

FINAL ENVIRONMENTAL ASSESSMENT

(File No. 200701161)
Applicant: Tennessee National, LLC

PROPOSED PRIVATE MARINA, BOAT RAMP, DREDGING, AND RIPRAP
AT MILE 583.3, LEFT BANK, TENNESSEE RIVER (WATTS BAR RESERVOIR),
IN LOUDON COUNTY, TENNESSEE,
LAT 35°46'10", LON 84°23'43", CAVE CREEK USGS QUAD MAP

U.S. ARMY CORPS OF ENGINEERS
Nashville District, Regulatory Branch
in cooperation with the
TENNESSEE VALLEY AUTHORITY

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1.0 Proposed Activity

1.1 Project Description. Tennessee National, LLC (National), proposes the construction of facilities to provide an amenity for the National residential development. National has stated that the upland portion of the development would be designed to minimize the construction of buildings and permanent structures within the existing Tennessee Valley Authority (TVA) flowage easement. A natural walkway is planned along the edge of the river that will pass through sections of native riparian vegetation. The proposed action was advertised in Joint Public Notice (JPN) No. 07-95 (Appendix A). The facilities planned are described below.

1.1.1 Private Marina. The proposed marina would be built in phases as dictated by demand. Construction would consist of 20 floating docks (A-L and N-U) containing a total of 127 double slips and 23 single slips. A transient dock (M) would be built to provide access to two fuel dispensers and a sewage pump-out station. The boat docks would extend into the reservoir from 97' to 153' measured from the normal summer pool (NSP) shoreline, Elevation (El) 741.0. Proposed dock capacities would vary from 7 to 18 boats. The main walkways and slip fingers would be 8' and 4' in width, respectively. The floating docks would be connected to the shoreline by 4' wide and 40' to 80' long gangways. The marina facilities will observe guidelines established in TVA's Tennessee Valley Clean Marina Initiative. Individual water-use facilities will not be allowed on this development. During the initial planning stages, the applicant developed and assessed several dock iterations. Some of the designs incorporated large basins that would have required extensive excavation/dredging and shoreline revetment.

1.1.2 Boat Launching. A three-lane concrete boat ramp would be built at the eastern terminus of the marina. The ramp would be constructed at a 13% slope and extend approximately (approx.) 50' into the lake measured from the NSP contour. The bottom of the ramp would be at El. 731, i.e., 4' below the lake's normal winter pool (NWP), El. 735. The toe of the ramp would be protected with riprap. Each of the three planned ramp lanes would be 16'x89'. One floating staging dock measuring 8'x165' and another floating dock measuring 10'x171' would be located at the ramp.

1.1.3 Dredging. Approx. 51,200 cubic yards (CY) of material would be excavated from a 50' wide (average) by 2,800' long area using land-based equipment during winter pool levels. The remaining 19,700 CY of material would be dredged from a barge. The excavated area would be deepened to El. 727 to ensure sufficient navigation depths. The removed material would be loaded into trucks and transported to an upland location within the applicant's property, approx. one mile from the marina location. The material would be properly deposited, contained, and stabilized.

1.1.4 Bank Stabilization. Riprap revetment would be installed along 2,800' of shoreline at a 2:1 slope to reduce erosion potential and stabilize the riverbank. The protection would average 32' in height. Approx. 8,400 CY of material would be placed below NSP. A riparian buffer consisting of native vegetation would be established along portions of the shoreline. The buffer is intended to provide shoreline stabilization, wildlife habitat, stormwater filtering, and an aesthetic amenity.

1.1.5 Storm water Retention Basin. A storm water retention basin (basin) would be constructed within TVA's flowage easement. A berm would be created for the basin.

1.2 Purpose and Need. The basic purpose of the proposed project is to provide safe, conveniently accessible, water-use facilities. The overall project purpose is to dredge approx. 70,900 CY of material to provide safe boat access, construct 20 floating docks and a transient dock, construct a three-lane concrete boat ramp with courtesy docks, and stabilize 2,800' of shoreline with riprap. We determined the overall project purpose based on information submitted by National.

1.3 Project Changes. Four changes have been indicated by National since the Joint Public Notice was published. a) To save costs and avoid long truck hauls of the dredged material to the originally selected disposal site, National plans to temporarily dewater the material at three locations closer to the shoreline as shown on the attached Dredge Spoil Dewatering Plan (Appendix B). b) In addition, the fuel docks and sewage pump-out stations would be made available to the public. However, the remaining structures associated with the marina would be a private amenity of National. A membership fee would be required for the right to rent a boat slip in the marina. Members of the marina would then pay an annual fee for the slip rental. This business model is based on National's golf course membership. c) National had requested to construct a swimming pool with pavilion, restrooms, equipment storage buildings, portions of condominiums, several roads and a parking area within TVA's flowage easement. National has agreed to relocate the portions of condominiums outside of TVA's flowage easement. The construction of the roads and parking areas do not require the placement of fill material and are considered a repetitive action within the floodplain. The pavilion would be constructed between the 100-year and 500-year flood elevations. In order to comply with TVA's Guidelines, the pavilion will remain open to the elements and never be enclosed in the future. TVA's flowage easement contains restrictions that do not allow for the construction of a swimming pool, restrooms, equipment storage buildings and portions of condominiums. Therefore, TVA would not provide Section 26a or Land Use approval for the construction of a swimming pool, restrooms, equipment storage buildings and portions of condominiums within the flowage easement. d) National has requested approval to construct a storm water retention basin within TVA's flowage easement.

1.4 Decision Required. Section 10 of the Rivers and Harbors Act of 1899 (Section 10) prohibits the alteration or obstruction of any navigable water of the United States unless authorized by the Secretary of the Army acting through the Chief of Engineers. The Tennessee River (TR) at Mile (M) 583.3, Watts Bar Reservoir (WBR), is a navigable water of the United States as defined by 33 CFR 329. In addition, Section 301 of the Clean Water Act (CWA) prohibits the discharge of dredged or fill material into waters of the United States (WUS) unless authorized by the Department of the Army (DA) pursuant to Section 404 of the same Act. The TR is a WUS as defined by 33 CFR 328. A Section 26a permit would be required for the construction of the private marina and associated structures, excavation below normal summer pool, shoreline stabilization, and pavilions and fill for the basin located on TVA flowage easement.

A DA permit under Section 10 and Section 404 is required for the work. Therefore, the Corps of Engineers (Corps) must decide on one of the following:

- issuance of a permit for the proposal
- issuance of a permit w/modifications or conditions
- denial of the permit

below, National has already contacted TWRA regarding the number and location of spawning benches, agrees to place all dredged material above the 100-year floodplain, and will install a floating boom around the dredge area.

2.3 Applicant's Rebuttal. On 17 January 2007, the Corps furnished National the JPN objections/comments for resolution or rebuttal. In a letter dated 1 February 2008, BDY Environmental Consultants (BDY), National's agent, responded to the substantive issues raised by the commenters. BDY expressed three commitments to the project based on the objections/comments: a) National has contacted and will work with TWRA Region IV to ensure that impacts to shallow-water habitats are satisfactorily offset; b) National will ensure that all dredged material is removed above the 100-year floodplain; and c) National will ensure that a floating silt boom is installed and maintained around the dredged area during all construction phases. A copy of BDY's response on behalf of National has been included in Appendix F.

2.4 Supplemental Public Notice. The basic precept of the public notice process is to include sufficient information to give a clear understanding of the nature and magnitude of the activity to generate meaningful comment. A supplemental notice must be issued whenever there is a change in the application data that would affect the public's review of the proposal or when the probable impacts to the aquatic environment resulting from the changes are substantially greater from those described in the original notice. The changes described in Section 1.3 (Project Changes) are not normally controversial in nature. We believe advertisement of the changes would not have substantially affected the public's review of the proposal. Therefore, issuance of a revised JPN to advertise the changes is not warranted. The environmental evaluation conducted in Section 3 of this decision document is based on the final proposal (Section 1.1) including all changes (Section 1.3).

3.0 Environmental and Public Interest Factors Considered

3.1 Introduction. 33 CFR 320.4(a) states that the decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts, of the proposed activity and its intended use on the public interest. All factors that may be relevant to the proposal must be considered (for full list see the attached public notice, Appendix A). The following sections describe the relevant factors identified and provide a concise description of the probable impacts of the proposed action. The baseline data discussed in this section has been obtained from information provided by the applicant, field investigations, input to the JPN, and other sources.

3.2 Physical/Chemical Characteristics and Anticipated Changes. The relevant blocks are checked with a description of the impacts. An unchecked block denotes that no adverse effects are expected.

(x) substrate – The existing reservoir substrate consists of sand, silty clay, and fine sediments. Based on geotechnical cores obtained from areas adjacent to the reservoir edge, the underlying substrate is likely comprised of a silty clay material atop a bedrock layer located at depths ranging from 19.75-22.5 feet. The proposed dredging would eliminate roughly 3.2 acres of these materials and result in an immediate loss of the existing benthic community. However, the benthos would quickly recolonize in areas directly adjacent to the site. To mitigate for the loss of shallow water habitat impacts, the applicant has agreed to construct spawning benches or install equivalent habitat enhancements in selected areas of WBR along the perimeter of Matlock Bend, adja-

cent to the edge of the property. This work will be performed in consultation with TWRA Region IV fisheries section. TWRA has already performed an initial site visit to conduct reconnaissance of potential areas for the placement of these mitigation measures.

There are no data documenting the likely potential for contaminants to be present in the bottom sediments. Contamination within WBR is well documented further downstream, specifically in the vicinity of the confluence of the Clinch Arm of the reservoir, which is one reason for the inclusion of these downstream reaches on the TDEC First Draft Year 2006 303(d) list. Fish tissue sampling data from TDEC have documented trace occurrences of polychlorinated biphenyls (PCBs) that exceed the levels for safe consumption set by the U.S. Food and Drug Administration (FDA) in two of seven fish sampled from Watts Bar Reservoir near TRM 560. These results are not unexpected, as this location is well within the areas of known contamination within the reservoir.

Site specific research was conducted to ascertain the likely presence of localized sources of contaminants adjacent to or immediately upstream or downstream of the proposed marina. This research included a review of Environmental Protection Agency (EPA) EnviroMapper data as well as site radius review conducted by Environmental Data Resources, Inc. (EDR). These data serve as a review of historic and current properties that are listed within federal and state environmental databases that use, generate, store, treat, or dispose of hazardous substances and chemicals or have had release incidents of such substances, which may have adversely affected the site. Based on these data, there are two current companies located within one mile of the site listed as Small Quantity Generators (SQGs) of hazardous materials. Both are currently in compliance with their permitted activities therefore it is highly unlikely that either has adversely affected the site. The only other listed site adjacent to the reservoir and listed as a SQG is located approximately six miles upstream. There is no listed reference to PCBs in the Toxic Release Inventory (TRI) for any identified sites.

(x) currents, circulation or drainage patterns – The proposed marina would be exposed to high flows and to debris/drift accumulation. The facility would be properly designed to account for fluctuating lake levels and strong river currents. Therefore, boat moorage risks would be relatively minor. No considerable changes in water circulation are expected to result from the construction of the marina and the dredging activity.

(x) suspended particulates, turbidity – Construction of the marina and the proposed dredging activity would result in localized turbidity increases. However, dredging operation impacts would be temporary. In addition, National proposes to perform the work in a manner that would reduce the expected turbidity plume. A floating silt curtain would be installed prior to the commencement of work and maintained daily in all areas where construction/dredging would take place. Inspection of the structural integrity and performance would be conducted daily and adjustments made as needed to maximize its efficiency. Effective sediment and erosion control BMPs would be utilized on the upland portions of the dredging/construction areas. This includes the installation of silt fences along the edge of the reservoir and swales to prevent direct runoff of spoil materials or turbid water directly into the reservoir during the transfer of materials from excavation machinery to dump trucks or during transport to stockpile or dewatering areas. Materials excavated from the shore and from the dredging operation will be stockpiled on the upland portions of the site outside of the TVA Flowage Easement. Saturated spoil materials will be dewatered in two separated basins in the upland areas behind earthen berms and silt fences.

(x) water quality (temperature, color, odor, nutrients, etc) – According to the TVA Reservoir Ecological Health web page (www.tva.gov/environment/ecohealth/wattsbar.htm), WBR rated "low-

fair" in 2006, comparable to results from previous dry years. TVA rates reservoir condition based on five ecological indicators: dissolved oxygen, chlorophyll, fish, bottom life, and sediment. Dissolved oxygen rated poor at the forebay and good at the mid-reservoir monitoring location. Chlorophyll levels were very high as in previous years and rated poor in 2006. The monitoring of the fish assemblage rated good or "high fair" at all locations except the Clinch inflow, which rated fair. State fish consumption advisories exist against eating certain fish species from WBR because of PCB contamination. Bottom life rated poor at the forebay and Tennessee River inflow locations and fair at the mid-reservoir location. The forebay sediments rated as fair in 2006 due to the detection of lindane and those at mid-reservoir location were rated good because no PCBs or pesticides were detected, and no metals had elevated concentrations. Conditions at the National site would be most similar to those at the mid-reservoir sampling location.

As indicated in the "suspended particulates, turbidity" paragraph, dredging would result in substantial short-term water quality impacts due to increased turbidity. As soon as the dredging activity ceases, water quality conditions would return to preconstruction levels. The construction of the marina would result in relatively minor long-term water quality impacts mainly from the inadvertent spillage of petroleum products from boats. Stormwater discharges and surface runoff originating in upland areas adjacent to the reservoir could also contribute to water quality degradation. However, impacts would be relatively minor since river currents would help disperse the discharges quickly in the water column. TDEC is responsible for enforcement of state standards for construction sites and storm water runoff under Section 402 of the CWA.

(x) flood control functions - The proposed project involves the construction of floating boat slips, dredging, riprap, launching ramps, roads, parking areas, pavilions, and underground fuel tanks. The floating boat slips, dredging, riprap, launching ramps, roads, parking areas and pavilions would be located within the 100-year floodplain. Consistent with Executive Order 11988, floating boat slips, dredging, riprap, launching ramps, roads, and parking areas are considered to be repetitive actions in the floodplain that would result in minor impacts. A pavilion is considered to be a recreational facility that can be constructed in the 100-year floodplain provided adverse floodplain impacts are minimized. To prevent an increase in flood damages, the pavilions must remain open to the elements and never be enclosed in the future. Consistent with Executive Order 11988, a storm water retention basin (basin) is considered to be a functionally dependent use of the floodplain that is approvable provided adverse floodplain impacts are minimized. To minimize potential impacts, National has designed the basin to be constructed with the least amount of fill possible. The fill material used to construct the berm for the pond and the permanent pool behind the dam would be offset by the excavation of the shoreline as part of the marina project. Therefore, there would be no loss of flood control storage which would comply with the TVA Flood Control Storage Loss Guideline.

(X) storm, wave, and erosion buffers - The presence of Bogart Island to the north of the proposed marina site would serve as a natural breakwater buffer from the main channel of the reservoir. This natural barrier would serve to deflect waves and reduce wave energy. The addition of riprap along the shoreline would also serve as a wave and erosion buffer for that area. The proposed dredging is not expected to have any noticeable effect on wave action or erosion intensity.

(x) shore erosion and accretion patterns - The proposed riprap placement would stabilize the banks and prevent erosion. If any accretion pattern currently exists, it would not be substantially affected by the presence of the docks, ramp, and riprap.

() baseflow -

3.3 Biological Characteristics and Anticipated Changes. The relevant blocks are checked with a description of the impacts. An unchecked block denotes that no adverse effects are expected.

(x) special aquatic sites (wetlands, mudflats, pool and riffle areas, vegetated shallows, sanctuaries, and refuges, as defined in 40 CFR 230.40-45) – Neither the Corps nor TVA has identified the presence of special aquatic sites within the project development areas.

(x) habitat for fish and other aquatic organisms – WBR comprises approximately 722 miles of shoreline and over 30,090 acres of water surface. The lake's fish population contains species such as largemouth bass, smallmouth bass, spotted bass, white bass, black crappie, white crappie, channel catfish, sauger, walleye, and others. The proposed dredging to provide adequate boat access to the marina would permanently eliminate approximately 3.2 acres of lakebed habitat used by fish and aquatic organisms for feeding and spawning. However, this impact would be relatively minor and temporary since aquatic organisms would soon start recolonizing the area after completion of the dredging operation. To compensate for the temporal loss of shallow water habitat, National has agreed to construct (under TWRA's guidance) 106 spawning benches or install equivalent habitat enhancement measures in the reservoir adjacent to Matlock Bend. Therefore, the overall aquatic habitat impact would be minimal. In addition, the placement of riprap along the shoreline would provide habitat for benthic species colonization and fish shelter. Finally, the new boat docks would provide additional attachment surfaces and shading which would be beneficial to fish and aquatic organisms.

(x) wildlife habitat – The project site is located in an area that was historically utilized for cattle pasture and contains a significant portion of forested land. This proposed marina is an amenity provided as part of a larger residential and golf course community development. National controls approximately 1,450 acres of Matlock Bend and has developed and implemented a building strategy that conserves much of the forested areas. Much of the currently developed and planned portions of the site have utilized historically cleared pasture land. Additionally, this area is planned as a low density residential community with the golf course areas providing expansive areas of open space similar to preconstruction conditions. As a result, the impacts to wildlife have been minimal and considering the mobility and adaptability of species that may occupy the site, the proposed action would result in minimal short- and long-term wildlife impacts.

Based on a review of its Natural Heritage database, TVA has indicated that three heron colonies occur within three miles of the project area. Two of these colonies are approx. 0.6 and 2.4 miles from the project area and would not be affected by the proposed actions. Great blue herons historically nested on Bogart Island, approx. 400' from the proposed marina. It appears that this colony has moved to a smaller island 0.6 miles upstream from the proposed actions. Only two great blue heron nests were observed on Bogart Island during the field survey. The proposed project would not result in adverse impacts to herons in the vicinity. The project would not substantially affect herons and other migratory bird populations. In addition, TVA believes that due to the scope of the project, there is no potential for it to contribute to the spread of exotic or invasive terrestrial or animal plant species.

(x) endangered or threatened species – TVA reviewed its Natural Heritage database in August 2007 finding records for two species within three miles of the project site: the federally and state-listed gray bat (*Myotis grisescens*) and the state-listed bald eagle (*Haliaeetus leucocephalus*). Bald eagles prefer wooded areas near large bodies of water where they forage. One nest of this bird occurs approximately 3 miles from the project area, but suitable forested habitat does not exist at the immediate project area, and impacts to this species are not expected. Gray bats roost

in caves year-round and also forage over large bodies of water, as well as rivers and streams. A gray bat cave occurs 2.6 miles from the project site. This cave would not be impacted by the proposed action. Although the proposed marina may increase boat traffic in the area, foraging habitat over WBR would also not be significantly affected. No additional federally protected species are known from Loudon County, Tennessee.

Three species are not state-listed, but are considered rare by the Tennessee Natural Heritage Program. The Berry cave salamander (*Gyrinophilus gulolineatus*) is restricted to a few caves containing suitable streams, and the incurved cave isopod (*Caecidotea incurva*) is also restricted to cave habitats. Both species are known from a cave 3.0 miles from the project area, and would not be impacted by the proposed action. Osprey forage and nest on large bodies of water, and numerous nests of this bird occur within 3 miles of the project site. Two nests exist in close proximity to the proposed dock (0.1 and 0.3 miles). Development already exists in the area and the proposed action would not significantly increase disturbance, therefore no impacts to these nests or other ospreys are expected. The proposed actions would not impact any state- or federally protected species, or their habitats.

One federally listed aquatic species, the Pink mucket, occurs near the proposed project. A survey was performed by Pennington and Associates and only common mussel species were found around the project area. Due to the habitat at the site, silty soil away from the main river channel, it has been determined that suitable habitat for the pink mucket does not exist at the site. Based on the habitat, survey of the dredge area, and discussions with the U.S. Fish and Wildlife Service, it has been determined that there would be no impacts to endangered or threatened aquatic species in the area.

In addition, review of the TVA Natural Heritage database indicates that two state-listed plant species are recorded from within five miles of the proposed project area. These species are *Aureolaria patula* (Spreading false fox glove, threatened), and *Pedicularis lanceolata* (Swamp Lousewort, species of special concern). Review of maps, photos, and knowledge of rare plant habitats in the vicinity indicates the proposed project area could provide habitat for Spreading false fox glove, but due to the abundance of individuals known from populations in the surrounding area, there would be no significant impact to the viability of the species from project activities. In addition, suitable habitat (wet meadows on basic soils) for swamp lousewort is not present within or adjacent to the project site. A field visit was conducted on 19 September 2007 and neither rare species was observed within the project area. The proposed action is not expected to result in impacts to rare plant populations.

Based on the above assessments and on the response from the USFWS (Section 2.2.3), the Corps and TVA have determined that the proposal would have no effect on any federally-listed threatened or endangered species or their designated critical habitat.

(x) biological availability of possible contaminants in dredged or fill material – Based on available data from federal and state regulatory databases there is no reason to assert that there is a high potential for contaminants to be present in the area where bottom sediments would be dredged. Trace amounts of metals and other chemicals are typically found within sediments in this country at numerous locations. However, due to a lack of a historic and current localized source of these contaminants in proximity to the proposed marina location, it is not likely that any would be present in concentrations requiring treatment or disposal in an approved facility. The dewatered dredge material will be disposed of onsite and used as fill. The spoils would then be capped with locally available clay and covered with topsoil in preparation for use as green space.

3.4 Human Use Characteristics and Anticipated Impacts. The relevant blocks are checked with a description of the impacts. An unchecked block denotes that no adverse effects are expected.

(x) wild and scenic rivers - Because no such designated waters occur at or adjacent to the project site, the proposed action is not anticipated to impact Wild and Scenic Rivers or their tributaries. Accordingly, the proposed action is not anticipated to impact streams listed on the Nationwide Rivers Inventory.

(x) existing and potential water supplies; water conservation – The Corps' Regulatory Branch permit database records only six private and no municipal or industrial raw water intake sites in the main stem of the TR (WBR) within five miles downstream of the work site. The City of Loudon municipal intake is approx. 2.2 miles upstream at TRM 585.5R. The proposed dredging activity would result in short-term increases in suspended particulates and turbidity. However, the work would be conducted following best management practices and controls to minimize resulting water quality impacts. As indicated in Section 1.5.2, a water quality certification (WQC) was issued by TWPC on 31 March 2008. The WQC process considers water quality impacts and potential adverse effects on the intakes. The WQC establishes pollution control and monitoring requirements based on protection of designated uses through implementation of water quality standards and other applicable state and federal rules. We expect only minimal impacts on the intakes. The construction of the marina, launching ramp, dredging, and addition of riprap to the shoreline would have negligible impacts on existing/potential water supplies. Water conservation (storing, saving, reducing or recycling water) would not be affected by the proposed action.

(x) water-related recreation – The project site borders upon WBR, a TR main-stem reservoir. The reservoir is approx. 72.4 miles long, has 39,090 acres of surface area, and 722 miles of shoreline. As stated in TVA's web site under facts and figures for the reservoir, "...Watts Bar Lake creates a slack-water channel for navigation more than 20 miles up the Clinch River and 12 miles up its tributary, the Emory." The typical normal operating zone for this reservoir fluctuates between El. 740-741 in the summer and El. 735-737 in the winter. The Corps considers El. 741 as the NSP and El. 735 as the NWP. Several marinas, community docks, resorts, state/municipal parks, and camping areas exist along the shores of WBR. The nearest TVA recreation area is Riley Creek located 13 miles downstream at TRM 570L. This facility provides boat launching, a beach, free camping, restrooms, showers, dump station, and picnic sites. Located at TRM 571.7R, Long Island Marina is the nearest commercial boat dock to the site. In addition, the nearest public boat ramp is located in the Adolphus community near TRM 579.6L.

The proposed marina would provide users substantial recreational opportunities such as boating, fishing, skiing, and swimming. Since the proposed docks are located in the Bogart Island back chute, a secondary navigation channel, and would not extend more than one third the width of the back chute, impacts on existing recreational usage would be relatively minor. The marina would be properly lit to ensure visibility during non-daylight hours. Based on current knowledge of motorized recreational carrying capacity, the number of watercraft generated will not significantly detract from the recreation experience provided.

(x) aesthetics – The proposed activity is located along a portion of the reservoir where land use/cover includes residential, agriculture, and forest land. The positioning of the marina behind Bogart Island will result in only minor aesthetic impacts from the northern shore and along the river, and these impacts will primarily be confined to the late fall, winter and early spring when most deciduous trees on the island are leafless, creating a direct line of sight. The construction of the marina and bank stabilization activities would result in a relatively minor change in the general

visual characteristics of the area, as a residential community and golf course have already constructed on many portions of the site adjacent to the river. Additional watercraft on the lake would contribute to an increase in visual congestion. New structures and additional watercraft would combine to reduce the scenic value class. However, the development would likely not reduce scenic class by two levels or more, the threshold of significance. All exterior lighting for the marina would be fully shielded or should have internal low-glare optics, such that no light is emitted from the fixture at angles above the horizontal. Shielded low pressure sodium lights would be used during the construction and operational phases. Area lighting and parking lot poles would be no taller than 40', unless they are lighting objects taller than 40'. In such cases, pole heights would be minimized. All color schemes for the marina buildings and boat slip exteriors would be visually compatible with neutral background colors and provide dark roofs on all structures. Considering all the above-discussed factors, the aesthetic impact would be minimal.

(x) traffic/transportation patterns – Most of the transportation infrastructure serving the community and golf course has already been constructed. Minimal transportation infrastructure would be necessary to allow for access to the marina from within National. The design and implementation of the infrastructure currently supporting the community has been reviewed and developed in conjunction with the planning and engineering departments of Loudon County, Tennessee. The long-term effect of the proposal on traffic/transportation patterns or waterborne traffic would be minimal.

() energy consumption or generation -

(x) navigation – The proposed work and facilities would be located along the south shoreline of the Bogart (Matlock) Island back chute. The site is on a fairly straight reach of the TR approx. 1.5 miles downstream of Interstate 75, in Loudon County, Tennessee. The width of the back chute varies from approx. 380' to 560'. The commercial navigation channel is in the main channel on the north side of the island. From TRM 580.0 to 586.0, the Corps maintains a bottom grade El. of 723.0 in the main channel. Based on a typical NWP elevation for WBR of 735.0, available water depth for commercial barge traffic at the main channel would be 12' which would accommodate vessels with a maximum draft of 10'. Bottom elevations along the Bogart Island back chute generally range from El. 716 to 735 or higher. Permanent nun (red) buoys delineate TR's left descending navigation channel limit lying to the north of the island. The inactive McKinnon Bridge Company barge terminal is located approx. two-thirds of a mile upstream, also on the left descending bank. The McKinnon site is currently being developed for residential purposes (Lighthouse Pointe) with several community docks and would require dredging.

The National site was field inspected jointly by the Corps and TVA on 28 September 2007. The majority of the proposed facilities would be located behind Bogart Island and should not interfere with commercial navigation. All of the facilities have been designed to not exceed more than one-third of the distance across the waterway to the island from NSP, El. 741. As long as the facilities are well-lit and no portion of a proposed no-wake zone extends onto the main navigation channel, they should not interfere with navigation. If the decision is to issue the respective DA and Section 26a permits, the following conditions would be incorporated:

- None of the boat slips shall extend more than one-third of the way across the channel to Bogart Island from bank to bank at NSP, El. 741.

- The facilities will be adjacent to a commercial navigation channel at a location which makes the facilities and any moored boats vulnerable to wave wash and possible collision damage from passing vessels.
- All floating facilities shall be securely anchored to prevent them from floating free during major floods.
- All facilities shall be properly lit to ensure visibility during non-daylight hours.
- No portion of a proposed no-wake zone shall extend onto the commercial navigation channel. Requests for a no-wake zone and associated buoys must be reviewed by Corps and TVA Navigation personnel.

(x) safety – Water safety related issues have been discussed before in the “water-related recreation” and “navigation” paragraphs.

TVA must consider safety issues associated with underground storage tanks (USTs). 26a Regulation 1305.405(a) lists a number of requirements for applications submitted after 8 September 2003 for installation of a UST, or any part of a UST system, below the applicable TVA Flood Risk Profile elevation. The TVA Flood Risk Profile elevations for the proposed marina location are as follows: TRM 583.0 = 754.3, TRM 583.5 = 754.5, and TRM 584.0 = 754.7. National has agreed to relocate the UST to private property located above TVA's Flood Risk Profile. Fuel will be stored in a combination tank that will hold 6,500 unleaded and 3,500 diesel, for a total capacity of 10,000 gallons. Pollution potential from the operation of the UST system and the fueling facilities at the marina would be minimized if the applicant complies with:

- Applicable environmental laws and regulations (e.g., a Tennessee Department of Environment and Conservation UST Permit would be required).
- TVA 26a Standard Condition 1.k
- TVA 26a regulations 1304.405(a) and (b)
- Best management practices regarding fuel management, such as are presented in Section 2 of the Tennessee Valley Clean Marina Guidebook (TVA 2005).

(x) air quality - A conformity applicability determination pursuant to regulations implementing Section 176(c) of the Clean Air Act (CAA) has been made. The proposed action would only result in minimal direct emissions.

(x) noise – Noise levels would increase slightly above background values during the construction phase, as residential construction is ongoing within the development and has been for several years. The operation phase would result in minor long-term increases above background levels as boat traffic increases in the vicinity of the marina.

(x) historic structures - For at least 12,000 years, the TR and the Little Tennessee River Valley have been an area for human occupation which became more intense through succeeding cultural periods. In the upper east Tennessee area, archaeological investigations have demonstrated that Tennessee and the eastern Ridge and Valley Region were the setting for each one of these cultural/temporal traditions, from the Paleo-Indian (12,000-8,000 B.C.), the Archaic (8,000-

1,200 B.C.), the Woodland (1,200 B.C.-1,000 A.D.), the Mississippian (1,000-1,500 A.D.), to the Protohistoric-Contact Period (1,500-1,750 A.D.). Prehistoric archaeological stages are based on changing settlement patterns. Smaller time periods, known as "Phases" are represented by distinctive sets of artifact remains. In addition, historic era cultural tradition have included the Cherokee (1,700 A.D.-present), European and African-American (1,750 A.D.-present) occupations.

The NHPA of 1966 and the Archaeological Resources Protection Act (ARPA) of 1979 address the protection of significant archaeological resources and the preservation historic properties located on TVA lands or affected by TVA undertakings. A historic property is defined under 36 CFR Part 800.16 (1) as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places" (NRHP).

Archaeological Resources

In March 1974, a survey was conducted of portions of Matlock Bend, but a survey report was never compiled. The 1974 survey was restricted to the shoreline of WBR. A number of sites were found but were not assigned state site numbers. The sites currently numbered as 40LD187, 40LD191, and 40LD220 were identified by this survey. The 1974 survey was conducted in early spring when the lake level was low and substantial areas of shoreline and cut-bank were exposed.

Between 1985 and 1986, Kenneth P. Cannon (1986) conducted a survey at Matlock Bend for the TVA. Sites 40LD187 and 40LD191 were re-visited, officially recorded, and assigned state site numbers during this survey. In February 1988, William B. Turner, a graduate student at the University of Tennessee Knoxville, conducted an archaeological survey of a proposed barge terminal on Matlock Bend for McKinnon Bridge Company (Turner 1988). Turner investigated a 12.9-acre tract, located just upstream from Site 40LD191. Shovel testing and survey of the exposed shoreline of Watts Bar Lake resulted in the identification of a low density lithic scatter. No intact deposits were discovered nor were site forms filed with the state. In 1992, a 30-acre tract was surveyed, but failed to identify cultural material within the area.

In 1990, approximately 1300-acres were considered for development by Eastman Corporation. DuVall and Associates investigated the tract for archaeological resources. The archaeological methodology used consisted of numerous plow strips through the plow zone [personal communication, Glyn DuVall]. Four sites were recorded, and later evaluated. A 1992 investigation (Phase II Archaeological Testing of Specific Site and Proposed Disturbance Areas on Matlock Bend, Loudon County, Tennessee) included a limited evaluation of each site. Testing identified the location of at least four prehistoric Indians sites, and all four showed evidence of intact cultural deposits. Two reports, Merrill Dicks (2004) Phase II Archaeological Testing on Matlock Bend, Loudon County, Tennessee: 40LD187 and Slaughter and McCorkle (2005) Phase II Archaeological Testing on Matlock Bend, Loudon County, Tennessee: 40LD191, 40LD220, and 40LD221, documented more intensive investigations and determined that all four sites have intact archaeological deposits. Site 40LD187 is a Woodland and Mississippian site, and Site 40LD191 is Middle to Late Woodland Period site. Site 40LD220 is a multi-component site with Woodland and Historic Period material. Site 40LD221 is a Middle Woodland site. All four sites contain intact archaeological deposits that may provide important information regarding prehistory and were recommended eligible for listing in the NRHP.

TVA reviewed the Phase II draft survey reports and agreed with the findings/recommendations that Sites 40KN187, 40LD191, 40LD220 and 40LD221 are eligible for listing in the NRHP. TVA recommended to the applicant that avoidance of these intact archaeological resources should

occur. The applicant will avoid Sites 40LD187 and 40KN220. Due to the design of the development, the applicant cannot avoid Sites 40LD191 and 40LD221.

In November 2007, TVA consulted with the Tennessee State Historic Preservation Officer (TNSHPO), USACE and appropriate affiliated Native American Indian Tribes for this project. Based on these comments, a Memorandum of Agreement (MOA) was executed in March 2008, between TVA and TNSHPO (Appendix G). The MOA sets forth a phased compliance survey strategy. National will install a temporary barrier around Sites 40LD187 and 40KN220 to make certain that construction activities do not inadvertently affect the portions of the sites to be preserved-in-place. Data recovery procedures will be conducted at Sites 40LD191 and 40LD221 per the conditions set forth in the MOA.

The proposed development will have adverse effects to historic properties (archaeology). However, with the avoidance of Sites 40LD187 and 40KN22, and data recovery at Sites 40LD191 and 40LD221, the overall impacts to historic properties (archaeology) would be insignificant.

Historic Structures

There have been extensive industrial and residential developments adjacent to National and across the river. An historic structures survey was previously conducted (Architectural/Historical Assessment of Four Buildings on Matlock Bend Loudon County, Tennessee) and identified one structure (Wilson House) potentially eligible for listing on the NRHP. Since the time of the survey, the Wilson House has been destroyed. National had the Wilson House destroyed by the local fire department because it was structurally unsound and had been heavily vandalized. Furthermore, the Wilson House had become a safety concern because of unauthorized use and debilitating condition. National was unaware that the Wilson House was considered potentially eligible for listing on the NRHP in the 1990s. The remaining structures identified by the historic structures survey (Matlock School, Carroll House and Matlock/Price House) lacked historic significance or did not maintain integrity. These structures were considered ineligible for the NRHP. No historic properties (historic structures) will be affected by this development.

(x) land use classification – National controls approximately 1,450 acres of Matlock Bend. The current setting of Matlock Bend is rural and consists of a mixture of open fields and interspersed wooded plots. A few private homes still exist. Much of the currently developed and planned portions of the site have utilized historically cleared pasture land. Predominant uses of adjacent lands are agricultural and residential. The former McKinnon Bridge Company property is located about two-thirds of a mile upstream at TRM 584.0. The 36-acre property was used as a barge terminal and construction materials storage. Master Land Group, LLC, purchased this property and plans to develop it as a high-density residential development known as Lighthouse Pointe. The proposed action would have minimal impacts on land use classification.

National had requested to construct a swimming pool with pavilion, restrooms, equipment storage buildings, portions of condominiums, several roads and a parking area within TVA's flowage easement. National has agreed to relocate the portions of condominiums outside of TVA's flowage easement. The construction of the roads and parking areas do not require the placement of fill material and are considered a repetitive action within the floodplain. The pavilion would be constructed between the 100-year and 500-year flood elevations. In order to comply with TVA's Guidelines, the pavilion will remain open to the elements and never be enclosed in the future. TVA's flowage easement contains restrictions that do not allow for the construction of a swimming pool, restrooms, equipment storage buildings and portions of condominiums. Therefore, TVA would not provide Section 26a or Land Use approval for the construction of a swimming pool,

restrooms, equipment storage buildings and portions of condominiums within the flowage easement.

(x) conservation - No wetlands or sensitive/important upland features or resources would be affected by this proposal. Approx. 3.2 acres of shallow-water habitat would be eliminated during the dredging activity. However, through wave action and river currents, sedimentation would gradually occur, and the disturbed bottom would return to nearly the same composition after a relatively short period. Short term, the loss would be adequately mitigated by constructing spawning benches in areas of WBR under the direction of TWRA. These areas would not be located within the project impact area.

Because no managed areas and/or ecologically significant sites occur at or adjacent to the project site, the proposed action is not anticipated to impact natural areas. The nearest managed area to the proposed action on Watts Bar Reservoir is Polecat Creek Slopes TVA Habitat Protection Area which is approx. 2.8 miles southwest of the proposed action.

(x) economics – The National development currently represents over a \$50 million investment that includes the design and construction of a residential community and golf course. Construction activities associated with the marina would provide a minor short-term stimulus to the local economy from temporary employment and related sales of goods and services. The local economic base would experience long-term benefits associated with additional tax revenues, additional employment, and higher property values.

() food and fiber production -

(x) general environmental concerns - This is a broad factor almost synonymous with the area's quality of life. All the relevant issues falling under this heading have been evaluated in this document. No public/private agency, group, or individual expressed concerns for the proposed activities. Special conditions have been added to minimize the unavoidable adverse environmental impacts identified.

() mineral needs -

(x) consideration of private property – Corps regulations at 33 CFR 320.4(g) state that authorization of work by the DA does not convey any property rights, either in real estate or material, or any exclusive privileges. Furthermore, a DA permit does not authorize any injury to property or invasion of rights or any infringement of federal, state or local laws or regulations. The same regulation also states that a riparian landowner has a general right of access to navigable waters of the U.S. However, this right of access is weighed through the DA public interest review process against the similar rights of access held by nearby riparian landowners and to the general public's right of navigation on the water surface. No individual, corporation, or entity, particularly adjacent property owners, indicated conflicts with the proposed development. TVA has flowage rights along the shoreline not based on a fixed contour line but on a metes and bounds document developed by the agency when the reservoir was impounded.

(x) floodplain values – The proposed project involves the construction of floating boat slips, dredging, riprap, launching ramps, roads and parking areas, pavilions and underground fuel tanks. The floating boat slips, dredging, riprap, launching ramps, roads, parking areas, and pavilions would be located within the 100-year floodplain. Consistent with Executive Order 11988, the floating boat slips, dredging, riprap, launching ramps, and roads and parking areas are considered

to be repetitive actions in the floodplain that should result in minor impacts. A pavilion is considered to be a recreational facility that can be constructed in the 100-year floodplain provided adverse floodplain impacts are minimized. To prevent an increase in flood damages, the pavilions must remain open to the elements and never be enclosed in the future.

3.5 Cumulative and Secondary Impacts. The Council on Environmental Quality regulations define cumulative impact as "the environmental impact which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." The Corps considers every DA permit application on its own merits and assesses its environmental impacts within the proper scope of review for NEPA purposes.

There are no full service marinas or active barge terminals within a five mile radius of the site. However, between 1986 and 1989, three commercial barge terminals obtained permits to construct in the general area behind the Bogart Island back chute. Permits were issued to McKinnon Bridge Company, Bayou Steel Corporation, and Intermodal Terminal Services. None of these facilities were built, and the permittees allowed their authorizations to expire. Subsequently, in 1992, McKinnon Bridge Company applied and obtained Corps/TVA approval for a barge terminal at TRM 584.1. McKinnon completed the facility around 1996 or 1997.

Although numerous permits have been issued for private water-use facilities in this area of WBR, apart from the above, the Corps and TVA have issued few permits for new community boat docks, marinas, barge terminals, or public boat ramps in the last 20 years. However, in 2007, the Corps and TVA received at least four commercial marina and/or community dock applications for proposed work activities within 12 miles of this site: Master Land Group, LLC, involving a community dock (109 boats), launch ramp, dredging, and riprap at TRM 584.0; Carlie Smith (formerly Browne's Dock), commercial marina (93 boats) at Smith Creek Mile 0.2L, opposite TRM 571.5R; The Cove at Blackberry Ridge, LLC, community dock (10 boats), bank stabilization, and launching ramp at TRM 577.5L; and Tennessee River Partnership, community dock (74 boats), dredging, riprap, boat ramp at TRM 584.1L. The Tennessee River Partnership permits were issued at the end of 2007. Finally, a proposal by Wilkinson Land Developers, LLC, requesting a community dock permit (10 boats) at TRM 586.3L was withdrawn by the company.

As lake-front properties continue to develop, a moderate number of community docks and marinas would likely be proposed. We do not foresee a large number of proposals involving commercial barge facilities in this area. Future construction of community docks, marinas, public ramps, and barge terminals would be evaluated for environmental impacts, including effects on navigation. If a decision is made to issue the National and other future DA/TVA permits, special permit conditions and/or commitments will be incorporated to minimize impacts to the extent practicable. When considering the impacts from past, present, and reasonably foreseeable future proposals, the cumulative and secondary impacts from this proposal are not considered substantial.

4.0 Alternatives

4.1 Introduction. This section discusses alternatives as required by Corps and TVA regulations and by NEPA. Corps requirements about consideration of alternatives are found at 33 CFR 320.4 (a)(2). The relevant environmental issues identified in Section 3.0 were used to formulate the

alternatives. The alternatives considered in detail are described in Section 4.2 and their impacts compared in Section 4.4. Other alternatives not considered in detail are discussed in Section 4.3.

4.2 Description of Alternatives.

4.2.1 No Action. This alternative is one that results in no construction or work requiring a Corps or TVA permit. No Action would be brought about by denial of the permits or withdrawal of the permit application.

4.2.2 Applicant's Proposed Action. This alternative consists of the proposal and revisions described in sections 1.1 and 1.3, respectively.

4.2.3 Applicant's Proposed Action with Added Special Conditions. This alternative consists of the Applicant's Proposed Action identified in Section 4.2.2 above with the inclusion of special conditions to further minimize/mitigate unavoidable environmental impacts to the maximum extent practicable.

4.3 Alternatives not Considered in Detail. Other practicable alternatives involving different designs (size, shape, height), materials (metal, composites, etc.), or sites exist. However, the resultant degree of impact would be commensurate with the impacts of the proposed action. All of the alternative designs would require DA/TVA permits and would be subject to the agencies' review processes. These alternatives might not satisfy the applicant's purpose and need.

4.4 Comparison of Alternatives.

4.4.1 No Action. This alternative would result if no work occurs in WUS. No Action would be brought about by a denial of the DA or TVA permits. The potential environmental impacts described in Section 3.0 would not occur. Conversely, the expected socio-economic benefits also described in that section would not be achieved. No Action would not satisfy the applicant's stated purpose and need.

4.4.2 Applicant's Proposed Action. The proposed action described in sections 1.1 and 1.3 would potentially have various adverse and beneficial environmental and socioeconomic effects. These potential effects have been listed in Section 3.0 above.

4.4.3 Applicant's Proposed Action with Added Special Conditions. This alternative would result in similar impacts and benefits to the alternative described in Section 4.4.2 above. Special permit conditions have been developed for incorporation into the permit (see below). The special conditions are reasonably enforceable and would afford appropriate and practicable environmental protection. Some of the conditions are necessary to satisfy legal and public interest requirements. Conditions have been specifically added to minimize adverse impacts on navigation, water quality, cultural resources and the aquatic environment.

- The work must be in accordance with any plans attached to this permit. *Justification: Clarify the permit application.*
- You must have a copy of this permit available on the site and ensure all contractors are aware of its conditions and abide by them. *Recommended at 33 CFR 325, Appendix A.*

- Your use of the permitted activity must not interfere with the public's right to free navigation on all navigable waters of the United States. *Recommended at 33 CFR 325, Appendix A.*
- A preconstruction meeting must be held among representatives of the Nashville District Corps of Engineers, TVA, permittee, and contractor(s) to discuss the conditions of this permit. You should contact J. Ruben Hernandez (Corps), telephone number (615) 369-7519, at least two weeks in advance to arrange the required meeting. *Clarify the permit application.*
- You are required to notify this office, in writing, by completion of the enclosed "Navigation Data Sheet" at least 10 working days in advance of any work in the waterway related to the construction of the activity herein approved. Failure to comply with this requirement may result in revisions or delays of work schedules to allow adequate time for notification of navigation interests utilizing the waterway. *Public interest requirement (navigation safety).*
- The disturbance to riparian vegetation shall be kept to a minimum during construction. *Minimize impacts on wildlife habitat, water quality, and the aquatic environment.*
- You must institute and maintain a strict erosion and sediment control program for the life of the project and ensure that all disturbed areas are properly seeded, riprapped, or otherwise stabilized as soon as practicable to prevent erosion. *Minimize impacts on water quality and the aquatic environment.*
- Riprap material shall be quarry-run stone (adequate size distribution and weight) or its equivalent, i.e., clean material free of waste metal products, organic materials, unsightly debris, etc. *Minimize impacts on water quality and the aquatic environment.*
- You must install and maintain, at your expense, any safety lights and signals prescribed by the United States Coast Guard (USCG), through regulations or otherwise, on your authorized facilities. The USCG may be reached at the following address and telephone number: Commander, Eighth Coast Guard District (oan), Hale Boggs Federal Building, 501 Magazine Street, New Orleans, LA 70130-3396, (314-539-3900). *Public interest requirement and recommended at 33 CFR 325, Appendix A.*
- You hereby recognize the possibility that the structure permitted herein may be subject to damage by wave wash and possible collision damage from passing vessels. The issuance of this permit does not relieve you from taking all proper steps to ensure the integrity of the structure and the safety of boats moored thereto from damage by wave wash or collisions and you shall not hold the United States liable for any such damage. *Public interest requirement (navigation safety).*
- No boats shall be moored along the outside end of the floating docks at any time. *Public interest requirement (navigation safety).*
- Marina sewage pump-out station(s) must be installed and operated according to recommended TVA Clean Marina guidelines. *Minimize aquatic life/environment and water quality impacts.*
- To mitigate for the elimination of shallow-water habitat, you must install 106 spawning benches under the direction of TWRA Region IV fisheries personnel, (423) 522-2465, or equivalent habitat enhancements in selected areas of WBR along the perimeter of Matlock Bend, adjacent to the

edge of the property. *Minimize impacts on aquatic life, water quality, and the aquatic environment.*

- None of the boat slips shall extend more than one-third of the way across the channel to Bogart Island from bank to bank at NSP, El. 741. *Public interest requirements (navigation safety considerations).*
- No portion of a proposed no-wake zone shall extend onto the commercial navigation channel. Requests for a no-wake zone and associated buoys should be reviewed by Corps and TVA Navigation personnel. *Public interest requirements (navigation safety considerations).*
- All floating facilities must be securely anchored to prevent them from floating free during major floods. *Public interest requirements (navigation safety considerations).*
- Silt curtains must be placed around the dredge area perimeter so as to not allow silt-laden water outside the impact area. *Environmental protection and to minimize impacts on water quality.*
- All saturated spoil shall be dewatered using berms, straw bales, silt fencing, or other silt control devices positioned in such a way as to not allow silt-laden water to re-enter the reservoir. *Environmental protection and to minimize impacts on water quality.*
- You agree that spoil material will be disposed of and contained on land lying above the 754.5-foot contour. Every precaution will be made to prevent reentry of the spoil material into the reservoir. *Environmental protection and to satisfy legal requirements.*
- This permit also authorizes the periodic maintenance dredging of the project herein approved, which may be performed under this permit for ten years from the date of issuance of this permit. However, you must advise this office in writing at least two months before you intend to undertake any maintenance dredging. All initial dredging special conditions and requirements, e.g., testing, handling, etc., also apply to maintenance dredging. *Recommended at 33 CFR 325, Appendix A.*
- Certified "as-built" drawings shall be furnished this office within 60 days of completion of construction showing final dimensions of all structures and work, i.e., docks, ramps, riprap, dredging, etc. Docks shall show the maximum extension from the shoreline referenced to the NSP contour, El. 741. *Public interest requirement (navigation safety).*

Additional Conditions. The following measures and conditions would be included as additional conditions in TVA's Section 26a Permit:

- You will comply with the stipulations of the executed Memorandum of Agreement.
- The pavilions will remain open to the elements and never be enclosed in the future.
- The applicant will provide calculations showing that the underground fuel tank anchorage is sufficient to prevent the tanks from floating free if they are flooded while being empty.

5.0 Citations

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Duvall, Glyn

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1974 Field notes and records pertaining to a shoreline survey of Matlock Bend, Loudon County, Tennessee. On file, Tennessee Division of Archaeology, Nashville, Tennessee.

Slaughter, Bernard W. and Shane A. McCorkle

2005 Phase II Archaeological Testing On Matlock Bend, Loudon County, Tennessee: Sites 40LD191, 40LD220, and 40LD221. DuVall and Associates, Franklin, Tennessee.

Taylor, Richard D., Jr.

1992 A Cultural Resources Reconnaissance of Approximately Thirty Acres Located on Matlock Bend, Loudon County, Tennessee. DuVall and Associates, Franklin, Tennessee. Submitted to Tennessee Eastman Company, Kingsport, Tennessee.

Turner, William B.

1988 Archaeological Survey of Barge Terminal and Equipment Storage Yard on the Matlock Bend of Watts Bar Lake, Loudon County, Tennessee. Submitted to McKinnon Bridge Company and Tennessee Valley Authority, Norris Tennessee.

FOR THE COMMANDER:

5/20/2008

Date

Lisa R. Morris

William L. James
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