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Technical Memorandum

Date: 31 March 2020

To: Sherwood McKenney, District Engineer
Waste Management Disposal Services of Maine, Inc. (WMDSM)

From: Nicholas J. Yafrate, P.E.
Scott M. Luettich, P.E.

Subject: Response to MEDEP Comments
Phase 14 Solid Waste Permit Application - Volume 1
Crossroads Landfill, Norridgewock, Maine

The purpose of this memorandum is to provide responses to comments (RTCs) from the Maine Department of Environmental Protection (MEDEP) after their review of Volume 1 of the Phase 14 Solid Waste Permit Application, dated October 2019. MEDEP's review comments were presented in a memorandum transmitted as an attachment to an email from Linda Butler to WMDSM on 14 February 2020. The responses were prepared by Geosyntec Consultants (Geosyntec), Golder Associates (Golder), Normandeau Associates (Normandeau), SCS Engineers (SCS) and Verrill Dana, LLP. Clarifications to some of the review comments were provided by MEDEP during a conference call with WMDSM's project team on 6 March 2020.

MEDEP's comments are presented below in italics followed by responses to each.

1. No comments

2. No comments

3. Please indicate the year for which projected costs are planned. For example, design costs are likely provided in 2019 dollars, while construction cost may be projected in 2021 dollars, etc. Please include the dollar per acre.

Response to Comment 3. All projected costs in Volume I - Section 3 of the October 2019 permit application are presented in 2019 dollars. There have been no time-value adjustments made because the future currency escalators and exact rate at which the cells will be filled over the life of the site are not able to be predicted with a high enough level of precision to warrant such projections.

Design and Permitting costs cover activities such as site investigation, hydrogeologic and civil/geotechnical engineering analyses, optimizing layout and geotechnical aspects of the landfill and infrastructure, land acquisition, and regulatory submittals and interactions. Construction costs include activities associated with bidding, procuring, and managing contractors in the installation of the infrastructure and landfill components such as general excavation, access roads, leachate management piping and pumps, stormwater erosion controls, and landfill gas piping. Operations includes activities such as waste filling, environmental monitoring, leachate management, and landfill gas management, and daily and interim covers. Final Closure includes construction of the final cover system and submission of deed restrictions. Post-Closure Care includes environmental monitoring, management of control systems, and reporting.

As requested, the projected years in which the costs presented in Section 3 of Volume I have been estimated to be as shown below:

Years	Primary activity	Cost Est.
From 2017 to 2020:	Design and Permitting	$5.3 MM
During 2021:	Permitting and Construction	$7.4 MM
During 2022:	Construction	$12.3 MM
During 2023:	Construction	$2.2 MM
During 2024:	Construction	$1.1 MM
From 2025 to 2041:	Operation and Closure	$41.6 MM
From 2041 to 2071:	Post Closure	$10.6 MM
Total (in 2019 dollars):		**$80.5 MM**

Using the estimated cost of $80.5 million provided above and in the October 2019 Solid Waste Permit Application, the cost per acre for Phase 14 is calculated to be approximately $1.66 million per acre.

4. MEDEP requires that geological interpretations, such as are presented in this application, be completed by Maine Certified Geologist. Please mention that this was done and provide proof of it somewhere in the application.

Response to Comment 4. Mr. Alistair Macdonald of Golder Associates, Inc., a professional geologist registered by the State of Maine as Geologist No. GE 431 was in responsible charge of the development of the geologic and hydrogeologic information provided in the application. Mr. Macdonald's P.G. stamp was provided next to his signature at the end of the text of Volume III of the October 2019 permit application as proof of this certification.

5. Please confirm, whether or not, the "transporter management program" (page 8) refers to the "Transporter Rules and Regulations" submitted as Attachment C of the Host Community Agreement. If not, please explain the differences.

Response to Comment 5. The "transporter management program" (page 8 of Volume I of the October 2019 permit application) refers to the "Transporter Rules and Regulations" submitted as Attachment C of the Host Community Agreement.

6. WMDSM should add a section in the proposed landfill operations manual to discuss management of potential site impacts (waste spills, sediment from vehicle tires, winter maintenance activities) to sensitive resources post-construction, ie., Phase 14 access road stream crossing and adjacent wetlands. WMDSM should propose to update the SWPPP to include inspection of the access road routinely prior to storms (This may become license condition).

Response to Comment 6. WMDSM will update the existing sitewide operations manual to ensure it discusses potential site impacts (waste spills, sediment from vehicle tires, winter maintenance activities) to sensitive resources post-construction, i.e., the Phase 14 access road stream crossing and adjacent wetlands. Additionally, WMDSM will update the SWPPP to include inspection of the access road routinely prior to storms. As indicated in the October permit application, WMDSM's Site-wide Operations Manual will be updated and submitted after a permit is issued by MEDEP but prior to opening the first cell in Phase 14.

7.

a. Chapter 400.4.F(1)(d), second paragraph (page 16), states: "In addition, Phase 14 activities will benefit from the existence of mature vegetation that will further reduce sound impacts." Please describe the sound impacts after the Phase 14 activities rise above the vegetation.

Response to Comment 7a. WMDSM has commissioned Bodwell EnviroAcoustics, LLC of Brunswick, Maine to perform a sound assessment for the Phase 14 project. The modeling activities are currently underway, and the results will be submitted as a supplement to the Response to Comments.

b. Chapter 400.4 F(1)(d), Monitoring Results During Phase 8 Operation (page 17). This paragraph describes sound levels above 60 dBA that are attributed to 1-minute sound spikes. After excluding these spikes, the sound levels are calculated to be less than 60 dBA. Short duration, high-level sounds can be more bothersome to the surrounding community than constant or regular background drone noises. Please reassess without eliminating sound spikes when assessing sound levels.

Response to Comment 7b. See Response to Comment 7a.

c. Chapter 400.4.F(1)(d), next to last paragraph (page 18), states: "…noise reduction can be expected from the approximately 300 feet of vegetation strip…", but please describe the impact on the surrounding receptors when Phase 14 activities rise above the vegetation.

Response to Comment 7c. See Response to Comment 7a.

d. Chapter 400.4.F(1)(d), last paragraph (page18). Please replace "will be" with "are estimated to be" or "probably will be", when describing predicted sound levels at nearby properties. Please describe if any testing is proposed to verify these estimations.

Response to Comment 7d. See Response to Comment 7a.

e. Appendix 7C, Figure 3. The yellow boxes indicating residences or buildings do not seem to match up with structures in aerial images. For example, there are no residences/structures on Airport Road

northeast of the proposed landfill (where the "Airport Road" label is) or in the area to the southwest, along Mercer Road. Please check that the residence/structures are accurately located. Please center the landfill in this figure and include more residences/structures to the east and north.
Response to Comment 7e. Figure 3 has been updated to show the locations of residences on Airport Road and Mercer Road as recently generated by WMDSM's surveyor (Boynton & Pickett) from a detailed overlay with the aerial image. And as requested, the coverage of Figure 3 has been adjusted to show the Phase 14 footprint centered on the page with additional residences west of the Kennebec River now identified. The labels for the roads have been shifted to clarify that no residences are obscured by the labels. The updated Figure 3 is attached to this RTC technical memorandum as ATTACHMENT RTC#7e-1.

f. Appendix 7C, 2.2 Study Area Characteristics, Vegetation (page 3). Please include a discussion of the visibility of the landfill in the winter compared to in the summer. Were field observations obtained during worst-case times of the year?
Response to Comment 7f. Photographs were recently obtained in March 2020 from the five vantage points in the visual assessment report. Comparison of these photographs (attached to this RTC letter as ATTACHMENT RTC#7f-1) to the photographs in the October 2019 Visual Assessment report confirms the vegetation in the Phase 14 buffer zone consists largely of densely wooded areas with a high percentage of evergreen/conifer trees, and as such, the visual screening provided by the vegetation in the winter is not significantly different than provided during summer months.

g. Appendix 7C, 3.2 Visual Characteristics of Phase 14 Development, Post-Closure Period, second paragraph (page 6). The vantage points chosen for evaluation are appropriate, but please also evaluate the view from the school/cemetery area.
Response to Comment 7g. Pursuant to this MEDEP comment, an evaluation of the potential for Phase 14 to be visible from the school/cemetery area along Route 2 has been performed using the same methods and modeling software used in the October 2019 Visual Impact Assessment Report. The location of photographs obtained from the additional Vantage Point 6 is shown on Revised Figure 4 attached to this RTC technical memorandum as ATTACHMENT RTC#7g-1. AutoDesk® Infraworks® 3-dimensional software was used to show the final configuration of the landfill on the photograph from Vantage Point 6. As shown, Phase 14 will not be visible from this area until the final period of operations, during which time the landfill will be incrementally covered with a vegetated cover system that blends in visually with the surroundings. It is noted too that this depiction of visibility was conducted using a photograph obtained in March 2020 (during winter), and as noted in the October 2019 report much of the vegetation is expected to continue growing and providing additional visual screening over the approximately 15 years before Phase 14 approaches final height.

h. Appendix 7C, 3.2 Visual Characteristics of Phase 14 Development, Post-Closure Period, second paragraph, last sentence (page 6). Based on Google Earth images, Phases 10 and 11 at

Norridgewock had exposed black plastic for at least 13 to 15 years after completion. Please explain how this will be different for Phase 14.

Response to Comment 7h. To ensure good stewardship of disposal capacity at the site, interim cover systems were placed on the Phase 10 and Phase 11 units prior to final closure to provide time for consolidation and strengthening of the underlying clay to occur, thereby allowing more waste to be disposed of in those units. Phase 14 is sited in an area where consolidation of the clay will occur more rapidly than in other areas of the Crossroads site. WMDSM therefore anticipates placing final cover system incrementally on the sideslopes of Phase 14 more rapidly than on some of the other previous disposal units at Crossroads. As with all the other units, WMDSM will communicate closely with MEDEP about the schedule and methods for interim cover and incremental placement of the Phase 14 final cover.

i. Appendix 7C, 3.2 Visual Characteristics of Phase 14 Development, Post-Closure Period, third paragraph (page 6). This paragraph discusses WMDSM's ability to construct and maintain visual barrier berms with trees planted on top in certain areas. Please discuss whether WMDSM will do this or not. MEDEP suggests adding visual barriers to the gaps in previous barriers along Route 2 and the entrance road to the landfill.

Response to Comment 7i. As requested, WMDSM will add visual barriers to gaps in previous barriers on their property along Route 2 and the entrance to the landfill at the time they are needed.

j. WMDSM should propose additional measures to mask visual and noise impacts "during the final years of operation" when operations would be above the vegetation buffers. Suggestions include, but should not be limited to: (1) strict adherence to daily cover requirements; (2) use of available intermediate cover materials to reduce glare and enhance blending of the colors of materials employed with the natural environment; (3) phased final cover should be applied as soon as possible on areas where final grades have been reached; (4) area focused back-up alarms on equipment to reduce travel of noise; (5) improve the buffer of trees along the route 2 travel corridor to improve screening and ensure maintenance of existing buffer as older trees begin to decline; and (6) periodic monitoring of noise for the period of time operations occur at elevations above the natural tree height at the closest residential location.

Response to Comment 7j. As requested, and as described above in Response to Comments 7a through 7i, WMDSM will consider and employ measures as applicable to mask visibility and sound impacts of Phase 14 during the final years of operation when the operations would be above the vegetation buffers. These will include consideration of the measures listed by MEDEP in this comment.

8.

a. A license condition may be added to the license to require the New Source Review license amendment prior to commencement of operations in Phase 14.

Response to Comment 8a. While Crossroad's Title V (Part 70) license (A-816-70-C-R/A) states that the design capacity of the landfill is greater than or equal to 2.5 million megagrams and 2.5 million cubic meters, the license does not include permit limitations related to the design capacity of

the landfill. Based on correspondence with MEDEP, the landfill capacity, if specified in the Title V license, is intended to be descriptive only and not a permit limitation.

Condition 14.K of the Title V (Part 70) license states:

"WMDSM may expand beyond the currently permitted design capacity without an amendment to this Part 70 Air Emission License provided all of the following are met:

1. *WMDSM submits to DEP and EPA an amended Design Capacity Report and a report identifying the recalculated NMOC emission rates for the next five years within 90 days after commencing construction on the permitted expansion;*
2. *The recalculated NMOC emission rates remain less than 50 megagrams per year; and*
3. *WMDSM continues to meet the emission limits set forth in this license."*

(Note that because WMDSM is now subject to 40 CFR 60 Subpart XXX in lieu of Subpart WWW, the relevant NMOC threshold in Condition 14.K(2) above is 34 megagrams in lieu of 50 megagrams.)

Therefore, an air licensing action to increase the landfill capacity to account for Phase 14 is not required, provided the existing combustion equipment as currently licensed can accommodate an increased LFG flow rate (due to increased LFG collection from Phase 14) and WMDSM meets the three requirements listed above.

Based on SCS Engineers' October 2019 Phase 14 LFG Collection and Control System Design Report which was submitted with the Phase 14 Solid Waste Permit Application on October 25, 2019, the potential facility-wide (including Phase 14) LFG collection rate will peak at approximately 2,400 scfm at 50 percent methane, which is less than the total combined capacity of the two existing LFGTE engines and two existing utility flares of approximately 5,700 scfm at 50 percent methane. Additionally, the potential facility-wide peak LFG collection rate (2,400 scfm) is less than the total LFG combustion rate of 3,500 scfm on which the emission limits in the pending Title V renewal license will be based. Therefore, a modification to the facility's Title V license is not required prior to the construction of Phase 14. WMDSM submitted a letter to MEDEP on 23 March 2020 providing the landfill capacity including Phase 14 and reviewing of the regulatory applicable requirements to supplement the pending Title V renewal application that has not yet been acted upon by MEDEP.

b. The Department acknowledges that WMDSM has previously not accepted significant quantities of odorous wastes. However, WMDSM should revise its operations manual to include procedures related to landfilling of such wastes, ie., sludges, MSW, MSW by-pass and residuals, in order to minimize odors associated with handling of the wastes, when they are received.
Response to Comment 8b. WMDSM will revise the operations manual to include procedures related to landfilling of wastes such as sludges, MSW, MSW by-pass and residuals, in order to minimize odors associated with handling of the wastes when they are received.

9. Elements of this section are subject to engineering review. Comments may be offered at a future time in the review process.
Response to Comment 9. Understood, no response needed at this time.

10. A license condition may be added to the license to require NRPA and ACOE permits/licenses are obtained prior to commencement of construction of Phase 14.
Response to Comment 9. Any required NRPA and ACOE permits/licenses will be obtained prior to commencing with construction of Phase 14.

11. Elements of this section are subject to engineering review. Comments may be offered at a future time in the review process.
Response to Comment 11. Understood, no response needed at this time.

12.

a. There are a lot of conclusions and assertions in this section, but no reference to the document that these statements come from. Please include a reference to the Geologic and Hydrogeologic Assessment in Volume III to support these assertions. MDEP will need further review of Volume III before we can comment on the assertions, so we may have further comments on this section.
Response to Comment 12.a. The conclusions presented in Section 12 are supported by information contained in Volume III, Geologic and Hydrogeologic Assessment or as otherwise noted in Section 12. Specific references are provided for certain maps and figures as appropriate. Because Volume I addresses General Information Requirements, detailed references were not provided for all statements. Table S1-2 of Volume I also provides references for the location of where specific regulatory requirements are addressed in the permit package.

b. Third paragraph states (page 24): "The groundwater beneath Phase 14 flows away from public water supply protection areas and the significant sand and gravel aquifers." Some of the groundwater flow from Phase 14 is to the southeast, such as in the phreatic and till units, and, although it is not towards the aquifers which lie to the north and west of the landfill, it cannot be described as "away from". It is more accurate to state that groundwater flow is not towards the aquifers or does not intersect the aquifers but WMDSM should not state that flow is "away from" them.

Response to Comment 12.b. The terminology used in this statement was intended to convey that groundwater beneath Phase 14 flows in a direction generally opposite of the direction of the Town of Norridgewock public drinking water source water protection area (i.e., away from the drinking water source protection area). WMDSM maintains that groundwater beneath Phase 14 flows "away from" the public water supply protection area. However, as indicated by MEDEP the phrase "away from" in reference to the significant sand and gravel aquifer is not entirely appropriate because some groundwater near the Phase 14 boundary has a localized southeasterly flow component. While there is some localized flow to the southeast, the regional groundwater flow direction is to the south and

not towards the portion of the significant sand and gravel aquifer located to the southeast of Phase 14. Consistent with MEDEP's comment, we will use the term "away from" when referencing groundwater flow relative to the public water supply protection area and the term "not towards" when referencing groundwater flow direction relative to the significant sand and gravel aquifer.

c. Chapter 400.4.K(1)(b) (page 25). The solid waste disposal facility may not pose an unreasonable threat to the quality of a significant sand and gravel aquifer. The application states, "There 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, away from the aquifers." See Comment 12 b. above.
Response to Comment 12.c. See response to Comment 12 b.

d. Chapter 400.4.K(1)(c), The solid waste disposal facility may not pose an unreasonable threat to the quality of an underlying fractured bedrock aquifer. The third paragraph (page 26) should specify how the leachate is transferred and transported to Sappi or Anson-Madison WWTP (assumed by tanker truck) and any risk of release posed, by the method selected, during this process. Please compare with other available methods.
Response to Comment 12.d. Details of how the leachate is transferred and transported are described in the existing Crossroads sitewide Leachate Management Plan, and in Sections 3.5 and 3.6 of Volume IV of the October 2019 Permit Application. Leachate will be conveyed from the Phase 14 leachate vaults through a new buried double-containment HDPE transfer pipe to the existing on-site storage tanks. As required in Section 01669 of the Crossroads Cell Construction Specifications (Appendix IV(c) of Volume IV of the October 2019 permit application), the new leachate transfer pipe will be pressure tested during installation to ensure integrity of containment when conveying leachate to the storage tanks. 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 1000-ft along the forcemain pipe (see Sheets 23 and 24 of the Permit Level Engineering Drawings presented in Appendix IV(a) of Volume IV of the October 2019 permit application). The containment and detection redundancy provided by this system is consistent with the high standard-of-practice for transferring leachate at the existing Crossroads site and at landfill facilities throughout the United States.

Also as described in Section 3.6.5 of Volume IV, the leachate will continue to be transported via tanker trucks from the storage tanks to the Sappi and/or Anson-Madison Wastewater Treatment Plant (WWTP). WMDSM currently uses H.O. Bouchard, a licensed truck-transport company that has been operating successfully in Maine since 1958. The existing leachate storage tanks and truck loadout areas are located within concrete secondary containment structures to further reduce any risk of release with respect to the surrounding environment or any underlying fractured bedrock aquifer. Additionally, WMDSM has commissioned the on-site storage tanks to be inspected along with the associate piping system in 2020. The inspection will require both tanks to be emptied and cleaned

to allow inspection of both the interior and exterior of each tank. This comprehensive inspection will ensure the tanks continue to meet all standards for safety and continued use.

This method for managing leachate at the Crossroads facility has been used successfully with no leachate releases for over 25 years. In theory the leachate could be conveyed by underground pipeline to the off-site water treatment facilities, but that alternative would involve significant cost and impacts associated with construction of a 12- to15-mile long buried pipeline with pump (lift) stations. And at some landfills it is possible to treat and discharge leachate on-site. That option, however, would require development and permitting of a new treatment facility and the subsequent discharge to an appropriate water body or river. No such water body or river of significant size exists at the Crossroads site.

WMDSM has measures in place to ensure that on-site infrastructure is protected against damage and safely manages leachate from the site. The current infrastructure is designed so: (i) new infrastructure will be constructed to transfer the leachate from Phase 14 to on-site storage tanks, (ii) the on-site storage tanks include secondary containment and are subject to regular maintenance and inspection to ensure their continued integrity, (iii) leachate is loaded into tanker trucks within an area with secondary containment, and (iv) leachate is transported by licensed tanker trucks to a licensed water treatment facility. This leachate management program is consistent with that used at Crossroads for numerous years and will ensure the successful collection, transportation and management of leachate from the Phase 14 project.

Chapter 400.4.K(1)(c). fifth paragraph (page 26). There are statements that the Presumpscot clay is "almost impermeable and greatly impedes flow" and "the bedrock would be protected by this naturally occurring Presumpscot clay". The Presumpscot Formation is known as an aquitard, but caution is recommended at assuming that groundwater below an aquitard would be protected from contamination. Current understanding of aquitards is that fracturing, unobserved sand lenses, root systems or other pathways can allow for rapid migration of contamination across and aquitard. MEDEP has experience suggesting that, "impermeable clay" deposits have allowed for the transport of contaminants to sensitive aquifers below them. The fact that usable monitoring wells were installed within the Presumpscot Formation indicates that, it may allow for the transport of water through it. MEDEP accepts that the Presumpscot Formation may impede flow and it may be protective, but it is far from certain. Please revise these statements to include caveats or cautionary language.

Response to Comment 12.d with respect to Chapter 400.4.K(1)(c) fifth paragraph (page 26). As indicated by MEDEP, the Presumpscot clay is known and widely accepted as having properties of an aquitard and does greatly impede flow between overlying and underlying units. WMDSM considers reference to the Presumpscot as an "aquitard" (and not an "aquiclude", the term for a formation that is for all practical purposes "impermeable") to be the appropriate "caveat or cautionary language" requested by MEDEP. Furthermore, as presented in Volume III, WMDSM conservatively evaluates the potential horizontal and vertical flow pathways through the Presumpscot

Clay. These evaluations confirm that these flow pathways do not pose an unreasonable threat to the quality of the underlying fractured bedrock aquifer.

With respect to MEDEP's comment regarding "usable wells" in the Presumpscot, the wells/piezometers installed in the Presumpscot Clay are only "usable" in the sense that they do eventually equilibrate to the potentiometric head in the unit. However, as evidenced during the performance of slug tests in wells/piezometers screened in the Presumpscot, equilibration can take a very long time. To complete the slug testing, most of the wells/piezometers had to be monitored for 10's of hours to achieve sufficient recovery for data analysis. Even then, most tests were terminated well before complete recovery was achieved.

e. Chapter 400.4.K(1)(c) (page 26). The proposed landfill design does not appear to include a liner leak-detection system. Given the performance standard of Chapter 401.1(C), is one planned?
Response to Comment 12.e. As thoroughly presented in Section 6.4 of Volume III of the October 2019 Permit Application, Phase 14 meets or exceeds the performance standards set forth in SWMD 401.1(C), specifically, the time-of-travel greatly exceeds the performance standard required by SWMR 401.1(C)(1)(c) even under the most conservative assumptions.

Maine SWMR 2.D.(1)(b) states that "Landfills sited where development within the solid waste boundary will disturb soil material within five feet of the bedrock surface in more than 5% of the disturbed area must also incorporate a single 40 mil HDPE liner and a leak detection system or a composite liner and a leak detection system into the liner system." The liner grades for Phase 14 have been designed specifically such that soil material within five feet of the bedrock surface will not be disturbed.

As presented in Volume IV of the October 2019 permit application, the Phase 14 composite liner system includes multiple layers (from top to bottom):

- 24-in. thick drainage sand leachate collection system (LCS) layer;
- geocomposite drainage layer consisting of nonwoven geotextiles bonded to both sides of a high-density polyethylene (HDPE) geonet (i.e., a double-sided geocomposite);
- 60-mil thick textured HDPE geomembrane;
- Geosynthetic clay liner (GCL); and
- 12-in. thick compacted clay layer.

The base liner system will be constructed directly over in-situ or compacted low-permeability soil having a hydraulic conductivity that is no greater than 1×10^{-5} cm/s. The liner and LCS of all five cells (Phases 14A through 14E) will be sloped down from high points at the northeast ends of the cells such that leachate within each cell will drain in a southwesterly direction to LCS sumps located along the southwest perimeter portion of the base grades of each cell where it will be pumped to the on-site leachate storage tanks.

Based on the Phase 14 design meeting or significantly exceeding the SWMR 401.1(C) performance standards, and the multiple levels of containment redundancy provided by the Phase 14 liner and leachate collection system, a double-liner system with leak detection is not required nor warranted.

13. WMDSM must submit an updated contract and/or agreement for services for treatment of leachate generated on site.
Response to Comment 13. The Crossroads Facility continues to operate under its existing agreements with SAPPI and the Anson-Madison Sanitary District for treatment of leachate generated on site. As contracts are renewed, they will be provided to MEDEP. WMDSM and SAPPI are in discussions regarding updates to the agreement to deliver leachate to the SAPPI facility. It is expected that this agreement will be updated and in place to support the existing Crossroads operation during 2020. It is also expected the agreement will be renewed as needed prior to the planned Phase 14 operations.

14. Elements of this section are subject to engineering and geology review. Comments may be offered at a future time in the review process.
Response to Comment 14. Understood, no response needed at this time.

15. through 17. Please submit detailed responses to the conditions of the Department's Phase 14 Public Benefit Determination (#S-010735-W5-XY-N). A license condition may be added to the license for any unresolved issues relating to implementation of the programs developed.
Response to Comments 15-17. MEDEP listed certain conditions within its Phase 14 Public Benefit Determination dated December 21, 2018. Section 5(D) of the Department's Determination lists five programs proposed by WMDSM in its Phase 14 Public Benefit Determination Application. An update regarding the status of each program referenced within 5(D) follows below.

1. Expansion of Airport Road Transfer Station

WMDSM has been and continues to make progress evaluating and planning its upgrade to the Airport Road Transfer Station (transfer station). The WMDSM team anticipates construction of the upgraded transfer station will take place within 24 months of obtaining all necessary regulatory permits for the Phase 14 project and is expected to have construction completed prior to beginning operation of Phase 14. WMDSM is planning to develop and provide educational materials to its customers associated with the launch of the upgraded transfer station. In the meantime, WMDSM actively provides its municipalities and commercial customers with educational materials associated with recycling best practices. Educational materials are developed by Waste Management, ECOMAINE, and Coastal Resources of Maine (Fiberight), which are then provided to municipalities and commercial customers by WMDSM. The circulation of these materials often leads to constructive conversations between WMDSM and its customers about recycling best practices and the general state of the recycling market. In addition, WMDSM has developed and introduced an initiative within its Single-Sort Recycling Program to further enhance recycling efforts.

For the past year, WMDSM has operated a targeted initiative aimed at reducing contamination within its Single-Sort Recycling Program. Each load of recyclable materials entering the Crossroads Material Recovery Facility is inspected to determine general contamination levels. Loads with significant amount of contamination are flagged and photographed for documentation purposes. Photo documentation allows WMDSM to identify municipalities and commercial customers with routinely high contamination rates. WMDSM then works constructively with identified customers to develop a strategy for reducing contamination in future recycling loads. Following this initial step, WMDSM staff then separate and remove as much contamination as possible from the load significantly reducing overall contamination rates. Recyclable materials are then gathered and shipped to processing locations.

WMDSM's decontamination initiative has proven highly effective. Recycling loads shipped from Crossroads to ECOMAINE have seen significant improvements in contamination rates. At its facility, ECOMAINE inspects recycling loads and assesses fees based upon contamination levels. Loads over 6% contamination are assessed a fee. Over the past year, WMDSM's initiative has effectively reduced and almost entirely eliminated all fees assessed by ECOMAINE for loads originating at the Crossroads Facility. WMDSM's initiative has helped its customers keep recycling costs as low as possible at a time when the market rate for recycling continues to climb.

2. Organics Diversion and Reuse

WMDSM has been and continues to make progress evaluating and planning the launch of its Organics Diversion and Reuse program at the Crossroads Facility. Like planning for the upgraded transfer station, the WMDSM team anticipates construction of the organics facility will take place within 24 months of obtaining all necessary regulatory permits for the Phase 14 project, and is expected to have construction completed prior to beginning operation of Phase 14.

WMDSM has been and continues to work closely with the Farmington Compost Cooperative to facilitate its organics program. Organic material was temporarily staged at the Crossroads 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 transfer station free of charge. Finally, WMDSM donated a vehicle to the Cooperative to assist with its compost collection efforts and formal acceptance of the vehicle is underway.

3. Textile Diversion and Reuse

WMDSM anticipates the launch of its Textile Diversion and Reuse program will coincide with the opening of the upgraded transfer station. WMDSM anticipates developing a location within the upgraded transfer station specifically to facilitate collection of textiles. Educational materials provided by WMDSM for the launch of the upgraded transfer station will also highlight textile collection capabilities and the general importance of keeping textiles out of municipal solid waste.

4. Household Hazardous Materials Collection and Reuse Program

On August 24, 2019, WMDSM held a Household Hazardous Materials Collection Event as part of its Phase 14 Hazardous Materials Diversion Program. Residents of the nine member communities were encouraged to participate in the event free of charge. To further its Hazardous Materials Collection Program, WMDSM anticipates holding a second collection event on August 8, 2020. As with its first event, the nine member communities will be encouraged to participate and WMDSM will engage a licensed hazardous materials management company to plan and implement the event. The 2020 event will continue to ensure that the Crossroads Facility promotes the State's Waste Hierarchy.

5. Informational Meetings

As discussed above, WMDSM is currently engaged in informational discussions with its customers regarding recycling best practices and its Single-Sort Recycling Program. During the course of these conversations, WMDSM seeks feedback from its customers regarding the challenges faced by their recycling programs. Most frequently, WMDSM's customers cite the same central and critical challenge: the astronomical price increases within the recycling market.

To address this chief concern, WMDSM is exploring new recycling markets and partnerships. Currently, WMDSM is working collaboratively with Fiberight to identify a significantly more cost-effective recycling option made possible by the capabilities of its facility. In the meantime, WMDSM 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. WMDSM anticipates these efforts will continue to support the State's Waste Hierarchy and assist it in reaching its overall recycling goals.

18. No comments

19. No comments

20. No comments

21. No comments

22. Please provide a detailed breakdown to support the estimates provided on Schedule A of the amendment to the Trust Agreement dated April 21, 1993, as revised January 28, 2020 (submitted separately from the application).

Response to Comment 22. Itemized tables of the projected closure and post-closure costs for Phase 14 are attached to this RTC technical memorandum as ATTACHMENT RTC#22-1. These projected costs were used to support estimates provided on Schedule A of the amendment to the Trust Agreement dated 21 April 1993.

23. *No comments*

24. *N/A*

25. *No comments*

26.

a. Restrictive Siting Criteria, SWMR 401.1.C(3)(a)(iv), second paragraph (page 47), states: "Where present in the Phase 14 area, the silty fine sand typically ranges in thickness from approximately 1 to 6 ft." How was "typically" determined? Please state the actual range in thickness (0 to 21.9 ft) or that a certain percentage are below a value (e.g. 75% of the data are below 7.5 ft thick).
Response to Comment 26a. The "typical" sand thickness referenced above was based on a qualitative, visual review of the silty fine sand isopach (thickness) map presented as Figure 5b of Volume III of the Permit Application. Section 4.1 of Volume III describes how in most of the Phase 14 area the silty fine sand ranges in thickness from approximately one foot to six feet but that it is absent in some areas and thicker in other areas, particularly in the southeast corner of Phase 14. The observed thickness of the silty fine sand unit ranges from 0 to 21.9 feet in the area of Phase 14.

b. Restrictive Siting Criteria, SWMR 401.1.C(3)(a)(iv) discussion, third paragraph (page 47). Please see Comment 12 e. above regarding the description of aquitards.
Response to Comment 26b. See response to Comment 12 d.

c. Restrictive Siting Criteria, SWMR 401.1.C(3)(a)(vii) (page 47). [This section is mislabeled as "(vi)"] "The water supply well locations are shown in Figure S26-2 of APPENDIX 26A, as provided by the Maine Geological Survey Water Well Database." We thought the water supply well locations were obtained in the field with a GPS unit by WMDSM. The MGS Well Database is not accurate regarding the location of the wells, because they are based on tax maps and reasonable guesses at the locations, not GPS-acquired locations. Please describe how the residential well locations were measured.
Response to Comment 26.c. The purpose of Figure S26-2 is to show there are no water supply wells within 1000 ft of the Phase 14 limit of waste that are not owned by WMDSM, thereby complying with the requirements of SWMR 401.1.C.(3)(a)(vi). Wells located close to (but indeed more than) the 1000-ft setback from Phase 14 were shown on parcels through which the 1000 ft buffer line passes.

The sources of the each water supply well location were identified in the legend on Figure S26-2 as being from one of three sources: the Maine Geological Survey On-line Database; Shape File Data prepared by the Maine Geological Survey and Coordinated with Norridgewock Quadrangle Surficial Materials Map Open-File No. 00-65 dated 2000; or Survey Data prepared by Boynton & Pickett received 7 February 2018. As requested by MEDEP, WMDSM's surveyor (Boynton & Pickett) has performed further field verification of the locations of the subject wells in March 2020, as noted on the annotated version of Figure S26-2 attached to this RTC technical memorandum as

ATTACHMENT RTC#26c-1. These surveyed locations provide further verification that there are no water supply wells within 1000 ft of the Phase 14 limit of waste that are not owned by WMDSM.

d. Restrictive Siting Criteria, SWMR 401.1.C(3)(b) (page 48). The geometric mean of the hydraulic conductivity of the clay unit is 7.47E-07, but this restrictive siting criterion doesn't mention the geometric mean. It states that, "The in-situ soils must have an undisturbed hydraulic conductivity less than or equal to 1x10-5 cm/s". The hydraulic conductivity values of the clay unit in Vol. III are 1.56E-5 and 1.87E-5 cm/S for PZ-16M, demonstrating that the clay in the vicinity of this piezometer does not meet the restrictive siting criteria. Please mention this exception and propose how the exceedance of this restrictive siting criterion will be addressed

Response to Comment 26d. The hydraulic conductivity values calculated from the slug tests completed at PZ-16M are not considered representative of the hydraulic conductivity of the Presumpscot Clay. Golder conducted 32 slug tests at eight wells/piezometers screened in the Presumpscot Clay, including PZ-16M, for the Phase 14 application. Results of these tests are provided in Table 4b of Volume III of the application. Hydraulic conductivity values calculated for the tests completed at the 7 other wells/piezometers ranged from a high of 2.04E-6 cm/s (PZ-17M) to 1.31E-07 cm/s (MW14-02M). The hydraulic conductivity values calculated from PZ-16M slug test data are approximately an order of magnitude greater than the highest value calculated for the other seven wells/piezometers.

Piezometer PZ-16M was constructed differently than most of the other Presumpscot Clay wells / piezometers in that it was installed in a geotechnical borehole (GB-12 see borehole log in Appendix B of Volume IV) that was advanced through overburden to the top of the underlying bedrock. The portion of the borehole that penetrated the bottom of the clay was backfilled with bentonite chips to provide a seal between the bottom of the screened interval and the underlying till and bedrock. Similarly, bentonite chips were used above the well screen to provide a seal between the top of the screened interval and the overlying silty fine sand. Golder suspects that one of the two seals may have allowed a small amount of water from either the underlying till or the overlying silty fine sand to enter the screened interval during slug testing. Even a small amount of water entering the screened interval during the testing would result in a much higher calculated value of hydraulic conductivity. Five of the 7 remaining wells/piezometers slug tested in the Presumpscot Clay were installed in boreholes that terminated in the clay. These wells/piezometers only have a seal above the well screen, thereby reducing the likelihood of water from other units to enter into the screened interval during slug testing.

The Presumpscot Clay was investigated at 40 soil borings and 46 CPTs in the Phase 14 area. The lithologic descriptions of the Presumpscot Clay at PZ-16M (GB-12) are consistent with lithologic descriptions of this unit at other boring locations. In addition, the response of the CPT (CPT43) completed at the PZ-16M location is similar to the response observed in the clay unit at other CPT locations. There were no lithologic observations at the PZ-16M area that would indicate zones of higher hydraulic conductivity. Given the similarities of the clay at PZ-16M with the clay unit across

the Phase 14 area, there is no reason to conclude that the hydraulic conductivity of Presumpscot Clay at PZ-16M should be different than elsewhere.

The Presumpscot Clay is approximately 13.5 feet thick at PZ-16M. The screened and sandpacked interval at PZ-16M (6.5 feet) only covers about half the clay thickness at this location. Given the consistently low hydraulic conductivity measured in the Presumpscot Clay in the Phase 14 area and other areas of the Crossroads Facility, the consistency of the lithology at PZ-16M with all other borings completed in the Phase 14 area, and the well-documented and consistently low hydraulic conductivity of the Presumpscot Clay, the 13.5 feet of Presumpscot Clay at PZ-16M is considered to meet the restrictive siting criterion SWMR 401.1.C(3)(b).

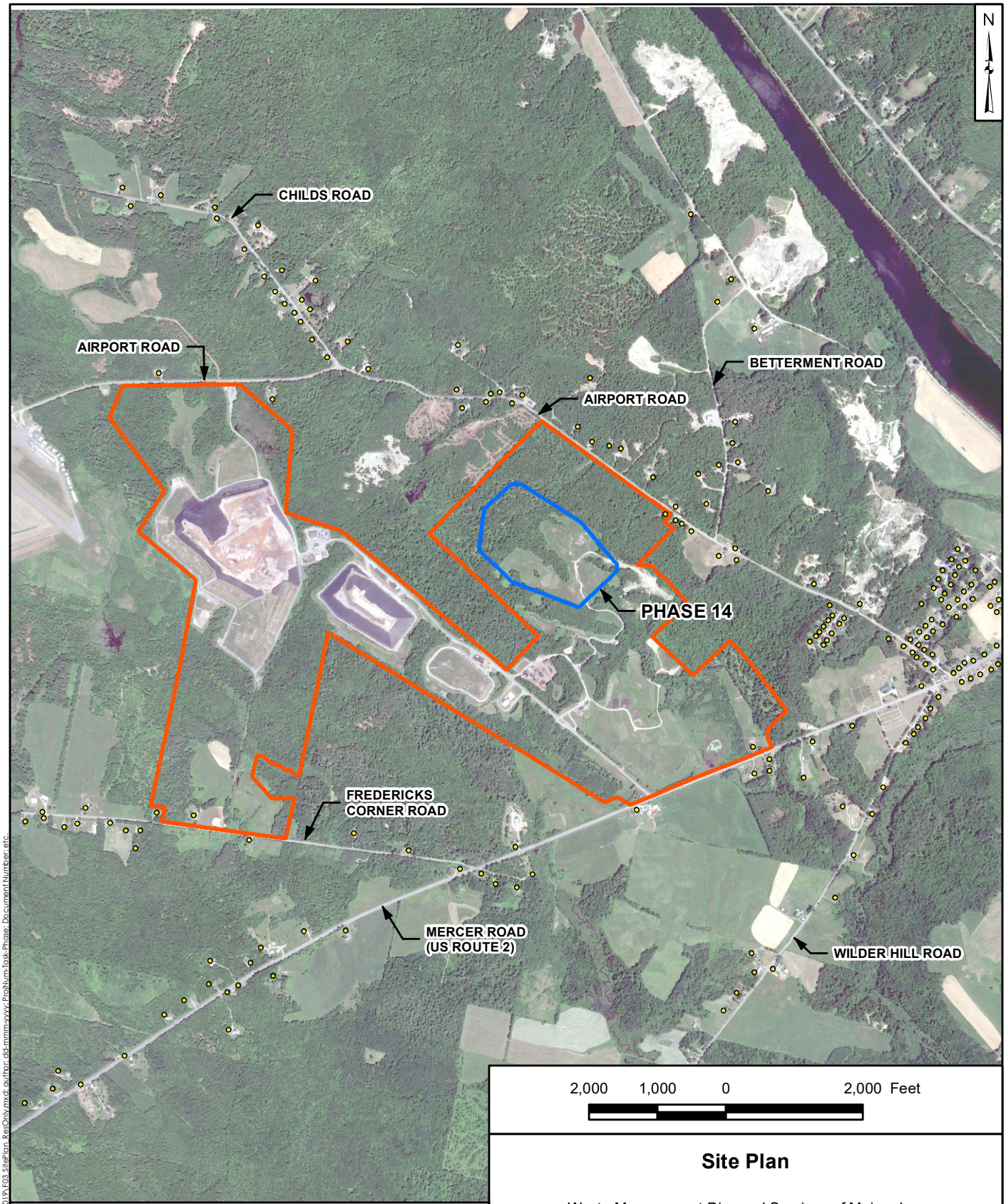
* * * * *

List of Attachments:

ATTACHMENT RTC#7e-1 – Figure 3 - Updated Aerial Image of Phase 14 Vicinity
ATTACHMENT RTC#7f-1 – Photographs from Vantage Points taken in Winter
ATTACHMENT RTC#7g-1 – 3D Visual Assessment Modeling Results from Riverview Memorial Schoolyard and Adjacent Cemetery on Route 2
ATTACHMENT RTC#22-1 – Itemized tables of Phase 14 Closure and Post-Closure Projected Costs
ATTACHMENT RTC#26c-1 – Annotated Figure S26-2: Setback Plan

ATTACHMENT RTC#7e-1

Figure 3 – Updated Aerial Image of Phase 14 Vicinity



2,000 1,000 0 2,000 Feet

Legend

- Residential Structures
- WMDSM Facility Site Boundary

Notes:
- Aerial Image Source: Google, 2018.
- Residential Structure Source: Boynton & Pickett, LLC, March 2020.

Site Plan

Waste Management Disposal Services of Maine, Inc.
Crossroads Landfill
Norridgewock, Maine

Geosyntec consultants

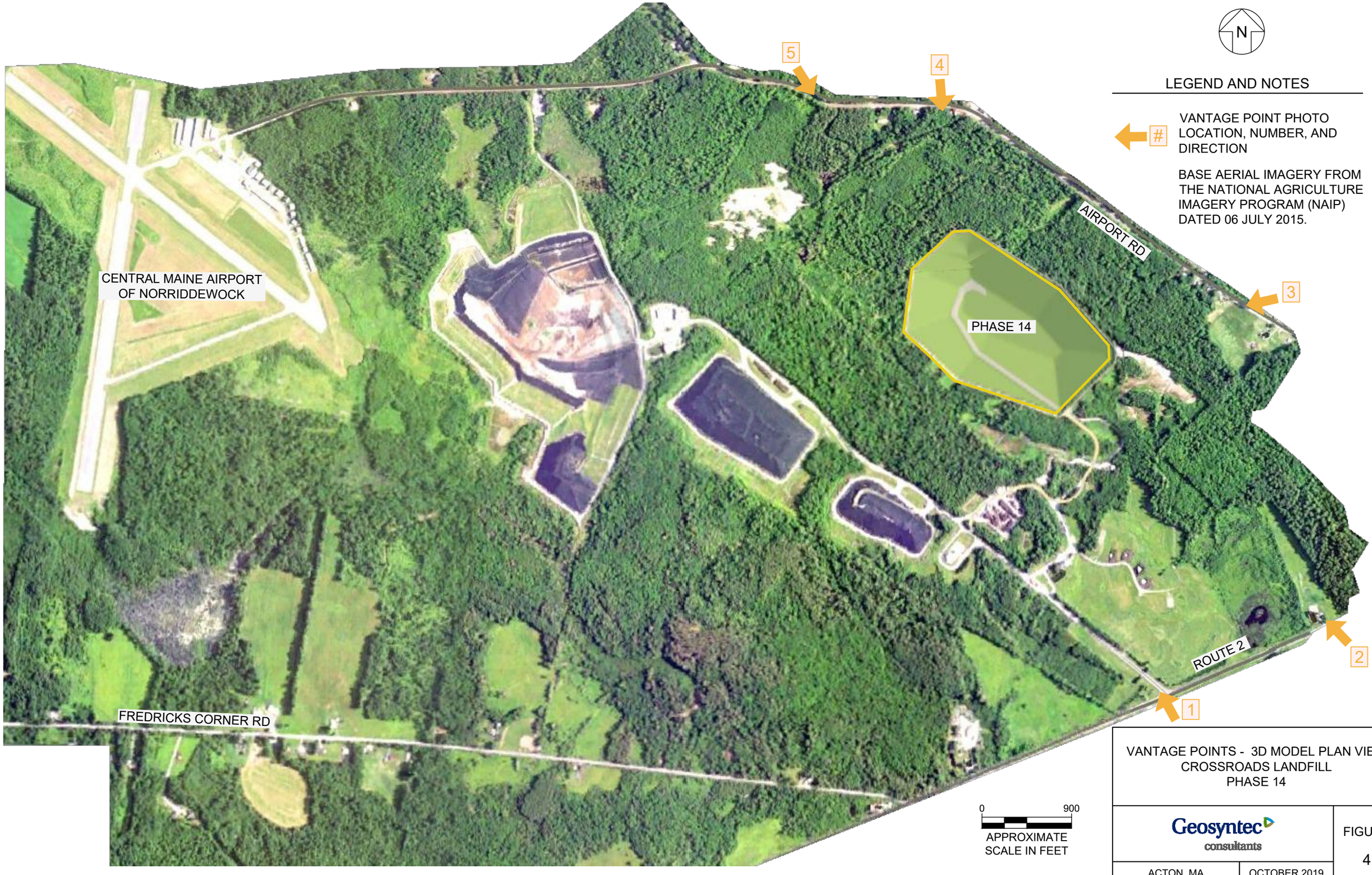
Acton, Massachusetts | March 2020

Figure 3

Q:\GIS\Projects\WE0214_Norridgewock.mxd\2019\F03_SitePlan_ResOnly.mxd; author: dd-mmm-yyyy; ProjNum-Task-Phase; Document Number; etc.

ATTACHMENT RTC#7f-1

Photographs from Vantage Points taken in Winter



N

LEGEND AND NOTES

VANTAGE POINT PHOTO LOCATION, NUMBER, AND DIRECTION

BASE AERIAL IMAGERY FROM THE NATIONAL AGRICULTURE IMAGERY PROGRAM (NAIP) DATED 06 JULY 2015.

0 900

APPROXIMATE SCALE IN FEET

VANTAGE POINTS - 3D MODEL PLAN VIEW
CROSSROADS LANDFILL
PHASE 14

Geosyntec consultants

ACTON, MA | OCTOBER 2019

FIGURE 4

P:\CAD\PROJECTS\CROSSROADS LANDFILL\PERMIT\PHASE 14 (ME1752A.02)\FIGURES\ME1752AF05 - Last Saved by: JJVail on 10/17/19

PHOTOGRAPH OF EXISTING CONDITIONS

3D IMAGE OF PHASE 14 LANDFILL

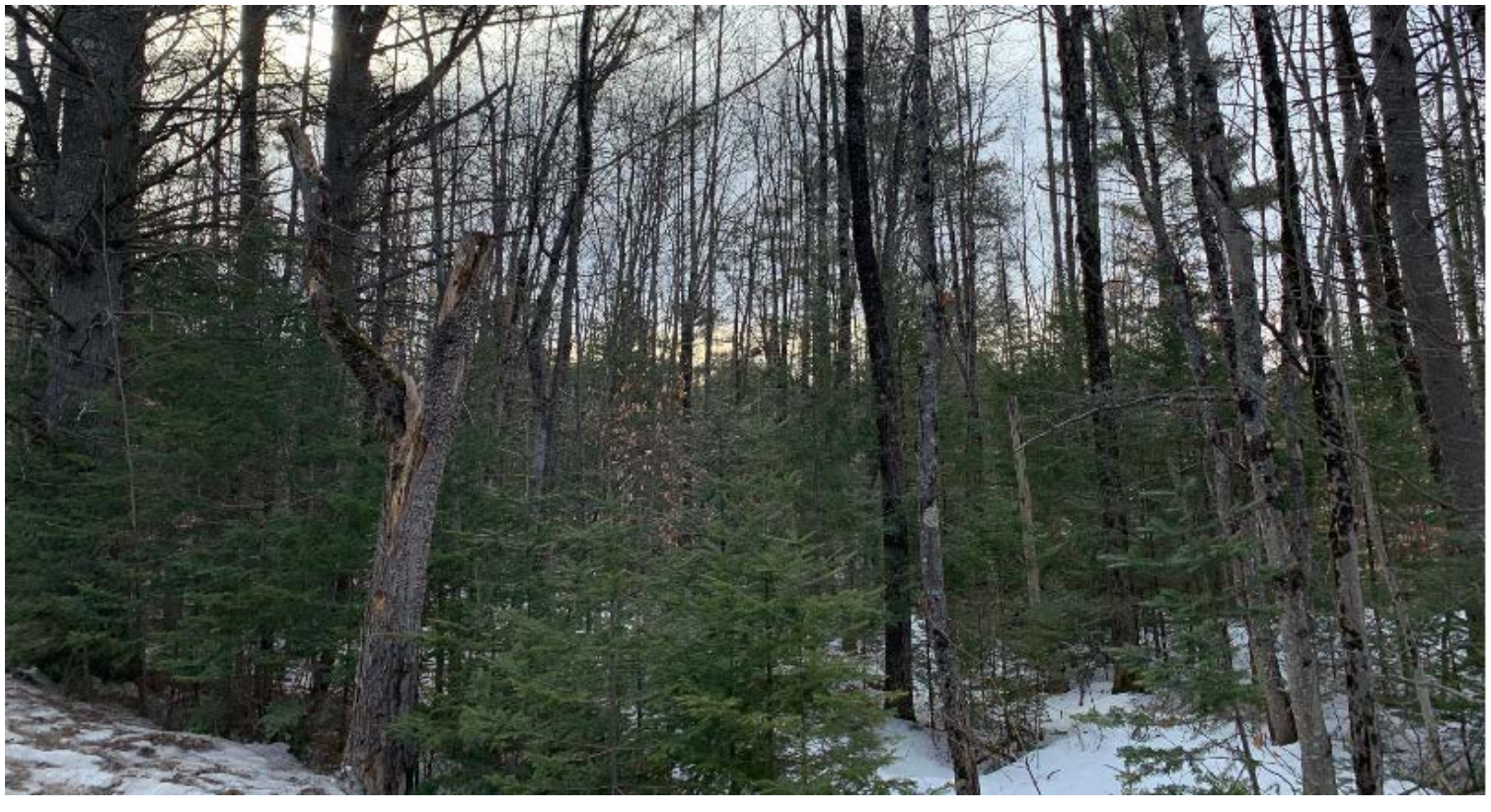
VANTAGE POINT #1

VANTAGE POINT #2

VANTAGE POINT #3

PHOTOGRAPH OF EXISTING CONDITIONS

3D IMAGE OF PHASE 14 LANDFILL



VANTAGE POINT #4


PHOTOGRAPH OF EXISTING CONDITIONS


3D IMAGE OF PHASE 14 LANDFILL

VANTAGE POINT #5

ATTACHMENT RTC#7g-1

3D Visual Assessment Modeling Results from Riverview Memorial Schoolyard and Adjacent Cemetery on Route 2

N

LEGEND AND NOTES

VANTAGE POINT PHOTO LOCATION, NUMBER, AND DIRECTION

BASE AERIAL IMAGERY FROM THE NATIONAL AGRICULTURE IMAGERY PROGRAM (NAIP) DATED 06 JULY 2015.

0 900

APPROXIMATE SCALE IN FEET

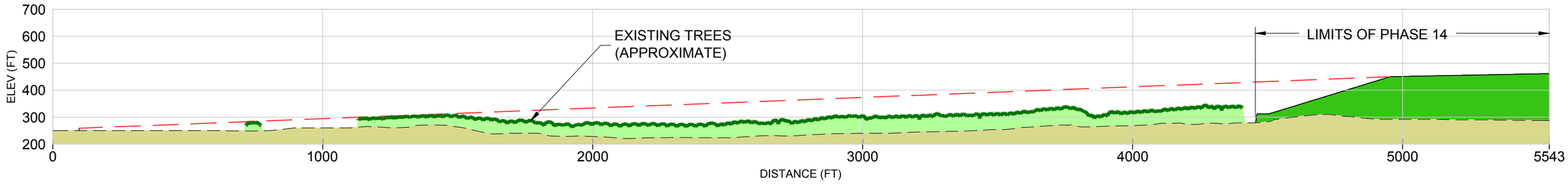
VANTAGE POINTS - 3D MODEL PLAN VIEW
CROSSROADS LANDFILL
PHASE 14

Geosyntec consultants

ACTON, MA | MARCH 2020

FIGURE 4

P:\CADD\PROJECTS\CI\CROSSROADS LANDFILL\PERMIT\PHASE 14 (ME1752A.02)\ME1752A05 - Last Saved by: MCarlson on 3/19/20

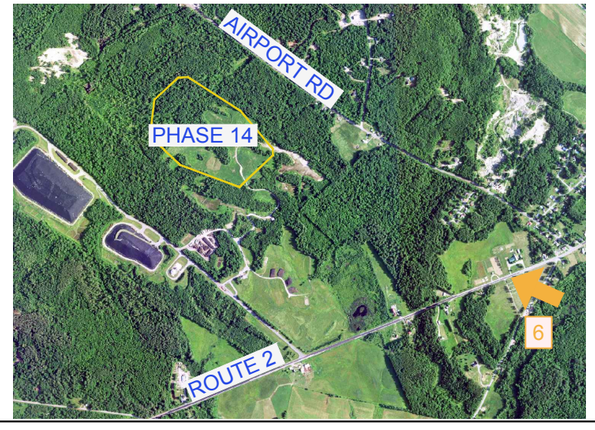


LEGEND AND NOTES

6 VANTAGE POINT LOCATION, NUMBER, AND VIEWING DIRECTION

AERIAL PHOTO FROM THE NATIONAL AGRICULTURE IMAGERY PROGRAM (NAIP) DATED 06 JULY 2015.

PHOTOGRAPH OF EXISTING CONDITIONS OBTAINED BY WMDSM ON 10 MARCH 2020.



3D MODEL VIEW FROM
VANTAGE POINT LOCATION #6
CROSSROADS LANDFILL
PHASE 14

Geosyntec consultants

ACTON, MA | MARCH 2020

FIGURE
10

ATTACHMENT RTC#22-1

Itemized Tables of Phase 14 Closure and Post-Closure Projected Costs

PHASE 14 FINAL CLOSURE PROJECTED COSTS

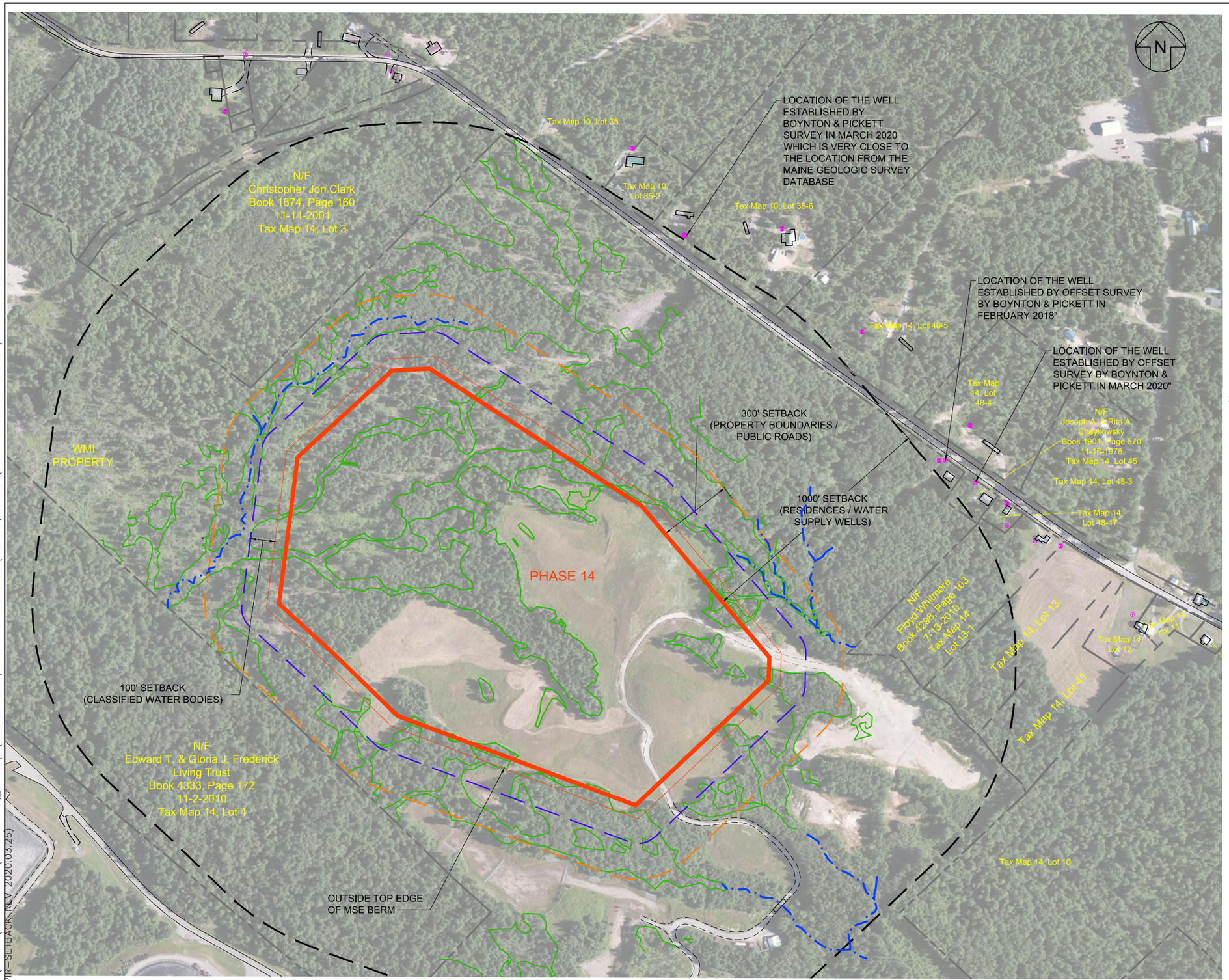
WORK DESCRIPTION	UNIT	UNIT COST	QUANTITY	COST
ADMINISTRATION	ACRE	$ 10,770	48.6	$ 523,422
(Construction drawings, bid package, design support, etc.)				
EARTHWORK AND CLAY LINER	ACRE	$ 42,700	48.6	$ 2,075,220
(Contractor mobilization, CQA, surveying, ESC, GCL purchase/install, soil/geosynthetic testing, etc.)				
GEOMEMBRANE	ACRE	$ 31,690	48.6	$ 1,540,134
(Installer mobilization, CQA, surveying, anchor trench, geomembrane purchase/install, boots, etc.)				
DRAINAGE AND COVER LAYERS	ACRE	$ 84,129	48.6	$ 4,088,669
(Drainage geocomposite purchase/install, protective cover soil, topsoil, vegetation/seeding, drainage benches, downchutes, gas vent layer soil, etc.)				
DEED RESTRICTION SUBMISSION	EACH	$ 25,000	3	$ 75,000
			SUB-TOTAL	$ 8,302,445

CROSSROADS LANDFILL POST-CLOSURE PROJECTED COSTS

WORK DESCRIPTION	UNIT	UNIT COST	QUANTITY	COST
CROSSROADS LANDFILL POST-CLOSURE CARE				
Operation, Maintenance, Administration	YEAR	$ 127,391	30	$ 3,821,730
Groundwater/Surface Water Management	YEAR	$ 67,549	30	$ 2,026,464
Leachate Management	YEAR	$ 75,570	30	$ 2,267,086
Landfill Gas/Air Management	YEAR	$ 83,410	30	$ 2,502,312
			SUB-TOTAL	$ 10,617,592

ATTACHMENT RTC#26c-1

Annotated Figure S26-2: Setback Plan



LEGEND

- PROPERTY LINE (NOTE 1)
- SETBACK LINES (NOTE 2)
- PHASE 14 PROPOSED WASTE BOUNDARY (NOTE 4)
- EXISTING WETLANDS (NOTE 3)
- CLASS B STREAMS (NOTE 3)
- EXISTING PAVED / GRAVEL ROAD (NOTE 1)
- WATER SUPPLY WELL (NOTE 5)
- RESIDENCE (NOTE 6)

NOTES:

1. EXISTING FEATURES BASED ON "TOPOGRAPHIC PLAN UPDATE APRIL, 2002, WASTE MANAGEMENT LANDFILL" BY SACKETT & BRAKE SURVEY DATE OF AERIAL SURVEY 20 APRIL 2002. WASTE MANAGEMENT PROPERTY LINE FROM A SHAPE FILE PREPARED BY BOYNTON & PICKETT DATED 22 JULY 2019. ABUTTING PROPERTY LINES FROM A CAD FILE PREPARED FROM BOYNTON & PICKETT DATED 8 DECEMBER 2017
2. REFER TO 06-096 MEDEP SOLID WASTE MANAGEMENT RULES: CHAPTER 400.4.E AND 401.1.C FOR SETBACK REQUIREMENTS.
3. STREAM & WETLANDS FROM SHAPE FILES RECEIVED FROM NORMANDEAU ENVIRONMENTAL CONSULTANTS (NORMANDEAU) DATED 4 AUGUST 2017. STREAM LOCATIONS UPDATED FROM A CAD FILE RECEIVED 30 MAY 2019 FROM NORMANDEAU.
4. APPROXIMATE WASTE BOUNDARY AREA 48.6 AC.
5. EXISTING WATER SUPPLY WELL LOCATIONS FROM;
   - MAINE GEOLOGICAL SURVEY ON LINE WELL DATABASE
   - SURVEY DATA PREPARED BY BOYNTON & PICKETT RECEIVED 7 FEBRUARY 2018 AND 19 MARCH 2020.
   - SHAPE FILE DATA PREPARED BY MAINE GEOLOGICAL SURVEY AND COORDINATED WITH NORRIDGEWOCK QUADRANGLE SURFICIAL MATERIALS MAP OPEN-FILE NO. 00-65 DATED 2000.
6. LOCATIONS OF RESIDENCES FROM SHAPE FILES RECEIVED FROM BOYNTON & PICKETT, DATED 19 MARCH 2020.
7. WELLS ON PROPERTIES OUTSIDE THE 1,000 FT SETBACK WERE NOT SURVEYED (E.G. TAX MAP 14 LOT 48-17).
8. IF WELL WAS FIELD LOCATED, THEN WELL LOCATION FROM MAINE DATABASE IS NOT SHOWN.

0 200' 400'
SCALE IN FEET

SETBACKS PLAN
PHASE 14 PERMITTING

WASTE MANAGEMENT DISPOSAL SERVICES OF MAINE, INC.
CROSSROADS LANDFILL
NORRIDGEWOCK, MAINE

Geosyntec consultants

FIGURE
S26-2

PROJECT NO: BE0232 | MARCH 2020

C:\USERS\RKOHLSTROM\DOCUMENTS_CADD\C\CROSSROADS\PHASE 14 EXPANSION\PERMIT\FIGURES\2019.09 PERMIT FIGURES\BE0232 F S27-2 (PIR - SETBACK, REV. 2020.03.25)