Harpeth River, Tennessee

Senate Committee on Public Works Resolution dated September 19, 1973

(P2 Project Number 336718)

FY 2013

Project Management Plan (PMP)

U.S. Army Corps of Engineers, Nashville District

Revision: DRAFT

Approval Date:

Document History

Revision Number	*Approval Date*	*Revised Section(s)*	*Description of Revision*

Project Management Plan Approval

The undersigned individuals have approved the current version of this PMP.

Nashville PM Date

Franklin PM Date

Brentwood PM Date

Williamson County PM Date

Porter Williams, Project Manager Date

Phillip Jones, Economist Date

Mary Tipton, Biologist Date

James Bilbrey, Hydrology & Hydraulics Date

Mary Catherine Keith, Real Estate Date

Sovireak In, Structural Engineer Date

Valerie McCormack, Archaeologist Date

Tong Haw, Geology Date

Steve Matheny, Soils Engineer Date

Kathryn Firsching, Attorney Date

Kimberly Spicer, Cost Estimating Date

Contents

The Project Management Plan

The content of the PMP is dictated by the five tasks key to the success of a project. Those five key tasks for project success are:

- obtaining agreement on project goals and expectations (particularly regarding scope, project quality, safety, costs, and schedule);
- developing a plan for acquiring and delivering a project that meets customer expectations, objectives, and needs;
- establishing a good internal and external communications strategy;
- defining and controlling the scope of the project; and
- defining the resources necessary for project success.

1. SCOPE

The Harpeth River and its tributaries drain the 870 square mile Harpeth River Watershed with over 1,000 miles of streams. The watershed contains large portions of Williamson, Davidson, Cheatham, and Dickson counties, and small portions of Rutherford and Hickman Counties, Tennessee. The Harpeth River and its tributaries are subject to frequent flooding and major flooding every few decades, with the most recent major flood occurring in May 2010. The May 2010 flood event saw devastation throughout the watershed, causing 4 fatalities and over $480 million in direct economic impacts in the Harpeth River Watershed alone. The Watershed also provides habitat to 6 federally listed endangered species in addition to one endemic snail species.

Preliminary reconnaissance, documented in the Harpeth River, Tennessee Section 905(b) reconnaissance report, dated May 2012, finds over 850 structures in the regulated floodplain within the basin, including several structures recognized by FEMA to be repetitive loss structures. These structures are primarily located in the City of Brentwood, the City of Franklin, Williamson County, and Davidson County. There are additional aquatic ecosystem issues found throughout the basin, primarily involving stream bank erosion and a loss of riparian buffer and/or wetlands.

The scope of this feasibility study includes both flood risk management (FRM) and ecosystem restoration (ER) analysis in the Davidson County, Williamson County, City of Brentwood, and City of Franklin area. The FRM alternatives analyzed will be geared toward regional measures that provide cross-jurisdictional benefits in the study area. Reconnaissance level analysis indicated a strong possibility for a dry dam or a configuration of multiple dry dams to effectively reduce flood risk in the primary damage centers of the basin. Additional structural and non-structural measures will be analyzed as well, and an effort will be made to develop FRM alternatives that provide ancillary ecosystem benefits.

Additionally, ER measures will be analyzed throughout the basin, particularly in the City of Franklin, which has identified areas along the main stem of the Harpeth River as potential project areas to yield aquatic ecosystem restoration benefits. Additional ecosystem restoration opportunities and measures will be analyzed in the other jurisdictions in the study area; these sites are to be identified with greater specificity during the feasibility phase of study.

Flood Risk Management Measures

Preliminary analysis shows potential net positive benefits for regional detention measures (dry dams) that would benefit Metro Nashville, Williamson County, and Franklin. A feasibility study would further investigate regional detention that would benefit the damage centers on the main stem of the Harpeth River. The study would investigate the Lampkins Bridge Road site that has been proposed as well as additional sites on the main stem of the Harpeth River and its tributaries for additional sites or optimization of a dry dam or a series of dry dams. These potential dry dam sites will be initially screened using a hydrologic analysis, and later screened using a hydraulic analysis of the system. Existing hydraulic modeling will be leveraged alongside current FEMA Flood Insurance Study (FIS) updates to expedite the hydraulic modeling process for the study.

In the damage centers, both structural and nonstructural alternatives will be considered. Initial measures will be developed based on site reconnaissance. Existing conditions hydraulics and economic impacts will yield a further refined array of measures. These measures will be grouped into alternative plans by the Project Delivery Team (PDT), and a parametric cost analysis will yield Benefit to Cost Ratios (BCRs) for the screening of alternative plans.

At this point, the National Economic Development or National Ecosystem Restoration (NED/NER) plan will be identified. Prior to progressing into a detailed analysis and detailed cost of the recommended plan, the team will get sponsor buy in, possibly resulting in moving forward with the Locally Preferred Plan (LPP) instead of the NED/NER plan.

In the City of Brentwood, where regional measures on the main stem of the Harpeth River will have no effect, select damage centers will be analyzed through updated hydrologic and hydraulic modeling. This will, in itself, provide a valuable flood preparedness tool to the City of Brentwood, and will help identify additional flood risk management options or alternatives moving forward.

Ecosystem Restoration Measures

The feasibility study scope includes analysis of ER measures in the study area. The City of Franklin has potential sites for ER along the Harpeth River. Additional sites may be later identified within the City of Brentwood, Williamson County, or Davidson County. All identified sites will undergo a screening level of analysis, with the sites with the strongest potential for beneficial impacts to the aquatic ecosystem carrying forward for further analysis.

Analysis of ER sites and opportunities includes modeling baseline conditions as well as with-project conditions using an approved habitat model. To find with-project conditions, ER measures will be

proposed and screened on the same schedule as the FRM measures, ultimately using the Cost Effectiveness/Incremental Cost Analysis (CE/ICA) software and professional judgment for selecting a recommended plan. This recommended plan will be paired with the recommended plan from the FRM analysis, unless it is deemed less efficient to do so, to yield a multi-purpose recommended plan for the feasibility study.

Study Tasks

A. **Develop Goals and Objectives.** Problems and opportunities that were developed in the reconnaissance level of study will be confirmed. The full PDT, including sponsors, will develop goals and objectives of the feasibility study. The goals and objectives of the study will guide the course of the study. Additionally, the PDT will develop the Risk Register. The Risk Register is a tool that will be used for analyzing and screening alternatives. A sample Risk Register is attached in Appendix A. Once the Risk Register is developed, it will be incorporated into this PMP.

   Once the goals and objectives of the study are developed, the PDT will determine, with input from sponsors, damage sites and potential project sites, then conduct full PDT site visits at these locations. The site visits will provide further information for the development of alternatives and their analysis, as well as potential early screening opportunities. Sites will be visited for both flood risk management and ecosystem restoration goals and objectives.

   The early phases of site visits and developing goals and objectives for the study will confirm or redirect the proposed scope of work for developing baseline existing conditions and future without project conditions. As the study is currently scoped, the main stem of the Harpeth River will be modeled in HEC-RAS for both regional FRM alternatives and local FRM alternatives in the Franklin, Williamson County, and Nashville damage centers. The West Harpeth River, Murfrees Fork, and Leipers Fork will undergo hydrologic analysis to determine if further analysis of regional detention measures in the West Harpeth River subbasin is warranted. Streams in the Little Harpeth River Basin in Brentwood will be hydraulically modeled in HEC-RAS to develop existing conditions models, and to investigate the potential for both structural and nonstructural local FRM measures.

B. **Develop Baseline Existing Conditions and Future Without Project Conditions.** For the flood risk management portion of the study, existing conditions hydrology and hydraulic modeling will be completed for those streams where deemed necessary at this point of analysis. A structure inventory will be developed to the necessary level of detail to determine baseline existing and expected future average annual damages. The Corps' FDA model will be used to develop Average Annual Damages (AADs) with the existing and future conditions hydraulics.

   Once the AADs are developed and the damage centers are defined, the Full PDT will develop and preliminarily screen measures for the study. This preliminary screening will be based on all existing data and professional judgment to date, and will be largely based on the Risk Register.

For ER, environmental surveys will be performed as needed to develop baseline ecosystem conditions. This will be done using an approved model. Baseline conditions will be both current and expected future conditions. These baseline conditions, along with the data collected to this point in the study, will guide the development and initial screening of aquatic ecosystem restoration measures.

C. **Planning Charette/Alternatives Milestone.** This charette will involve the sponsors, full PDT, and vertical team. The goal of this charette is to get Corps vertical team buy-in on the work to this point, primarily the array of alternatives for further consideration as well as the proposed evaluation criteria.

D. **Develop and Analyze Alternative Plans.** Measures that have been approved by the Corps vertical team at the Alternatives Milestone will be modeled to determine their individual benefits. Measures seen as beneficial will be used to develop alternative plans. Alternative plans will consist of potential measures that work together. Alternative plans will be analyzed at a benefit-to-cost ratio level. Benefits will be developed for each alternative plan, and parametric costs for each plan will be developed using the design team and cost engineer.

ER measures will be analyzed using the CE/ICA software suite to determine the "best buy" plans. The CE/ICA software suite automates the process of determining the plans with the greatest net benefits and greatest marginal increase in benefits.

By the end of this level of analysis, the full PDT will be able to select both the NED and NER plans. Prior to determining the Tentatively Selected Plan (TSP) (for both FRM and ER), the full PDT will meet with the sponsors. The TSP may be the NED/NER plan, or it may be a LPP tailored to what the sponsor would be interested in implementing.

E. **Planning Charette/Tentatively Selected Plan Milestone.** This charette will involve the sponsors, full PDT, and vertical team. The goal of this charette is to get Corps vertical team buy-in on the TSP that will be recommended for detailed cost analysis.

F. **Planning Charette/Agency Decision Milestone.** Once the TSP milestone is complete, the study will undergo a technical review process to confirm the validity of the TSP. Upon completion of the technical review process, the sponsors, full PDT, and Corps vertical team will reconvene to confirm the TSP as the recommended plan.

G. **Feasibility-Level Detailed Analysis on the Recommended Plan.** The PDT will develop feasibility a feasibility level cost estimate on the recommended plan. The cost engineer will develop this estimate using an appropriate level of design from the soils and structural engineering leads. At this point in the study, the real estate plan (REP) and real estate gross appraisal will be completed on the recommended plan.

After this feasibility-level detailed analysis and design is complete for the recommended plan, the decision document will be properly reviewed and will go through the feasibility study decision document approval process. The Corps team will work with the vertical team to get the report approved by the Civil Works Review Board and subsequently seek Congressional authorization for implementation of the recommended plan.

Additional Study Considerations. The PDT will also accomplish all necessary policy and planning compliance aspects of a federal Feasibility Study such as NEPA compliance, HTRW analysis and cultural resources surveys.

Study assumptions for the development for this scope and cost estimate are found in Section 4, Critical Assumptions and Constraints.

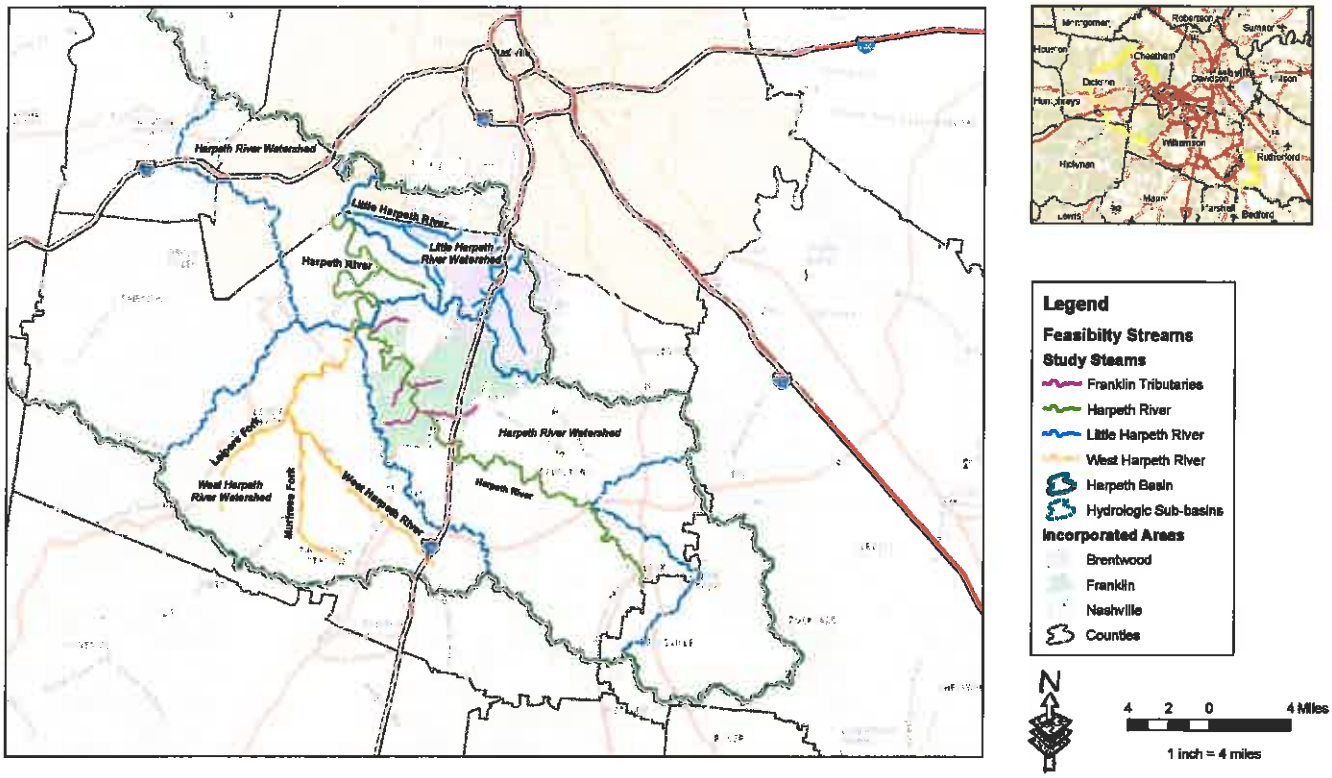


Figure 1 - Harpeth River Feasibility Study Extents, Flood Risk Management Analysis

2. PROJECT HISTORY & PATH FORWARD

Brief Project Chronology

Reconnaissance Report Signed by LRN	May 2012
Reconnaissance Report Certified by LRD	July 2012
FCSA Signed	*February 2013*

Funding History

A Feasibility Cost Share Agreement has been drafted to include the Corps of Engineers as well as Davidson County, Williamson County, the City of Franklin, and the City of Brentwood. The feasibility study cost estimate is estimated at $1.4 million. In Q4 of FY12, the Corps reprogrammed $12.5k to initiate the study, and expects to be able to reprogram approximately $130k in Q2 of FY13, once the FCSA is signed.

Path Forward

A scope, schedule and cost estimate for the proposed feasibility study, all of which can be found in this PMP, have been developed. The next step is to negotiate and execute an FCSA between the Corps and all willing sponsors.

This PMP is a dynamic document which will be revised as needed as the project progresses.

3. STUDY COST ESTIMATE

Total Study Cost Estimate

The cost estimate in Table 3.1, below, is current as of the date of approval of this PMP. This cost estimate will be continually refined and revisited as the study progresses.

Task	Total Cost ($)	Government Cost ($)[1]	Total Sponsor Cost ($)[2]	Sponsor Costs	
				In-Kind ($)	Cash ($)
LiDAR	0.00	0.00	0.00	0.00	0.00
Archaeology	34000.00	18307.69	15692.31	0.00	15692.31
ATR & Reviews	90000.00	48461.54	41538.46	0.00	41538.46
Biology	69000.00	37153.85	31846.15	0.00	31846.15
Cost Engineering	44000.00	23692.31	20307.69	0.00	20307.69
Economics	69000.00	37153.85	31846.15	0.00	31846.15
Geology	23000.00	12384.62	10615.38	0.00	10615.38
Geotech	54000.00	29076.92	24923.08	0.00	24923.08
H&H	498000.00	268153.85	229846.15	0.00	229846.15
HTRW	60000.00	32307.69	27692.31	0.00	27692.31
Landscape	45000.00	24230.77	20769.23	0.00	20769.23
Plan Form	200000.00	107692.31	92307.69	0.00	92307.69
Real Estate	25000.00	13461.54	11538.46	0.00	11538.46
Structures	55000.00	29615.38	25384.62	0.00	25384.62
Contingency	34000.00	18307.69	15692.31	0.00	15692.31
Sponsor PM Involvement	100000.00	0.00	100000.00	100000.00	0.00
Grand Total	**1400000.00**	**700000.00**	**700000.00**	**100000.00**	**600000.00**

[1] Government Cost refers to Total Federal Government Cost, and is 50% of the total study costs. Since the "Sponsor PM Involvement" line item does not involve Federal Government Cash, but it is still cost shared as a part of total study costs, all other line items receive a share to yield a total of $700,000 for Government Cost.

[2] Total Sponsor Cost is 50% of total study costs. Since the "Sponsor PM Involvement" line item is 100% Sponsor in-kind credit, all other line items receive a share to yield a total of $700,000 for Total Sponsor Cost.

Sponsor Cost Apportionment

Based on the Estimated Study Costs of $1.4 million, the following Table 3.1 indicates the recommended cost apportionment for each of the Non-Federal Sponsors. PM Involvement Credit is not cash, but it is sponsor labor time that is credited to the total study costs. This means that the Federal Government will match this labor contribution with a cash equivalent. The "sponsor cash" is the total cash contribution that will be required from each sponsor for the duration of the study.

	Total Study Costs by Sponsor		
	Federal Cash ($)	**PM Involvement Credit ($)**	**Sponsor Cash ($)**
Franklin	280,166.17	33,333.33	246,832.84
Brentwood	50,000.00		50,000.00
Williamson	83,333.33	33,333.33	50,000.00
Nashville	286,500.49	33,333.33	253,167.16
	700,000.00	**100,000.00**	600,000.00

Note there is not PM Involvement Credit apportioned for Brentwood. This is due to the nature of work being performed in the Little Harpeth Basin; currently there is no alternative screening scoped for this area, but model updates and an assessment of existing conditions flooding issues.

Cost apportionment was determined in negotiation of the FCSA with all of the Sponsors.

4. TEAM IDENTIFICATION

4.1.Team Members

The PDT is responsible for the overall quality, adequacy, and accuracy of the work products required by this project, as well as the continuing adequacy and suitability of this PMP, over the life of the project. The current membership of the PDT for this project is listed in Table 4-1:

Table 4.1 – Project Delivery Team*

Name	Position	Affiliation
Jim Snyder	Nashville PM	Metro Water Services (sponsor)
Paul Holzen	Franklin PM	Franklin Engineering (sponsor)
Floyd Heflin	Williamson Co. PM	Williamson Co. Engineering (Sponsor)
Mike Harris	Brentwood PM	Brentwood Engineering (sponsor)
Porter Williams	PM	USACE PM-P
James Bilbrey	Hydrology and Hydraulics	USACE EC-H
Mary Tipton	Biologist	USACE PM-P
Phillip Jones	Economist	USACE PM-P
Kimberly Spicer	Cost Engineer	USACE EC-A
Valerie McCormack	Archaeologist	USACE PM-P
Mary Catherine Keith	Real Estate Specialist	USACE RE
Sovireak In	Structural Engineer	USACE EC-CD
Steve Matheny	Geotechnical Engineer	USACE EC-CD-S
Tong Haw	Geologist	USACE
Kathryn Firsching	Attorney	USACE OC

*This table only includes the current PDT based on the current scope of work. Historic and additional PDT members can be found below in Table 3-2.

4.2.Roles & Responsibilities

The list below includes additional contributing members to the project. The majority of these members do not have substantial roles with the current work based on the current letter agreement with Metro, however they have had contributions in the past and could well be involved again in the future, depending on the outcome of current work.

4.2.1. **District Project Manager: Porter Williams** – The role of the District Project Manager for the study is to lead the study team through the steps of the planning process, assisting the team throughout the study with labor and programmatic issues. The Project Manager manages the scope, schedule, and budget of the study, and ensures that the study adheres to scope, schedule, and budget.

4.2.2. **Sponsor, Nashville: Jim Snyder** – The sponsor will remain involved throughout the study at the Project Manger level. Sponsor involvement will help guide the direction of the study so that alternative plans that the sponsor would not consider for implementation are not a part of the recommended plan.

4.2.3. **Sponsor, Franklin: Paul Holzen** - The sponsor will remain involved throughout the study at the Project Manger level. Sponsor involvement will help guide the direction of the study so that alternative plans that the sponsor would not consider for implementation are not a part of the recommended plan.

4.2.4. **Sponsor, Brentwood: Mike Harris** - The sponsor will remain involved throughout the study at the Project Manger level. Sponsor involvement will help guide the direction of the study so that alternative plans that the sponsor would not consider for implementation are not a part of the recommended plan.

4.2.5. **Sponsor, Williamson County: Floyd Heflin** - The sponsor will remain involved throughout the study at the Project Manger level. Sponsor involvement will help guide the direction of the study so that alternative plans that the sponsor would not consider for implementation are not a part of the recommended plan.

4.2.6. **Hydraulics & Hydrology: James Bilbrey** – For a feasibility study that would look at both Flood Risk Management measures and Ecosystem Restoration projects along the Harpeth River and Little Harpeth River, there are 8 primary tasks that H&H would need to complete as part of the Feasibility Study for the Harpeth River:

Task 1: Develop a Quality Assurance/Quality Control Plan – A Quality Assurance/Quality Control (QA/QC) plan will be developed for this scope of work according to the most current Corps of Engineers standards. An in-branch review will be conducted after completion of each major task. Major tasks include, but are not limited to, hydrology, hydraulics, GIS data collection, structure database development, and alternative analysis.

Task 2: Data Collection and Assessment – A search will be conducted for existing Geographical Information System (GIS), hydraulic, and hydrologic data prior to beginning work. The data will be reviewed for completeness and, if necessary, data will be converted into a standard format for the study. Where gaps exist, additional data will be sought from other sources.

Task 3: Perform Flood Frequency Analysis – Flood frequency analysis will be performed for available stream gages using USGS annual peak stream flow data. Standard graphical

and tabular output will be developed from this analysis. Frequency results will also be compared to current flood insurance discharges where available.

Task 4: Develop Existing Conditions Hydrologic Models for Study Watersheds – This task involves the development of a Digital Elevation Model (DEM) for Hydrologic Analysis; the development of a Data Storage System (DSS) Database for hydrologic analysis; the development of the existing conditions Hydrologic Model using HEC-HMS software; and performing the existing conditions hydrologic analysis.

Task 5: Develop Existing Conditions Hydraulic Models for Study Streams – This task involves necessary field reconnaissance and GPS survey; the development of a DEM for hydraulic analysis; performing the existing conditions hydraulic analysis; and performing the 100-year floodway analysis.

Task 6: Develop Structure Database for Flood Damage Assessment (HEC-FDA software)

Task 7: Perform H&H Alternative Analysis – Using the hydrologic and hydraulic information derived from previous tasks, a comprehensive evaluation of alternatives will be conducted for the eight annual percent chance exceedence events. Alternatives include, but are not limited to, levees, channel restoration/widening, bridge modifications, regional detention, flood proofing, floodway evacuation, flood warning, and non-structural measures.

Task 8: Geospatial Data System Support

4.2.7. **Biology: Mary Tipton and Chip Hall** – The environmental PDT members will provide environmental/National Environmental Policy Act (NEPA) input and support for all alternative development. They will provide the NEPA analysis/compliance and any environmental planning input for the project report. That would also include public and agency coordination. They will develop any environmental benefit analysis needed for the project and collect any needed environmental data through in house or contracting mechanisms. They will lead any ecosystem restoration alternative development and support other PDT members in design of those alternatives.

They will develop any environmental benefit analysis needed for the project and collect any needed environmental data through in house or contracting mechanisms. The Cost Effectiveness/Incremental Cost Analysis (CE/ICA) process will be used to evaluate and compare various ecosystem restoration alternatives. In this process, environmental benefits determined by models (Index of Biological Integrity, Floristic Quality Assessment, U.S. Fish and Wildlife Service Habitat Suitability Indices) and costs of alternatives are used for comparisons to determine "Best Buy" plans.

4.2.8. **Geotechnical Engineer: Steve Matheny** - The Nashville District Soils Branch of Engineering/Construction Division will be responsible for performing all required activities for the development feasibility input into a report and if authorized plans and specifications for the geotechnical component of the project. Activities will include:

A. Using topographic contour mapping and GIS Information to develop plans and cross sections for the project in the location specified for geotechnical input. The project as envisioned consists of structural and/or non-structural alternatives. Dry dams and/or reservoir storage may be involved as alternatives. The engineer oversees the development of all the design drawings in which the technicians use Microstation to produce Computer Aided Design Drawings (CADD).
B. The preliminary plans are generally given to the non-Federal sponsor in advance of any meetings to see if the sponsor's desires are being adequately met. Review meetings are conducted at a mutually agreeable location.
C. Plans and cross sections are used to derive all material quantities for the design.
D. Quantities for the design shall be given to a cost engineer so that the cost engineer can get quotes on material and prepare both preliminary and detailed cost estimates.
E. The technical portions of the report and/or specifications relative to the Geotechnical design are written in Geotechnical Branch. The technical portion shall be given to either Project Management or Engineering Management Support for additional application of all other appendices supplied by the various disciplines or for the inclusion of the documentation for solicitation by Contracting Division for advertisement and award of the job.
F. The geotechnical engineer develops schedules and budgets associated with the job; provides input into planning documents such as the Project Management Plan and the Quality Control Plan. There is an internal review that occurs with a group of engineers that are totally independent from the engineers that provide the design. This is termed (ITR) Independent Technical Review. The engineers have to resolve and respond to all issues associated with the comments received. The engineer is also responsible for the Construction Branch comments that are received in the form of Biddability, Constructability, Operability and Environmental review. A legal review takes place also. If technical questions arise, the engineer takes responsibility for resolving these questions also.
G. If necessary, the design engineers will work with the Real Estate department to establish temporary construction easements and to set take lines for obtain rights-of-entry or any permanent easements associated with the finished project.

The engineer works internally with sections such as Hydraulic, Structures, Hazardous Toxic Radiological Waste, Environmental, Regulatory, Engineering Management Support, Real Estate, Legal, Contracting and other sections of the Corps of Engineers to ensure all regulatory requirements are being met.

4.2.9. **Structural Engineer: Sovireak In** - The structural engineering component of the feasibility effort will be gathering information to develop, screen, evaluate, and compare preliminary alternatives in order to identify an NED Plan. After identifying an NED plan, the feasibility

level design for the recommended alternative will be developed. Quantities from this design will be provided to Cost Engineering for development of the detailed estimate.

4.2.10. **Cost Engineering: Kimberly Spicer** - The Cost Engineering component of the Feasibility effort will be developing preliminary alternative estimates using parametric (abstract or previous cost information) to assist in the Alternative Formulation process. After preliminary screening of alternatives, preliminary design and quantities will be provided by the design team to Cost Engineering to assist in the development of costs to be used in the incremental cost analysis to determine which design components and alternatives appear to be cost effective. Those alternatives will then be analyzed and compared to one another to determine which has the most likelihood of Federal interest, i.e. average annual benefits exceeding the average annual costs of construction. The alternative that appears to have the highest NED benefits will be chosen as the NED Plan. Either this plan or the recommended plan will then have a Microcomputer Aided Cost Engineering System (MCACES) Software – MII Generation level estimate produced. This estimate will be developed as a "bottoms-up" approach that will have specific detail relating to the labor, equipment and material that would be required by a construction company for accomplishing the work. This estimate would also include the engineering labor, real estate, and supervisory and administrative costs during construction. Ideally only one MII level cost estimate will be produced, however depending on whether the Locally Preferred Plan (LPP) is the same as the NED Plan, an additional MII level estimate for the LPP may be warranted.

4.2.11. Economics: Phillip Jones – For the FRM portion of the study, the Economist will review the supplied structure inventory database to check for deficiencies in first floor elevations, addresses, structure ID, etc. Non-residential structures will be surveyed to determine type and estimate content value. Economist will establish depreciated replacement costs for all structures in database.

Economist will create the study in FDA model and import structure database and without project/existing conditions profiles and establish risk and uncertainly parameters. Model runs will be performed to establish without project existing average annual damages. Economist will import any H&H profiles representing measures and alternatives to be run against without project profiles to establish expected annual benefits. Economist will calculate individual structure expected annual benefits for non-structural portion of the analysis.

Economist will tabulate results and incorporate project costs to establish BCR's for all measures and alternatives proposed to identify the NED plan. Economist will write appendix with data to be used in the main portion of the report. Economist will answer all review questions and make appropriate changes in the data and the aforementioned report.

For the ER portion of the study, the Economist will input provided with and without project restoration gains into the IWR Planning Suite model to be analyzed with provided measures and alternatives to identify the "Best Buy" alternatives.

4.2.12. **Geologist: Tong Haw** - Potential sites for flood control will be evaluated to determine the extent geologic conditions affect constructability and costs. Subsurface information will be obtained and inspected and cost estimates made in cases where flood control proposals involve soil and/or rock removal or flood control structures are to be constructed on rock foundations.

4.2.13. **Cultural Resources: Valerie McCormack** – The Archaeologist's role in the early phases of the study would be to gather information on what is already known about the cultural history, very similar to what was already accomplished during the last report.

The Archaeologist will remain involved throughout the study as plans are being developed, whether they are flood risk management of ecosystem restoration. Site visits and checking known resources will determine the probability of cultural resource investigations being necessary.

Actual cultural resource investigations and coordination for preferred projects will occur after the selection of the recommended plan. Schedule and budget for the archaeological work will depend upon the specific details of the plan. A Phased Compliance may also be POSSIBLE at this point, stating we will conduct necessary investigations during the implementation phase.

4.2.14. **Real Estate Specialist: Mary Catherine Keith** - Real Estate Division will have the responsibility of writing a Real Estate Plan (REP) that will accompany the Feasibility Report and that will be tailored specifically for the Harpeth River Project. The REP will ensure that adequate Real Estate analysis is conducted during project planning. The writing of the REP will take place when all of the alternative plans have been measured and the proposed plan is selected. A gross appraisal will be done as part of the REP. Additionally, the Real Estate appraiser will approve the local sponsor's selected appraiser and provide guidance for that person with any questions they might have during the project. Real Estate will serve as a part of the PDT to provide input specific to Real Estate during the Feasibility process.

After the project is authorized (and the feasibility phase of study is complete), Real Estate will provide non-Federal Sponsor oversight and assist the Sponsor with any needs they may have with acquiring the appropriate Real Estate interests. Real Estate will certify land availability for construction and calculate the Sponsor's credit amount for Lands, Easements, Right-of-way, Relocation and Disposal Areas (LERRDs) provided for the project.

4.2.15. **HTRW: Lannae Long** – The Corps is obligated under Engineer Regulation 1165-02-132 to assume responsibility for the reasonable identification and evaluation of Hazardous, Toxic, and Radioactive Waste (HTRW) contamination within the vicinity of proposed civil works projects during all project phases. The HTRW PDT member will perform a site reconnaissance and search government environmental databases to identify evidence for recognizable environmental conditions in and around each proposed project site for the Environmental Assessment (EA) and Feasibility Study (FS). If there are any recognizable HTRW conditions identified, the PDT shall take the HTRW conditions into consideration prior to the completion of the feasibility study, and make efforts to design around the HTRW condition. The HTRW PDT member will prepare limited Phase I Environmental Site Assessments (LESA) for each proposed project site, and provide the LESAs for record for an appendix to the EA and FS, and summary of the LESAs in the HTRW section of the EA and FS.

During the PED for each project, before construction, a full ESA shall be conducted. If there are any recognizable HTRW conditions identified, the PDT shall make efforts to design around the HTRW conditions. The HTRW PDT member will prepare a full Phase I ESA project site, and provided the ES for record to the project manager, and an appendix to the PED documentation.

4.2.16. **Office of Counsel: Kathryn Firsching** - Office of Counsel is an integral part of the PDT and is responsible for providing timely preventive advice and counsel on all aspects of project delivery. The Office of Counsel will review the draft and final versions of the Feasibility Cost Sharing Agreement, any amendments thereof, the Real Estate Memorandum of Understanding, any EA, EIS, or EIR including any ROD or FONSI, and any issue or white papers, environmental compliance issues, fish and wildlife and Endangered Species and Fish and Wildlife Act coordinations, and cultural and historic memoranda of agreement. The Office will further review final transmittal packages sent to Division or HQ, responses to Congressionals, review of correspondence, and any required legal certifications.

All correspondence and agreements regarding this project signed by the commander will be reviewed by a member of the Office of Counsel. The Office of Counsel will also provide legal advice and representation during all phases of contract formation and contract administration including support to the SSEB and the SSA as well as reviewing any proposed cure notices or show cause letters and contractor disputed requests for equitable adjustments or claims.

The Office of Counsel PDT member will attend PDT meetings, will coordinate with PDT members as appropriate, and will be available to the various working groups as needed for legal advice and counsel. The Office of Counsel PDT member will keep appropriate members of the Office of Counsel, including the District Counsel, and Lead Civil Works

Attorney, Environmental Attorney, Contract Law Attorney, and Real Estate Attorney informed of significant legal issues confronting the PDT. The Office of Counsel PDT member will also assist the PDT in coordinating reviews of documents with the appropriate attorney in the Office of Counsel.

Also, an Agency Technical Review (ATR) Team will be established as per the Project Review Plan (currently pending MSC approval). Team functions and ATR team membership are discussed in Section 9.

5. CRITICAL ASSUMPTIONS & CONSTRAINTS

Critical assumptions for the study are listed below.

H&H Concerns and Assumptions:

- No additional LiDAR acquisition will be necessary. The study is scoped assuming that Metro, Franklin, and Brentwood recent LiDAR acquisitions will be available, and that Williamson County DEM will be both available and adequate where more recent LiDAR acquisition is not available. If existing data is deemed insufficient for the proposed scope of work, LiDAR acquisition could be necessary, and thus could increase total study costs.

Geologic Concerns and Assumptions:

- There will be no need for subsurface explorations during the feasibility phase, and feasibility design concepts will not generate the need for subsurface explorations. Current cost estimate for the geology PDT member includes funding for involvement throughout the study including giving expertise where applicable and determining future needs for subsurface surveys.

  Further: Within the constraints of this fiscal year total available funding, Geology section estimated that $23,000 was the minimal funding needed to support the PDT 's recommendations for flood reduction on the Harpeth River. Initial expenditure of the available Harpeth River Feasibility Study funds, in part, provides for the determination of expectations, needs, consensus, and commitment of prospective shareholders. After local sponsors sign an agreement with the U.S. Army Corps of Engineers proposed project design concepts undergo close evaluation and are eliminated or refined and recommended for implementation. At this point Geology Section funding requirements could increase if the design proposals included channel widening in rock, bridge or road relocations, a dry dam constructed of concrete or roller compacted concrete, or hard levee structures all which require subsurface foundation exploration. A dry dam exploration program, depending upon the dimensions of the dam and appurtenances, would require a minimum of three borings which may cost about $100,000 for the borings, laboratory testing, and analyses. Explorations costs for river channel widening to determine the Top of Rock Surface and to estimate rock excavation quantities are estimated to be about $100,000 depending on the

extent of the proposed channel widening concept. Hard levee structures may cost about the same depending on the nature and extent of the structure.

Archaeological and Cultural Resources Concerns and Assumptions:

- The budget for the archaeological and cultural resources work does not include large scale cultural resources surveys. The necessity of these surveys will depend on the actual footprint of the recommended plan. It is known that the Harpeth River Watershed is home to many cultural resources sites, but until greater detail is known, the actual need for and cost of a cultural resources survey cannot be determined. It is also possible, and preferred if it does not threaten the implementation of the recommended plan, that cultural resources surveys could be completed in the Preconstruction Engineering and Design (PED) Phase, following the feasibility study.

Other Concerns and Assumptions:

- The inclusion of the May 2010 flood event will have a significant impact on prior analysis of flood risk management alternatives.
- Home owners will want to participate in a home buyout program.
- Real Estate acquisition for regional structural alternatives will be feasible.

Cost Assumption:

- All costs are estimated based on available data and professional judgment. As more data becomes available and level of analysis increases as the study progresses, all cost estimates will be revised and refined, and all are subject to change.

Critical constraints include:

Primary critical constraints revolve around bringing this study in compliance with the "3x3x3" initiative mandated by MG Walsh in a February 2012 memorandum. Under this new civil works directive, the feasibility phase of study is to last no longer than 3 years, cost no more than $3 million, and the body of the feasibility report is to be of manageable length (fits into a 3 inch binder, not including technical appendices). Additionally, the new directive is a champion of 3 levels of vertical team review, or frequent meetings and consensus among district, division, and headquarters levels throughout the duration of the study.

This directive will be achieved by coming to a recommendation with less data than a traditional feasibility study, thus introducing a greater level of risk in the feasibility phase of study. Much of detailed design will be pushed to the PED phase. Plans may have to be formulated and screened with less physical data and more professional judgment than would previously have been done.

6. WORK BREAKDOWN STRUCTURE (WBS)

The following shows the Work Breakdown Structure (WBS) that is proposed at the feasibility study planning stage, prior to signing an FCSA.

1. Specify Problems and Opportunities; Development of Goals and Objectives
   - 1.1. Define Goals and Objectives for the study – Full PDT Involvement
   - 1.2. Site Visits
2. Existing Conditions and Future Without Project Conditions/Inventory
   - 2.1. Flood Risk Management
     - 2.1.1.Hydrologic and Hydraulic Modeling
       - 2.1.1.1. LiDAR Acquisition
       - 2.1.1.2. Existing Data and Modeling Acquisition
       - 2.1.1.3. Existing Conditions Hydrologic Modeling
       - 2.1.1.4. Existing Conditions Hydraulics
         - 2.1.1.4.1. Harpeth River Main Stem
         - 2.1.1.4.2. Little Harpeth River
       - 2.1.1.5. Future without project conditions hydrology (50 yr)
       - 2.1.1.6. Future without project conditions hydraulics (50 yr)
     - 2.1.2.Economic Analysis
       - 2.1.2.1. Update existing conditions structure inventory database
       - 2.1.2.2. Develop existing conditions damages
       - 2.1.2.3. Develop future without project conditions damages (50 yr)
   - 2.2. Ecosystem Restoration
     - 2.2.1.Determine HSU Model to be used for the study
     - 2.2.2.Site visits to determine firm list of ecosystem restoration sites
     - 2.2.3.Biological survey and inventory of these sites
     - 2.2.4.Determine baseline model output for both existing and future without project conditions
3. Develop Measures
   - 3.1. Develop measures to address specific flood risk issues seen in existing conditions and future without project conditions economic analysis.
   - 3.2. Preliminary screening of alternatives based on professional judgment of these proposed measures. Only move forward in analysis with the most promising alternatives
4. Evaluate Effects of Measures
   - 4.1. Flood Risk Management
     - 4.1.1.Hydraulic modeling of alternatives
     - 4.1.2.Economic analysis of hydraulic modeling using both existing and future without project conditions -- determine annualized benefits of measures proposed
   - 4.2. Ecosystem Restoration
     - 4.2.1.Use habitat model to determine benefits of ecosystem alternatives

5. Develop Alternative Plans
   5.1. Group measures, synergistically, into specific action plans
6. Evaluate/Compare Alternative Plans
   6.1. Flood Risk Management
      6.1.1. Perform any additional hydraulic modeling for measures as needed
      6.1.2. Develop materials quantities to be used in parametric cost analysis
      6.1.3. Develop parametric cost estimate for plans
      6.1.4. Develop benefits for each plan (economics)
      6.1.5. Compare benefit-to-cost ratios for each plan to yield NER plan
      6.1.6. Discuss with sponsors the proposed NER plan and determine what the sponsors want to move forward with. Come away with a recommended plan.
7. Detailed analysis on selected plan
   7.1. Finalize detailed H&H work
   7.2. Finalize detailed economic analysis/benefits
   7.3. Complete sufficient level design for M2 Level detailed costs
   7.4. Develop M2 Level
   7.5. Perform Necessary Archaeological and HTRW Surveys for making an informed recommendation.

7. FUNDING

As stated earlier, in Q4 of FY12 the Corps reprogrammed $12.5k to initiate the study, and expects to be able to reprogram approximately $140k in Q2 of FY13 once the FCSA is signed. Once the FCSA is executed and sufficient funds to progress with the feasibility study are received, Table 7-1 will be filled out.

Table 7-1 shows the estimated Federal and local cash contributions. These amounts include both actual and projected expenditures.

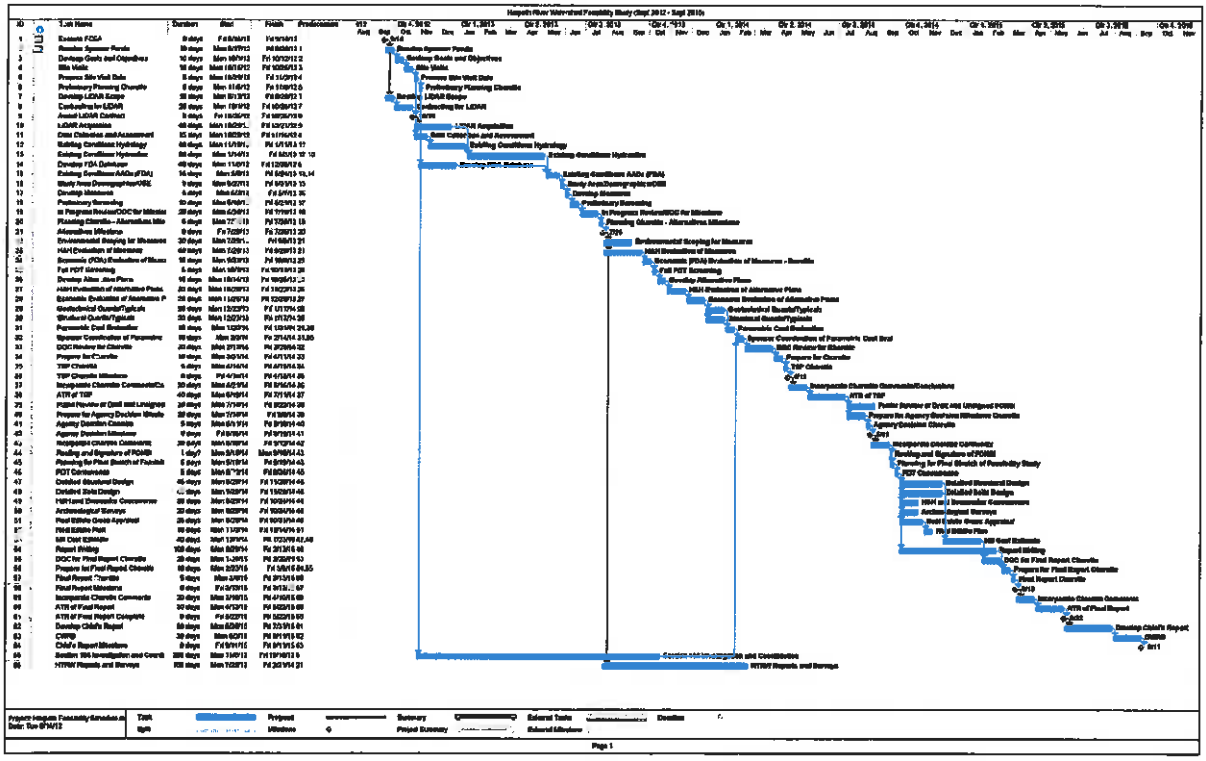
Table 7.1 - Funding

Harpeth River Watershed FY 12 Budget ($1000s)				
	Sponsor Contribution	**Harpeth River Flood Risk**	**Harpeth River Ecosystem Restoration**	
Environmental	0	0	0	
Economics	0	0	0	
Plan Formulation	0	0	0	
Subtotal	**0**	**0**	**0**	
H&H	**0**	**0**	**0**	
Cost Estimating	**0**	**0**	**0**	
Geotech	**0**	**0**	**0**	
Design	**0**	**0**	**0**	
Real Estate	**0**	**0**	**0**	
ATR				
Scott Miner	0	0	0	
Mitch Laird	0	0	0	
Mike Greer	0	0	0	
H&H	0	0	0	
Cost	0	0	0	
Environmental	0	0	0	
Geotech	0	0	0	
Real Estate	0	0	0	
Subtotal ATR	**0**	**0**	**0**	
Printing	**0**	**0**	**0**	
Contingency				
Total Projects	**0**	**0**	**0**	

8. SCHEDULE

The current schedule for the Feasibility Study is shown below.

In revisions to this PMP, additional milestones will likely be identified and all milestones will be assigned dates. Those dates will correspond to the project schedule, as maintained in P2. During the life of the project, milestones will be coordinated with the PDT and updated as needed. Those changes will be documented as a revision to this PMP and in P2.



9. PROJECT QUALITY CONTROL PLAN AND OBJECTIVES

The objective of the Quality Control Plan (QCP) is to ensure the successful completion of the study and delivery of high-quality study reports and supporting documents, within budget and on time. The quality control strategy will be developed and executed in accordance with USACE **PMBP REF8008G**, "Quality Management Plan."

The vehicle for quality management and quality assurance of products and analysis developed throughout the Feasibility Study is in reviews. The Feasibility Study will be subject to District Quality Control (DQC), Agency Technical Review (ATR), and Independent External Peer Review (IEPR). These reviews and procedure are outlined in the Review Plan.

9.1.Project Teams

Two teams have been assigned with specific project responsibilities, which are described as follows:

- **Project Delivery Team (PDT).** The PDT is responsible for the overall quality, adequacy, and accuracy of the work products required by this project, as well as the continuing adequacy and suitability of this PMP, over the life of the project. Members of the PDT are as identified in Section 3.
- **Agency Technical Review (ATR) Team.** The ATR Team is made up of personnel with experience in the major disciplines and representatives of the local sponsor. The team's purpose is to provide a final agency review of all products to insure that the design conforms to applicable standards, policy, and guidance of the Corps of Engineers. Members of the ATR Team are as follows:

AGENCY TECHNICAL REVIEW TEAM	
Name	***Affiliation/Discipline/Position***
TBD	Plan Formulation
TBD	Economics
TBD	Environmental Resources
TBD	Structural Engineer
TBD	Cost Engineering
TBD	Hydraulics and Hydrology
TBD	Geotechnical Engineering
TBD	HTRW (If Needed)

TBD	Risk Analyst

The aforementioned teams will be responsible for several processes selected to ensure that the quality requirements of the sponsor are achieved. These include:

- **Evaluation of Lessons Learned / After Action Review Information:** The PDT will evaluate the lessons learned database (per USACE **PMBP PROC3020**, "Lessons Learned") to determine whether or not quality issues or suggested improvements have been developed on similar projects. Relevant information will be considered in the development of the written work products for this phase of the project.

- **Periodic Team Meetings.** Meetings of the PDT will be conducted to coordinate the efforts of its members. Meetings will be of the necessary length (anticipated to be one hour or less) and will be used to discuss issues, budget and schedules. PM will be responsible for scheduling the meetings. PM will issue a meeting agenda prior to each meeting so PDT members can determine if their attendance is required. PM will provide minutes of the meetings to all PDT team members, regardless of attendance, after the meeting.

  Periodic meetings will also be held that will include the sponsor PMs. These meetings will cover the same topics, but seek buy-in on the process, progress, and path forward from sponsors.

9.2.Technical Requirements

All correspondence, reports, plans and specifications for this project will use English units. Studies that are conducted as part of the overall feasibility study are subject to the technical requirements contained in the following primary references and other appropriate Corps documents, such as Policy Guidance Letters. Most of the documents in the following list can be found at www.usace.army.mil/publications/.

- U.S. Army Corps of Engineers Business Process, ER 5-1-11
- Digest of Water Resources Policies and Authorities, EP 1165-2-1
- Procedures for Implementing NEPA, ER 200-2-2
- Engineering and Design for Civil Works Projects, ER 1110-2-1150
- Civil Works Cost Engineering, ER 1110-2-1302
- Technical and Policy Compliance Review, EC 1165-2-203
- Real Estate Handbook, ER 405-1-12
- Hazardous, Toxic, and Radioactive Waste Guidance for Civil Works, ER 1165-2-132

9.3.Other Requirements

None.

9.4.Quality Objectives

The sponsor's major objectives will be identified in the future, but are likely to include:

The Sponsor's major objective:

a. Complete Feasibility ASAP within available funding.

9.5.Deliverables

The following table of project deliverables will be completed in a future revision to the PMP.

Deliverable	PDT Member	QCP Reference	QAP Reference	Completion Date	ATR/QA Team Member
Feasibility Decision Document	All				

10. ACQUISITION STRATEGY

An acquisition strategy plan will be developed once the FCSA is signed and the feasibility phase governed by this PMP is initiated.

All acquisition would be conducted in accordance with USACE **PMBP PROC2050**, "Project Delivery Acquisition Strategy."

11. RISK ANALYSIS PLAN

The major scope, quality, schedule and cost-related risks associated with the feasibility phase of this project are listed in Table 11-1; health and safety risks are discussed separately in Section 12. These risks will be assessed in accordance with USACE **PMBP REF8007G**, "Risk Management Plan" and the results will be considered in the development of the written work products required for this study.

Table 11-1: Risk Considerations

Risks related to:	Triggers	Potential Impact	Actions/Mitigation Measures
Scope	• Change in Corps' scope	• Schedule slippage • Cost growth	Discuss impacts with sponsor
Quality	• Communication errors • Loss of data • Change site conditions	• Schedule slippage • Re-analysis costs • Potential redesign	• Recent surveys
Schedule	Slippage due to unanticipated review requirements, funding limitations, or other conditions, including: • Environmental issues • USACE policy/legal issues • Unresolved real estate status • Unknown archaeological sites • Weather delays • Changes Site Conditions • Loss or absence of a key PDT member	• Schedule slippage • Increased study costs • Requirement for new PDT member • Work stoppage • Potential redesign	•
Cost	• Schedule slippage • Weather delays • Changed site condition • Unacceptable Bids	Cost growth due to: • Extended project schedule • Requirements project redesign • Increased costs	•

12. SAFETY & OCCUPATIONAL HEALTH (SOH) MANAGEMENT PLAN (SOHP)

All field investigations conducted in support of this project will require the conduct of Position/Activity Hazard Analyses in accordance with USACE **PMBP REF8016G**, "Safety and Occupational Health Plan", including compliance with EM 385-1-1, "Safety and Health Requirements Manual."

SOH-related risks will be examined throughout the project and will be considered in light of the project activities. Risks for this project are primarily associated with potential accidents during field activities and site visits, including risks associated with vehicle and boating safety considerations. It is anticipated that there will be environmental and physical hazards such as unstable buildings and stream banks, trip hazards (roots, etc.), quarries and other open pits, snakes, insects, bats and other wildlife.

12.1. Types of Risks

A. Site Visit Risks: During site visits, stream banks and buildings may contain environmental hazards such as mold or asbestos, and physical hazards such as unstable structures, loose debris, unstable streambanks, insects or wildlife.

Responsibility for first action: PDT members

Action: All team members will take care when working around hazardous conditions, and avoid if possible. Team members will inform the PM of any unsafe conditions encountered. The PM will then inform the Safety Office and the remainder of the PDT, including the Local Sponsor.

Cost risk: Low.

Probability: High.

B. Risks associated with vehicle and boating safety

To minimize risks associated with motor vehicles and marine safety, the PDT and A-E will comply with requirements in Section 18.E and 10.A, respectively, of EM 385-1-1.

C. Unforeseen risks:

Responsibility of first action: PM

Action: Depends upon severity and potential catastrophic nature of the risk.

a. It the severity is catastrophic or critical and has little time tolerance, the PM will direct action to be taken and then immediately inform his superiors of the action taken. The probability for this occurring is very unlikely.
b. If the severity is catastrophic or critical but not time sensitive, the PM will inform superiors of the situation for a District approach and call a PDT meeting to develop a detailed problem solving strategy. The probability for this occurring is very unlikely.

If the severity is moderate or negligible the PM will call a meeting of the PDT to develop a detailed problem solving strategy.

12.2. Responsibilities:

PM will:

- Initiate the development of the SOHP and ensure that it is kept current.
- Coordinate with the customer to identify and manage safety and health related hazards inherent to the project.
- Assure that hazard controls are successfully implemented.
- Coordinate with the SOH office and notify the Commander of all high-risk issues.
- Coordinate with the SOH office for necessary SOH training of the PDT.

PDT members will:

- Help develop the SOHP and identify and define potential risks and appropriate responses to risks for the project.
- Attend safety and health training necessary to develop and implement a sufficient SOHP.
- Raise issues to the PDT for resolution when a hazard control cannot be lowered to an acceptable level.

The Safety and Occupational Health Office will:

- Provide training to the PDT on the SOHP development methodology
- Serve as an advisor to the PDT, providing safety and health assistance to PDT throughout the project life cycle
- Participate in PRB and Line Item Reviews
- Provide SOH program oversight by monitoring, assessment and evaluation
- Determine the overall project risk.

The District Commander is responsible for providing final SOHP approval if the overall project risk rating is high.

The Major Subordinate Command (MSC) Commander is responsible for providing final SOHP approval if the overall project risk rating is extremely high.

PRELIMINARY HAZARD ANALYSIS

Risk	Hazard	Cause	WBS Item Affected	Impact on Project Objectives	Risk Manager	Agreed Response to Risk	Expected Result of Response
Critical, Probability is low	Bites/stings from wildlife	Natural		Cost, schedule slippage	PM, PDT	Continued awareness through Safety Meetings	Avoidance

Critical, Probability is moderate	Accidents/ trips/falls involving stream banks/bldgs, quarries, pits	Natural		Cost, schedule slippage	PM, PDT	Continued awareness or avoidance of hazard	Avoidance

13. CHANGE MANAGEMENT PLAN

The purpose of this document is to define and manage the project's baseline performance measurement thresholds for scope, cost, schedule, risk and quality. Other performance measurement thresholds should be considered based on the complexity and specific needs of the project.

PDT members are responsible for monitoring their work activities and identifying when changes to this PMP are necessary. Significant changes will require the generation of a change request form in P2 and updating the PMP as noted in USACE **PMBP REF8009G**, "Change Management Plan." For the purposes of this project, "significant" category changes will include:

- Changed/Unknown Site Conditions;
- Congressional funding reductions;
- Sponsor-requested changes;
- Reduction in sponsor match; and
- Other significant types of changes as deemed appropriate by the PDT.

All other changes will be considered "minor" and will be documented by the PM in the PMP revision log.

13.1. Responsibilities

PM will:

- If a change is proposed, initiate the change by calling a meeting of the PDT. The change will be coordinated with the sponsors and documented in the PMP. The change will be carried across the project to adjust costs, schedule and work products accordingly.

PDT will:

- Determine if the identified changes or corrective actions have impacted the project's Baseline PMP.
- Determine if the proposed change exceeds the project's PMP thresholds (a project management technique in which the user specifies a threshold parameter and a lower and/or upper threshold value against which project data can be evaluated to identify issues that the project manager wants to track. An issue is automatically generated when a threshold parameter is equal to or less than the lower threshold value, or equal to or more than the upper threshold value).

13.2. Requirements and Criteria

- Baseline performance metrics and thresholds are defined during PMP development, approved by the PRB, and are updated as required during the project's life cycle.

Performance Item	Baseline Performance Metrics
Scope	See scope earlier in this document
Cost	See cost earlier in this document
Schedule	See PMP Section 8.0
Quality	See PMP Section 9.0
Risk	See PMP Section 11.0

14. COMMUNICATIONS PLAN

The purpose of this document is to enhance synergistic relations internally and externally and determine the information needs of all project delivery team (PDT) members and stakeholders – who needs what information, when they will need it, how it will be given to them, and by whom – by reporting and distributing specific project information effectively. The complexity of the project and impacts to the PDT and stakeholders will determine the appropriate level of detail for the Communications Plan for this project.

This plan will promote a work climate that is open, informed and actively engaged. It will allow the building of effective relationships with external and internal partners, stakeholders and customers by keeping them informed of project issues and progress that impacts them. Effective communications will be timely, truthful, and open. Two-way communication is key to the project's successful execution.

The communications strategy will be planned and executed in accordance with USACE **PBMP REF8006G**, "Communications Plan."

The project will require the routine engagement and participation of many stakeholders. Stakeholders are defined as individuals or groups with direct interest, involvement, or investment in the project. For this project, in addition to Metro Water Services, Franklin, Brentwood, Williamson Coutny, and LRN, the following stakeholders have been identified:

- Mayors of Nashville, Franklin, Brentwood, and Williamson County
- Residents of Nashville, Franklin, Brentwood, and Williamson County
- Harpeth River Watershed Association (HRWA)
- Harpeth Valley Utility District

14.1. Meeting Notes

The PDT will conduct several different types of meetings:

- **Regularly Scheduled PDT Meetings:** PDT meetings will take place approximately monthly, with the frequency depending upon the need and level of activity. The intent of these meetings is to track issues and action items, document and discuss project information, and distribute budget and schedule changes. The anticipated length of these routine team meetings is 15-60 minutes. The PM will chair these meetings and distribute a meeting memo to the PDT via email. All necessary PDT members will be invited to each meeting, with those members actively working on the current activity expected to attend. Remote members, such as the sponsor representatives, may be brought into the meeting by phone. Under the new 3x3x3 planning paradigm, the sponsors should be in attendance of monthly meetings. Having open communication lines with the sponsors throughout the life of the study should lend itself to meeting the 3x3x3 requirements.
- **Working Meetings:** Any PDT member may call a working meeting at any time to solve specific issues or coordinate study work items. The team member calling the meeting is responsible for: chairing the meeting, setting up location and time, requesting member attendance, notifying the project manager, and preparing and distributing the meeting memo.

14.2. Responsibilities

PM will:

- Initiate and facilitate development of the Communications Plan and revisions to it.
- Incorporate the Communications Plan into the project PMP.
- Serve as the primary Corps spokesperson for the project/program, with PAO support.
- Initiate the development of a draft communication requirements document that outlines and analyzes information needs of project stakeholders, then designs a communication strategy for each stakeholder with linkages to appropriate project milestones.
- Determine key decision points in the project according to information requirements/expectations and project schedule milestones.
- Note impacts and risk (addressed in Risk Management Plan)
- Analyze the relationship between key decision points in the project and the stakeholders' concerns.
- Develop key messages for each key decision point that consider the following characteristics for an effective message (ensure a match with project goals and objectives): Timeliness, Clarity, Honesty, Sensitivity, Relevance, Openness and Consistency
- Consolidate PDT review comments of the communications requirements document and provide enough additional information to address the recommended Communications Plan contents.
- Submit Communications Plan to the PDT for review.
- When the Communications Plan is finalized, incorporate it into the project's PMP.

PDT will:

- Assist the PM in determining all stakeholder project communications requirements, including internal communications.
- Ensure the PM and PAO are informed of potential key issues that may impact the delivery of the project/program, may engender congressional or media attention, or create a public controversy.
- Review and comment on draft stakeholder communication requirements document.
- Review the Communications Plan.

PAO will:

- Assist PM in determining all stakeholder project communications requirements, including internal communications.
- Provide Public Affairs advice, counsel and support to the PM and the PDT.
- Coordinate with the PM and PDT to develop specific products to publicize the project to internal and external audiences, including news releases, booklets, brochures, and web-based materials.
- Field calls about the project from the media and coordinate with the PM and appropriate PDT members.
- Arrange communications-related training for PM and PDT members, to include media training and risk communications training.
- Provide PA support at public functions such as meetings, signings, groundbreakings, and dedications.
- Monitor media reports about the project and ensure the PDT members and the PM are kept appraised of media activity.

PM and PDT will continuously identify and consider project stakeholders:

- Who is affected by the project?
- Who affects the project?
- How, when and why?
- Consider geography, economics, quality of life, and political sensitivity when determining internal and external interested parties.
- Document this information for easy access by the PDT, review and update as needed.
- Identify the problems, concerns and/or issues (technical, institutional, political – tribal, Federal, state, local, Environmental, Economic/Fiscal, Cultural, Safety & Health, Legal, etc) and identify how they affect the project.
- Listen, understand, and verify expectations, problems, concerns, and issues by talking with local sponsors/customers, reviewing existing documents, and talking with interest groups
- Evaluate effectiveness and document in Lessons Learned (DrChecks), as required throughout the life-cycle of the project.

PM & PAO will:

- Identify formal and nominal opinion leaders.
- Identify societal points of view that will affect the project/program.
- Identify historical/inherent prejudices that predominate.

14.3. Requirements and Criteria

The Communications Team: Communications implementation is led by the PM and executed by all PDT members. A list of the individual PDT members is included in the PMP.

Identification of Communications Issues: The PDT will identify project issues, confirm as valid and adjust by employee and stakeholder feedback and coordination with mid-level and first line supervisors.

Key project issues - The PDT has identified the following key issues:

Issue #1 – Keep the sponsor and Congressional representatives informed of project status, direction and future needs.

Issue #2 – Keep the stakeholders informed of project status and direction.

Key Messages: identify key messages for each decision point that match project goals and objectives. Audience is shown in parentheses.

- We will provide a quality product in a timely manner and within budget that meets the sponsor's needs (Sponsor)
- We will keep you informed (sponsor, A-E, Media, Public, Congressional Staff)
- Safety is our paramount concern (Public and Sponsor)

Tactics: identify tactics for consistency of purpose and one-voice communication and implementation:

- Workplace discussion
- Discussion between Sponsor and Stakeholders.

Expected Outcomes: identify outcomes and changes identified by feedback to improve communication.

- More active team membership and contributions among the PDT members.
- Better, timely communication with sponsor and Congressional interests on project status, direction and needs.

Costs: LRN costs for project communication are primarily PDT time and travel. These estimated costs will be identified in the future. Communications will focus on producing and maintaining a one-voice consistency of messages.

Measures: identify measurement for each issue identified above by surveys or other means such as feedback from commanders, middle managers, team members, and stakeholders.

Measure for Issue #1:

Help the sponsor and Congressional staff stay aware of project status and future project needs and their role in this project:

- Direct feedback from staff and sponsor.

Measure for Issue #2:

Keep the local stakeholders informed of project status and direction.

- Direct feedback from stakeholders

Opportunities: identify opportunities to provide communications to PDT, sponsor, A-E and stakeholders.

14.4. Communications Activities

Primary activities for communicating are presented in the following table:

Activity/Milestone	Frequency	Participants	Key Message
Project Review Board Briefings	Monthly or as requested	PM, PDT members	Update PRB minutes to PRB board, Branch Chiefs and District Commander
Project Managers Meetings	Monthly	PM, PDT members	Update PRB minutes and milestones to District Commander and mid-level and first line supervisors
Team Meetings	As necessary	PM, PDT, A-E	Update PDT and supervisors (if necessary) about progress/issues on project.
Sponsor Meetings	Quarterly, or as needed.	PM, PDT, A-E, sponsor	Update Sponsor on status of project or resolve project issue.
Sponsor phone calls	As needed	PM, PDT, A-E, sponsor	Update Sponsor on status of project or resolve project issue.
A-E phone calls	Weekly or as needed	PM, PDT, A-E	Discuss project; resolve issues
Congressional Briefings	Annually	PM, Programs, Mid-level and first line supervisors	Update Congressional Representatives on project status and current work.
Emails	As needed	PM, PDT, Sponsor, mid-level and first line supervisors	Topic of discussion.

15. VALUE MANAGEMENT PLAN

The purpose of this plan is to define how Value Management (VM) will be used to seek the highest value for the project product by balancing resources and quality, using a functional analysis approach for decision-making throughout the life cycle of the product development.

The nature of the feasibility study inherently seeks to maximize value of the proposed study, and it will be the responsibility of the PDT, with buy-in from the sponsors as well as the vertical team, to see that study value is maximized.

During the Preconstruction Engineering and Design (PED) phase, a Value Management specialist will be assigned to the PDT to ensure that the design of the recommended plan achieves its highest value, balancing resources and quality.

Value Management for this project will be accomplished in accordance with USACE **PMBP REF8023**, "Value Management Plan."

15.1. Project VM Goals

Overall goals of the VM effort are to ensure the product development and execution processes are in compliance with Federal Laws pertaining to the use of value methodology, and to identify possible cost savings and project enhancement options.

15.2. Objectives

Specify objectives of the VM effort are to: identify possible cost savings and project enhancement options, validate current alternative strategies, identify pertinent issues that may impact the implementation and effectiveness (performance, reliability, quality, safety, life cycle costs, project costs and esthetics, etc.) of the current and alternative strategies, and provide recommendations for future research needs.

15.3. Project VM Execution

The Corps PDT will incorporate VM principles into the feasibility process (including the development and technical review activities) in such a way as not to require a separate VM study. Guidance for the VM-related activities includes USACE PMBP REF8023 and the Value Methodology Standard, by SAVE International.

16. CLOSEOUT PLAN

The purpose of this plan is to define and manage the project's closeout process. Closeout of the project will be performed in accordance with USACE **PMBP PROC4000**, "Activity/Project/Program Closeout." The final closeout process will not begin until after approval of the decision document. Closeout documents will be prepared as required in the closeout checklist and as described in this plan.

Administrative closeout actions include: detailing all activities, collecting project records, gathering lessons learned and archiving project information. This involves preparation of a Completion Report and close-out letter and compiling the Close-out file.

Financial closeout procedures include: closing out all contracts, terminating all labor codes and other ULOs, and summarizing the Total Project Cost in a spreadsheet which generates the proper cost-share requirements. Will also perform a project audit and prepare a letter to the sponsor informing them of the audit results.

Documents prepared in project closeout include:

- Project Audit Report
- Closeout Memos
- Completion Report
- Closeout letter to sponsor
- Form ENG3013, and
- Lessons-Learned.

The process will be conducted in accordance with standard closeout procedures outlined below and procedures outlined in the Nashville District SOP. A key reference document for close-out is ER 5-1-11, U. S. Army Corps of Engineers Business Process .

16.1. Responsibilities

PDT will –

conduct an After-Action-Review (AAR) to include:

- Preparation of a specific and detailed project assessment addressing:
  - Comparison of actual outcomes to planned execution in the baseline PMP; what went right and wrong?
  - If there is a difference between the two, discuss why
- develop recommendations to improve performance on future projects
- contractor/AE evaluations
- document results (within 90 days after project is physically complete)
- document Lessons Learned in DrChecks, if required.

PM will -

- archive the AAR report
- complete project closeout checklist below

The PDT will specify if the above products are electronic or hard copy and location of each file.

16.2. Project Closeout Checklist

17. APPROVALS

Approval of this PMP and any revisions will be made in accordance with USACE **PMBP PROC2070** and LRN SOPs. The original version of this PMP (Revision 0) has been reviewed and approved by the approvers listed on page 2. Approval of the PMP will be indicated in P2. All issued revised versions will

require the approval of the PDT. The sponsor will sign the cost-sharing agreement and a future revision to this PMP and will approve any future significant changes to the PMP.

18. DATA MANAGEMENT PLAN

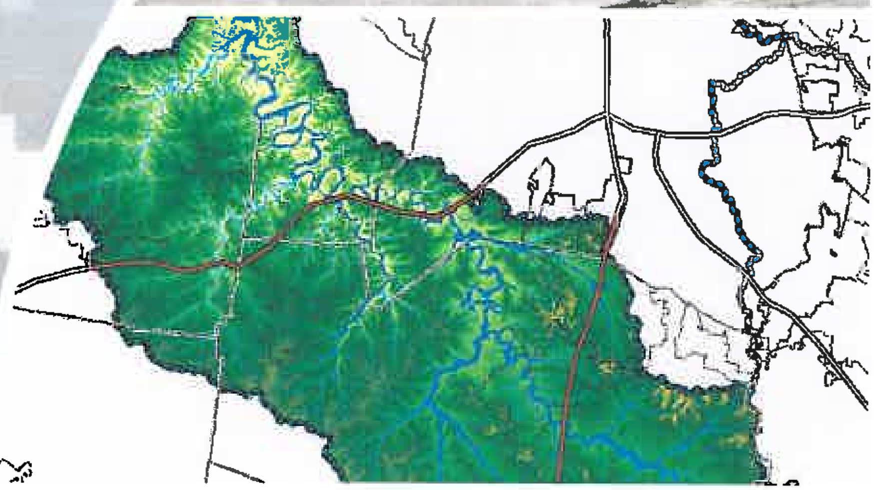
This study is subject to the Data Management Plan requirements laid out in REF 9270F, as applicable.

Appendix A

Sample Risk Register

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1 Eng	3-May-12	C. Danny	Use WSE from H&H and topo to determine heights and lengths of levees, floodways, or other features	Those lengths and heights used could be wrong	Affects the cost estimate	Medium	There is an [illegible] margin of error and iteration with H&H	High	[illegible] it is likely that H&H will change WSE	High	High	1. Use better topo data. 2. Get locations of utility, infrastructure, HTRW, Farmland Trust, etc. 3. Site visit/recon.	Tolerate the risk and proceed	[illegible], Real Estate, Cultural Resources, Environmental, [illegible]		Dependent on H&H WSE
2 Eng	3-May-[illegible]	[illegible]	Cost of alternative based on levee alignment	Cost is wrong	Could [illegible] alternatives [illegible] correctly	High	[illegible]	High	It is not likely that a huge error would occur	High	High	[illegible] costs [illegible] detail cost estimate.	Tolerate the [illegible] and proceed	[illegible], Real Estate, Design, Environmental		
											#N/A					
											#N/A					
											#N/A					
											#N/A					
											#N/A					
											#N/A					
											#N/A					
											#N/A					
											#N/A					
											#N/A					
											#N/A					
											#N/A					

Harpeth River, Tennessee
Feasibility Study
City of Franklin



Nashville District, US Army Corps of Engineers

January 8, 2013

US Army Corps of Engineers
BUILDING STRONG®

Agenda

- Corps Study Process
- Feasibility Study Goals
- Feasibility Study Execution
- Study Costs
- Partnership Benefits
- Questions

Corps Study Process

- Interest from local sponsor or recognized need
- Reconnaissance Study (Funding 100% Federal)
- Feasibility Cost Share Agreement (FCSA)
- Feasibility Study (Funding 50% Federal, 50% Sponsor)
- Project Partnership Agreement (PPA)
- Project Design and Implementation (Varies; Typical Funding 65% Federal, 35% Sponsor)

Corps Study Process

- Interest from local sponsor or recognized need
  - May 2010 Flood saw 4 fatalities and an estimated $480 million in direct economic impacts in the Harpeth Basin alone.
- Reconnaissance Study (Funding 100% Federal)
- Feasibility Cost Share Agreement (FCSA)
- Feasibility Study (Funding 50% Federal, 50% Sponsor)
- Project Partnership Agreement (PPA)
- Project Design and Implementation (Varies; Typical Funding 65% Federal, 35% Sponsor)

Corps Study Process

- Interest from local sponsor or recognized need
- Reconnaissance Study (Funding 100% Federal)
  - Reconnaissance Study, completed in May 2012 and Certified in July 2012, finds federal interest in pursuing both flood risk management and ecosystem restoration studies in the Harpeth Basin, with particular emphasis on regional flood risk measures.
- Feasibility Cost Share Agreement (FCSA)
- Feasibility Study (Funding 50% Federal, 50% Sponsor)
- Project Partnership Agreement (PPA)
- Project Design and Implementation (Varies; Typical Funding 65% Federal, 35% Sponsor)

Corps Study Process

- Interest from local sponsor or recognized need
- Reconnaissance Study (Funding 100% Federal)
- Feasibility Cost Share Agreement (FCSA)
  - Over the past six months, Franklin, Brentwood, Williamson County, Nashville, and the Corps have negotiated the scope, schedule, and budget of a multipurpose feasibility study, with a focus on regional flood risk management alternatives that would provide multi-jurisdictional benefits.
- Feasibility Study (Funding 50% Federal, 50% Sponsor)
- Project Partnership Agreement (PPA)
- Project Design and Implementation (Varies; Typical Funding 65% Federal, 35% Sponsor)

Feasibility Study Goals

- Inventory and model existing conditions in the Harpeth River Basin.
- Develop and analyze Flood Risk Management alternatives in the Harpeth River Basin, to benefit Franklin, Nashville, and Williamson County.
- Will analyze *regional* Flood Risk measures that benefit Franklin, as well as *local* Flood Risk measures in Franklin.
- Will investigate Aquatic Ecosystem Restoration opportunities as a secondary consideration in Franklin.
- Determine a recommended plan of action, and go to 30% design and detailed implementation costs for this plan.
- End Result: A Feasibility Report with a recommended plan of action approved by Congressional Committee, and the opportunity for sponsors to continue with Detailed Design and Implementation of recommended plan.

Feasibility Study Execution

- Comply with "3x3x3" planning paradigm:
  - No more than 3 years duration.
  - No more than $3 million total study costs.
  - Must ensure 3 vertical levels of review and concurrence.
- Use as much existing, reliable data as possible to reach decision points in an effort to minimize study costs and duration.
- Sponsor PMs will be closely involved throughout the life of the study to ensure unfeasible alternatives are not analyzed in detail.
- Will have an approved Feasibility Report 3 years after study initiation, but much of that time will be spent getting the report finalized and approved by Congressional Committee; a decision on a recommended plan will be reached by 19 months.

Study Costs

- Total Study Cost is $1.4 million
  - Federal Share is $700k
  - Collective sponsor share is $700k; $100k is in-kind credit for PM involvement
    - Franklin's share, for the entire feasibility study, is $246.8k

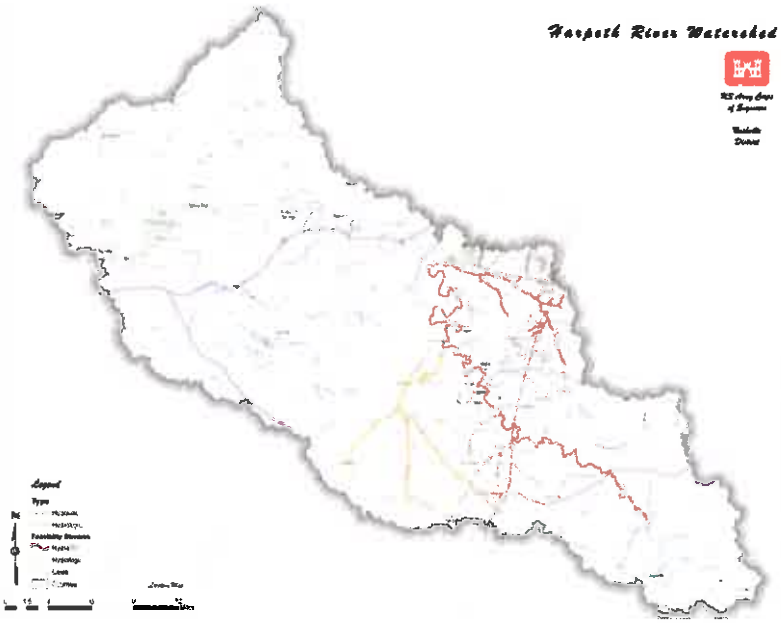
	Total Study Costs by Sponsor		
	Federal Cash ($)	PM Involvement Credit ($)	Sponsor Cash ($)
Franklin	280,166.17	33,333.33	246,832.84
Brentwood	50,000.00		50,000.00
Williamson	83,333.33	33,333.33	50,000.00
Nashville	286,500.49	33,333.33	253,167.16
	700,000.00	100,000.00	600,000.00

Partnership Benefits

- Other potential sponsors, also considering this effort, include Nashville, Brentwood, and Williamson County.
- This multi-government partnership provides valuable advantages in data and knowledge exchange, reducing study costs and duration.
- Regional flood risk management alternatives that benefit multiple jurisdictions could be cost shared among multiple partners.

Summary

- Corps has determined a federal interest in pursuing a Feasibility Study for the Harpeth River Basin.
- Feasibility Study will investigate both regional and local flood risk management measures for Franklin and other sponsors, as well as aquatic ecosystem restoration measures in Franklin.
- Total study cost is $1.4 million, with $246.8k contributed by Franklin; study will be complete in 3 years, but actual decision on a recommended plan will be made in less than 2.



Points of Contact

- Russ Rote, Chief of Project Planning Branch, (615) 736-7865
- Craig Carrington, Chief of Plan Formulation Section, (615) 736-7861
- Porter Williams, Project Manager, (615) 736-7635