

LINKWOOD MITIGATION BANK

FINAL PROSPECTUS



Dorchester County, MD
Tangier Subbasin (USGS 8-digit HUC 02080110)
USACE Action ID: NAB-2023-60340-M37

Prepared for:
Wetlands Resource Center

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I. Project Description

A. Type and Purpose

The Bank Sponsor, Wetlands Resource Center, LLC (WRC) proposes to establish the Linkwood Mitigation Bank (Bank) as a multi-user commercial mitigation bank. The Bank will provide compensatory mitigation for unavoidable impacts to Waters of the United States and Waters of the State, including wetlands, resulting from activities authorized under Sections 404 and 401 of the Clean Water Act (CWA) and/or Maryland regulations, provided such activities have met all applicable requirements and are authorized by the appropriate authority. The following Final Prospectus outlines the existing conditions and proposed site restoration and functional uplift for the Linkwood Mitigation Bank. Further information regarding existing conditions, wetland community types, and methods for site restoration and enhancement are provided below.

B. Size and Location of Proposed Linkwood Mitigation Bank

Total Acreage: 269.3 acres (per GIS calculations)

Parcel IDs: 1014003312, 1014004254

Address:

5317 Linkwood Road

Linkwood, MD 21835

Latitude: 38.548335

Longitude: -75.927533

The project is located east of Linkwood Road just northeast of Linkwood, MD and less than one mile northeast of the intersection of Route 50 and Linkwood Road. The site is bordered to the north by Transquaking River which flows west across Linkwood Road and south to Fishing Bay and eventually into the Chesapeake Bay. The site is bounded to the south by the 313-acre Linkwood Wildlife Management Area (WMA) (protected and managed by the Maryland Department of Natural Resources). The tract is located approximately 5.4 miles east of the Cambridge-Dorchester Regional Airport (CGE). Refer to the enclosed site location map (Figure 1), USGS topographic quadrangle (Figure 2), LiDAR topographic map (Figure 3),

GIS Soil Survey map (Figure 4), NWI map (Figure 5), and Maryland Department of Natural Resources (MD DNR) wetland map (Figure 6) for additional site information. A 1995 infrared aerial and a 2019 aerial of the site are also enclosed for reference (Figure 7 and Figure 8, respectively). The property includes a 23.4-acre (according to the boundary survey dated 3/2/2011) power company right-of-way that is excluded from mitigation credit calculations.

C. Owner/Sponsor

Wetlands Resource Center, LLC

The Linkwood Mitigation Bank has been recently purchased by the Sponsor, Wetlands Resource Center, LLC (WRC). The Sponsor owns fee simple title to the property. However, sections of the parcel are participating in the Maryland's Conservation Reserve Enhancement Program (CREP). The local representative at the Dorchester County United States Department of Agriculture Soil Conservationist has indicated that wetland enhancement/restoration within the CREP areas are consistent with the goal of the program. However, the Maryland Department of the Environment (MDE) and the Interagency Review Team (IRT) will require CREP buyout prior to the execution of the Mitigation Banking Instrument (MBI). Therefore, the Sponsor will have control of all ditches and water rights affecting groundwater hydrology of the site. Written documentation of permission from WRC for the IRT to access the site is included in Appendix A.

Wetlands Resource Center was established in 1998 and they have completed the restoration and preservation of more than 110,000 linear feet of streams and 8,500 acres of wetlands that were used for full delivery permittee responsible mitigation, in-lieu fee mitigation, and mitigation banks. Thus, the Sponsor is well-versed in site restoration techniques, re-forestation practices, and site management.

D. Consultant

Davey Resource Group

Davey Resource Group (DRG) (lead environmental consultant) has designed and implemented over 8,000 acres of wetland restoration for large PRM projects, in-lieu fee full-delivery, and private wetland and stream mitigation bank sites of the coastal plain of the Carolinas. Utilizing an experienced team of marine scientists, professional wetland scientists, licensed soil scientists, and professional geologists, DRG specializes in wetland and stream mitigation in the Atlantic coastal plain.

II. Establishment of the Linkwood Mitigation Bank

A. Project Goals

The goal of the Linkwood Mitigation Bank is to provide high-quality compensatory mitigation for permitted impacts within the USGS 8-digit Tangier, Choptank, Nanticoke, and Pocomoke-Western Lower Delmarva HUCs via the restoration, enhancement, and preservation of wetlands (including areas historically consisting of wetlands) on the site. In doing so, functions and values typically associated with riparian and non-riparian wetlands will be restored. The entire site, with the exception of a small access easement and utility right-of-way, will be protected via a perpetual conservation easement. The project goals and objectives will be achieved on a multi-spatial scale and include the following:

- To capture and store hydrologic input (i.e., precipitation) that is currently shunted downstream via the existing drainage network;
- To re-establish native vegetation communities;
- To improve water quality within the watershed and to contribute to the broader efforts for improving water quality on a regional level; and

- To provide for and expand protected wildlife habitat.

B. Target Functions

Given its landscape position, soil types, and degree of degradation, the site is well suited for restoration. The mitigation effort will provide and/or significantly uplift a number of wetland functions that have been either significantly impacted or removed entirely through anthropogenic impacts. Specific functions beneficially affected by the project include:

Nutrient Removal/Transformation – Silvicultural management practices serve to increase net export of nitrogen and phosphorous to downstream waters particularly during harvest and post-harvest periods. Both N and P are soluble and enter water bodies through surface water runoff. The presence of ditches on the site decreases residency times and increases peak flow runoff. As a result, site drainage provides direct conduits of contaminants (including N and P) to down-gradient water bodies and the Transquaking River. Nutrient loading may manifest itself in a variety of water quality impairments including hypoxia/anoxia, aquatic weed infestations, and toxic algal blooms. Water quality impairments, in turn, can adversely affect resident macroinvertebrate and fish assemblages. Fish assemblages located downstream include anadromous species such as Striped bass, Hickory and American shad, Blueback herring, Alewife, White perch, and Yellow perch. Transformation and removal of nitrogen and phosphorous will be enhanced through re-establishment of characteristic wetland hydroperiods, removal of direct conduits, and the protection of restored forested wetlands and streams.

Flood Attenuation and Surface Water Storage – Restored and enhanced wetlands will dissipate the current rapid delivery of stormwater runoff via existing ditches. Both surface and subsurface water storage will be increased, ameliorating downstream runoff events and associated adverse impacts. In doing so, the project provides for increased flood resilience against climate change-related risks (e.g. elevated storm intensity and frequency).

Sediment/Pollutant Capture and Retention – Restoration of the site will reduce sediment runoff via plugging and backfilling of existing ditches. This will reduce the erosive velocity of runoff and channel flows. Protection of the site via a conservation easement will remove any potential occurrence of ditch clean-out/maintenance. Removing the land from silvicultural production will eliminate potential sediment run-off that occurs during harvest periods and will reduce overall sediment loading to downstream waters.

Groundwater Discharge and Recharge - Restoration of typical hydroperiods will allow the restored wetlands to increase infiltration and reduce surface runoff. Shallower and longer hydroperiods will help prolong base flow in the streams and riparian areas near the northern boundary of the site.

Wildlife Habitat – The restoration, enhancement, and preservation of forested wetlands will provide for improved feeding and refuge habitat for a variety of resident and transient fauna such as the Delmarva fox squirrel (*Sciurus niger cinereus*), white-tailed deer (*Odocoileus virginianus*), and a variety of herpetofauna. Important habitat features such as large woody debris will be increased throughout the site. The protection of the site will also provide important habitat connectivity between the existing Linkwood Wildlife Management Area (313 acres of state-protected lands) and the Transquaking River and will expand the area under conservation in this ecologically-significant and diverse landscape. The entire site, with the exception of a small access easement and utility right-of-way, will be protected via a perpetual conservation easement.

Restoration and enhancement activities will re-establish native hardwood forest assemblages that are currently in monoculture pine. Doing so will provide valuable heterogeneity which supports a more diverse food web within the ecosystem. This diversity provides a variety of food sources and refuge habitat for resident and transitory species.

These restored functions are likely to have discernible benefits to water quality and habitat on a local and regional level. The eastern shore of Maryland is particularly susceptible to the loss of wetland function and associated watershed impacts due to site management practices associated with farming and silviculture in the region. The restoration of the headwater wetland system will help to replace the wetland functions critical to water quality and wildlife habitat in the area.

C. Site Selection

Initial site identification was performed in response to the anticipated mitigation needs for state projects in the watershed. Parameters for site selection criteria included, but were not limited to the following:

- (1) Location of site relative to 8-digit Federal Hydrologic Unit Codes (HUC) (i.e., site is located in the 02080110 HUC);
- (2) Location of site relative to ecoregion boundary (i.e., site would preferably be located within EPA Level III Ecoregion Middle Atlantic Coastal Plain (63);
- (3) Watershed-scale features including proximity of site relative to other protected lands and ability to provide habitat connectivity;
- (4) Compatibility with watershed plans;
- (5) Compatibility with Maryland Watershed Resources Registry;
- (6) Occurrence and extent of hydric soils;
- (7) Opportunity for functional uplift (including increased habitat diversity) through combination of wetland re-establishment, rehabilitation and enhancement; and
- (8) Opportunity for high-quality wetland preservation with benefits to ecologically important aquatic and terrestrial resources (including rare or endangered species).

Site selection was based upon the set of criteria identified above and the availability of the property for the intended mitigation use. After performing initial site visits the Sponsor decided to purchase the property and proceed with further investigations of the site due to

the historic and current resources occurring on the property, the suitability for wetland functional uplift, and the long-term conservation desires of the Sponsor.

The Linkwood Mitigation Bank is located within the Tangier Subbasin (USGS 8-digit HUC 02080110). The Tangier Subbasin includes several smaller MDE 8-digit HUCs. The MDE 8-digit HUCs are discussed in more detail due to the availability of relevant information from the MDE. The Bank is located within the Transquaking River Watershed (MDE 8-digit HUC 02130308) of the Lower Eastern Shore. The Transquaking River state water quality stream classification is Use Class I. Designated uses of Class I waters include: growth and propagation of fish, water contact sports, leisure activities, fishing, agricultural water supply and industrial water supply. Land use within the MDE 8-digit Transquaking River Watershed consists predominantly of forest (56%) and agriculture (40%) with smaller urban landscapes accounting for 4% of the watershed land use. According to the Watershed Report for Biological Impairment of the Transquaking River Watershed (MDE 2012b), the Transquaking River watershed is listed under Category 5 of the 2010 Integrated Report for impacts to biological communities. Approximately 67% of stream miles in the Transquaking River watershed are estimated as having benthic and/or fish indices of biological integrity in the poor to very poor category. These impairments are associated with the prevalence of agricultural use within the watershed and resulting sediment and contaminant run-off into ditches and streams that flow into the river (MDE 2012b). A dam resulting in fish blockage is located approximately 2.6 aerial miles downstream of the site. The watershed includes the main transportation corridor of Maryland-Route 50. The site is not located in a Tier II catchment.

The site is located only approximately 1.4 miles from the adjoining Choptank Subbasin (USGS 8-digit HUC 02080110). The Lower Choptank River Watershed (Maryland 8-digit HUC 02130403) is the closest portion of the Choptank Subbasin to the site. Land use in the Lower Choptank River Watershed is approximately 49% agricultural, 32% forest/herbaceous, and 19% urban. Urban areas in the watershed include Easton, Cambridge, Oxford, and portions

of Trappe and Preston. According to the Watershed Report for Biological Impairment of the Lower Choptank River Watershed (MDE 2012a), the Lower Choptank River watershed is listed under Category 5 of the 2008 Integrated Report for impacts to biological communities. Approximately 45% of stream miles in the watershed are estimated as having benthic and/or fish indices of biological integrity in the poor to very poor category. The watershed is not attaining its nontidal warmwater aquatic life use designation due to biological community impacts (MDE 2012a). Data suggest that the biological communities are strongly influenced by agricultural land and its effects including stream channelization and elevated sediment levels. Most of the watershed is drained through ditches for agriculture. The ditches are typically devoid of vegetation which expedites flow and offers less opportunity for nutrient uptake and denitrification. Transportation land use in the watershed was also significantly associated with degraded biological conditions (MDE 2012a). There are four main transportation corridors in the watershed: Maryland-Route 50, Route 16, Route 331, and Route 322.

The Linkwood Mitigation Bank is located within the Middle Atlantic Coastal Plain (Level III Ecoregion 63) as determined by U.S. Environmental Protection Agency (EPA) Ecoregions of the U.S. (refer to Appendix B). The site is included in the Delmarva Uplands subregion (Level IV Ecoregion 63f). The Delmarva Uplands encompass the nearly level to gently rolling areas of the Delmarva Peninsula and include marshes and swamps such as the Great Cypress Swamp of southern Delaware (Woods et al. 1999).

The site lies just north of the Linkwood Wildlife Management Area (WMA) (Figure 1). The Linkwood WMA is a remnant of a larger forest ecosystem. Its 313 acres include some of the most significant forests in the county. The Linkwood WMA supports a wide range of forest animals including the Delmarva fox squirrel. The proximity of the mitigation site to this refuge creates a level of habitat connectivity that is large enough to provide benefits on a watershed level scale.

Based upon a review of Maryland Historical Trust (MHT) maps, there are no known resources on the site. In addition, MHT provided a certified letter on 5/9/2023 certifying the project will not have an effect on any structures/properties eligible or listed on the National Register of Historic Places (Appendix C). No comprehensive archaeological survey is proposed at this time.

A review of the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) was conducted to determine the documented occurrence of any federally threatened or endangered species within the project boundary (refer to Appendix D). The IPaC report lists the Northern Long-Eared Bat (*Myotis septentrionalis*) as the only endangered species potentially affected by activities on the site. DRG has completed the Northern Long-Eared Bat (NLEB) Determination Key (Appendix E). The Key determined that the project is not reasonably certain to cause incidental take of the NLEB. The Monarch Butterfly (*Danaus plexippus*) is included in the report as a candidate species not yet listed or proposed for listing. The IPaC report also lists several migratory bird species that are either on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in the project location. Refer to Appendix D for a list of the migratory bird species shown in the IPaC report. The USFWS will have the opportunity to comment on federally listed species upon review of the Draft and/or Final Prospectus.

The MD DNR List of Rare, Threatened, and Endangered Species of Dorchester County (November 2021) was also reviewed to determine what state-listed species may occur on the site. The Delmarva fox squirrel appears on the list but has since been de-listed. This species is likely to exist on the site and should benefit from the restoration, enhancement, and preservation of wetlands on the site. The Pennsylvania Natural Diversity Inventory (PNDI) was also consulted. However, none of the site extends into Pennsylvania so no records were found. The Maryland Environmental Review Program will have the opportunity to comment on fish and aquatic resources upon review of the Final Prospectus.

The Maryland Watershed Resources Registry (WRR) was consulted to determine compatibility with existing conservation plans and goals. The WRR mapping shows the majority of the site as a green infrastructure hub (Figure 9). Forest interior dwelling species also occur throughout the site. Portions of the site are within a sensitive species project review area. DRG has consulted with MD DNR regarding the sensitive species project review area and has received no comments.

D. Site Constraints

The zoning of the site according to Dorchester County is Agricultural Conservation (Figure 10). Other parcels in the vicinity of the site are zoned Agricultural Conservation with the exception of one parcel to the northwest across Linkwood Rd zoned Heavy Industrial. The parcel zoned Heavy Industrial is located downstream of the site. Therefore, there appear to be no conflicting land uses in the surrounding area that could compromise the mitigation site. Furthermore, the location of the Linkwood Mitigation Bank within an agricultural area provides tremendous opportunities for water quality improvement.

The proposed bank property has not been used as mitigation for any previous projects. The site is not already designated or dedicated for passive park or open space use. The tract has not been acquired by a public entity or provided to a jurisdiction for park or natural open space purposes.

The Sponsor owns fee simple title to the property. However, buyout of Maryland's CREP easements will occur (as required) prior to the execution of the MBI. The property includes a 23.4-acre (according to the boundary surveys dated 3/2/2011) power company right-of-way that is excluded from mitigation credit calculations (Appendix F). The perpetual right-of-way is for a powerline company with no existing infrastructure.

No public funding has been received or is expected to be received for restoration activities on the proposed bank property. The Sponsor, Wetlands Resource Center, is a full-service wetland and stream impacts mitigation company.

The tract is located approximately 5.4 miles east of the Cambridge-Dorchester Regional Airport (CGE). For all airports, the Federal Aviation Administration (FAA) recommends a distance of 5 miles between the closest point of the airport's operations area and a hazardous wildlife attractant. The Linkwood Mitigation Site is not anticipated to be a significant attractant of hazardous wildlife with respect to potential occurrence of strikes to aircraft. In addition, the proposed mitigation site is located beyond the 5-mile separation distance recommended by the FAA. Nonetheless, DRG has initiated coordination with the FAA. DRG will file a federal form 7460 and develop a Wildlife Management Plan as part of the Draft Mitigation Plan. There are no anticipated changes to site design resulting from FAA coordination.

III. Baseline Conditions

A. Community Types

The tract predominantly consists of loblolly pine (*Pinus taeda*) stands of varying age class. Approximately 180 acres of the property currently consists of loblolly pine stands. Of this acreage, approximately 83 acres was in row crop agricultural production until approximately 2005 at which time the fields were planted with loblolly pine for timber harvesting. The former fields consist of both hydric and non-hydric soils (as further described below). Non-hydric soils in an undisturbed condition supported mesic oak-hardwood communities while more poorly drained soils consisted of wet hardwood flats. Remnant areas of the undisturbed, reference wet hardwood flat community type (approximately 37 acres) continue to exist on the northeastern portion of the site with a mature, well-developed canopy of oaks, hickories, and tulip poplars present.

Areas proposed for rehabilitation include wetland flats that may have contained an old farm/house and Delmarva Bay wetlands that were historically converted to agricultural fields and farmed until approximately 2002. The old farm/house site is partially wooded and dominated by loblolly pine and sweetgum. The other portion is relatively open and dominated by invasive species including Asiatic tearthumb (*Persicaria perfoliata*) and common reed (*Phragmites australis*). The Delmarva Bay (approximately 7 acres) is dominated by immature sweetgum and red maple trees with some scattered loblolly pine. Common shrubs include green ash (*Fraxinus pennsylvanica*) and American holly (*Ilex opaca*). Prevalent herbs and woody vines include soft rush (*Juncus effusus*) and yellow jessamine (*Gelsemium sempervirens*).

As indicated above, the northwestern portion of the site is bounded by the Transquaking River. Bottomland hardwood wetlands associated with the river and its immediate floodplain comprise approximately 11 acres. These wetlands are dominated by tulip poplar (*Liriodendron tulipifera*), red maple, black gum (*Nyssa sylvatica*), and water oak (*Quercus nigra*) with an understory of American holly, ironwood (*Carpinus caroliniana*), and highbush blueberry (*Vaccinium corymbosum*). Chinese privet (*Ligustrum sinense*) is prevalent along the outer edge of the bottomland hardwood community.

A comprehensive wetland delineation performed by DRG indicates that approximately 177.3 acres of jurisdictional wetlands remain on the tract. Other waters on the site include 2,540 linear feet of jurisdictional streams (includes 2,340 lf of the Transquaking River channel), 10,480 linear feet of jurisdictional ditches, 640 linear feet of non-jurisdictional ditches, and a 0.3-acre pond. The drainage area for the onsite portion of the Transquaking River is approximately 3.4 square miles or 2,200 acres (Figure 11). The drainage area for the small tributary (stream) to the Transquaking River is approximately 0.4 square miles or 250 acres. A data package request for a Preliminary Jurisdictional Determination (PJD) was submitted to the U.S. Army Corps of Engineers (USACE) on May 22, 2023 (Appendix G). The PJD was issued on December 19, 2023 (Appendix H). Refer to Appendix H for maps showing the

approximate boundaries of all existing aquatic resources within the property boundary. None of the wetlands are mapped as Special State Concern wetlands by the state of Maryland. Refer to Appendix I for photos of the bank property.

B. Soils and Hydrology

As indicated above, the Linkwood Mitigation Bank is located adjacent to Transquaking River and exhibits nearly level to gently sloping topography. Soils of the site have formed from stratified alluvial and marine sediments. According to the NRCS soil survey, non-hydric soils include Ingleside sandy loam, Woodstown sandy loam, and Downer loamy sand (Figure 4). Generally, these soils are moderately well-drained to well-drained soils occurring on convex landscape positions adjacent to drainageways. Hydric soils on the site include Zekiah silt loam, Fallsington sandy loam, Hurlock sandy loam, and Pone mucky sandy loam. The Zekiah series is poorly drained and occurs within the floodplain of the Transquaking River. The Fallsington series is poorly drained and occurs within depressions and smaller drainageways adjacent to the river. The Hurlock and Pone series are poorly drained organic soils occurring within slightly concave landscape positions of broad interstream flats.

A detailed onsite soil mapping was conducted by a Certified Professional Soil Scientist of DRG (Figure 12). Hydric soils mapped by NRCS that were confirmed onsite include the Zekiah, Fallsington, and Hurlock soil series. The Zekiah series occurs within the floodplain of the Transquaking River. The Fallsington series was mapped in depressions and flats in slightly higher landscape positions. The Hurlock series occurs in higher landscape positions in broad, slightly concave, interstream flats. Refer to Appendix J for representative soil borings documented on the site.

In undrained conditions, Pone mucky sandy loam soils exhibit seasonal high-water levels from 6 inches below the soil surface to shallow surface inundation. Both Hurlock soils and Fallsington soils exhibit seasonal high-water levels between 0 and 12 inches below the soil surface (in undrained conditions).

Prior site drainage of the Linkwood site for historic agricultural purposes has effectively lowered groundwater levels, and ditches intercept surface drainage (particularly within areas mapped as Fallsington and Hurlock by DRG soil scientists). The resultant condition has been the removal of prior wetlands or the degradation of areas that are still exhibiting some level of wetland hydrology. The effects are more pronounced adjacent to existing ditches and up-gradient of ditches. Note that there are broad areas on the eastern portion of the site in which hydrology has remained relatively unaltered. These areas continue to support the presence of wetlands. Primary existing sources of hydrology include groundwater and surface runoff.

Riparian wetlands along the Transquaking River currently exhibit altered hydrology due to the berms along the river. These berms largely prevent overbank flooding from accessing the riverine floodplain. Field indicators of overbank flooding (sediment deposition) have been observed in select areas where berms are not present.

IV. Wetland Restoration Plan

The site restoration plan incorporates different treatments to provide wetland functional uplift corresponding to the degree and nature of prior site disturbances. Based upon preliminary site evaluations, the following mitigation types and quantities have been identified for the site (refer to Table 1 below).

Table 1. Mitigation Types and Quantities

Proposed Mitigation Approach	Resource Type	Acres
Non-Riparian Wetland Re-establishment	Forested Wetland	38.0
Riparian Wetland Re-establishment	Forested Wetland	0.5
Non-Riparian Wetland Rehabilitation (Vegetation and Hydrologic)	Forested Wetland	10.6
Non-Riparian Wetland Enhancement (Vegetation and Hydrologic)	Forested Wetland	0.3
Non-Riparian Wetland Enhancement (Veg Only)	Forested Wetland	93.0
Riparian Wetland Enhancement (Hydro Only)	Forested Wetland	4.0
Non-Riparian Wetland Preservation	Forested Wetland	37.5
Riparian Wetland Preservation	Forested Wetland	6.9
Upland Buffer Restoration ^b	Forested Upland Buffer	49.6
Upland Buffer Preservation	Forested Upland Buffer	3.3
Total		243.7^a

^a The total acreage of the property (based upon GIS) is 269.3 acres.

^b Note that additional vernal pools and depressional wetlands will be sited within appropriate landscape positions and soil types to increase niche habitat and provide for increased hydrologic storage/residency times.

The mitigation prescriptions for each mitigation type are described further below. Figure 13 depicts the approximate location and extent of each of the mitigation units on the site and the boundary of the proposed conservation easement. As described in Section III (A) above, much of the site consists of monoculture loblolly pine stands associated with long-term silvicultural management. A Forestry Plan for the site has been prepared by a Registered Forester, and the pine will be commercially harvested by the current landowner prior to the implementation of mitigation site activities. Some larger pines will remain on the ground as large woody debris to enhance wildlife habitat. The harvest operation is anticipated to increase microtopographic heterogeneity relative to the existing monoculture pine plantation. Relatively mature hardwoods, excluding sweetgum, will be identified and

excluded from harvesting. Desirable native shrubs will be left where practical. The Forestry Plan is included in Appendix K. If additional forest roads are required for silviculture, then they will be removed after harvesting has been concluded.

A. Wetland Re-establishment

Approximately 38 acres of former non-riparian wetland areas have been historically converted to non-wetlands for agricultural or silvicultural purposes. These areas are suitable for restoration via re-establishment of characteristic hydrology and re-planting of native hardwood species. Currently these areas lack wetland hydrology and consist primarily of monoculture pine. Grading work will include the backfilling of ditches (i.e., removal of drainage) and minor earthwork associated with the removal of prior field crowning (as necessary). Non-riparian wetland re-establishment will be achieved primarily via the backfilling and plugging of ditches. Installation of ditch plugs and associated grading work will restore characteristic wetland hydrology to hardwood wetland flats (i.e., the target wetland community type). The plugging and/or backfilling of onsite ditches will increase both surface and subsurface water tables onsite. Given the size and location of the ditches to be plugged or backfilled and the occurrence of boundary ditches (to remain intact), the proposed restoration is not anticipated to result in hydrologic trespass (i.e. adverse effects off-site). Ditch plugs will consist of impervious clay material and will be lined as necessary with rip-rap material for long-term stability and functioning. The plugs will be located at the downstream ends of the conveyances, and additional sections of earthen fill will be included where spoil material is available. Existing dirt access roads/paths will remain for monitoring, long-term maintenance, adaptive management, potential public recreational access, and construction. Roadside swales or ditches will be plugged and/or backfilled. The existing entrance road into the site from Linkwood Road will remain for site access into the property.

Prior to placing fill material in any of the existing ditches, a Nationwide (#27) permit will be prepared and submitted to the USACE and the MDE. A Joint Permit Application will be submitted to the MDE as part of the Draft Instrument to authorize temporary and

permanent impacts to wetlands, 25-foot wetland buffer, floodplains (if applicable), and waterways (if applicable). As total disturbance will exceed one acre, a sediment and erosion control plan will also be filed with the state. The erosion control plan will include provisions for installation of check dams and silt fencing to prevent sedimentation of down-gradient waters.

Approximately 0.5 acre of former riparian wetlands along the south side of the Transquaking River were historically filled with spoil material from channelization of the river. These spoil berms currently prevent overbank flooding from accessing the riverine floodplain. Berm removal will result in the re-establishment of these former riverine wetlands.

Planting of characteristic wetland species will be conducted within areas designated for wetland re-establishment (as well as those areas identified for rehabilitation and vegetative enhancement). Plantings will consist of native species suited for the restored hydrologic regime and soil type. Identified suitable species include willow oak (*Quercus phellos*), black gum, swamp chestnut oak (*Quercus michauxii*), water oak, and American holly. Bald cypress (*Taxodium distichum*) will also be planted in depressional areas susceptible to periodic inundation. Note that the site is located near the northern extent of the native range of bald cypress. The native range is expected to extend north and west due to the long-term effects of climate change impacts. It is anticipated that hydrologic restoration and removal of the current loblolly pine canopy will facilitate the regeneration of target community shrubs and herbaceous species after replanting. A complete planting plan with associated maps demonstrating the locations and extent of each species will be provided within the Draft Mitigation Plan.

B. Wetland Rehabilitation and Enhancement

Areas considered suitable for wetland rehabilitation consist of areas that have been previously manipulated (graded) and lack the presence of desired or target vegetation. While hydrology is sufficient to meet the minimum standard for jurisdictional wetlands,

these areas have been disturbed such that the hydrology is not characteristic of the target wetland community type. Treatments for these areas include reestablishment of natural hydrology (i.e. plugging and/or backfilling of ditches and removal of spoil material), reestablishment of natural contours via light grading, and the re-planting of native species consistent with the hardwood wetland flat and Delmarva Bay community types (consistent with the species list identified for the wetland restoration mitigation unit). Note that plugging of the shallow swales in the Delmarva Bay will be accomplished by the construction of a small berm along the western side of the Bay. Based upon preliminary site evaluations, there are approximately 10.6 acres suitable for wetland rehabilitation.

An additional 98.1 acres of vegetative wetland enhancement is proposed within those areas consisting of monoculture pine stands. These areas exhibit hydrology characteristic of the wetland community but lack appropriate vegetation. Similar to the restoration and rehabilitation units, these areas will be planted with hardwood seedlings in a composition suitable for the target wetland assemblages (wet hardwood flat).

Approximately 4.0 acres of riparian wetland enhancement are proposed along the south side of the Transquaking River. Berms along the south side of the river will be removed to increase overbank flooding access to the riverine floodplain. Berms along the north side of the river cannot be removed due to hydrologic trespass concerns on neighboring properties.

C. Wetland Preservation and Upland Buffer

Approximately 44.4 acres of existing, relatively undisturbed wetlands have been identified for preservation within the site. Of this total acreage, approximately 6.9 acres consist of riparian bottomland hardwood forest wetlands associated with the floodplain of Transquaking River. The remaining 37.5 acres consist of non-riparian wet hardwood forests occurring within interstream flats and depressions. The non-riparian preservation wetlands will serve as an ecological reference for the non-riparian wetland re-establishment, rehabilitation, and enhancement areas. These reference hardwood flats have been

determined to be high quality as documented by MDWAM assessments. Preservation of these wetlands will remove them from the threat of ongoing silvicultural operations and protect them in perpetuity.

Upland buffers bordering wetland areas (including wetlands to be restored) will be included within the conservation easement recorded for the property. These upland buffers (totaling approximately 52.9 acres) will provide additional protected areas for groundwater recharge and wildlife habitat. Upland buffers have been included everywhere that the wetlands do not abut the property line and extend greater than 500 feet from the wetlands in places. The vast majority of these upland buffers (totaling approximately 49.6 acres) are currently forested in pine and will be restored by replanting with native hardwoods.

Note that additional vernal pools and depressional wetlands will be sited within appropriate landscape positions (i.e., flats or concave positions) of the upland buffer restoration area to increase niche habitat and provided for increased hydrologic storage/residency times. The specific location of these depressional wetlands will be identified in the Mitigation Plan to be developed for the site. A small portion of the upland buffer (totaling approximately 3.3 acres) is currently dominated by hardwoods and will be preserved. All existing structures located within the upland buffers will be removed.

D. Site Protection

Prior to construction, the Project Sponsor intends to convey a permanent conservation easement to an appropriate 501(c)3 non-profit organization (as approved by the Corps of Engineers and MDE) for long-term protection of the site. The entire site, with the exception of a small access easement and utility right-of-way, will be protected via the perpetual conservation easement. The recorded conservation easement deed will ensure the protection of the project in perpetuity. The Conservation Easement Area will be preserved in its natural condition and restricted from any development that would impair or interfere with the conservation values of the Conservation Easement Area. The MD DNR has also

expressed interest in potential ownership of the site. The Project Sponsor intends to continue discussions with the MD DNR on transfer of ownership to the Linkwood Wildlife Management Area (WMA) upon completion of monitoring.

E. Post-Construction Monitoring

Upon agency concurrence of the final wetland mitigation plan, mitigation site activities will be initiated. Staff environmental scientists will be present during project construction to ensure that the work is consistent with the proposed design. An 'as-built' survey will be prepared to document site conditions immediately post-construction. The mitigation site will be monitored annually for a period of up to ten (10) years to document site development over time. Note that during the development of the Final Mitigation Plan, the Project Sponsor will coordinate with the reviewing agencies for the final, accepted terms of post-construction performance monitoring. The site will be evaluated based upon established performance standards related to vegetative density and wetland hydrology. Hardwood flat preservation wetlands in the northeastern portion of the site and the adjacent WMA will be utilized as reference wetlands. The most recent IRT approved performance standards and monitoring protocol will be utilized.

V. Mitigation Credit Summary

Mitigation bank credits will be calculated using the following ratios as referenced in Table 2 below. Note that final ratios and credit quantities are subject to the development of a final mitigation plan and subsequent regulatory agency review and approval. The proposed credit ratios are justified by MDWAM assessments recently conducted onsite by the USACE. The MDWAM assessments documented very high potential for functional uplift in restoration and enhancement areas. The proposed credits to be derived from preservation are 6% of the total credits.

Table 2. Mitigation Quantities and Credit Totals

Mitigation Type	Acres	Ratio	Credits
Non-Riparian Wetland Re-establishment	38.0	1:1	38.0
Riparian Wetland Re-establishment	0.5	1:1	0.5
Non-Riparian Wetland Rehabilitation (Veg and Hydro)	10.6	2:1	5.3
Non-Riparian Wetland Enhancement (Veg and Hydro)	0.3	3:1	0.1
Non-Riparian Wetland Enhancement (Veg Only)	93.0	4:1	23.3
Riparian Wetland Enhancement (Hydro Only)	4.0	4:1	1.0
Non-Riparian Wetland Preservation	37.5	10:1	3.8
Riparian Wetland Preservation	6.9	10:1	0.7
Upland Buffer Restoration	49.6	15:1	3.3
Upland Buffer Preservation	3.3	20:1	0.2
Total	243.7		76.2

VI. Operation of the Bank

The Sponsor will be responsible for as-built and annual monitoring requirements of the Bank as per the approved Mitigation Plan and executed MBI. As part of the approval process for the MBI, the Sponsor must obtain the proper financial assurances. The MBI will contain provisions for long-term site management and reporting. In addition, the specific credit release schedule for projected wetland credit types and quantities will be identified in the MBI. Released credits can be utilized to satisfy compensatory mitigation requirements for authorized Section 404 and Section 401 wetland impacts. Use of credits from the MBI to offset wetland impacts authorized by federal permits or impacts related to requirements from the Maryland Nontidal Wetland Protection Act must be in compliance with the Clean Water Act, Section 404 (b)(1) guidelines and other applicable federal and state legislation, regulations, and policies.

The Geographic Service Area (GSA) is the designated area wherein a bank can reasonably be expected to provide appropriate compensation for impacts to similar wetland and/or other stream or aquatic functions. The site is located within the Tangier Subbasin (USGS 8-digit HUC 02080110) and Ecoregion 63f – Delmarva Uplands Level IV ecoregion of the Middle Atlantic Coastal Plain.

The proposed primary GSA for the Linkwood Mitigation Bank includes the Tangier USGS 8-digit HUC occurring within Level III Ecoregion 63. The proposed secondary GSA includes the adjacent Nanticoke Subbasin (USGS 8-digit HUC 02080109), Pocomoke-Western Lower Delmarva Subbasin (USGS 8-digit HUC 02080111), and Choptank Subbasin (USGS 8-digit HUC 02060005) which also occur within Level III Ecoregion 63. The Choptank Subbasin is located only approximately 1.4 miles from the site. Although the Choptank is located in the adjacent 6-digit HUC, it is included in the secondary GSA due to its close proximity in addition to similar soil series, topography, and vegetation. The Woodstown-Pocomoke-Fallsington general soil unit and USGS Plant Hardiness Zone 7b located on the site both continue into the adjacent Choptank Subbasin. See attached proposed GSA map (Figure 14) identifying the specific watersheds proposed for the primary and secondary service areas.

VII. Site Management

A. Project Risks and Uncertainties

There are several risks and uncertainties that are inherent in the development of a natural wetland mitigation site. Potential risks and uncertainties that may apply to the restoration of the Linkwood Mitigation Bank have been identified and are listed below. Plans to address these potential deficiencies, should they occur, are also listed below. Additional information on potential risks and uncertainties is included in the following Adaptive Management section.

1. **Easement Encroachment:** Encroachment to the conservation easement including road widening, culvert maintenance, utility easements, etc.

Plans to Address: The Sponsor owns the property and is well versed in the project requirements and limitations to easement access. The Sponsor fully understands and will maintain the easement protections. Site roads will remain for monitoring access with no plans for maintenance. It is unlikely that Linkwood Road will be widened considering the surrounding zoning. Any encroachment that occurs will be remedied by the Sponsor and/or Easement Holder and communicated with the IRT.

2. **Drought and Floods:** There is potential for extreme weather conditions (e.g., hurricanes) throughout the monitoring period.

Plans to Address: The Sponsor will apply adaptive management techniques as necessary to meet performance criteria. Such techniques may include replanting, undesirable volunteer species suppression, etc. Additional monitoring may be required by the IRT in the event of significant adaptive management events.

3. **Invasive Species:** Invasive species are known to exist in the easement area.

Plans to Address: Monitoring activities will include visual assessments of the presence of any invasive plant species. Any invasive species observed will be documented in the annual monitoring reports. Removal may include chemical and/or physical methods. Spot herbicide application of known invasive species will commence as conditions allow. The farm pond onsite will be sprayed to reduce *Phragmites australis*.

4. **Herbivory:** Wildlife browse may negatively affect site plantings.

Plans to Address: Deleterious effects of wildlife browse will be documented in annual monitoring reports. If herbivory is found to be a significant issue resulting in planted tree mortality, contingency measures will be coordinated with the IRT.

B. Adaptive Management

The Linkwood Mitigation Bank is planned and designed to be self-sustaining over time, but some active management or maintenance may be necessary to ensure the long-term sustainability of the mitigation efforts. The adaptive management approach involves analysis of monitoring results to identify potential problems occurring on the site and the identification and implementation of measures to rectify those problems. Remedial actions may include, but are not limited to, mechanized earth work (e.g., adjustment to the invert elevations of earthen plugs) or supplemental planting in the event areas do not meet vegetative success criteria. Prior to initiating any remedial actions, the proposed measures will be submitted to the USACE and MDE for review and approval.

The performance and functioning of the mitigation site may be affected by various factors, both natural and anthropogenic. Natural hazards may include invasive species and/or excessive herbivory. Human errors may include design flaws, construction deviation, and/or inadequate planting coverage. To minimize these potential problems, the following strategies may be employed:

1. If greater than 50% mortality is documented for any given species within the first three years of monitoring, then the species will either be replanted, or an acceptable replacement species will be planted in its place.
2. If herbivory appears to be jeopardizing the survivorship of planted species, discussions with appropriate agencies will be initiated to determine an appropriate course of action.
3. Construction errors will be identified as early as possible via the as-built report. If it appears that those potential errors jeopardize the integrity of the project,

appropriate remedial action will be identified and submitted to the USACE and MDE for concurrence prior to implementation.

4. Planting errors in spacing density or coverage will be minimized by careful coordination with planting crews. An account of planted stems will be provided with the as-built report.
5. If monitoring indicates a potential design flaw, remediation options will be reviewed.

C. Long-Term Management

Prior to construction, the Bank Sponsor will convey a permanent conservation easement to an appropriate 501(c)3 non-profit organization (as approved by the IRT) for long-term protection of the site. The MD DNR has also expressed interest in potential ownership of the site. The responsibility for long-term management can be transferred subsequent to project close-out from one 501(c)3 organization to another 501(c)3 organization or to the MD DNR. The recorded conservation easement deed will ensure the protection of the project in perpetuity. The Conservation Easement Area will be preserved in its natural condition and restricted from any development that would impair or interfere with the conservation values of the Conservation Easement Area. A copy of the draft conservation agreement, preliminary acceptance letter by the proposed easement holder, and proposed endowment/long-term management costs will be submitted with the Final Mitigation Plan to the IRT for review. No deviations to the USACE conservation easement agreement template language are anticipated.

The easement holder will be responsible for the following annual activities in perpetuity:

1. Inspecting the boundaries of the conservation easement to check for encroachment.
2. Spot-checking planted areas for the presence of invasive species.
3. Spot-checking ditch plugs to evaluate their condition.

The Sponsor will provide an endowment fee and separate long-term management fee to fund long-term site inspections and management of the conservation easement area.

VIII. Conclusion

The Linkwood Mitigation Bank has been historically managed for agriculture and silviculture for over 40 years. Silvicultural management is ongoing for many portions of the site but will cease once the mitigation site is constructed and planted. Historic land use practices have resulted in the loss or degradation of wetland habitats and the functions these systems provide. The proposed project seeks to provide functional uplift via the restoration, rehabilitation, enhancement, and preservation of self-sustaining wetland habitats. The mitigation effort will result in the restoration of headwater wetlands and the preservation of existing wet hardwood flats, basin wetlands, and riparian bottomland hardwoods. Removal of the extensive drainage network will have direct water quality benefits via increased hydrologic residency times and decreased sediment and nutrient loading to downstream waters. In addition, the project provides a unique opportunity for the expansion of protected habitats by securing a conservation easement for lands immediately adjacent to the current state-protected Linkwood WMA. In doing so, the project will secure an important and protected link between the diverse upland and wetland forests of the WMA to the riverine bottomlands of the Transquaking River. Completion of restoration work and protection of the site will enhance important ecological services within the area while also providing tangible water quality benefits within the broader Eastern Lower Delmarva watershed.

IX. Sources of Information

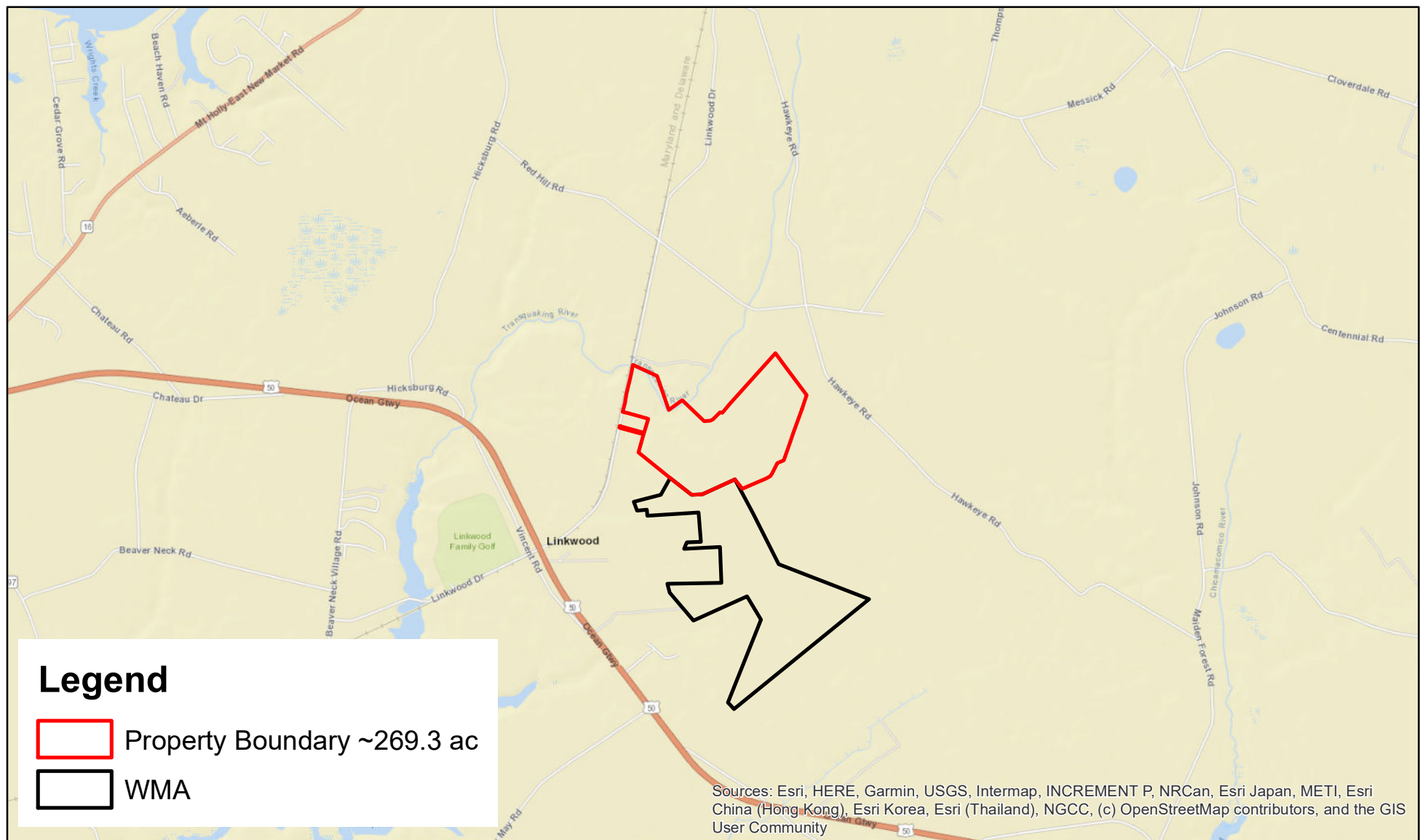
Maryland Department of the Environment (MDE), 2012a. Watershed Report for Biological Impairment of the Lower Choptank River Watershed in Caroline, Talbot, and Dorchester Counties, Maryland: Biological Stressor Identification Analysis, Results and Interpretation. 43 pp.

Maryland Department of the Environment (MDE), 2012b. Watershed Report for Biological Impairment of the Transquaking River Watershed in Dorchester County, Maryland: Biological Stressor Identification Analysis, Results and Interpretation. 40 pp.

Maryland Department of Natural Resources (MD DNR), 2021. List of Rare, Threatened, and Endangered Species of Dorchester County. 7 pp.

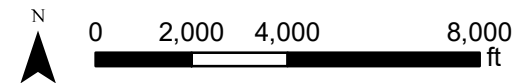
Woods, Alan J., Omernik, J.M., and Brown, D.D, 1999. Level III and IV Ecoregions of Delaware, Maryland, Pennsylvania, Virginia, and West Virginia. U.S. Environmental Protection Agency. 56 pp.

FIGURES



Boundaries are approximate and not meant to be absolute.

Map Source: ArcGIS World Street Map

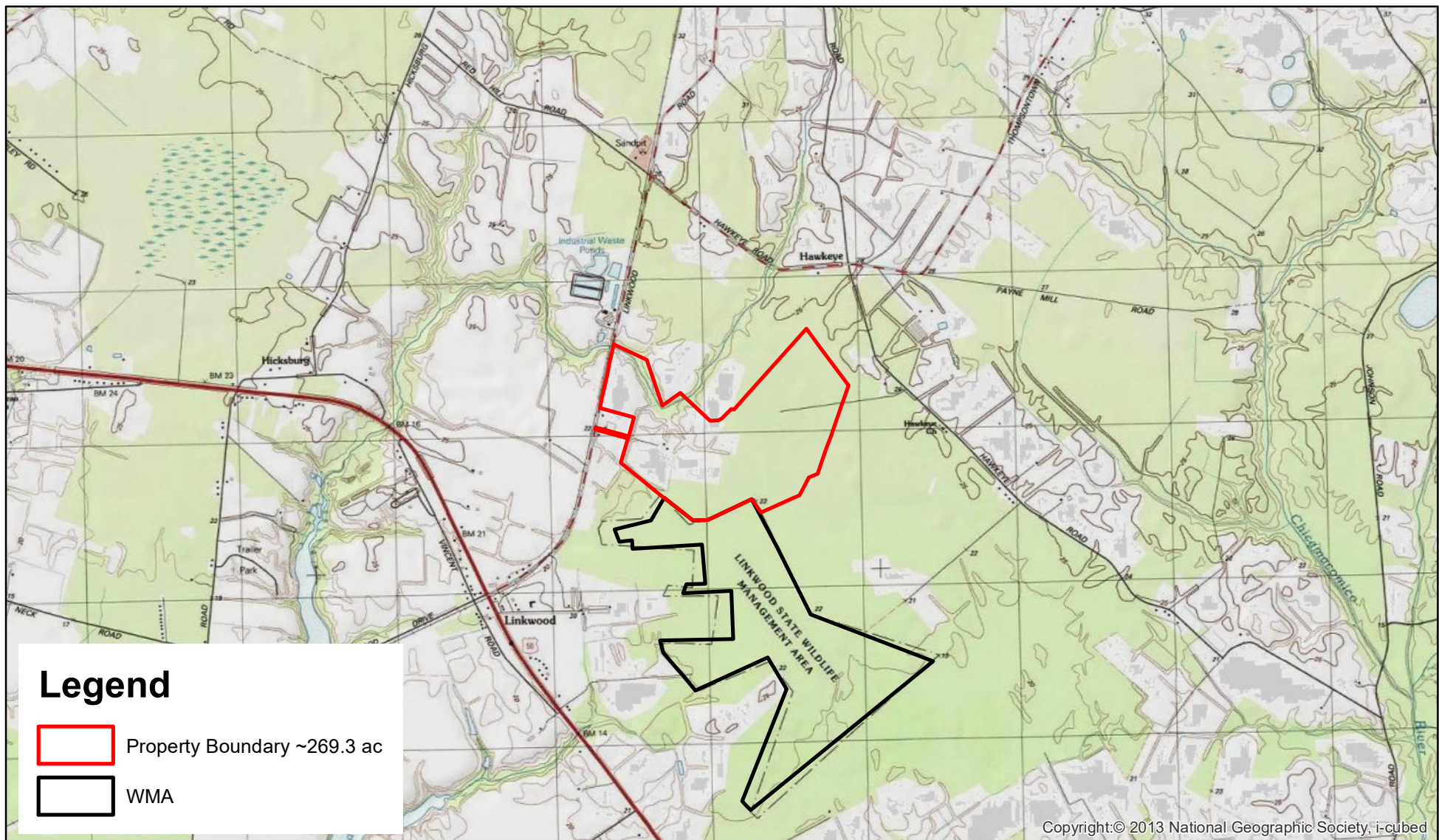


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Dorchester County, MD

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Figure 1
Site Location



Boundaries are approximate and not meant to be absolute.
 Map Source: USA Topo Maps 7.5' East New Market Quad

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Figure 2
Topographic Map



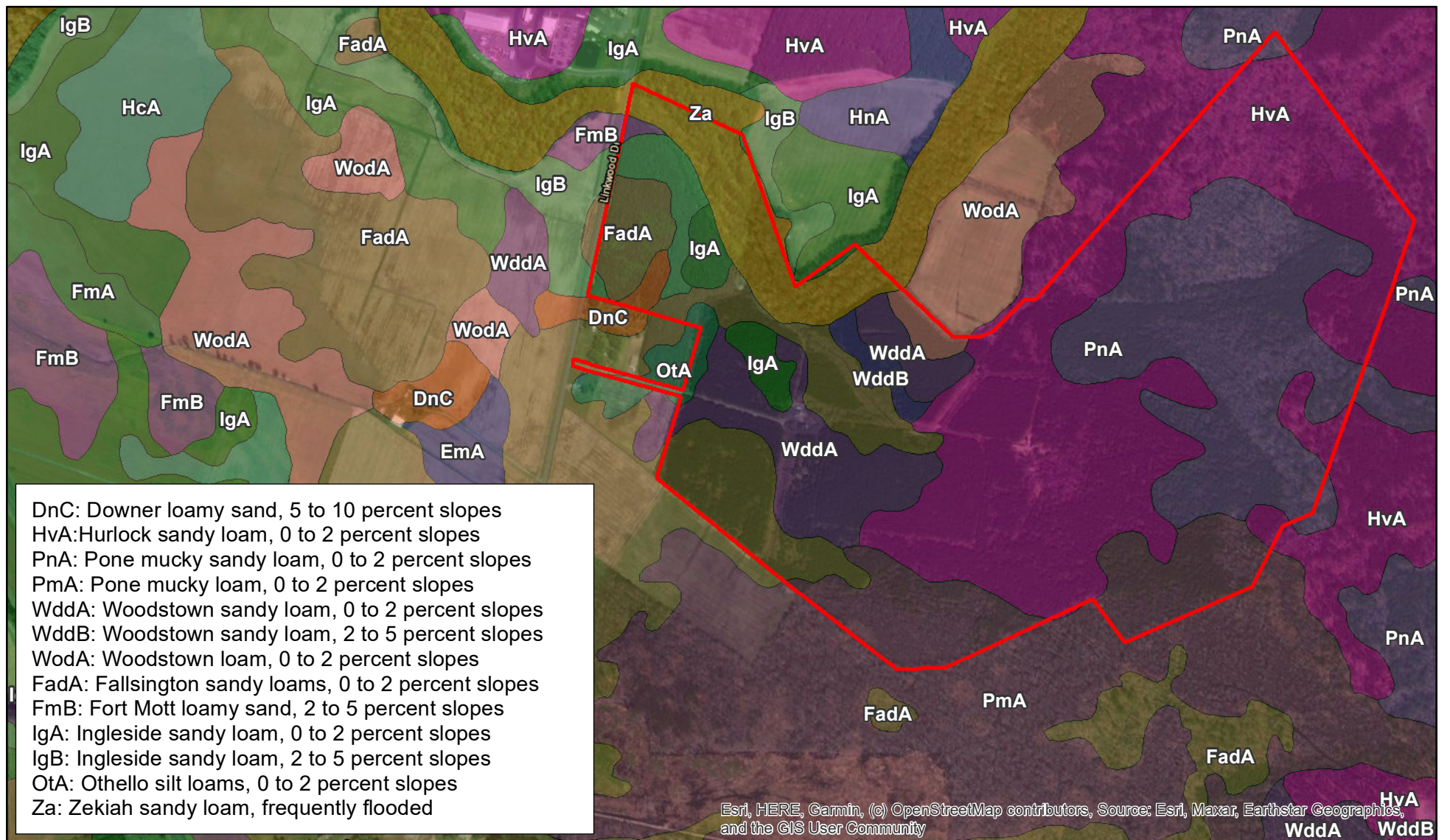
Boundaries are approximate and not meant to be absolute.
Map Source: Eastern Shore Regional GIS Cooperative (2021)

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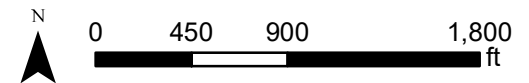
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Figure 3
LiDAR Map



Boundaries are approximate and not meant to be absolute.

Map Source: GIS Soils Data, Dorchester County

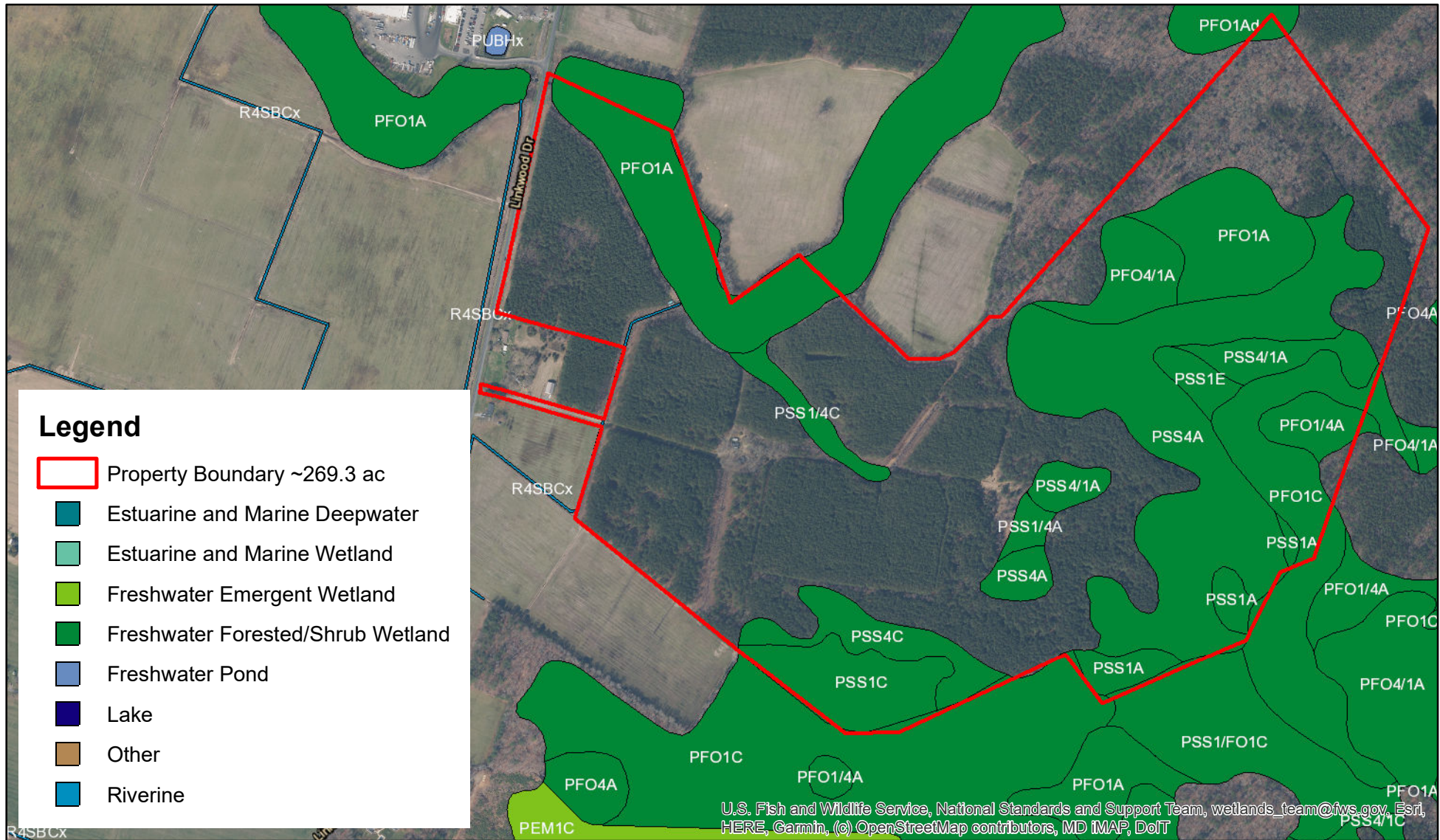


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Figure 4
NRCS Soil Map



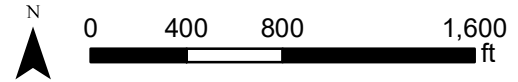
Legend

- Property Boundary ~269.3 ac
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

U.S. Fish and Wildlife Service, National Standards and Support Team, wetlands_team@fws.gov, Esri, HERE, Garmin, (c) OpenStreetMap contributors, MD iMAP, DoIT

Boundaries are approximate and not meant to be absolute.

Map Source: FWS HQ ES NWI

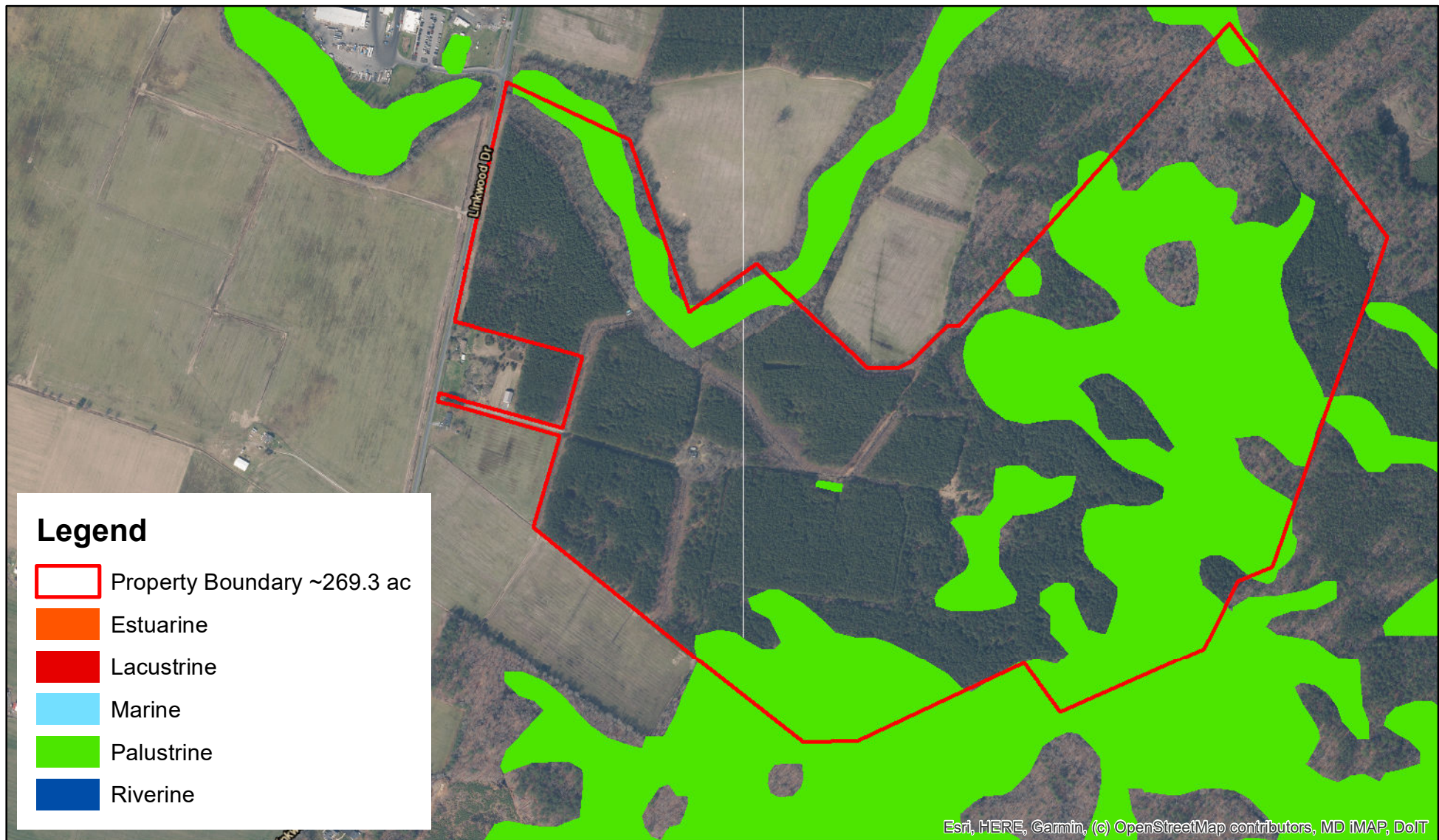


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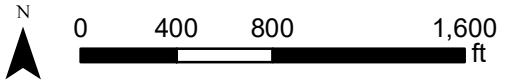
Figure 5
National Wetlands
Inventory (NWI) Map



Legend

- Property Boundary ~269.3 ac
- Estuarine
- Lacustrine
- Marine
- Palustrine
- Riverine

Boundaries are approximate and not meant to be absolute.
 Map Source: Maryland DNR Wetlands Map Server



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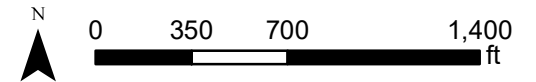
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Figure 6
DNR Wetland Map



Esri, HERE, Garmin, (c) OpenStreetMap contributors, MD IMAP

Boundaries are approximate and not meant to be absolute.
Map Source: 1995 Maryland Digital Orthophoto Quads - DOQ

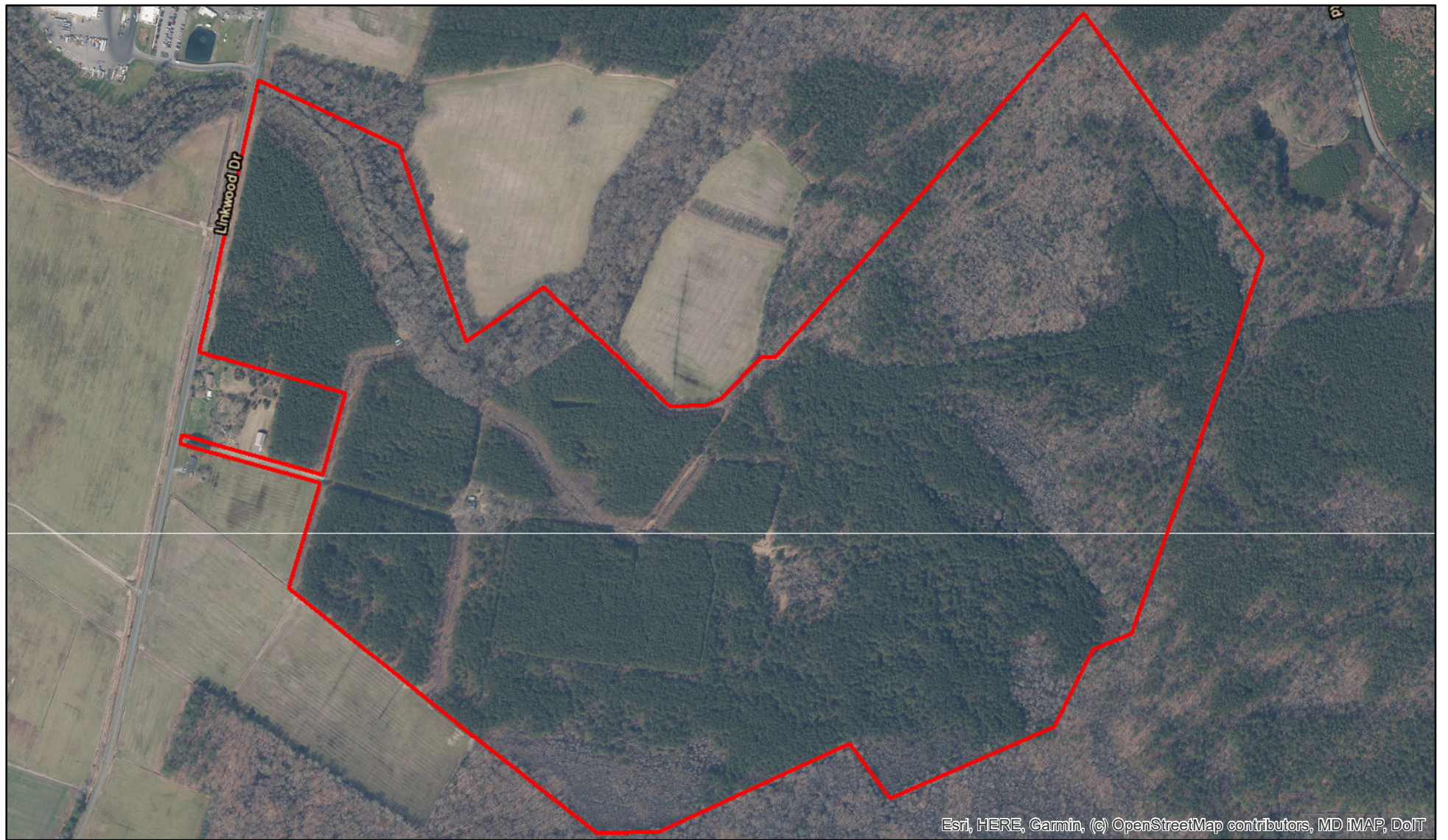


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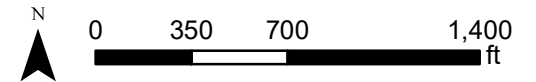
Figure 7
1995 Infrared
Aerial Photograph



Boundaries are approximate and not meant to be absolute.

Map Source: Maryland Six Inch Imagery - Image Service - 2019

Esri, HERE, Garmin, (c) OpenStreetMap contributors, MD IMAP, DoIT



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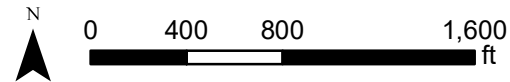
Figure 8
2019 Aerial Photograph



Legend

-  Property Boundary ~269.3 ac
-  Sensitive Species Project Review Areas
-  Forest Interior Dwelling Species
-  Corridor
-  Hub

Boundaries are approximate and not meant to be absolute.
 Map Source: Maryland Water Resources Registry Online Data



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Figure 9
WRR Map

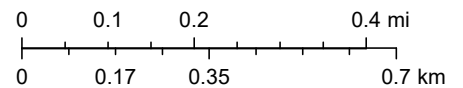
Figure 10 - Dorchester County Planning and Zoning



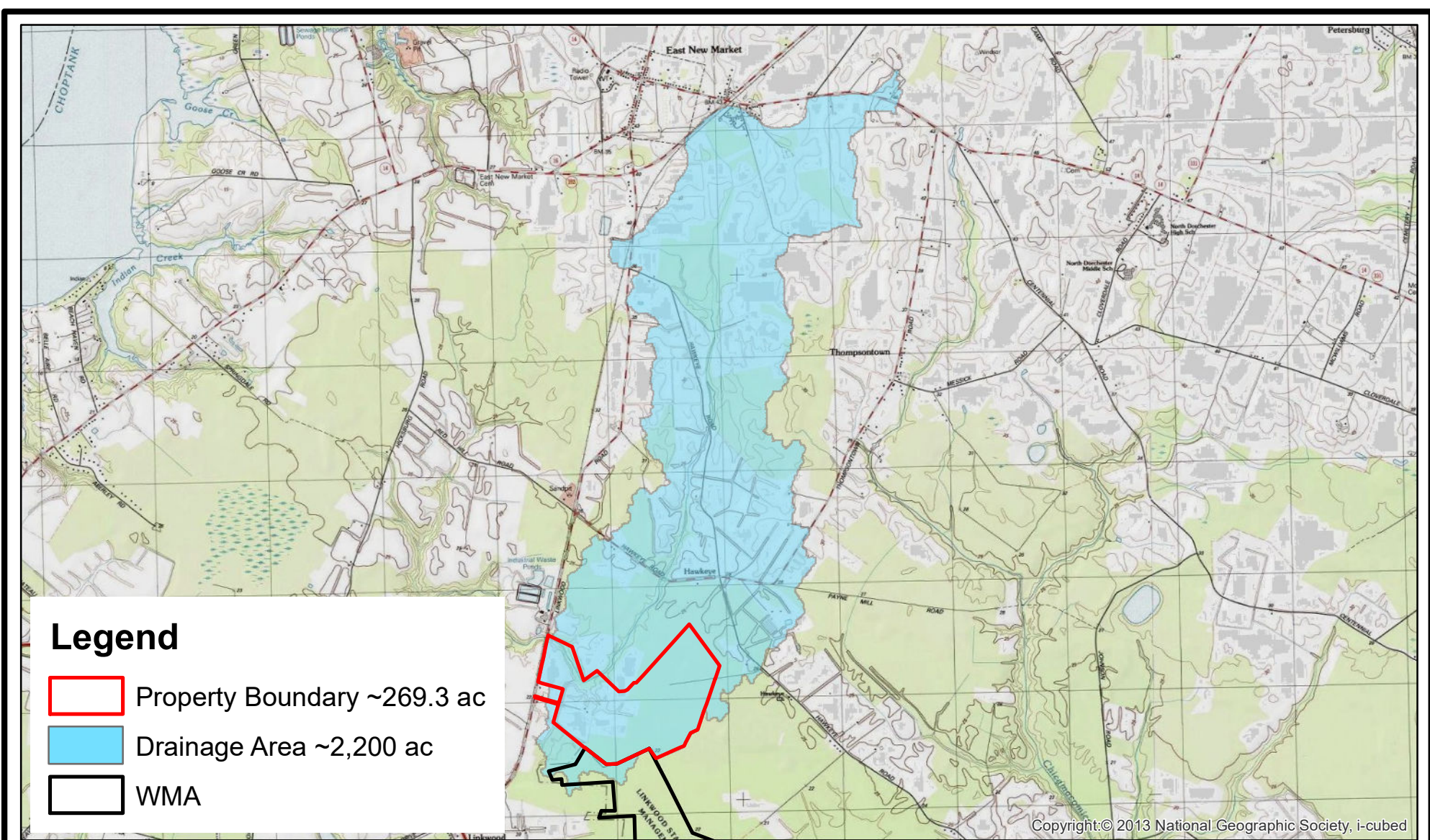
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-  Centerlines
-  Property Parcels
- Zoning**
-  AC
-  I-2



Google 2022, Maxar



Boundaries are approximate and not meant to be absolute.
 Map Source: USA Topo Maps; USGS Stream Stats

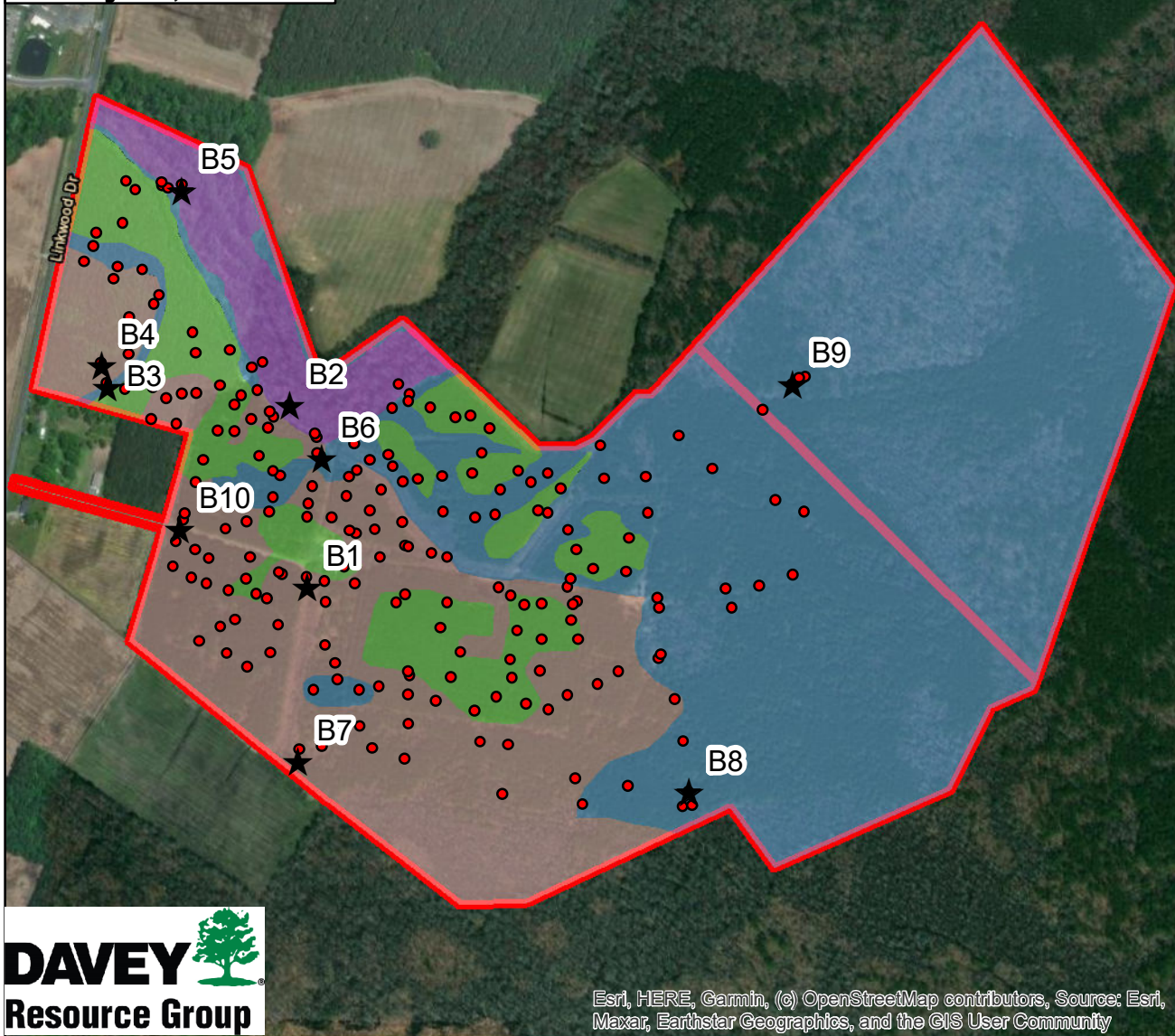
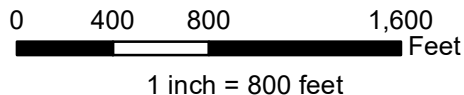
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Figure 11
Drainage Area Map

Figure 12
Linkwood Road
DRG Soil Map
 ~ 269 Acres
 May 11, 2023

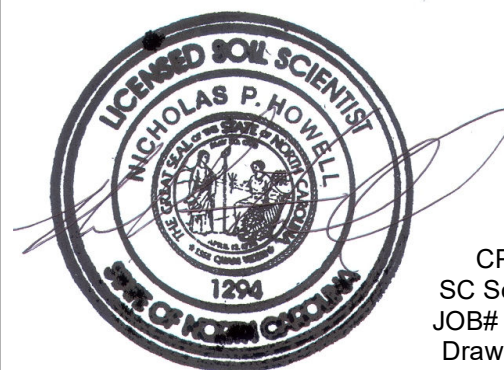


Legend

-  Blue Map Unit. Hurlock Soil Series. Poorly drained, coarse-loamy, hydric soils (indicated by A11, F3, and/or F6) ~155.5 Acres
-  Pink Map Unit. Fallsington Soil Series. Poorly drained, fine-loamy, hydric soils (indicated by A7, A9, F3, and/or F13) ~66.1 Acres
-  Purple Map Unit. Zekiah Soil Series. Poorly drained, coarse-loamy, hydric soils (indicated by A9, A11, and/or F3) ~13.8 Acres
-  Green Map Unit. Non-Hydric Soils ~33.3 Acres
-  Black Star. Locations of official soil boring descriptions
-  Red Dot. Locations of soil check points



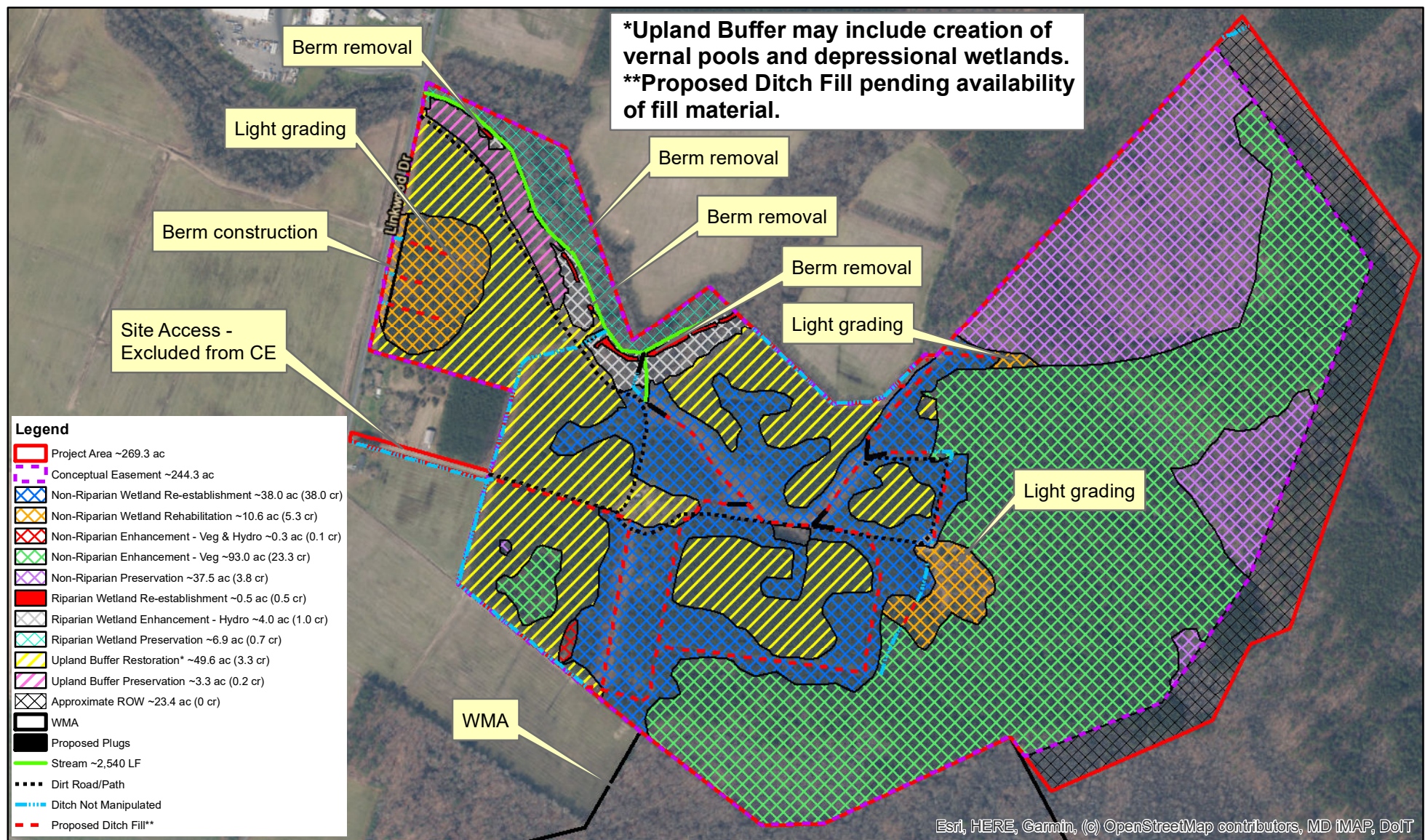
Esri, HERE, Garmin, (c) OpenStreetMap contributors, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



CPSS # 328892
 SC Soil Classifier #113
 JOB# DRGNCW22.194
 Drawing by SNB NPH

Nicholas P. Howell NCLSS #1294

This document represents our best effort to accurately describe the natural properties observed on the site. The site was reviewed under limited ground truthing utilizing aerial photography and gps data collection. This document may not fully represent additional political land use restrictions such as buffers, areas of environmental concern, conservation districts, and areas that have separate local jurisdictional controls, unless specifically noted on this document. Further consultation on these items is recommended prior to making land use decisions. This document does not guarantee a wastewater permit and is considered preliminary for planning purposes only. This is not a survey.



Boundaries are approximate and not meant to be absolute.

Map Source: Maryland Six Inch Imagery - Image Service - 2019






Linkwood Mitigation Bank
 Dorchester County, MD

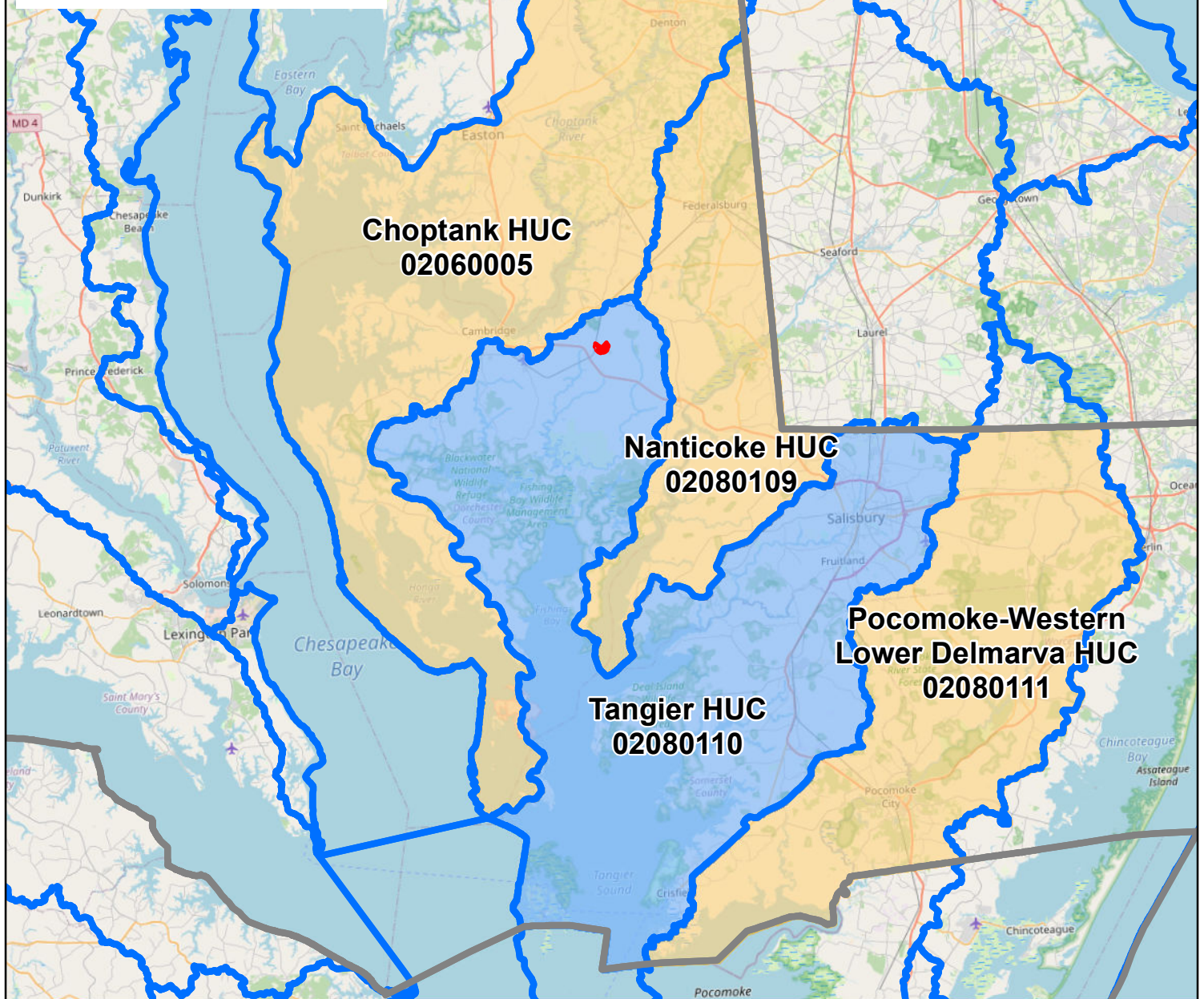
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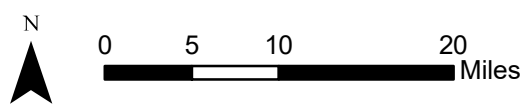
Figure 13
Conceptual Mitigation Plan

Legend

-  Project Area
-  State Boundary
-  USGS 8-Digit HUCs
-  Primary Service Area
-  Secondary Service Area



L:\Ecosystem Services\2022\DRGNCW22.194
\\Maps\GIS\Final Prospectus\Figures
Boundaries are approximate and not meant to be absolute.
Map Source: Open Street Map, Watershed Boundary Dataset



Linkwood Mitigation Bank
Dorchester County, MD

December 14, 2023
DRGNCW22.194

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Figure 14
Geographic Service Area Map