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October 7, 2022 **VIA EMAIL AND PRIVATE CARRIER**

Regina Esslinger
Baltimore County Department of Environmental Protection and Sustainability
Environmental Impact Review
Jefferson Building
111 West Chesapeake Avenue, Room 319
Towson, MD 21204

Subject: Technical Memorandum: Second Year Assessment of Block F trees near GWETS trenching
Lockheed Martin Corporation – Middle River Complex
2323 Eastern Boulevard, Middle River, Baltimore County, Maryland

Dear Mrs. Esslinger,

For your information, please find enclosed one hard copy of the above-referenced document. This memo is a first-year assessment of the trees adjacent to trenches made to hold underground discharge pipes for groundwater treatment. The trenching work was required by MDE as part of a Tax Block E/F groundwater extraction and treatment system.

Please let me know if you have any questions. My office phone is (240) 460-7508.

Sincerely,

Thomas D. Blackman
Project Lead, Environmental Remediation

cc: (via email without enclosure)
Anuradha Mohanty, MDE
Christine Kline, Lockheed Martin
Mary Morningstar, Lockheed Martin
Tom Green, LMCPI
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Cannon Silver, CDM Smith

cc: (Box)
Mark Mank, MDE
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Scott Heinlein, LMCPI
Christopher Keller, LMCPI

cc: (via mail with enclosure)
Budd Zahn, MRAS

TECHNICAL MEMORANDUM

To:	Tom Blackman, Cannon Silver, Katie Young
From:	Michael Martin, Jeff White
Cc:	
Date:	October 7, 2022
Subject:	Second year assessment of Block F trees near GWETS trenching
Attachments	none

Trenching to install underground discharge pipes for groundwater treatment was required as part of Block E/G groundwater extraction and treatment system. The path of the trench unavoidably impacted the critical root zone of three mature white oaks (*Quercus alba)* (see Figure 1, labeled trees #1, #2, #3). Due to the potential impacts, a submittal to the Baltimore County Department of Environmental Protection and Sustainability (BCDEPS) (Tetra Tech, 2020) documented a monitoring approach as follows:

> *Once construction is complete, the trees will be inspected annually for a period of two years to monitor for adverse impacts. A brief summary report will be submitted to the BCEPS for each annual monitoring event. If no adverse effects that may significantly impact the longevity of the trees are noted during the two-year monitoring period, then the project will be closed out with the BCEPS. If adverse effects that may significantly impact the longevity of the trees are noted during the monitoring period, then Lockheed Martin is committed to working with the BCEPS to develop a mitigation plan based on planting three replacement trees per any single tree damaged by the construction.*

Tetra Tech performed a baseline condition assessment on the trees on May 18, 2020 and June 9, 2020, and a memorandum describing the condition of the trees with photographs reported the assessment results. The location of the trees is shown on Photographs 1 through 4 and are shown in relation to the marked (LOD) for the trench. This memorandum describes the condition of the trees in their second year growing season following impact to their critical root zone.

In July 2020, a 3-ft deep trench was excavated through the critical roots zone of the three mature white oak trees with precautions taken as described in the referenced BCDEPS submittal. The oaks vary slightly in distance from the trench as shown in Figure 1. The degree of

potential impact to the trees critical root zone is also depicted in Figure 1. During the first annual field assessment (July 29, 2021), the condition of the trees was assessed for any dieback, loss of leaves, discoloration of leaves, and insect or plant disease damage (Table 1). During the second annual field assessment (July 6, 2022), the condition of the trees was assessed for the same parameters (Table 2).

For the July 6, 2022 assessment, there were signs of some minor leaf feeding insect damage on the lower leaves but no visible insect infestation. No damage of any consequence was observed in regard to leaves, branches or trunks of the trees. No damages to the trunk, bark, or branches were observed that may have been caused by storms or mechanical equipment. There were no signs of fungus or disease on the bark, branches, or leaves. There were no signs of any fruiting fugal bodies on or around the trees. The overall weather, rainfall, and temperature to date for this year and growing season has mostly been average for our climate. There have been some warmer than average days but nothing out of the ordinary for summer. Rainfall in the summer varies due to the nature of thunderstorms but overall, the area has had sufficient rainfall. The trees show no sign of stress from heat or excessive dry conditions. The leaf coverage or density in the canopy appears full and healthy. All observations, see photos, were made from the ground at different points and distances circling the trees. During the initial assessment prior to trenching, all three trees had signs of oak anthracnose and scale infestation. This year anthracnose or scale was not evident. Anthracnose is typically more common in the spring

Photos 1 – 6 were taken during the July 29, 2021, inspection are included for comparison. In 2021 all three of the white oaks appeared healthy for their size and age (Photos 1 - 3). The canopy and crowns of all trees look acceptable for mature trees (Photos 4 - 6). Last year, (2021) was the year of the Brood X 17-year locust and their egg laying on the oaks resulted in the ends of some small branches dying (Photo 5).

Photos 7 – 13 were taken July 6, 2022, to document the current condition of the trees. Photos 7 – 9 show the complete trees from different positions. Photos 9 – 13 show the canopy, branches, and leaves of the trees.

Conclusions

All three oaks that were subjected to potential impacts from trenching appear healthy and in good condition as observed for two growing seasons following the impact. Based on the visual inspection, the trees are as in as good as health as when inspected before trenching occurred. This completes the required commitment two years of monitoring. Closure of any further requirements on this matter by BCDEPS is appropriate.

Table 1. First year monitored in July 2021, trees within critical root zone and within the area of trenching.

Tree ID	Species	Common Name	Condition	Position	Comment
1	*Quercus alba*	White Oak	Good	Closest to trench	Some damage from 17-year cicada's noted as

Tree ID	Species	Common Name	Condition	Position	Comment
1	*Quercus alba*	White Oak	Good	Closest to trench	Very minor leaf damage from common leaf feeding insects such as aphids and oak sawfly.
2	*Quercus alba*	White Oak	Good	Second closest to trench	Very minor leaf damage from common leaf feeding insects such as aphids and oak sawfly.
3	*Quercus alba*	White Oak	Good	Third closest to trench	Very minor leaf damage from common leaf feeding insects such as aphids and oak sawfly.
					dead leaves at branch tips (flagging)
2	*Quercus alba*	White Oak	Good	Second closest to trench	Some damage from 17-year cicada's noted as dead leaves at branch tips (flagging)
3	*Quercus alba*	White Oak	Good	Third closest to trench	Some damage from 17-year cicada's noted as dead leaves at branch tips (flagging)

Table 2 second year monitored in July 2022, trees within critical root zone and within the area of trenching.

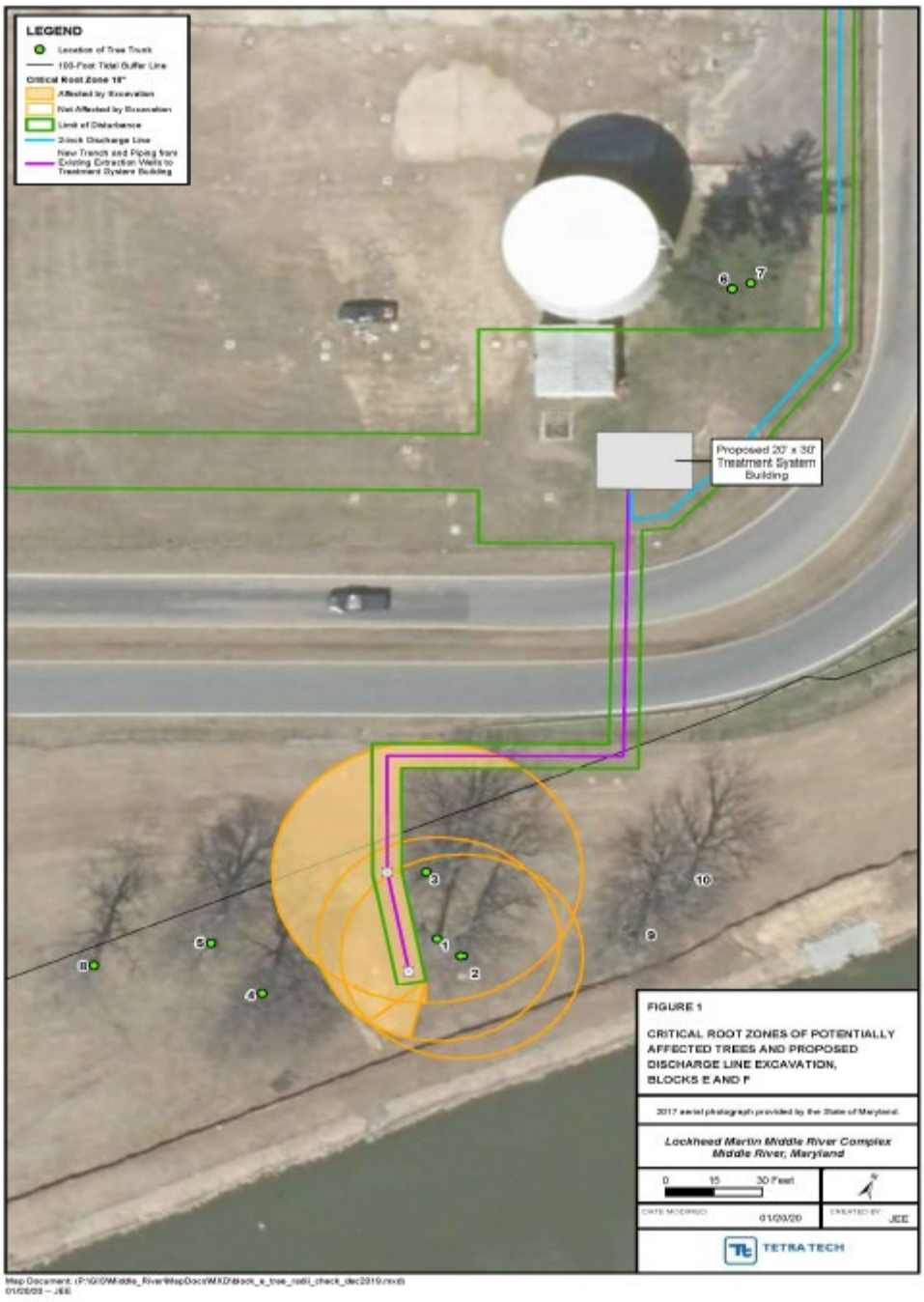

Figure 1– Location of trees in relation to proposed underground water discharge pipe.

Photo 1– Ground view of the trees during baseline assessment; tree #1, tree #2, and tree #3 are white oaks (May 2020)

Photo 2 – Tree #1 is closest to the trench, followed by tree #2, and tree #3 (May 2020)

Photo 3, First year assessment (July 2021) site view; all three trees appear healthy.

Photo 4 – White oak with bifurcated (forked) trunk; tree appears healthy (July 2021).

Photo 5 – First year assessment (July 2021), looking southeast, pipe is buried between tree #1 and tree #4, and is closest to tree #1. Trees appear healthy. Brown (dead) branch trips are due to 17-year Cicadas and should not affect the health of the tree.

Photo 6 – Canopy appears healthy on all three white oaks. (July 2021).

Photo 7 Tree #1 is closest to the trench, followed by tree #2, and tree #3 (July 2022) Trench runs between tree 1. 2. 3 and closest line of barrels (July 2022).

Photo 8 View of tree 1 and 2 looking south along Dark Head Cove (July 2022)

Photo 9 View of three trees looking south (July 2022)

Photo 10 Tree canopies looking south (July 2022)

Photo 11 Tree canopies looking southeast July 2022

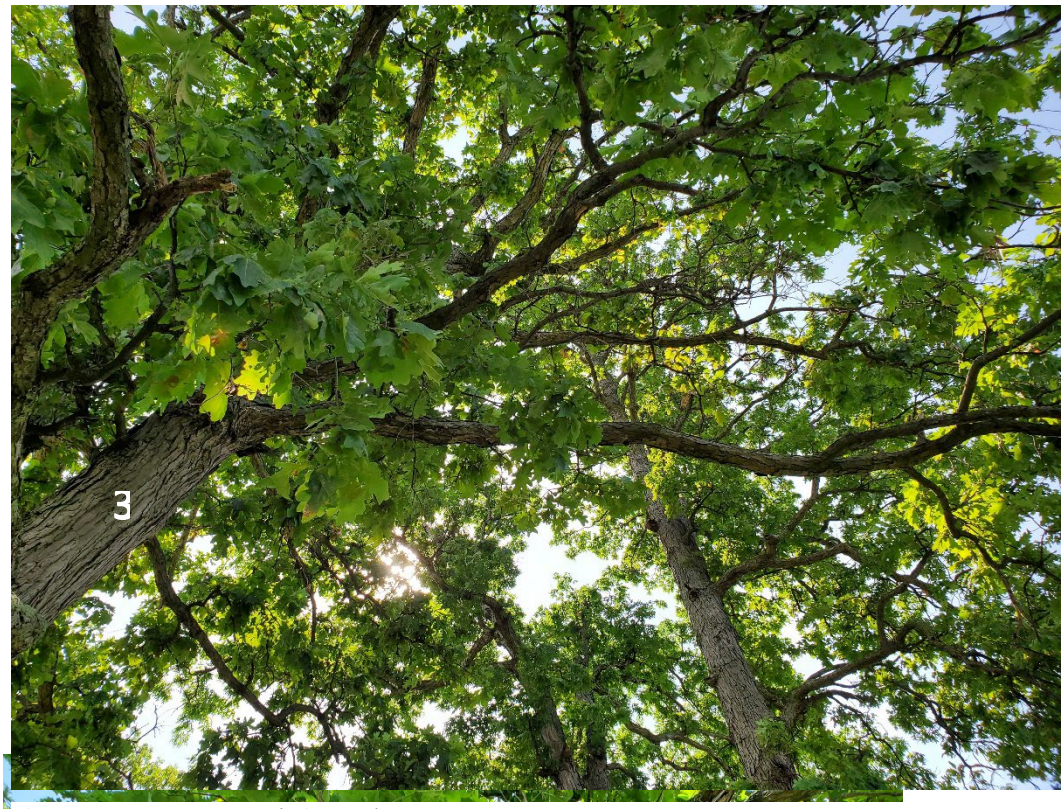

Photo 12 Canopy on tree 3 (July 2022)

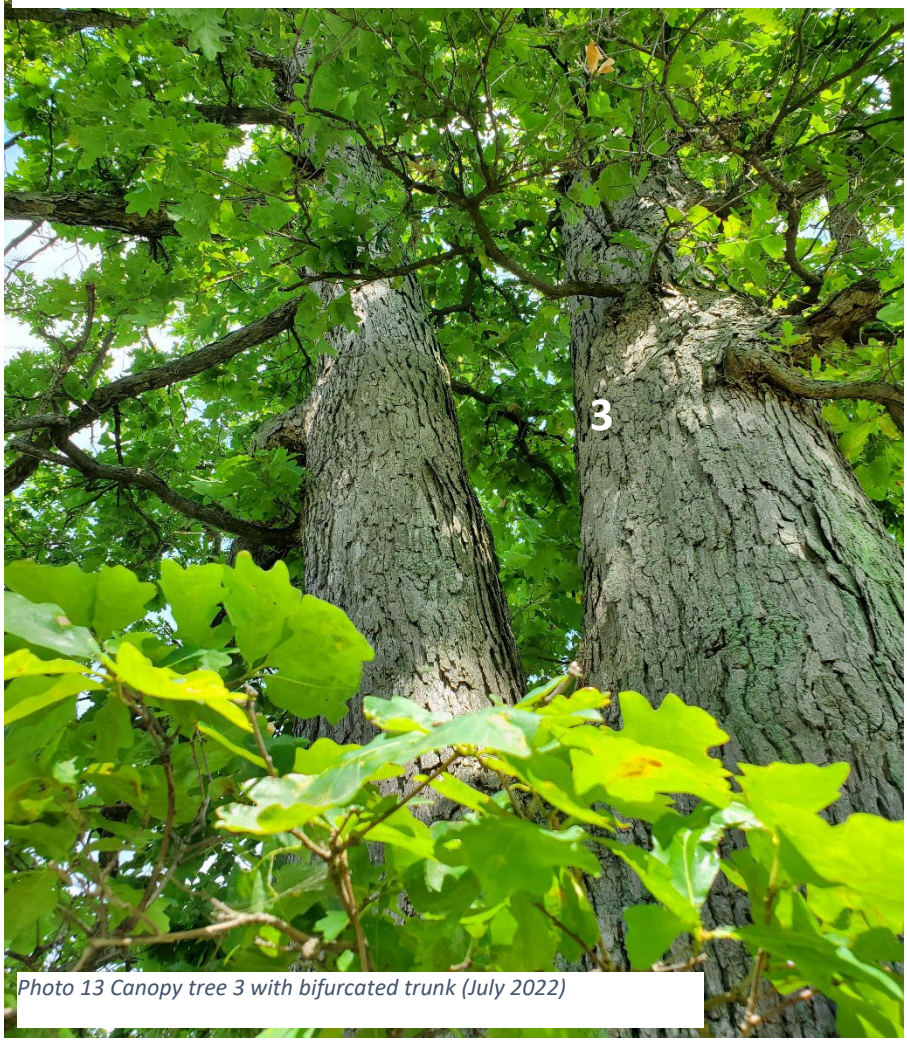

Photo 13 Canopy tree 3 with bifurcated trunk (July 2022)