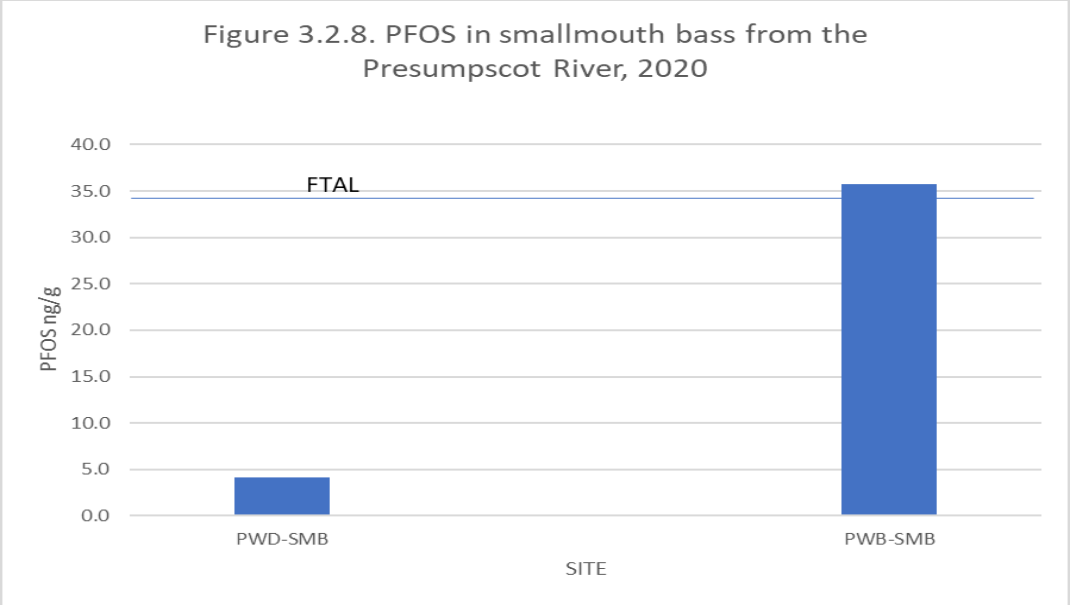
Levels of PFOS in brook trout from Halfmoon Stream were very low above the farm in Knox but elevated below the farm in Thorndike at levels slightly lower those in 2019, and well below the FTAL (Figure 3.2.6).



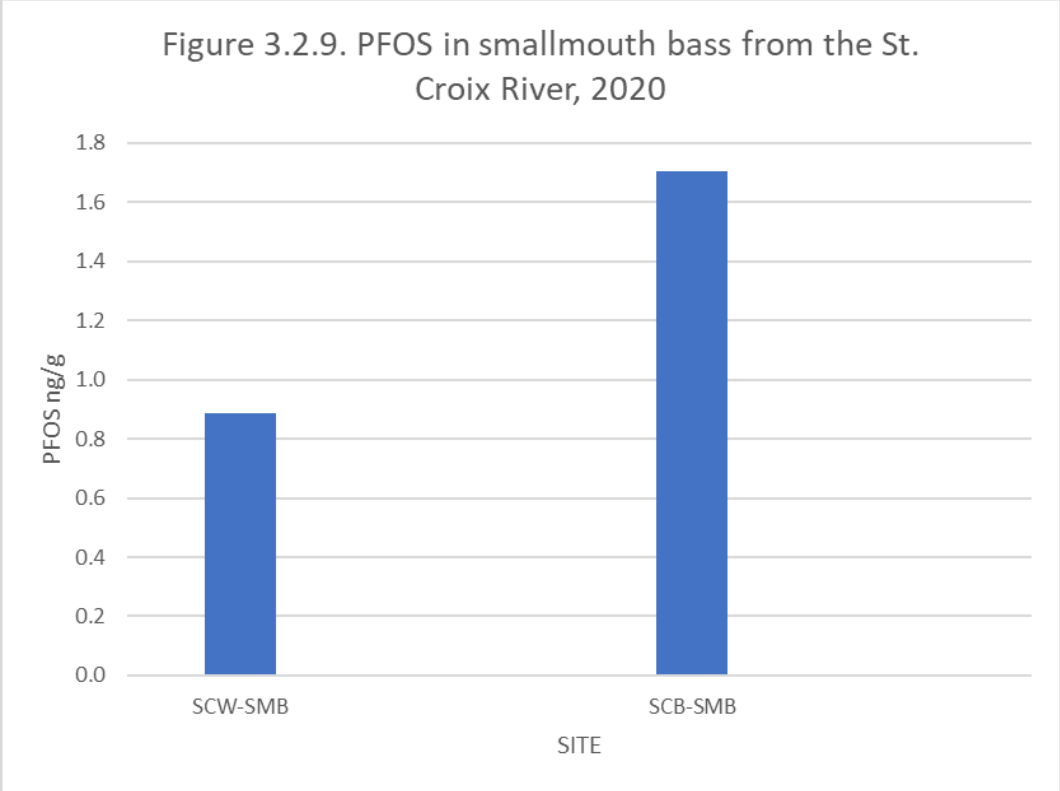
Levels of PFOS in smallmouth bass from the Penobscot River were all near background levels as shown by the East Branch levels (PBG) where there are no known sources (Figure 3.2.7).



Levels of PFOS in smallmouth bass were insignificant at Windham but elevated above the FTAL below the mill and WWTP in Westbrook (Figure 3.2.8).



Levels of PFOS in smallmouth bass at both sites on the St. Croix River were near background levels (Figure 3.2.9).



Levels of PFOS were near background levels in largemouth bass in the headwaters of the Salmon Falls River at Great East Lake, but elevated in the river below at South Berwick below several WWTPs, although still below the FTAL (Figure 3.2.10). Levels of PFOS were also elevated in smallmouth bass from the Kenduskeag River in Kenduskeag below several farms, but well below the FTAL.

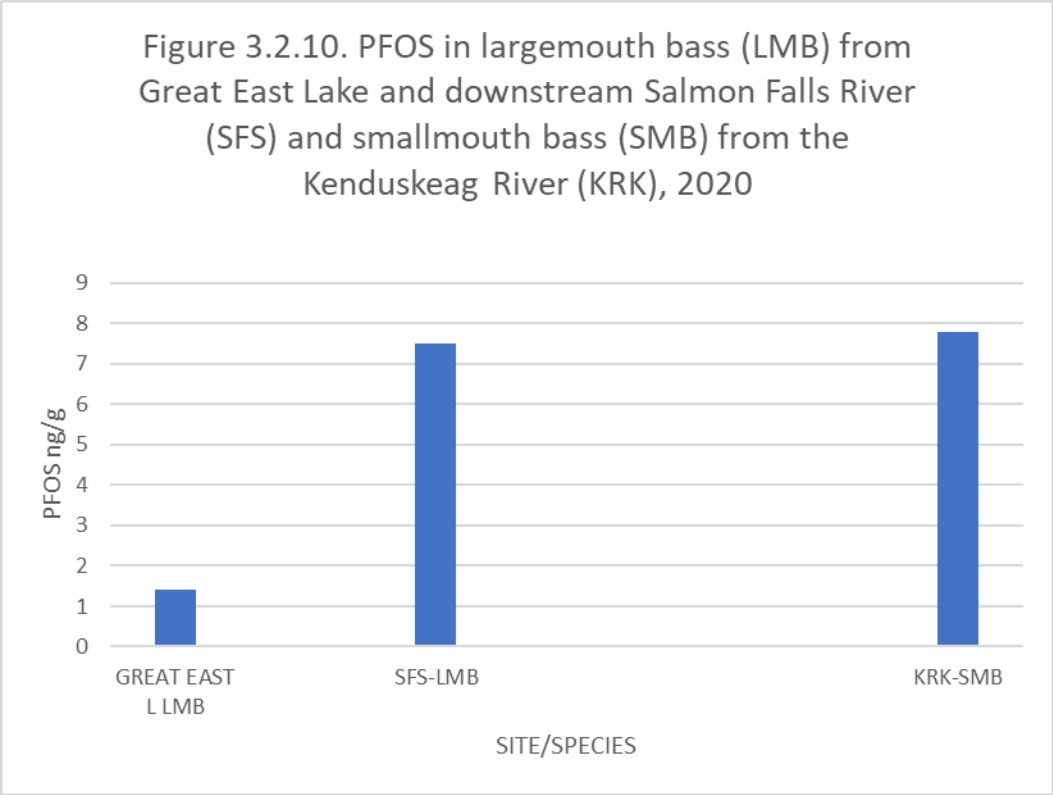


Figure 3.2.11. PFAS Fish Sample Sites