



US Army Corps
of Engineers
Memphis District

Public Notice

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**NOTICE DATE:
May 04, 2018**

Attn: Postmaster,
Please Post Until

**EXPIRATION DATE:
June 04, 2018**



Public Notice

U.S. Army Corps of Engineers

AUTHORITY: Pursuant to 33 CFR 332.8(d)(4) (Mitigation banks and in-lieu fee programs, public review and comment), this notice announces a prospectus submitted for the development of the West Tennessee Penitentiary Stream Restoration Project to be included in the Tennessee Stream Mitigation Program (TSMP) In-Lieu Fee (ILF).

BANK SPONSOR: Tennessee Stream Mitigation Program (TSMP)
5000 Linbar Drive, Suite 275
Nashville, Tennessee 37211

LOCATION: The West Tennessee State Penitentiary Stream Restoration Project site is located on Tennessee Department of Corrections (TDOC) property along Highway 87 in Henning, Tennessee. The project site lies within the Bluff Hills (74a) and Loess Plains (74b) Level IV Ecoregions. The project's HUC8 is 08010208 (Lower Hatchie River) and the HUC12 is 080102080806 (Hatchie River Outlet). Project coordinates are 35.666008, -89.738743. See attached maps.

BACKGROUND: The Tennessee Wildlife Resources Foundation's TSMP ILF Instrument was approved on June 7, 2013, by the Memphis and Nashville Districts of the U.S. Army Corps of Engineers. The West Tennessee Penitentiary Stream Restoration Project Prospectus has been submitted as a proposed addition to the ILF Instrument pursuant to 33 CFR 332, Compensatory Mitigation for Losses of Aquatic Resources (Federal Register: April 10, 2008, effective June 9, 2008). Pursuant to 33 CFR 332.8 (d), the district engineer will provide public notice of the proposed addition of an in-lieu-fee program mitigation site. As such, we are issuing this public notice to solicit comments for the instrument modification for addition of an in-lieu fee mitigation site.

PURPOSE: The purpose of this notice is to inform the public of the proposed modification of the existing TSMP ILF instrument to include the West Tennessee Penitentiary Stream Restoration Project stream mitigation site that would generate credits that would be used to meet compensatory mitigation requirements for permits issued under Section 404 of the Clean Water Act for the deposition of dredged or fill material into waters of the United States or under Section 10 of the Rivers and Harbors Act of 1899 for work within navigable waters of the United States. If approved, this mitigation site would also be used to satisfy permitting requirements of the Tennessee Department of Environment and Conservation under the Tennessee Water Quality Control Act. The following is a summary of the prospectus for this project; please contact the Memphis District (see contact info below) for further information.

OBJECTIVES: The sponsor's stated objectives are as follows: The project includes the restoration, enhancement and preservation of eight streams (T1-T8), most of which are first order tributaries. Recent and historical land use disturbances associated with agricultural practices have caused widespread stream degradation throughout the project site. The streams located within agricultural fields have been moved from their historic landscape positions, straightened and channelized. These channel alterations have led to severe incision, lateral instability, and a significant loss in stream function. The goal of this project is to improve the functional state of the project streams by addressing hydrologic, hydraulic and geomorphological deficiencies, which are a direct product of the landscape alterations described above.

Hydrology Objective: Eliminate concentrated flow points entering the reaches by conveying runoff into terrace slope drains and floodplain dissipation pads.

Hydraulics Objective: Restore floodplain connectivity by creating stream channels that have a bank height ratio near 1.0 and an entrenchment ratio greater than 2.2.

Geomorphology Objective: Restore riparian corridor conditions by planting stream buffers that are a minimum of 50' from the top of bank, have an average vegetative density of 300 woody stems/acre represented by each vegetative strata (overstory, understory, and shrub), and are comprised of less than 10% woody invasive stems.

Reduce sedimentation from stream bank erosion by creating channels that will remain stable with less than 10% of the banks actively eroding and attain a "Functioning" dominant BEHI/NBS rating.

Restore a channel with riffles and pools utilizing woody debris for aquatic refuge and bed stability, and create a riparian buffer with streamside vegetation to serve as a source of woody debris in the future. The restored stream should have a LWDI of 199-299 and provide greater than 70% stable habitat available for colonization by macroinvertebrates and fish.

SERVICE AREA: The service area for the restoration project is the South Hatchie Obion Geographic Service Area. The South Hatchie Obion Geographic Service Area is comprised of the following 8 digit HUC watersheds: 08010100 (Lower Mississippi-Memphis), 08010207 (Upper Hatchie), 08010208 (Lower Hatchie), 08010209 (Loosahatchie), 08010210 (Wolf), 08010211 (Horn Lake-Nonconnah). This service area is located in the Mississippi River Basin in West Tennessee, and it measures approximately 3,972 square miles. It includes the municipalities of Memphis, Bartlett, Bolivar, Collierville, Covington, Germantown, Ripley, and Somerville. The Lower Hatchie 8-digit HUC watershed comprises 37% of the Geographic Service Area.

PROPOSED CREDIT GENERATION: The Sponsor proposes to generate 22,575 credits by preserving, enhancing, reestablishing, or rehabilitating 38,884 linear feet of stream channel.

PROPOSED OWNERSHIP AND LONG-TERM MANAGEMENT: After seven years of monitoring is complete, performance standards are met, and the project is formally closed out, the long term stewardship of this project will be the responsibility of the Tennessee Wildlife Resources Foundation. The long-term steward will focus on ensuring easement integrity is maintained and that the landowner is observing the established restrictions for the easement. Long-term management consists of annual inspection of projects to assure that conservation easements or other site protection management agreements are not being violated. Sufficient funds have been retained in the TSMP mitigation fund to cover the costs of the annual site inspections, and for enforcing land use restrictions through litigation if necessary.

QUALIFICATIONS OF SPONSORS: The agent for this project is the TSMP. The TSMP has completed more than two dozen ecological restoration projects in Tennessee since 2004. For this project, the TSMP has hired KCI Technologies, Inc. (KCI) to provide assessment, design, oversight, and construction services.

ENDANGERED SPECIES: There are two federally listed species that are known to have a range that includes the project area. They are the federally endangered Indiana bat (*Myotis sodalis*) and the federally threatened northern long-eared bat (*Myotis septentrionalis*). This project is being coordinated with the United States Fish and Wildlife Service. Any comments they may have regarding endangered or threatened wildlife or plants, or their critical habitat, will be considered in our evaluation of the described work.

CULTURAL RESOURCES: The Memphis District will evaluate information provided by the State Historic Preservation Officer, federally-recognized Tribes and the public in response to this public notice and we may conduct or require a survey of the project area.

FLOODPLAIN: In accordance with 44 CFR Part 60 (Floodplain Management and Use), participating communities are required to review all proposed development to determine if a floodplain development permit is required. Floodplain administrators should review the proposed public notice and apprise this office of any floodplain development permit requirements.

PUBLIC INTEREST REVIEW: The purpose of this public notice is to advise all interested parties of the proposed activities and to solicit comments and information necessary to evaluate the probable impact on the public interest.

The decision whether to authorize this mitigation plan will be based on an evaluation of the probable impact including cumulative impacts of the activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefits which reasonably may be expected to accrue from the project must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the project will be considered, including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership and in general, the needs and welfare of the people.

The Corps of Engineers is soliciting comments from the public; federal, state and local agencies and officials; federally-recognized Tribes; and other interested parties in order to consider and evaluate the proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to authorize this request. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

PUBLIC HEARING: Any person may request, in writing, within the comment period specified in this notice that a public hearing be held to consider this prospectus. Requests for a public hearing shall state, with particularity, the reason for holding a public hearing. The District Engineer will determine if the issues raised are substantial and whether a hearing is needed for making a decision. If a public hearing is held, it will be for the purpose of obtaining additional information that we could not otherwise obtain through a public notice process and not to inform the public about the specific details of the project in greater detail than what is found in this notice. This is not a Corps of Engineers project. We are not a proponent nor are we an opponent of the project. We are merely the permitting authority of Section 404 and Section 10 permits required by our office.

COMMENTS: To request additional information or provide comments on this notice, please contact Damon McDermott using the information below:

Damon McDermott
Corps of Engineers – Memphis District
167 N. Main Street, Room B-202
Memphis, Tennessee 38103-1894
Email: robert.d.mcdermott@usace.army.mil
Phone: (901) 544-0732
Fax: (901) 544-0211

Comments may be sent via mail or email. The Corps of Engineers may provide copies of all comments, (including name & address of those providing comments) to the applicant for consideration and response prior to a decision. Comments must be received by the expiration date listed on page one of this notice.

For Final Individual Permits actions in the Memphis District, go to the following link: <http://geo.usace.army.mil/egis/f?p=340:2:0::NO:RP>. Using the Filter by district drop down box, select MVM-Memphis District, then select the year and month (information will populate in the table below). All pending individual permits can be located by selecting the "Pending IP" tab above. All of the environmental documents and statements of findings supporting issuance or denial of the permit decisions are available upon written request and where applicable, upon the payment of administrative fees. They are also available at the Memphis District, Regulatory Branch office for examination.

Gregg Williams
Chief
Regulatory Branch

Attachments

West Tennessee State Penitentiary Stream Restoration Project Prospectus



5000 Linbar Drive, Suite 275
Nashville, TN 37211
Phone: (615) 831-9311
Fax: (615) 831-9081

March 2018

1.0 PROJECT OWNER INFORMATION

Project Sponsor

Tennessee Stream Mitigation Program (TSMP)
5000 Linbar Drive, Suite 275
Nashville, Tennessee 37211

Landowner

State of Tennessee

2.0 PROJECT AGENT INFORMATION

The agent for this project is the Tennessee Stream Mitigation Program (TSMP). The TSMP has completed more than two dozen ecological restoration projects in Tennessee since 2004. For this project, the TSMP has hired KCI Technologies, Inc. (KCI) to provide assessment, design, oversight and construction services. A brief overview of qualifications can be found in Appendix A.

3.0 PROJECT LOCATION

The West Tennessee State Penitentiary Stream Restoration Project (WTSP) site is located on Tennessee Department of Corrections (TDOC) property along Highway 87 in Henning, Tennessee. The project site lies within the Bluff Hills (74a) and Loess Plains (74b) Level IV Ecoregions. The project's HUC8 is 08010208 (Lower Hatchie River) and the HUC12 is 080102080806 (Hatchie River Outlet). Project coordinates are 35.666008, -89.738743.

4.0 ACCESS TO PROPERTY

The project is located at a state owned correctional facility managed by TDOC. Access has been granted through the conveyance of an Option Agreement between the landowner and Project Sponsor. All site access should be coordinated through the TSMP who will directly coordinate with WTSP security personnel prior to visiting the project site.

5.0 PROJECT GOALS

The project includes the restoration, enhancement and preservation of eight streams (T1-T8), most of which are first order tributaries. Recent and historical land use disturbances associated with agricultural practices have caused widespread stream degradation throughout the project site. The streams located within agricultural fields have been moved from their historic landscape positions, straightened and channelized. These channel alterations have led to severe incision, lateral instability, and a significant loss in stream function. The goal of this project is to improve the functional state of the project streams by addressing hydrologic, hydraulic and geomorphological deficiencies, which are a direct product of the landscape alterations described above.

6.0 PROJECT OBJECTIVES

Table 1. Project Objectives

Functional Category	Function-based Parameter	Objectives
Hydrology	Runoff	Eliminate concentrated flow points entering the reaches by conveying runoff into terrace slope drains and floodplain dissipation pads.
Hydraulics	Floodplain Connectivity	Restore floodplain connectivity by creating stream channels that have a bank height ratio near 1.0 and an entrenchment ratio of > 2.2.
Geomorphology	Riparian Vegetation	Restore riparian corridor conditions by planting stream buffers that are a minimum of 50' from the top of bank, have an average vegetative density of 300 woody stems/acre represented by each vegetative strata (overstory, understory, and shrub), and are comprised of less than 10% woody invasive stems.
	Lateral Stability	Reduce sedimentation from stream bank erosion by creating channels that will remain stable with less than 10% of the banks actively eroding and attain a "Functioning" dominant BEHI/NBS rating.
	Bedform Diversity	Restore a channel with riffles and pools utilizing woody debris for aquatic refuge and bed stability, and create a riparian buffer with streamside vegetation to serve as a source of woody debris in the future. The restored stream should have a LWDI of 199-299 and provide greater than 70% stable habitat available for colonization by macroinvertebrates and fish.

7.0 SITE CONSTRAINTS

Many of the project reaches are located in agricultural fields where lateral and vertical constraints are minimal or absent, but design constraints related to roads and the correctional facility's infrastructure do exist in some locations. The majority of these constraints are located near the intersection of the project streams and Highway 87. Sewer, water and utility lines run parallel to the highway and cross several of the streams (some of which are suspended across the channel). The streams' designed planforms and profiles will consider the locations and elevations of all utilities in order to avoid impacting infrastructure while maintaining stream function. Streams T2, T4 and a section of T5 are controlled vertically by an upstream and downstream culvert, which limits the restoration approach in these reaches to a Priority II approach. The section of T5 downstream of Highway 87 passes directly in front of a correctional building. The riparian buffer in this area will be limited in terms of vegetation height and diversity for security reasons as requested by TDOC.

Although several infrastructural constraints exist, they are mostly isolated to a specific location. Project goals and objectives are achievable through proper design and due diligence.

8.0 CATCHMENT ASSESSMENT FORM

See the assessment forms in Appendix B.

9.0 EXISTING AND PROPOSED REACH-LEVEL STREAM FUNCTION-BASED RAPID ASSESSMENT DATA FORM

See the assessment data sheets in Appendix C.

10.0 BIOLOGICAL DATA

Macroinvertebrate samples will be collected at a later date in order to establish baseline conditions in regards to TMI and NCBI scores for the project streams. Biological data collection will not be a monitoring component for the project.

11.0 VISUAL HABITAT ASSESSMENT

Habitat assessment data sheets were completed on all project reaches. The assessment scores for each reach were compared to regional guideline scores for headwater streams in Ecoregion 74a or 74b depending on the location of the assessed reach. According to the August 2017 version of the Quality System Standard Operating Procedure for Macroinvertebrate Stream Surveys, the regional guideline score for Ecoregion 74a during the months of July – December is ≥ 116 and 108 during January – June. The regional guideline score for 74b during the months of July – December is ≥ 113 and 134 during January – June. The assessment locations and scores for the project are listed in the table below. See the RBP data sheets in Appendix D.

Table 2. Habitat Assessment Results Summary

Project Reach	Assessment Location (Begin)	Assessment Score
T1 – Reach 1	35.669272, -89.737151	32
T1 – Reach 2	35.661833, -89.734397	63
T1 – Reach 3	35.653983, -89.741797	56
T1 – Reach 4	35.648786, -89.744961	79
T2	35.670296, -89.741242	45
T3 – Reach 1	35.669378, -89.74151	48
T3 – Reach 2	35.667527, -89.739691	61
T4	35.666519, -89.742469	55
T5	35.665644, -89.744765	64
T6 – Reach 1	35.667371, -89.761364	149
T6 – Reach 2	35.664296, -89.75548	83
T6 – Reach 3	35.663070, -89.752119	108
T6 – Reach 4	35.659858, -89.747741	83
T6 – Reach 5	35.654539, -89.748352	56
T6 – Reach 6	35.651003, -89.750973	72
T8 – Reach 1	35.663917, -89.744594	81
T8 – Reach 2	35.657642, -89.741325	55
T9	35.662049, -89.744585	64

The visual habitat assessment ratings above illustrate a project site that has been impacted by the development of the correctional complex and the expansion of cropland in the watershed. Almost all of the streams' ratings are below the regional guideline score other than T6-Reach 1 and T6-Reach 3 where Preservation and Enhancement I are proposed, respectively. T6-Reach 1 is located in a forested headwater cove upstream of agricultural influences, and it possesses significantly higher quality habitats compared to the other project reaches. T6-Reach 3 is located in a low gradient valley that has transitioned into a linear stream/wetland complex. This reach equals the regional guideline score as it possesses higher quality instream habitat in the form of wetland vegetation and stable undercut banks. Impairments along the reaches scoring below the regional guideline are largely caused by inadequate riparian buffers, lateral instability and severe channel alteration.

12.0 MAPS

See all project maps in Appendix E.

13.0 SITE PHOTOS

Site photos and a photo map have been included in Appendix F.

14.0 BASELINE CONDITIONS

14.1 Proposed Service Area Description

The service area for the restoration project is the South Hatchie Obion Geographic Service Area. The South Hatchie Obion Geographic Service Area is comprised of the following 8-digit HUC watersheds: 08010100 (Lower Mississippi-Memphis), 08010207 (Upper Hatchie), 08010208 (Lower Hatchie), 08010209 (Loosahatchie), 08010210 (Wolf), 08010211 (Horn Lake-Nonconnah). This service area is located in the Mississippi River Basin in West Tennessee, and it measures approximately 3,972 mi². It includes the municipalities of Memphis, Bartlett, Bolivar, Collierville, Covington, Germantown, Ripley, and Somerville. The Lower Hatchie 8-digit HUC watershed comprises 37% of the Geographic Service Area. According to the Water Quality Management Plan for the Lower Hatchie River watershed produced by TDEC in 2007, land use classification within the watershed consists of approximately 49.5% agricultural land (row crops and pasture). A combination of forest types (deciduous, evergreen, and mixed) represent approximately 36.1% of the watershed while woody wetlands cover approximately 12.0%. The primary threats to aquatic resources throughout the geographic service area are: altered hydrologic regimes, altered instream physical habitat conditions and near-stream habitat conditions, sedimentation, nutrient loading, thermal alteration, and toxins and other contaminants. This site offers the opportunity to address many of these aquatic impacts, as described in the goals and objectives.

14.2 Summary of Catchment Assessment Form and Function-Based Rapid Assessment Forms

A catchment assessment form was completed for two watersheds for this project, T1 and T6. The watershed for T1 is approximately 2.0 mi² with land use consisting primarily of agricultural land (row crops). T6 measures approximately 0.7 mi² and row crops are the dominant land cover in the watershed. Forest coverage in this watershed comprises approximately 34% of the total area as the headwaters are well vegetated. The overall watershed conditions for T1 and T6 according to the catchment assessment forms are Fair. Parameters classifying as "Poor" for both watersheds include concentrated flow, proximity to roads and sediment supply. The table below summarizes the functional conditions of the assessed reaches:

Table 3. Functional Assessment Forms Summary

Reach	Runoff	Floodplain Connectivity (Vertical Stability)	Riparian Vegetation	Lateral Stability	Bedform Diversity	Water Quality and Nutrients
T1 – Reach 1	FAR	NF	NF	NF	NF	FAR
T1 – Reach 2	FAR	NF	FAR	NF	NF	FAR
T1 – Reach 3	FAR	NF	FAR	NF	NF	FAR
T1 – Reach 4	FAR	NF	FAR	NF	NF	FAR
T2	FAR	NF	NF	NF	NF	NF
T3 – Reach 1	F	FAR	NF	NF	NF	FAR
T3 – Reach 2	FAR	NF	NF	NF	NF	NF

T4	FAR	NF	NF	NF	NF	FAR
T5	FAR	FAR	NF	NF	FAR	FAR
T6 – Reach 1	F	F	F	F	F	F
T6 – Reach 2	FAR	NF	FAR	NF	FAR	FAR
T6 – Reach 3	F	F	NF	F	FAR	NF
T6 – Reach 4	FAR	NF	FAR	NF	NF	FAR
T6 – Reach 5	FAR	NF	NF	NF	NF	NF
T6 – Reach 6	FAR	NF	NF	NF	NF	NF
T7	FAR	NF	FAR	NF	FAR	FAR
T8 – Reach 1	FAR	NF	FAR	NF	FAR	FAR
T8 – Reach 2	FAR	NF	FAR	NF	FAR	FAR

Note: Biological data will be collected at a later date in order to establish baseline conditions.

Based on analysis of the functional assessment data, there is an opportunity for functional lift related to hydrology, hydraulics and geomorphology. See Appendix B for Catchment Assessment and Appendix C for Function-Based Rapid Assessment forms.

14.3 Adjacent Land Uses

The project is located on a large parcel owned by the State of Tennessee. The surrounding parcels, most of which are used for row crops, are not located near the project streams nor do they contribute drainage into them. The headwaters of the streams are located within the project parcel which minimizes the potential for offsite impacts to the project streams.

15.0 PROPOSED MITIGATION APPROACH

15.1 Mitigation Approach

The proposed restoration project includes the restoration, enhancement and preservation of nearly 39,000 linear feet of stream impacted by agricultural practices and development in the watershed. The restoration project is complex for several reasons including soil conditions, the Hatchie River's hydraulic and geomorphic impact on the downstream reaches of T1 and T6, and infrastructure design constraints near the correctional facility. Deliberation of each of these factors will occur during the design phase of the restoration project to ensure maximum uplift potential is met given the environmental and infrastructure conditions. Due to the complexity of the project and being in the beginning phases of project development, proposed mitigation approaches are conceptual and will be further developed at the Mitigation Plan phase of the project.

Restoration is proposed for the majority of the project reaches, and they will be restored using a combination of geotechnical valley restoration and traditional Priority II natural channel design. The geotechnical valley restoration approach focuses on inhibiting widespread bed degradation and subsequent lateral instability through geotechnical structuring in the highly erodible soil conditions onsite. This approach will focus on losing channel and valley grade at these structures and then building low slope channels between the structures. Traditional Priority II restoration techniques will be utilized in conjunction with the geotechnical valley restoration approach to provide bedform diversity and instream habitat by incorporating woody debris in riffle and pool features.

Stream alignments will generally follow that of the existing project streams, but offline restoration will be utilized wherever feasible and/or necessary. One known location where offline restoration will occur is along T6 where the stream currently enters a drop inlet, passes under an old in-line pond dam, and empties into a severely incised section of stream. Beginning near the old dam (end of T6 Reach 3), the stream will be relocated to the west using structures to navigate the steep landscape. T6 will

remain offline to the west of its existing location until realigning with the existing channel near the end of T6 Reach 5.

There are two reaches of the project where restoration is not the proposed mitigation type and they include T6 Reach 1 and T6 Reach 3. Preservation is proposed for Reach 1 of T6. This reach is protected by dense forest, is minimally constrained, has meanders throughout much of the valley floor, and provides reference reach conditions in terms of channel dimension and planform. T6 Reach 3 will be enhanced through planting, as vegetation is currently being periodically cleared. Lateral and vertical stability are currently “Functioning” due to the reach acting as a low gradient linear wetland/stream.

The following credit table is proposed based on the functional assessments and restoration potential for the reaches. Proposed lengths and credits associated with these lengths are estimates based on conceptual design approaches. These values will be modified as the project progresses.

Table 4. Project Crediting Scenario

Reach Name	Mitigation Type	Stream Length	Ratio	Potential Credits
T1R1	Rehabilitation	3,286	1.5:1	2,191
	Reestablishment	164	1:1	164
T1R2	Rehabilitation	4,961	1.5:1	3,307
T1R3	Rehabilitation	2,214	1.5:1	1,476
T1R4	Rehabilitation	1,583	1.5:1	1,055
T2	Rehabilitation	2,664	1.5:1	1,776
	Reestablishment	133	1:1	133
T3R1	Rehabilitation	545	1.5:1	363
	Reestablishment	27	1:1	27
T3R2	Rehabilitation	592	1.5:1	395
	Reestablishment	30	1:1	30
T4	Rehabilitation	1,390	1.5:1	927
	Reestablishment	70	1:1	70
T5	Rehabilitation	1,505	1.5:1	1,003
	Rehabilitation*	1,270	1.5:1	804*
	Reestablishment	75	1:1	75
T6R1	Preservation	4,989	10:1	499
T6R2	Rehabilitation	1,753	1.5:1	1,169
	Reestablishment	88	1:1	88
T6R3	Enhancement I	1,346	6:1	224
T6R4	Rehabilitation	2,388	1.5:1	1,592
T6R5	Rehabilitation	2,476	1.5:1	1,651
T6R6	Rehabilitation	834	1.5:1	556
T7	Rehabilitation	1,127	1.5:1	751
T8R1	Rehabilitation	908	1.5:1	605
T8R2	Rehabilitation	2,466	1.5:1	1,644
Total Stream Length		38,884	Total Credits	22,575

* Note: Credits reduced 5% due to managed buffer area.

15.2 Proposed Functional Lift

The proposed mitigation approach will provide significant functional lift in regards to hydrology, hydraulics, and geomorphology.

Hydrology – The majority of the project streams are “Functioning-At-Risk” due to the presence of several concentrated flow points entering from the agricultural fields. Hydrologic functional lift is attainable by transforming overland flow from concentrated flow to sheet flow through the implementation of terrace slope drains and floodplain dissipator pads. Large gullies and rills contributing significant amounts of fine sediment into the project streams will be eliminated. Suspended sediment entering the slope drains will likely be deposited onto the floodplain where planted vegetation will act as a filter. The elimination of concentrated flow paths and restoring riparian corridors will improve instream habitat by reducing sedimentation and promote infiltration throughout the floodplain.

Hydraulics – Functional lift is achievable hydraulically due to widespread vertical instability occurring throughout the project site. Several of the project streams are in similar evolutionary stages as they were likely altered around the same time. The majority of the streams classify as Rosgen Gc stream types that are transitioning to F streams. The streams are severely incised, with entrenchment ratios varying based on the severity of bank failure. Many of the streams are moderately entrenched as channel widening in the form of bank sloughing is increasing flood prone area widths. The restored stream channels will have bank height ratios near 1.0 and entrenchment ratios of 2.2 or greater. Additionally, geotechnical valley restoration will inhibit widespread vertical instability. Channel dimensions will be designed in a way that maintains the proper channel capacity given the local sediment regime, while also promoting frequent out-of-bank events in order to disperse energy in the highly erodible soil conditions.

Geomorphology – Restoration of the project streams will provide significant lift by improving several geomorphologic functional parameters. The existing riparian buffer conditions are “Not Functioning” in terms of buffer width throughout much of the project. Vegetation has been cleared to the top of bank in several reaches while a single row of trees separate the agricultural fields from the stream in others. Riparian buffer width will be increased to a minimum of 50 feet from the top of bank along all project streams. Vegetative protection along the stream banks yielded poor and marginal scores resulting in “Not Functioning” and “Functioning-at-Risk” functional ratings depending on the reach. Large sections of bare, eroding soil are common along the stream banks throughout the project site. Establishing vegetative bank protection will be a vital component of project success as it will provide significant uplift in regards to lateral stability. The majority of the project reaches are eroding at an exponential rate resulting in an overall lateral stability rating of “Not Functioning”. Mass wasting is common and is contributing notable amounts of sediment to the project streams and the Hatchie River. Lateral stability functional lift is achievable through the reestablishment of stream bank vegetation and floodplain connectivity. The lack of these two components has greatly impacted instream habitat and bedform diversity. Pool spacing and riffle percentage is “Not Functioning” throughout the project site as many of the reaches are single feature dominated with little variability in bedform and habitat. Aquatic refuge is restricted to fine sediment (silt) in pools throughout most of the site. Available riffles are typically of low quality due to sedimentation or occurring over an unproductive clay soil layer. Due to the nature of West Tennessee streams located in altered watersheds, these bedform diversity functional parameters may not improve significantly, or may only reach a “Functioning-at-Risk” condition. However, functional lift is still attainable by improving habitat quality and variety. The incorporation of large woody debris and rooted banks from planted vegetation will be instrumental in reestablishing instream habitat.

Physicochemical and Biology – Physicochemical and biological functional parameters will not be addressed directly through restoration. The project will focus on reducing sediment inputs from bank erosion and concentrated runoff, and establishing high functioning riparian corridors. While this will likely improve habitat and water quality overall, significant functional lift is not proposed and will not be monitored.

16.0 SITE PROTECTION

Site protection for the project will be provided by a perpetual conservation easement with the landowner, which will be held by the Tennessee Wildlife Resources Foundation, Inc.

17.0 LONG-TERM MANAGEMENT

After seven years of monitoring is complete, performance standards are met, and the project is formally closed out, the long term stewardship of this project will be the responsibility of the Tennessee Wildlife Resources Foundation. The long-term steward will focus on ensuring easement integrity is maintained and that the landowner is observing the established restrictions for the easement. Long-term management consists of annual inspection of projects to assure that conservation easements or other site protection management agreements are not being violated. Sufficient funds have been retained in the TSMP mitigation fund to cover the costs of the annual site inspections, and for enforcing land use restrictions through litigation if necessary.

18.0 HISTORIC PROPERTIES

According to the National Register of Historic Places, there are no properties listed within or near the project parcel. A search of the Tennessee Historical Commission database did not identify any records for historic properties in Lauderdale County. According to the Tennessee Historical Commission, Lauderdale County has not yet been formally surveyed. Due to the type of work being done and the location of the streams (open agricultural fields), impacts to potential historic properties not identified by these organizations are unlikely to occur.

19.0 THREATENED AND ENDANGERED SPECIES

No designated critical habitats are known to occur within the project limits. Correspondence with the Tennessee Wildlife Resources Agency indicates that there are five state-listed species within 5 miles of the project area, but it is not expected that habitat for these species will be disturbed. Additionally, the US Fish and Wildlife Service has identified suitable habitat at the site for two species of bat with a federally protected status. Impact to any potential habitat for these bats will be minimized according to guidelines provided by the USFWS. For more information, please refer to the correspondence with the TWRA and USFWS in Appendix J.

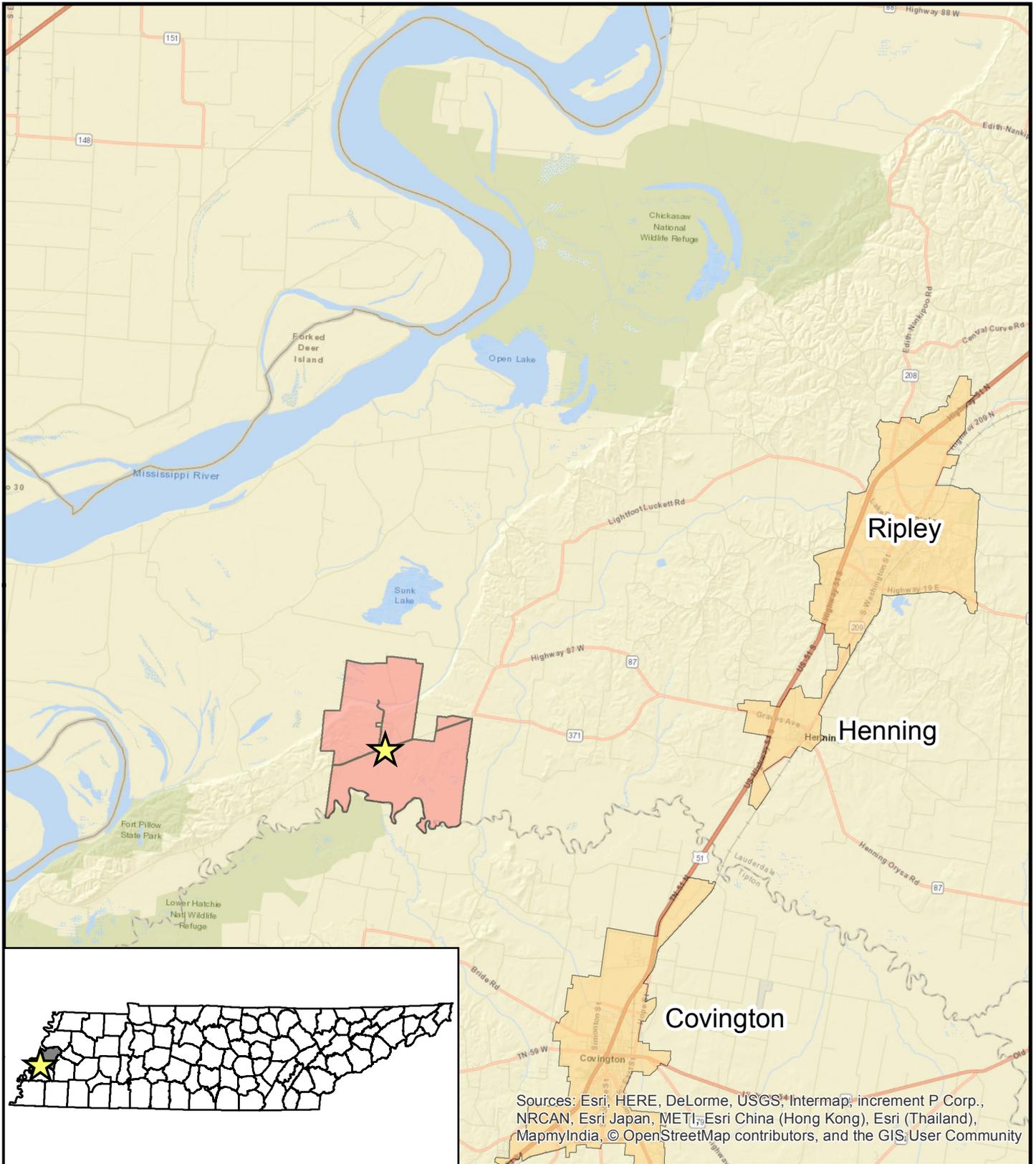
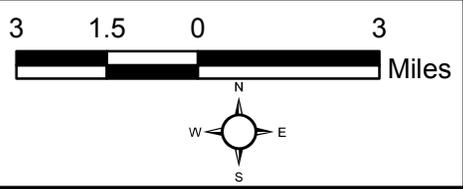


FIGURE 1. VICINITY MAP - WTSP STREAM RESTORATION



- WTSP Parcel
- Project Location



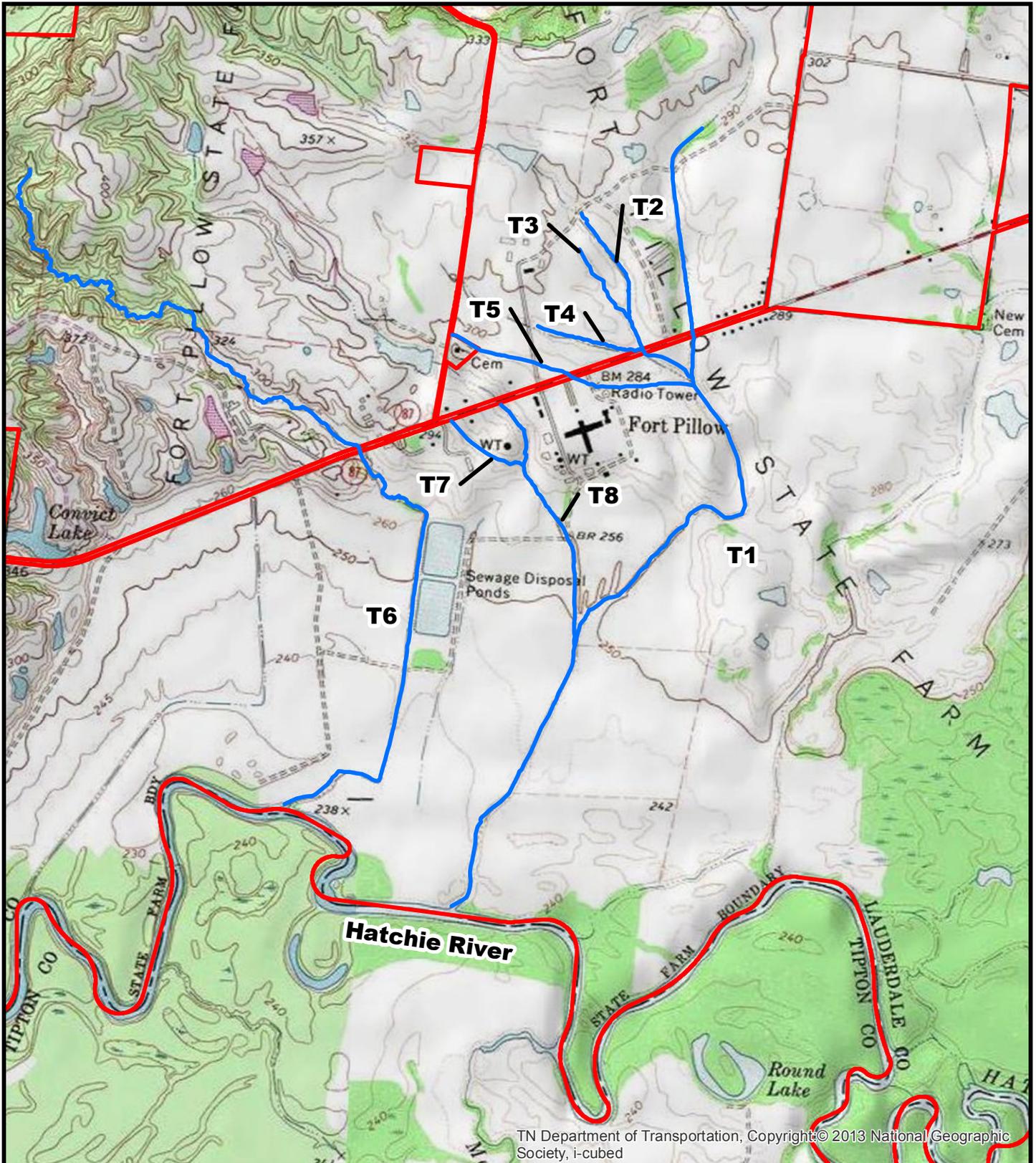


Figure 2. USGS Topographic Map - WTSP Stream Restoration



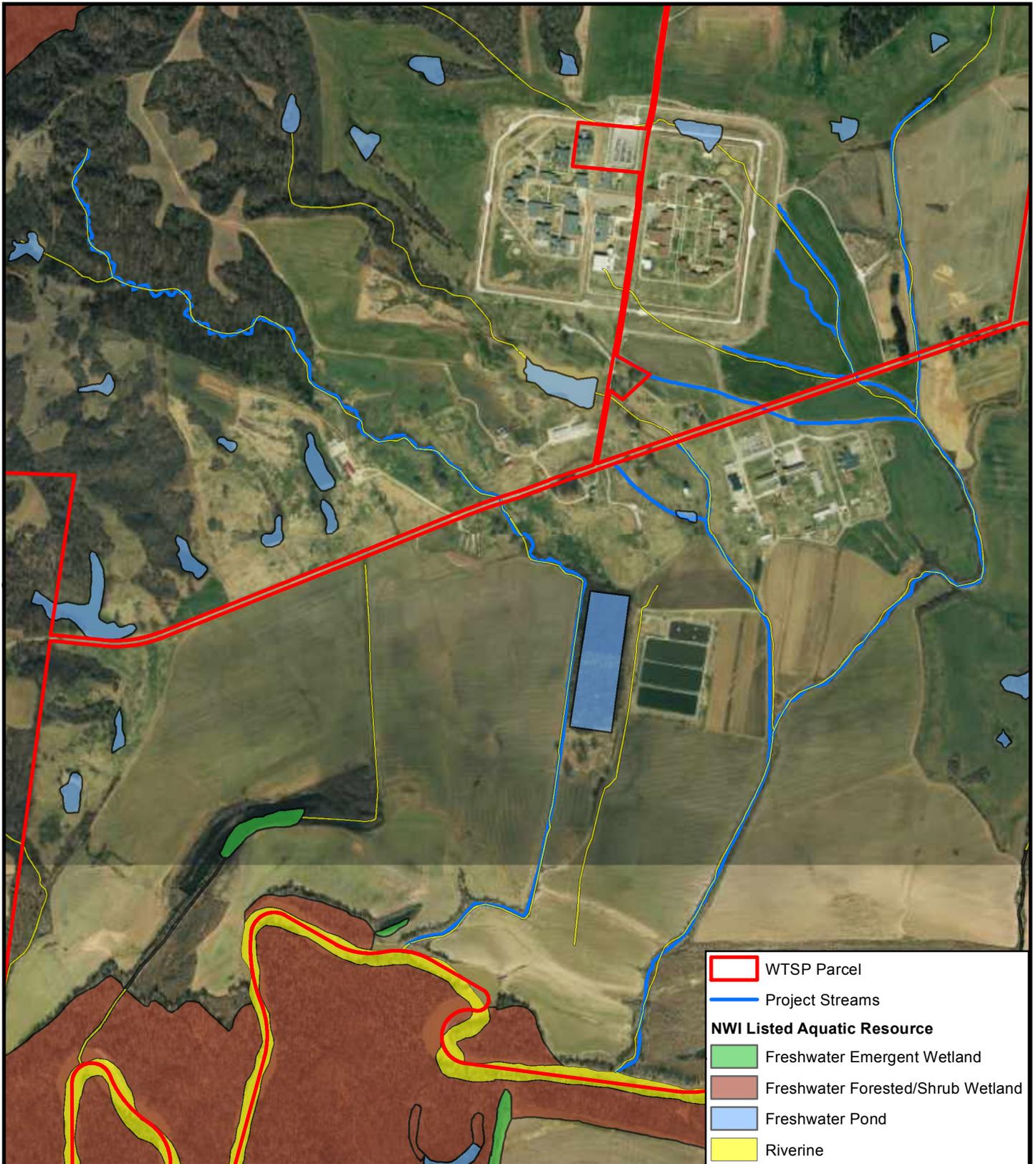
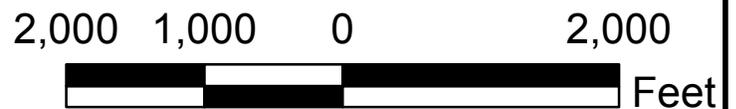
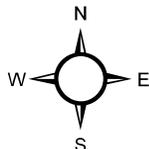
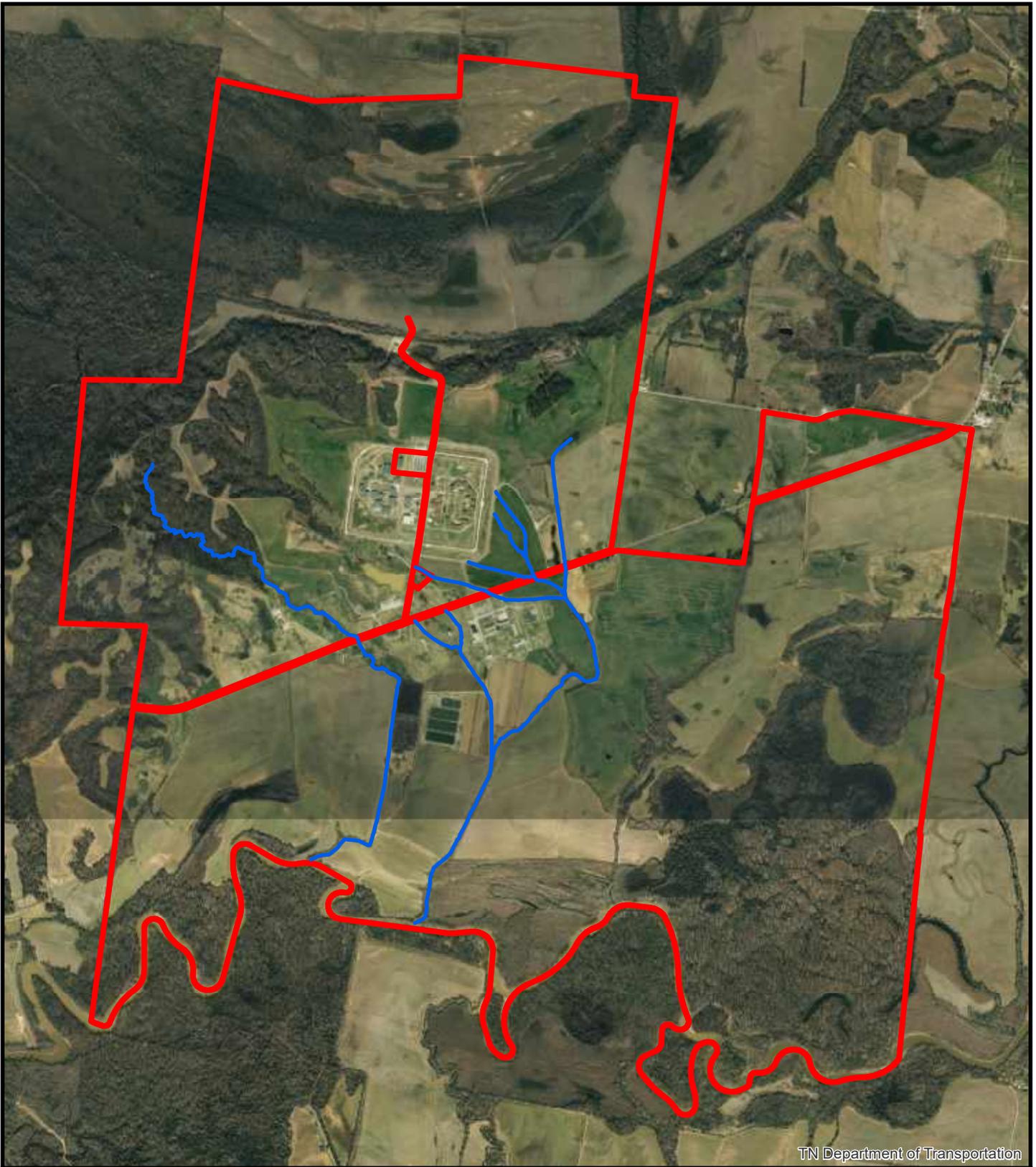


Figure 3. Aquatic Resource Map - WTSP Stream Restoration



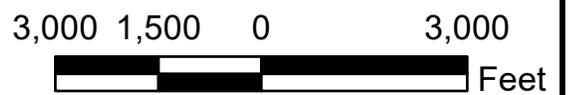
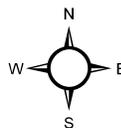


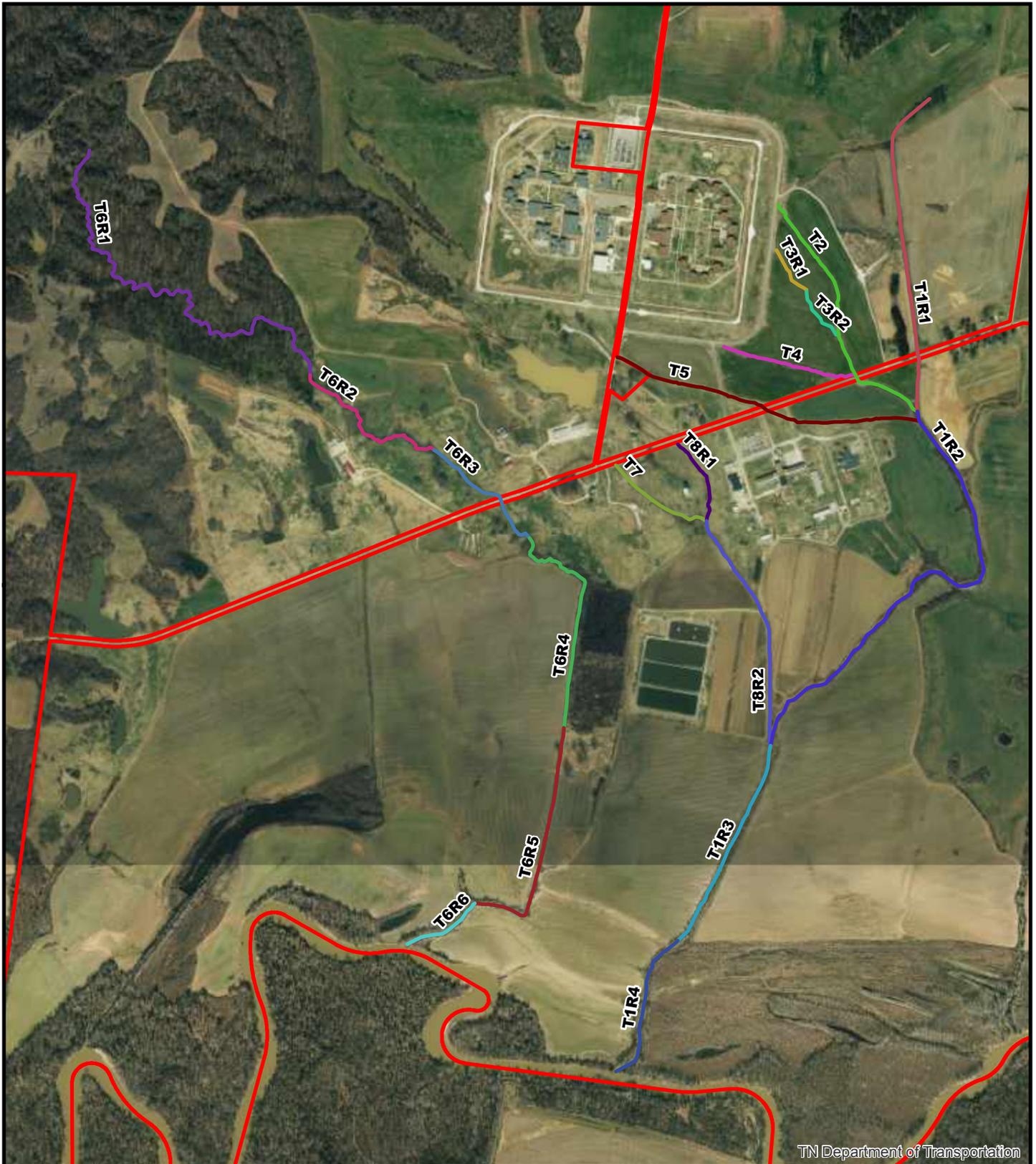
TN Department of Transportation

Figure 4. Parcel Map - WTSP Stream Restoration



- WTSP Parcel
- Project Streams



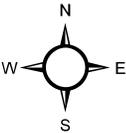


TN Department of Transportation

Figure 5. Reach Segmentation Map - WTSP Stream Restoration



 WTSP Parcel



1,500 750 0 1,500
 Feet

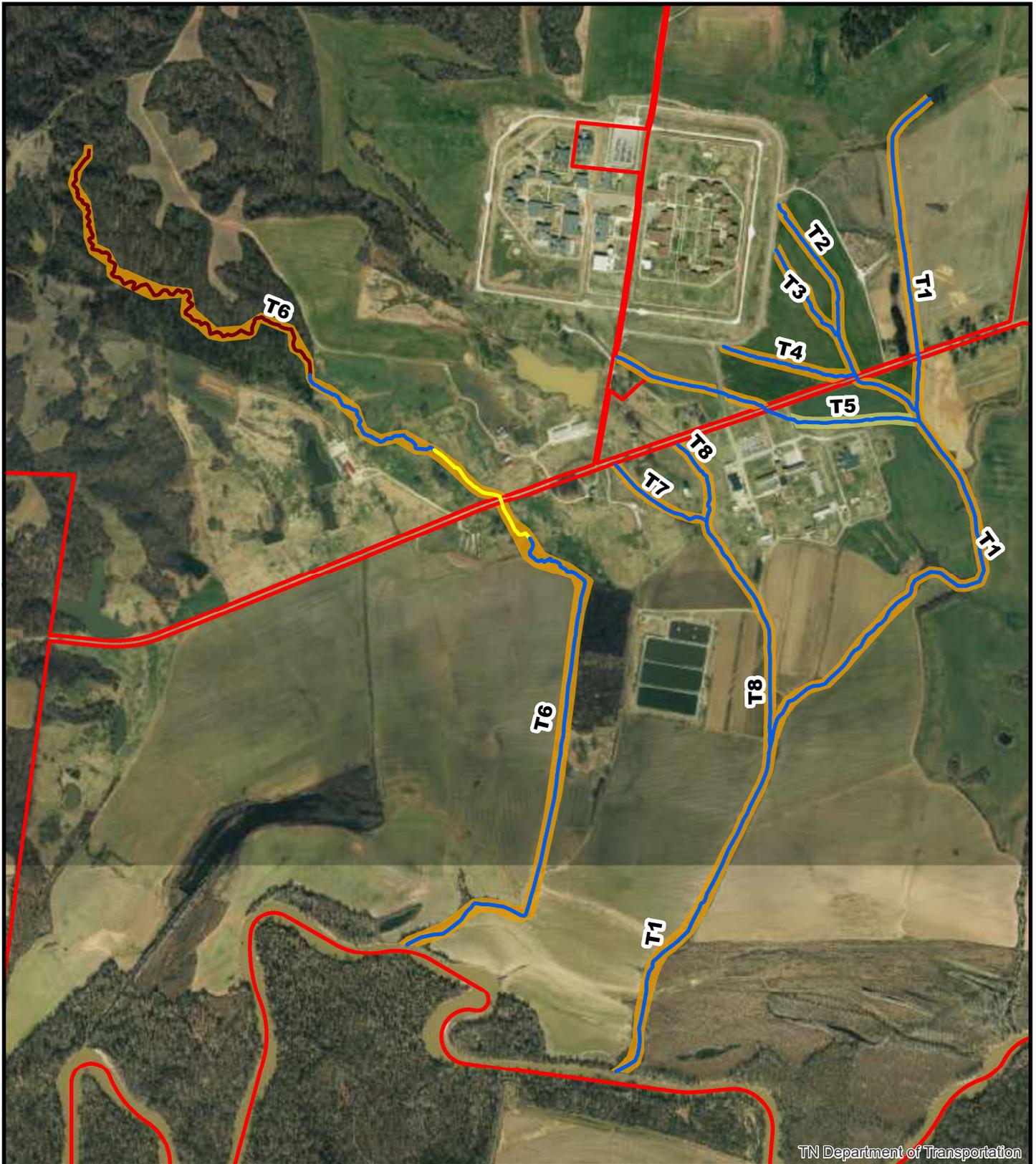


Figure 6. Conceptual Map - WTSP Stream Restoration



- WTSP Parcel
- Enhancement I
- Managed Buffer
- Preservation
- Stream Buffer
- Restoration

