LIVE OAK POINT LIVING SHORELINES

2023 (Spring) Reference Site Monitoring Report

USACE Permit No.:	SAJ-2011-00287
FDEP Permit No.:	0387876-001-EI-66
Permittee:	Northwest Florida Water Management District 81 Water Management Drive Havana, FL 32333-4712 POC: Robert Lide (robertlide@nwfwater.com)
Entity Conducting Monitoring:	Choctawhatchee Basin Alliance of Northwest Florida State College 109 South Greenway Trail Santa Rosa Beach, FL 32459-5415 POC: Rachel Gwin (gwinr@nwfsc.edu)
Project Location:	Live Oak Point Salt Marsh Reference Site 30.42° North, -86.27° West Approximately 2 ½ Miles NW of Santa Rosa Beach Walton County, Florida

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Synopsis

Live Oak Point contains the largest salt marsh system (approximately 1,000 acres) in Choctawhatchee Bay. However, its ecological integrity and long-term survival is threatened by ongoing erosion and shoreline retreat. Analysis of historic aerials indicates that, since 1941, the salt marsh has retreated up to 300 FT along the northern edge. In situ measurements and analysis of recent digital orthophoto quads (DOQs) show that shoreline retreat now averages >4 FT per year.

The objectives of the Live Oak Point Living Shorelines project are 1) halting loss of salt marsh habitat at Live Oak Point, 2) restoring salt marsh habitat in a strip parallel to the current shoreline that will be protected by limerock breakwaters, and 3) enhancing existing salt marsh habitat via improved buffers. To achieve these objectives, a living shoreline is being implemented along the northern edge of the Live Oak Point salt marsh.[1]

New construction of approximately 3,440 FT of limerock breakwaters has been implemented at the project site. Substantial plantings of salt marsh vegetation (*Spartina patens, Juncus roemarianus, Spartina alterniflora*) are anticipated for Spring 2023. Barring unforeseen events (e.g., a major hurricane), full completion of this project is anticipated in 2023.

The Live Oak Point Living Shorelines project is a component of the Northwest Florida Water Management District (NWFWMD) In-Lieu Fee (ILF) mitigation program (USACE Permit SAJ-2011-00287) and will generate, upon full completion, 2.61 estuarine mitigation credits for use by the Florida Department of Transportation (FDOT).

This 2023 (Spring) Reference Site Monitoring Report has been developed to comply with federal and state monitoring requirements. It is the fourth monitoring report for the reference site, the other three monitoring events having been conducted in Fall 2021, Spring 2022, and Fall 2022. Parameters for the Spring 2023 reference site monitoring are vegetation cover, sediment accretion, panoramic and general photo documentation. The reference site has similar geomorphology, tidal range, elevations, and vegetation community structure when compared with the project site (the reference site is located approximately 3,000 FT southwest of the project site). Trends established from previous monitoring indicate that vegetation at the reference site is generally stable, with the low marsh dominated by *Spartina alterniflora*, the mid marsh dominated by *Spartina patens*, and the high marsh dominated by *Juncus roemerianus*. Monitoring of the project site is scheduled to begin later 2023 after plantings of marsh vegetation is completed. All monitoring reports for the Live Oak Point Living Shorelines reference site and project site will be posted at https://www.nwfwater.com/Water-Resources/Regional-Wetland-Mitigation-Program/Regional-Mitigation-Plan/NWFWMD-Mitigation-Sites/Choctawhatchee-Watershed-Mitigation-Sites/Live-Oak-Peninsula-ILF/Living-Shorelines or any successor website.

[1] The NWFWMD has contracted with the Choctawhatchee Basin Alliance of Northwest Florida State College (CBA) to implement the Live Oak Point Living Shorelines project.

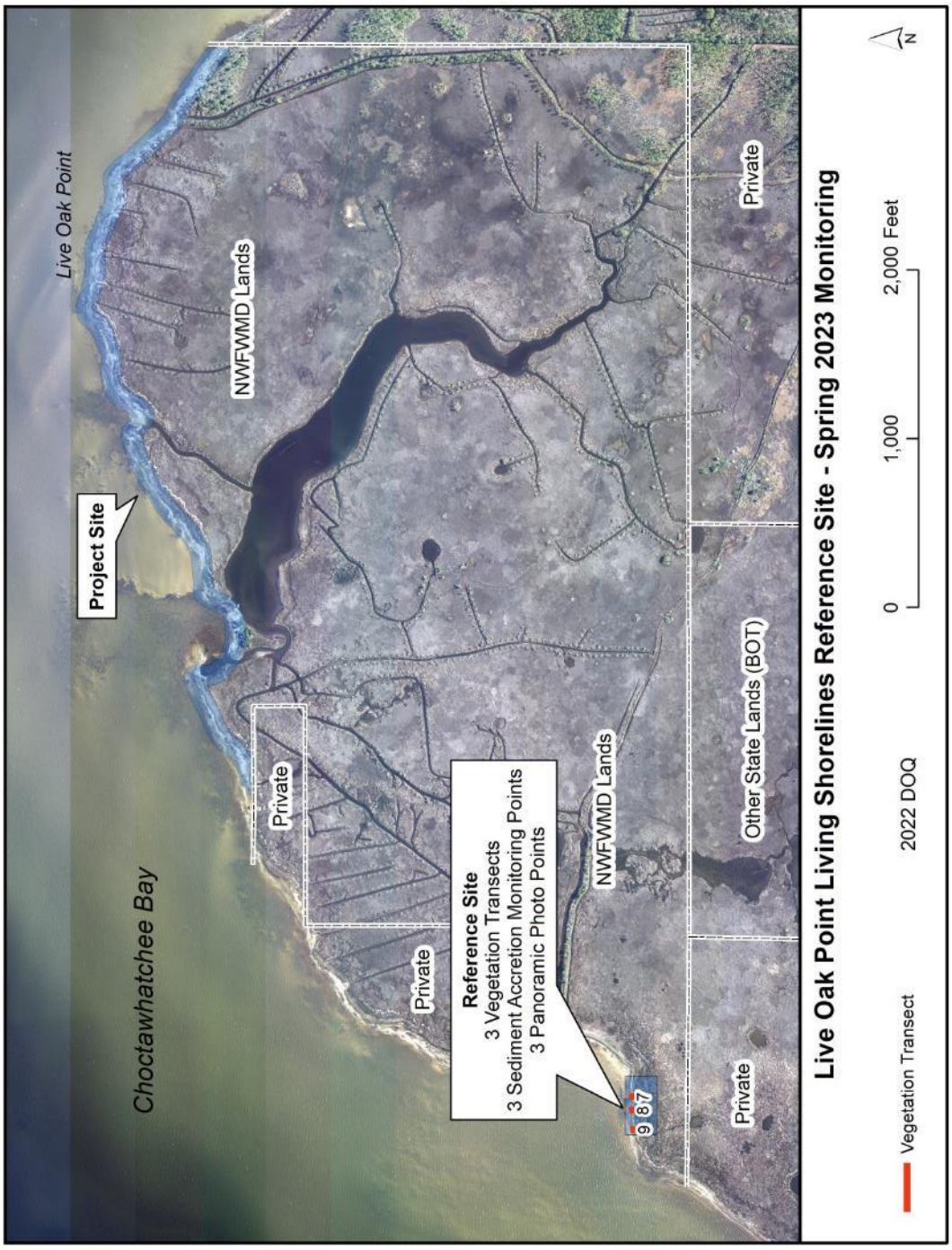

Figure 1. Spring 2023 Reference Site Monitoring Overview

Figure 2. Spring 2023 Reference Site Monitoring Closeup

Vegetation Monitoring

Vegetation cover at the reference site was quantitatively measured on 4/11/2023 using a modified Daubenmire method.[2] Three (3) transects of variable length were established in the reference area. Each transect began in the low marsh and extended into the high marsh. Twelve (12) 0.5-meter square (0.25m^2) quadrats were sampled along each transect. Four (4) quadrats were located in the low marsh, four (4) in the mid marsh, and four (4) in the high marsh. All plant species were identified in each quadrat. Percent cover of vegetation by species and bare ground was visually estimated. No exotic or invasive plants were present in any transect. Data collected on 4/11/2023 indicate that the low marsh continues to be dominated by *Spartina alterniflora*, the mid marsh by *Spartina patens*, and the high marsh by *Juncus roemerianus*.

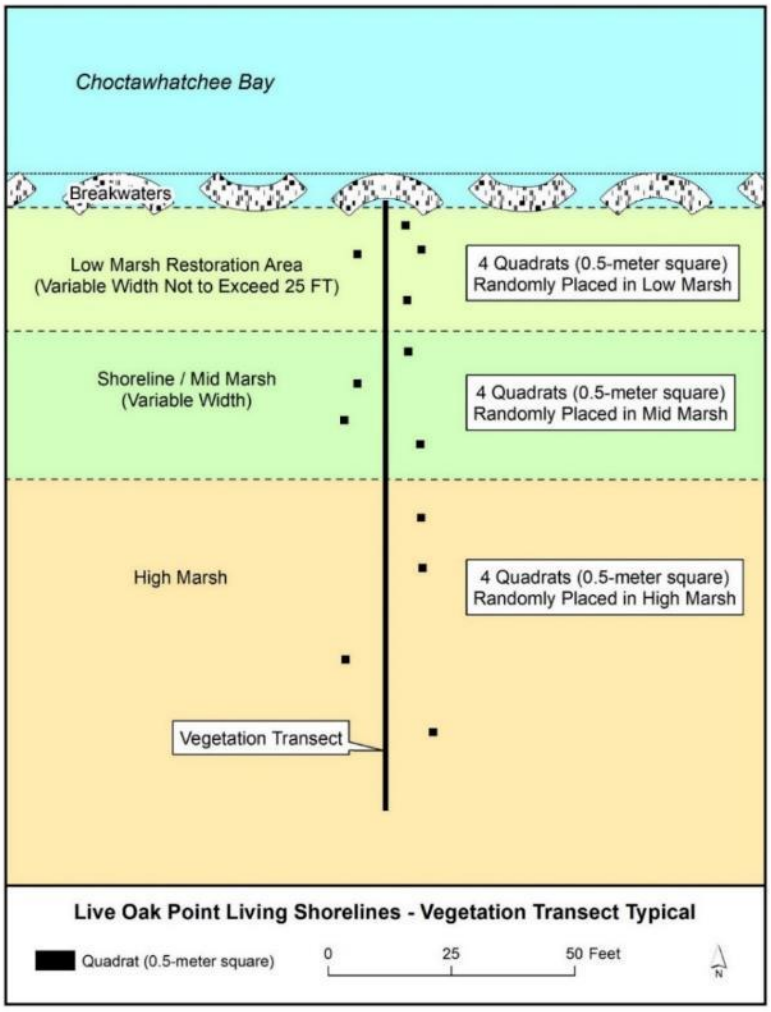

Figure 3. Vegetation Transect Sampling Design (Breakwaters Not Present at Reference Site)

[2] Daubenmire, Rexford. 1959. A Canopy-coverage method of vegetational analysis. Northwest Science 33:43-64.

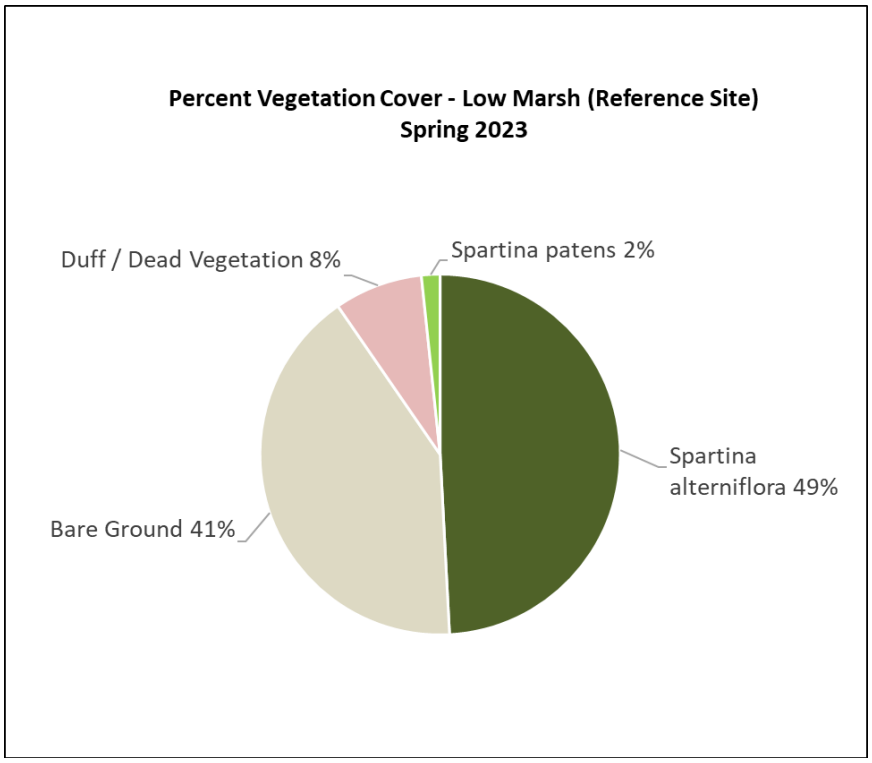

Figure 4. Reference Site Low Marsh Vegetation (Average of Transects T7 - T9)

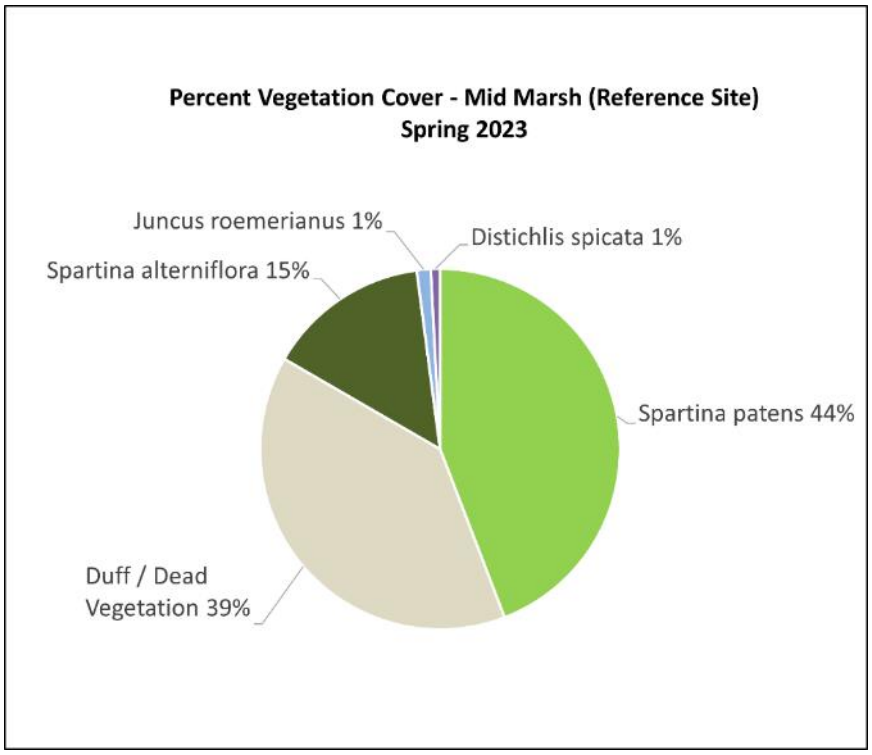

Figure 5. Reference Site Mid Marsh Vegetation (Average of Transects T7 – T9)

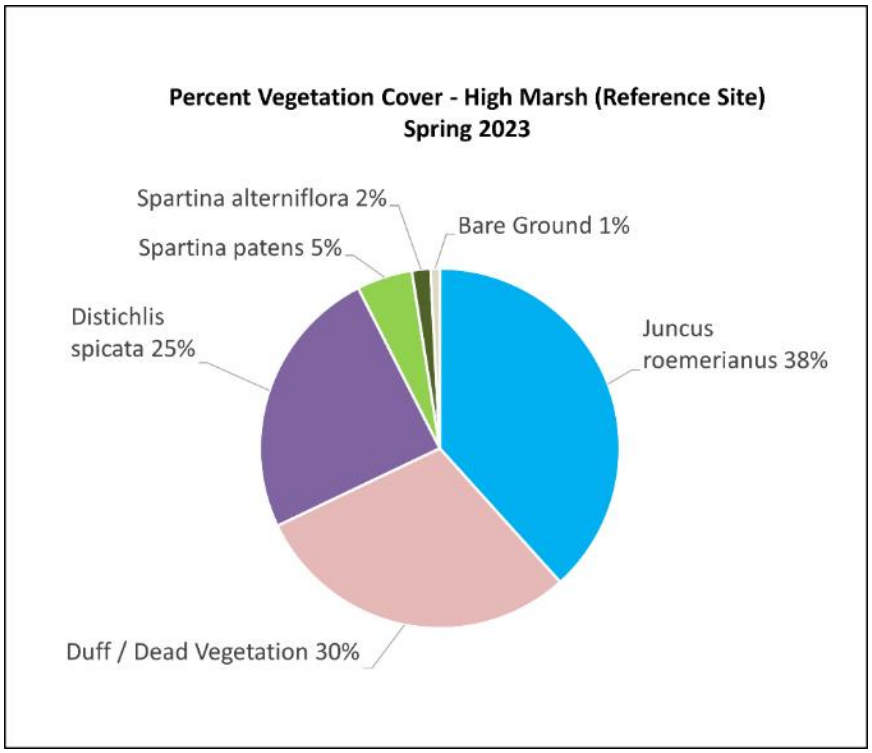

Figure 6. Reference Site High Marsh Vegetation (Average of Transects T7 – T9)

Table 1. Reference Site Vegetation (Spring 2023) by Marsh Zone (Average of Transects T7 – T9)

Species	Low Marsh	Mid Marsh	High Marsh
Baccharis halimifolia (Saltbush)	0%	0%	0%
Bare Ground	41%	0%	<1%
Distichlis spicata (Saltgrass)	0%	<1%	25%
Duff / Dead Vegetation	8%	39%	30%
Juncus roemerianus (Needle Rush)	0%	1%	38%
Schoenoplectus pungens (Threesquare Bullrush)	0%	0%	0%
Spartina alterniflora (Smooth Cordgrass)	49%	15%	2%
Spartina patens (Saltmeadow Cordgrass)	2%	44%	5%
Total:	100%	100%	100%

Table 2. Comparison of Reference Site Vegetation (Fall 2021 - Spring 2023; Average of Transects T7 - T9; By Marsh Zone)

Species	Low Marsh				Mid Marsh				High Marsh			
	Fall 2021	**Spring 2022**	**Fall 2022**	**Spring 2023**	**Fall 2021**	**Spring 2022**	**Fall 2022**	**Spring 2023**	**Fall 2021**	**Spring 2022**	**Fall 2022**	**Spring 2023**
Baccharis halimifolia (Saltbush)	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%	0%	0%
Bare Ground	86%	33%	37%	41%	4%	<1%	<1%	0%	57%	22%	3%	<1%
Distichlis spicata (Saltgrass)	0%	0%	0%	0%	<1%	32%	9%	<1%	5%	5%	21%	25%
Duff / Dead Vegetation	0%	5%	32%	8%	0%	26%	12%	39%	0%	46%	17%	30%
Juncus roemerianus (Needle Rush)	0%	<1%	0%	0%	<1%	<1%	4%	1%	37%	27%	50%	38%
Ruppia maritima (Wigeongrass)	<1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Schoenoplectus pungens (Threesquare Bullrush)	0%	0%	0%	0%	<1%	0%	0%	0%	0%	0%	1%	0%
Spartina alterniflora (Smooth Cordgrass)	12%	53%	31%	49%	11%	<1%	24%	15%	<1%	0%	<1%	2%
Spartina patens (Saltmeadow Cordgrass)	1%	8%	<1%	2%	84%	40%	47%	44%	<1%	0%	8%	5%

Sediment Accretion Monitoring

To increase accuracy of sediment accretion monitoring, the initial monitoring points (Point A and Point B, installed 6/14/2021) have been superseded by three new points installed in the mid marsh zone of the reference site on 10/24/2022. Each new point, assigned a unique ID of SB1 through SB3, consists of a 4" x 7" concrete paving stone placed approximately 20 cm below the vegetated ground surface. By placing these markers at greater depths and beneath vegetated surfaces, they will be at much less risk of washout than the initial monitoring points (Point A and Point B). Sea level rise for the Panama City area has been estimated by National Oceanic and Atmospheric Administration for the Panama City area at 2.91 mm per year.[3] Data will be periodically collected at SB1 through SB3 to establish sediment accretion trends for comparison with estimated sea level rise.

Table 3. Sediment Accretion Monitoring at Reference Site[4]

Date	Average Depth Below Surface (cm)				
	Point SB1	**Point SB2**	**Point SB3**	**Point A**	**Point B**
6/14/2021	-	-	-	2.5	5.1
10/21/2021	-	-	-	2.9	7.0
3/21/2022	-	-	-	0.0	0.0
10/20/2022	-	-	-	0.0	Missing
10/24/2022	21.9	16.9	21.3	1.1	Missing
5/4/2023[5]	17.1	Missing	Missing	Discontinued	Missing

[3] Station 8729108 Panama City, Florida; Relative Sea Level Trend; ±0.58 mm per year; 1973 to 2021.

[4] Point "A" was a circular (4" DIA) stainless steel drain plate installed 6/14/2021 at 2.5 cm below the surface (discontinued). Point "B" was (missing and presumed washed away) a circular (4" DIA) PVC drain plate installed 6/14/2021 at 5.1 cm below the surface. Points SB1 – SB3 are 4" x 7" concrete paving stones installed 10/24/2022 at depths of 21.9 cm, 16.9 cm, and 21.3 cm, respectively, beneath the surface (identified on Figure 2 map as Points 1 – 3).

[5] Decrease in sediment depth (10/24/2022 – 5/4/2023) for Point SB1 is most likely due to settling of sediment after installation and does not reflect erosional losses. Points SB2 and SB3 were unable to be located on 5/4/2023 (field markers for SB1 – SB3 and vegetation transects T7 – T9 had been removed by unknown persons). Additional sediment accretion monitoring points will be established to replace the missing SB2 and SB3.

Panoramic Photo Monitoring

Transect T7 (East)

Figure 7. Photo Point T7 Looking East – 11/8/2021

Figure 8. Photo Point T7 Looking East – 3/21/2022

Transect T7 (East)

Figure 9. Photo Point T7 Looking East – 9/21/2022

Figure 10. Photo Point T7 Looking East – 4/11/2023

Transect T7 (West)

Figure 11. Photo Point T7 Looking West – 11/8/2021

Figure 12. Photo Point T7 Looking West – 3/21/2022

Transect T7 (West)

Figure 13. Photo Point T7 Looking West – 9/21/2022

Figure 14. Photo Point T7 Looking West – 4/11/2023

Transect T8 (East)

Figure 15. Photo Point T8 Looking East – 11/8/2021

Figure 16. Photo Point T8 Looking East – 3/21/2022

Figure 17. Photo Point T8 Looking East – 9/21/2022

Figure 18. Photo Point T8 Looking East – 4/11/2023

Transect T8 (West)

Figure 19. Photo Point T8 Looking West – 11/8/2021

Figure 20. Photo Point T8 Looking West – 3/21/2022

Transect T8 (West)

Figure 21. Photo Point T8 Looking West – 9/21/2022

Figure 22. Photo Point T8 Looking West – 4/11/2023

Transect T9 (East)

Figure 23. Photo Point T9 Looking East – 11/8/2021

Figure 24. Photo Point T9 Looking East – 3/21/2022

Figure 25. Photo Point T9 Looking East – 9/21/2022

Figure 26. Photo Point T9 Looking East – 4/11/2023

Transect T9 (West)

Figure 27. Photo Point T9 Looking West – 11/8/2021

Figure 28. Photo Point T9 Looking West – 3/21/2022

Figure 29. Photo Point T9 Looking West – 9/21/2022

Figure 30. Photo Point T9 Looking West – 4/11/2023

Other Photo Documentation

Figure 31. Reference Site Monitoring (CBA Personnel) – 4/11/2023