DEPARTMENT OF THE ARMY
US ARMY ENGINEER DIVISION, SOUTHWESTERN
1100 COMMERCE STREET, SUITE 831
DALLAS TX 75242-1317

REPLY TO
ATTENTION OF

CESWD-PDS-P (1105)

02 NOV 2009

MEMORANDUM FOR Commander, Fort Worth District

SUBJECT: Review Plan for Leon Creek, San Antonio, Texas, Feasibility Study

1. References:

a. EC 1105-2-410, 22 August 2008, Review of Decision Documents.

b. Memorandum, CECW-CP, 30 March 2007, subject: Peer Review Process.

c. Addendum to Reference 1.b., CECW-CP, September 2008, subject: Supplemental Information for the Peer Review Process.

2. The review plan for the subject study, enclosed, has been reviewed and cleared for approval by the Flood Risk Management Planning Center of Expertise. It has been prepared in accordance with the referenced guidance, and public comments received will be incorporated into the plan as the study progresses. It does not require Independent External Peer Review at this time.

3. I hereby approve this review plan, which is subject to change as study circumstances require, consistent with study development under the Project Management Business Process. Subsequent substantial revisions to this plan or its execution will require new written approval from this office.

4. If you have questions or need further information, please contact Jo Ann M. Duman, CESWD-PDS-P, at (469) 487-7065.

Encl

ANTHONY C. FUNKHOUSER
Colonel, EN
Commanding

CF:
CESWG-PER-PP (Newman)

REVIEW PLAN

Leon Creek Watershed Feasibility Study
San Antonio, Bexar County, Texas
Feasibility Report

Fort Worth District

August 7, 2009

US Army Corps
of Engineers ®

REVIEW PLAN

Leon Creek Watershed Feasibility Study
San Antonio, Bexar County, Texas
Feasibility Report

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1. PURPOSE AND REQUIREMENTS

a. Purpose. This Review Plan defines the scope and level of peer review for the Leon Creek Watershed Feasibility Study

b. References

(1) Engineering Circular (EC) 1165-2-209, Civil Works Review Policy, 01 July 2009
(2) EC 1105-2-410, Review of Decision Documents, 22 Aug 2008
(3) EC 1105-2-407, Planning Models Improvement Program: Model Certification, 31 May 2005
(4) Engineering Regulation (ER) 1110-2-12, Quality Management, 30 Sep 2006
(5) Project Management Plan for Leon Creek Watershed Study, 12 Aug 2004
(6) FCSA Supplemental Agreement, 28 Sep 2005

c. Requirements. This review plan was developed in accordance with EC 1105-2-410, which establishes the procedures for ensuring the quality and credibility of U.S. Army Corps of Engineers (USACE) decision documents through independent review. The EC outlines three levels of review: District Quality Control, Agency Technical Review, and Independent External Peer Review. In addition to these three levels of review, decision documents are subject to policy and legal compliance review and, if applicable, safety assurance review and model certification/approval.

(1) District Quality Control (DQC). DQC is the review of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). It is managed in the home district and may be conducted by staff in the home district as long as they are not doing the work involved in the study, including contracted work that is being reviewed. Basic quality control tools include a Quality Management Plan providing for seamless review, quality checks and reviews, supervisory reviews, Project Delivery Team (PDT) reviews, etc. Additionally, the PDT is responsible for a complete reading of the report to assure the overall integrity of the report, technical appendices and the recommendations before approval by the District Commander. The Major Subordinate Command (MSC)/District quality management plans address the conduct and documentation of this fundamental level of review; DQC is not addressed further in this review plan.

(2) Agency Technical Review (ATR). ATR is an in-depth review, managed within USACE, and conducted by a qualified team outside of the home district that is not involved in the day-to-day production of the project/product. The purpose of this review is to ensure the proper application of clearly established criteria, regulations, laws, codes, principles and professional practices. The ATR team reviews the various work products and assure that all the parts fit together in a coherent whole. ATR teams will be comprised of senior USACE personnel (Regional Technical Specialists (RTS), etc.), and may be supplemented by outside experts as appropriate. To assure independence, the leader of the ATR team shall be from outside the home MSC.

(3) Independent External Peer Review (IEPR). IEPR is the most independent level of review, and is applied in cases that meet certain criteria where the risk and magnitude of the proposed project are such that a critical examination by a qualified team outside of USACE is warranted. IEPR is generally for feasibility and reevaluation studies and modification reports with Envirnomental Impact Statements (EISs). IEPR is managed by an outside eligible organization (OEO) that is described in Internal Revenue Code Section 501(c) (3), is exempt from Federal tax under section 501(a), of the Internal Revenue Code of 1986; is independent;

(4) Policy and Legal Compliance Review. Decision documents will be reviewed throughout the study process for their compliance with law and policy. These reviews culminate in Washington-level determinations that the recommendations in the reports and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the Chief of Engineers. Guidance for policy and legal compliance reviews is addressed further in Appendix H, ER 1105-2-100, Planning Guidance Notebook. When policy and/or legal concerns arise during DQC or ATR that are not readily and mutually resolved by the PDT and the reviewers, the District will seek issue resolution support from the MSC and HQUSACE in accordance with the procedures outlined in Appendix H, ER 1105-2-100. IEPR teams are not expected to be knowledgeable of Army and administration polices, nor are they expected to address such concerns. The home district Office of Counsel is responsible for the legal review of each decision document and signing a certification of legal sufficiency.

(5) Safety Assurance Review. In accordance with Section 2035 of Water Resources Development Act (WRDA) of 2007, EC 1105-2-410 requires that all projects addressing flooding or storm damage reduction undergo a safety assurance review of the design and construction activities prior to initiation of physical construction and periodically thereafter until construction activities are completed on a regular schedule sufficient to inform the Chief of Engineers on the adequacy, appropriateness, and acceptability of the design and construction activities for the purpose of assuring public health, safety, and welfare. A future circular will provide a more comprehensive Civil Works Review Policy that will address the review process for the entire life cycle of a Civil Works project. That document will address the requirements for a safety assurance review for the Pre-Construction Engineering Phase, the Construction Phase, and the Operations Phase. The decision document phase is the initial design phase; therefore, ER 1105-2-410 requires that safety assurance factors be considered in all reviews for decision document phase studies.

(6) Model Certification/Approval. EC 1105-2-407 requires certification (for Corps models) or approval (for non-Corps models) of planning models used for all planning activities. The EC defines planning models as any models and analytical tools that planners use to define water resources management problems and opportunities, to formulate potential alternatives to address the problems and take advantage of the opportunities, to evaluate potential effects of alternatives and to support decision-making. The EC does not cover engineering models used in planning. Engineering software is being address under the Engineering and Construction (E&C) Science and Engineering Technology (SET) initiative. Until an appropriate process that documents the quality of commonly used engineering software is developed through the SET initiative, engineering activities in support of planning studies shall proceed as in the past. The responsible use of well-known and proven USACE developed and commercial engineering software will continue and the professional practice of documenting the application of the software and modeling results will be followed.

2. STUDY INFORMATION

a. Decision Document. A Feasibility report is to be prepared for Leon Creek Watershed as authorized by a resolution by the committee on Transportation and Infrastructure, United States House of Representatives, House Resolution docket 2547 dated March 11, 1998, which reads as follows:

Guadalupe and San Antonio Rivers, Texas

Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, That, the Secretary of the Army is requested to review the report of the Chief of Engineers on the Guadalupe and San Antonio Rivers, Texas, published as House Document 344, 83rd Congress, 2nd Session, and other pertinent reports, with a view to determining whether any modifications to the recommendations contained therein area advisable at the present time, with particular reference to providing improvements in the interest of flood control, environmental restoration and protection, water quality, water supply, and allied purposes on the Guadalupe and San Antonio Rivers in Texas.

If this Feasibility report is approved by the Chief of Engineers, implementation of the recommended plan will require Congressional authorization.

b. Study Description. The Leon Creek Watershed Feasibility Study is a multi purpose study for flood risk management, ecosystem restoration, water quality, recreation, water supply and other allied purposes in the Leon Creek Watershed. This peer review plan is being developed for the Leon Creek Watershed Feasibility Study.

The Leon Creek Watershed Feasibility Study will be a typical U.S. Army Corps of Engineers feasibility study and will investigate structural measures such as upstream detention, and nonstructural measures such as evacuation of the floodplain. Ecosystem restoration measures will include riparian corridor expansion, aquifer recharge, wetlands and other measures that could be applicable. Multipurpose measures will also be explored to fully utilize project lands if features are compatible.

The Leon Creek Watershed Feasibility Study has not reached the feasibility scoping meeting milestone, and as such, detailed project risk is unknown at this time. However, it has been determined that there are over 6,000 structures located within the 500-year floodplain. Many of these structures are located between the 25-year and 500-year floodplains and are therefore not at risk during low frequency events. Most of the risk associated with flooding is due to damage of the structure. However, flooding does come from area of steep topography and rainfall comes in a short duration, so even at a 25-year event there is not a whole lot of warning time. There have been losses of life in the Leon Creek watershed due to flooding. Most if not all of these have been from people attempting to cross low water crossings in their vehicles and not as a result of flood inundation in their homes.

Due to the fact that the flood damages occur above the 25-year floodplain, detention structures would be a very practicable alternative. There are several existing quarries in the area that could be converted to off channel detention for minimal costs because the land cost for quarries would be insignificant. Therefore, the estimated project costs are between $30-40 million. Current cost estimates for two detention sites are under $10 million each.

During the feasibility study, additional project risk will be analyzed in detail and disclosed in the Draft and Final Feasibility Reports. However, generalized project risk can be discussed in terms of

proposed alternatives that may be evaluated. There are inherent project risk with all project alternatives as it relates to property and population. The alternative with the least amount of project risk for future damages would be evacuation of the floodplain. This is because if a structure is removed, it can no longer be damaged. With a structural detention alternative, there is an inherent project risk. The structural project in the form of a detention would provide a reduction in flood damages from floods of all magnitudes. In addition, there is a risk of project failure from geotechnical issues, lack of operations and maintenance, etc. This risk cannot be determined until detailed analyses have occurred to determine the associated risk. If a substantial risk to the public as a result of a proposed alternative is identified during the feasibility study, the review plan will be revised to incorporate the identified risk and it will be determined if there is a need to conduct IEPR.

There will be district quality control (DQC) and Agency Technical Review (ATR) for this project. Review of submittal packages and feasibility report materials will be required prior to the following major milestones:

- Feasibility Scoping Meeting (FSM)
- Alternative Formulation Briefing (AFB)
- Draft Feasibility Report
- Final Feasibility Report

The timing and scope of these reviews is discussed in the following sections of this PRP.

c. Factors Affecting the Scope and Level of Review. This study does not contain influential scientific information or assessment, nor does it have significant economic, environmental or social affects to the nation. Interagency interest is limited to the coordination required by federal law. No significant safety issues have been presented in relation to this study or are expected in relation to any recommended project. Currently, there is not a recommended project for this study however the total project cost is estimated to under $45 million ($30-40 million). The study is currently under preliminary investigation of alternatives if project costs escalate above $45 million this PRP will be revised to include an IEPR. Close coordination with the sponsor and public meetings are expected to negate significant public dispute with regard to a recommended plan as are coordination with USFWS and USGS and cultural/archeological interests. Methods and models used in this study are typical of all Corps flood risk management studies with little room for interpretation and are not expected to change prevailing practices on this or future flood risk management studies. If necessary, IEPR will occur after a final report is prepared, but before the Civil Works Review Board and State and Agency Review of the Final Feasibility Report.

d. In-Kind Contributions. The sponsor provided topographic surveys/bathyometry and HSPF processor development relevant to the study for an in kind credit of $594,300.00. These products will be reviewed by the PDT and the district's survey and imagery expert as required by the SWD Quality Assurance Plan and Corps policy and guidance.

3. AGENCY TECHNICAL REVIEW (ATR)

a. General. ATR for decision documents covered by EC 1105-2-410 are managed by the appropriate Planning Center of Expertise (PCX) with appropriate consultation with the allied Communities of Practice such as engineering and real estate. The ATR shall ensure that the product is consistent with established criteria, guidance, procedures, and policy. The ATR will assess whether the analyses presented are technically correct and comply with published USACE guidance, and that the document explains the analyses and the results in a reasonably clear manner for the public and decision makers. Members of the ATR team will be from outside the home district. The ATR lead will be from outside

the home MSC and is responsible for indentifying the ATR team members. ATR team members may be nominated from the home district. The leader of the ATR team will participate in milestone conferences and the Civil Works Review Board (CWRB) to address review concerns.

b. Products for Review. ATR will occur prior to major decision points in the planning process so that the technical results can be relied upon in setting the course for further study. An in-depth review of the report and all appendices will be coordinated and documented by the PDT leader prior to HQUSACE policy compliance review. As mentioned throughout the PMP, all ATR will be coordinated with the Planning Center of Expertise for Flood Risk Management (PCX). The ATR will be accomplished by an independent entity outside the Fort Worth District, within USACE, as designated by the PCX. The purpose of this review is to ensure the proper application of clearly established criteria, regulations, laws, codes, principles and professional practices of all project decision documents. The intent is for an ATR to not only ensure technical analyses are correct, but also ensure compliance with all pertinent USACE guidance in or to high quality products early in the study prior to HQUSACE review. ATR will be completed on the following documentation:

- FSM Documentation
- AFB Documentation
- Draft Feasibility Report
- Final Feasibility Report

Additional Issue Resolution Conferences (IRCs) may be required throughout the study when significant policy issues arise. If these require documentation for major decision making, then additional ATR of this documentation may be required; however, no IRCs are expected at this time. This quality control will occur prior to the decision event so that a firm technical basis for making decisions will be established. As a result, the decision event is free to address critical outstanding issues and set the direction for the next step of the study.

c. Required ATR Team Expertise. The expertise and disciplines represented on the ATR team reflect the significant disciplines involved in the planning effort. The ATR team consists of at least 10 team members outside of the Fort Worth District in the following functional areas:

Plan Formulation: Team member should have extensive experience in the Corps planning process and be knowledgeable of Corps policies and guidelines. He or she should be familiar with flood risk management projects, water resources and watershed planning and have experience relevant to issues associated with perched banks and flat topography.

Hydrology and Hydraulics: Team member should be an expert in the field of urban hydrology and hydraulics, have a thorough understanding of open channel systems, the effects of management practices and low impact development on hydrology, the use of levees and floodwalls within the space constraints of an urban environment, the use of non-structural systems as they apply to flood proofing, warning systems, and evacuation, and the use of HEC computer modeling systems.

Civil Design: Team member will have experience with utility relocations, positive closure requirements, interior drainage requirements, and application of non-structural flood risk management measures. A certified professional engineer is suggested.

Structural Design: Team member will have a thorough understanding of both structural and non-structural measures to include, but not be limited to, retaining walls, gate structures, bridges and

culverts, utility penetrations, and stoplog and sandbag gaps. A certified professional engineer is suggested.

Geotechnical: Team member will have extensive experience in levee and floodwall design, pre- and post-construction evaluation, and rehabilitation. A certified professional engineer is strongly recommended.

Cost Estimating: Team member will be familiar with cost estimating for similar projects in MCACES. Review includes construction schedules and contingencies for any document requiring Congressional authorization. The team member will be a Certified Cost Technician, a Certified Cost Consultant, or a Certified Cost Engineer. As the Cost Engineering Center of Expertise, Walla Walla District will assign this team member as part of a separate effort coordinated by the ATR or IEPR team lead in conjunction with the geographic district's project manager.

Economics: Team member will have extensive experience in flood risk management projects and a thorough understanding of HEC-FDA.

Cultural, Environmental, Real Estate, HTRW, and Recreation: Team members will be familiar with similar studies and projects.

Legal review is the responsibility of the Corps of Engineers, Office of Counsel and is not under the purview of the ATR team.

d. Documentation of ATR. DrChecks review software will be used to document all ATR comments, responses and associated resolutions accomplished throughout the review process. Comments should be limited to those that are required to ensure adequacy of the product. The four key parts of a quality review comment will normally include:

(1) The review concern – identify the product's information deficiency or incorrect application of policy, guidance, or procedures;
(2) The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not be properly followed;
(3) The significance of the concern – indicate the importance of the concern with regard to its potential impact on the plan selection, recommended plan components, efficiency (cost), effectiveness (function/outputs), implementation responsibilities, safety, Federal interest, or public acceptability; and
(4) The probable specific action needed to resolve the concern – identify the action(s) that the reporting officers must take to resolve the concern.

In some situations, especially addressing incomplete or unclear information, comments may seek clarification in or to then assess whether further specific concerns may exist. The ATR documentation in DrChecks will include the text of each ATR concern, the PDT response, a brief summary of the pertinent points in any discussion, including any vertical coordination, and lastly the agreed upon resolution. The ATR team will prepare a Review Report which includes a summary of each unresolved issue; each unresolved issue will be raised to the vertical team for resolution. Review Reports will be considered an integral part of the ATR documentation and shall:

- Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;

- Include the charge to the reviewers;
- Describe the nature of their review and their findings and conclusions; and
- Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

ATR may be certified when all ATR concerns are either resolved or referred to HQUSACE for resolution and the ATR documentation is complete. Certification of ATR should be completed, based on work reviewed to date, for the AFB, draft report, and final report. A sample certification is included in ER 1110-2-12.

4. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

a. General. IEPR is conducted for decision documents if there is a vertical team decision (involving the district, MSC, PCX, and HQUSACE members) that the covered subject matter meets certain criteria (described in EC 1105-2-410) where the risk and magnitude of the proposed project are such that a critical examination by a qualified team outside the USACE is warranted. IEPR is coordinated by the appropriate PCX and managed by an Eligible Outside Organization (OEO) external to the USACE. IEPR panels shall evaluate whether the interpretations of analysis and conclusions based on analysis are reasonable. To provide effective review, in terms of both usefulness of results and credibility, the review panels should be given the flexibility to bring important issues to the attention of decision makers; however, review panels should be instructed to not make a recommendation on whether a particular alternative should be implemented, as the Chief of Engineers is ultimately responsible for the final decision on a planning or reoperations study. IEPR panels will accomplish a concurrent review that covers the entire decision document and will address all the underlying engineering, economics, and environmental work, not just one aspect of the study. Whenever feasible and appropriate, the office producing the document shall make the draft decision document available to the public for comment at the same time it is submitted for review (or during the review process) and sponsor a public meeting where oral presentations on scientific issues can be made to the reviewers by interested members of the public. An IEPR panel or OEO representative will participate in the CWRB.

b. Decision on IEPR. It is not expected that IEPR will be required for this study. This study does not contain influential scientific information or assessment, nor does it have significant economic, environmental or social affects to the nation. Interagency interest is limited to the coordination required by federal law, and mild interest in the potential for NRCS detention projects. Loss of one life was recorded in the August 2007 flood event due to a vehicle being washed from a roadway. No other significant safety issues have been presented in relation to this study or are expected in relation to any recommended project. There is not currently a recommended project for this study however the cost is estimated to be under $45 million. It is expected an Environmental Assessment will be the required NEPA documentation. Close coordination with the sponsor and public meetings are expected to negate significant public dispute with regard to a recommended plan as are coordination with USFWS and EPA and cultural/archeological interests. Methods and models used in this study are typical of all Corps flood risk management studies with little room for interpretation and are not expected to change prevailing practices on this or future flood risk management studies. If necessary, IEPR will occur after a final report is prepared, but before the Civil Works Review Board and State and Agency Review of the Final Feasibility Report.

c. Products for Review. Not Applicable.

d. Required IEPR Panel Expertise. Not Applicable.

e. Documentation of IEPR. Not Applicable.

5. MODEL CERTIFICATION AND APPROVAL

a. General. The use of certified or approved models for all planning activities is required by EC 1105-2-407. This policy is applicable to all planning models currently in use, models under development and new models. The appropriate PCX will be responsible for model certification/approval. The goal of certification/approval is to establish that planning products are theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. The use of a certified or approved model does not constitute technical review of the planning product. Independent review of the selection and application of the model and the input data and results is still required through conduct of DQC, ATR, and, if appropriate, IEPR. Independent review is applicable to all models, not just planning models. Both the planning models (including the certification/approval status of each model) and engineering models used in the development of the decision document are described below:

b. Planning Models. The following planning models are anticipated to be used:

- HEC-FDA 1.2.4 (Certified). The Hydrologic Engineering Center's Flood Damage Reduction Analysis (HEC-FDA) program provides the capability for integrated hydrologic engineering and economic analysis for formulating and evaluating flood risk management plans using risk-based analysis methods. The program will be used to evaluate and compare the future without- and with-project plans along Leon Creek in Bexar County, TX to aid in the selection of a recommended plan to manage flood risk.

- The United States Fish and Wildlife Service Habitat Evaluation Procedure (HEP) (USFWS, 1980) (certified) was used to evaluate habitat conditions that would result from alternative plans. A habitat suitability index (HSI) for indicator species is derived by aggregating suitability indices (SIs) critical for habitat variables. These SIs are based on field measurements for existing conditions and on professional judgment for future conditions under alternative plans. The index ranges from 0.0 to 1.0, with 1.0 representing the highest habitat quality possible. A habitat unit (HU) is the product of the HSI multiplied by an area (acre) of available habitat. HSIs and HUs were developed for different times during the period of analysis (at year 1, 15, 25, and 50), and HUs are annualized to estimate an average annual habitat unit (AAHU).

  In this system, future habitat conditions can be estimated for both baseline (without project) and design (with project) conditions. Projected long-term effects of the project can be predicted using Average Annual Habitat Unit (AAHU) values. Based on the AAHU outcomes, alternative designs can be formulated and trade-off analyses can be simulated to promote environmental optimization. AAHUs are determined by multiplying the HSI by the number of acres in the study area, and therefore, HEP provides information for two general types of wildlife habitat comparisons. The first is the relative value of different areas at the same point in time. The second is the relative value of the same area at future points. Therefore, the impact of land and water use changes on wildlife habitat can be estimated.

  The USFWS, with assistance from the Texas Parks and Wildlife Department (TPWD) and the USACE Fort Worth District, completed the HEP for the without-project (existing and future) condition of riparian natural resources. Because the resource agencies are most concerned in the restoration of lost aquatic and riparian habitat functions, the focus was to use models that contain

variables that measure important components of riparian corridor structure. The team decided it was appropriate to measure the existing habitat value of the current vegetation state, even though the restoration measures were for converting or restoring existing vegetation to riparian woodlands. The following species, indicative of healthy ecosystems within the Leon Creek Watershed, were used for the habitat evaluations.

- Riparian Woodlands: raccoon, barred owl, fox squirrel, green heron
- Grasslands: red-tailed hawk, meadowlark, scissor-tailed flycatcher, eastern cottontail

While these species are relatively common, their HSI models, when averaged cumulatively, serve as good indicators of a healthy, functioning ecosystem and therefore provide a good basis for comparing outputs from alternatives plans. However, they should not be used to judge the importance or significance of these habitats as discussed in the Introduction.

- Environmental Protection Agency's (EPA) Habitat Assessment Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers (Not Certified). This model was used in conjunction with Habitat Evaluation Procedure (HEP) because HEP gives extremely low scores (sometimes zero scores) for aquatic conditions when water is not present and provides quality information when water is present. The Environmental Protection Agency (EPA) developed a Habitat Assessment model using Rapid Bioassessment Protocols to analyze the physical characteristics of habitat types. Therefore, a portion of the EPA Habitat Assessment was used for the aquatic habitat assessments, allowing the study team to quantify the existing value of the aquatic resources to establish a baseline for project evaluation to the extent practical.

  The EPA Habitat Assessment is described in depth in Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrate, and Fish, Second Edition (Manuel Barbour 1999). http://www.epa.gov/owow/monitoring/rbp/index.html. There are several protocols that can be used to complete an in-depth analysis, but only the Habitat Assessment Field Data Sheet was completed for this habitat analysis. There are forms for high or low gradient stream, with a few minor measurement differences. The analysis measures ten parameters including the epifaunal substrate/available cover, embeddedness or pool substrate characterization (depending on whether it is a high or low gradient stream), velocity/depth combinations or pool variability, channel flow status, channel alteration, frequency of riffles or channel sinuosity, bank stability, bank vegetation protection, and riparian zone width. Each parameter is given a score from 1-20 for a total score of 200 possible points.

  Each survey point has a score from 0 to 200; these scores are then averaged to compose a segment value for the existing condition. For the projection of Future without-Project condition, the team predicted expected changes for years 1, 15, 25, and 50 and completed additional field data sheets to document those expected changes. This will also be done after project features are developed for the future with-project projections. Using the Ultimate Land Use data provided by the sponsor, our projections held true, in that the remaining segments will experience a similar degradation pattern as Leon Creek. Each segments score was then normalized to produce a Rapid Bioassessment Protocol Index (RBPI), which is similar to the Habitat Stability Index (HSI) using HEP, where scores range from 0.0 to 1.0, with 1.0 representing the highest habitat quality possible. The RBPI was then multiplied by acres of stream to obtain aquatic RBPU's. The remaining runs of the model were accomplished similar to HEP with culmination of Average Annual Rapid Bioassessment Protocol Units (AARBPU)

c. Engineering Models. The following engineering models are anticipated to be used:

- HEC-RAS 4.0. The Hydrologic Engineering Center's River Analysis System (HEC-RAS) program provides the capability to perform one-dimensional steady and unsteady flow river hydraulics calculations. The program will be used for steady flow analysis to evaluate the future without- and with-project conditions in the Leon Creek watershed.

- HEC-HMS 2.2.2. The Hydrologic Engineering Center's Hydrologic Modeling System (HEC-HMS) simulates precipitation-runoff processes. Version 2.2.2 was chosen over the newer version, 3.3, for its efficiency and reliability in modeling the terrain present in Bexar County, which requires the development of routing data for approximately 190 reaches to address cross flow areas between Leon Creek. Some testing was done with the alpha and beta models of HEC-HMS 3.4 as HEC

6. REVIEW SCHEDULES AND COSTS

a. ATR Schedule and Cost. ATR will be completed prior to submission of documentation to the vertical team for a decision. ATR cost for the FSM is expected to be $25,000. Additional ATR costs for the AFB and draft feasibility report are currently estimated to be $35,000. These costs are cost-shared with the study's non-federal sponsors. ATR will be completed on the following documentation:

- FSM Documentation, anticipated August 2009
- AFB Documentation, anticipated August 2010
- Draft Feasibility Report, anticipated November 2011
- Final Feasibility Report, anticipated May 2012

b. IEPR Schedule and Cost. Not Applicable

c. Model Certification/Approval Schedule and Cost.

1) Engineering (HEC) models are not certifiable by planning.

2) Environmental Protection Agency's (EPA) Habitat Assessment Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers has a package under development to initiate the certification effort. At this time schedule and cost are not known. Coordination with the Ecosystem Restoration (ER) PCX has not yet been initiated by Fort Worth District, but may have been initiated by other districts as this model has been in use by EPA since 1999, and on multiple studies completed by multiple districts in subsequent years. It is not expected to have certification complete prior to issuing the final feasibility report for this study. Coordination with U.S. Fish and Wildlife Service on several independent studies currently underway with similar aquatic habitat conditions has led the district to pursue authorization for use as part of the ATR process for each independent study.

7. PUBLIC PARTICIPATION

The public will be able to comment on the feasibility study during the decision making process. Several public meetings will be held throughout the study. A public workshop will be held during the development of alternatives, which will be held after the FSM and prior to the AFB. In addition, after a tentatively selected plan is determined, a public meeting will be held to solicit public comment on the plan. Finally, a public meeting is normally held during the public review process of the draft feasibility report.

The public will have an opportunity to review and provide comments on the draft feasibility report and environmental assessment for 30 days occurring approximately November 2011. The environmental assessment will most likely begin after plan formulation is complete and prior to the AFB. In addition, the public can provide comments at anytime during the feasibility study process to the study's project manager at the following address:

U.S. Army Corps of Engineers, Fort Worth District
ATTN: Leon Creek Project Manager, CESWF-PM-C
P.O. Box 17300
Fort Worth, TX, 76102-0300

Comments and responses are documented by the date the comment was received, and provided as an attachment which follows the document from the first ATR in August-September 2009 through Washington D.C. level review of the final feasibility report expected May 2012. This includes comments from all ATRs and comments received from the public throughout the study process.

All published reports can be found at the Fort Worth District's website (www.swf.usace.army.mil) as well as directions for obtaining any information that may be disclosed under the Freedom of Information Act (Public Law 89-554, 80 Stat. 383; amended 1996, 2002, 2007).

8. PCX COORDINATION

Review plans for decision documents and supporting analyses outlined in EC 1105-2-410 are coordinated with the appropriate Planning Center(s) of Expertise (PCXs) based on the primary purpose of the basic decision document to be reviewed. The lead PCX for this study is the Flood Risk Management (FRM) PCX at South Pacific Division in San Francisco, CA. Additionally, the FRM PCX will coordinate with the Cost Engineering Directory of Expertise (DX) to conduct ATR of cost estimates, construction schedules and contingencies.

9. MSC APPROVAL

The MSC that oversees the home district is responsible for approving the review plan. Approval is provided the MSC Commander. The commander's approval should reflect vertical team input (involving district, MSC, PCX, and HQUSACE members) as to the appropriate scope and level of review for the decision document. Like the PMP, the RP is a living document and may change as the study progresses. Changes to the RP should be approved by following the process used for initially approving the RP. In all cases the MSCs will review the decision on the level of review and any changes made in updates to the project.

10. REVIEW PLAN POINTS OF CONTACT

Questions and/or comments on this review plan can be directed to the following points of contact:

- U.S. Army Corps of Engineers, Fort Worth District
  ATTN: Leon Creek Project Manager, CESWF-PM-C
  P.O. Box 17300
  Fort Worth, TX. 76102

- U.S. Army Corps of Engineers, Southwestern Division
  ATTN: Chief of Planning & Policy Division, CESWD-PDS-P
  1100 Commerce St.
  Dallas, TX. 75242

- U.S. Army Corps of Engineers, South Pacific Division
  ATTN: FRM-PCX Program Manager, CESPD-PDS-P
  1455 Market St.
  San Francisco, CA 94103

ATTACHMENT 2: ATR CERTIFICATION TEMPLATE

LEON CREEK, SAN ANTONIO, TEXAS
FEASIBILITY STUDY

Certification by Review Team Members

I certify that the study and review process required to be performed under my responsibility has been completed and the technical work is generally in accord with Corps regulations, standard report requirements and customer expectations.

Review Team Member **Date**

LEON CREEK, SAN ANOTONIO, TEXAS
FEASIBILITY STUDY

STATEMENT OF AGENCY TECHNICAL REVIEW

COMPLETETION OF AGENCY TECHNICAL REVIEW
LEON CREEK WATERSHED FESIBILTY STUDY

The Fort Worth District has completed the feasibility report of the Leon Creek Project. Notice is hereby given that an Agency technical review, that is appropriate to the level of risk and complexity inherent in the project, has been conducted as defined in the review plan.

During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions; methods, procedures, and material used in analyses; alternatives evaluated; the appropriateness of data used and level obtained; and reasonableness of the result, including whether the product meets the customer's needs consistent with law and existing Corps policy. The independent technical review was accomplished by and Agency team composed of staff from multiple districts. All comments resulting from ITR have been resolved.

(Signature) _____ _____
Name Date
Agency Technical Review Team Leader
Leon Creek Project

(Signature) _____ _____
Marie Vanderpool Date
Project Manager
Leon Creek Project

ATTACHMENT 3: ACRONYMS AND ABBREVIATIONS

Term	Definition	Term	Definition
AFB	Alternative Formulation Briefing	NED	National Economic Development
ASA(CW)	Assistant Secretary of the Army for Civil Works	NER	National Ecosystem Restoration
ATR	Agency Technical Review	NEPA	National Environmental Policy Act
CSDR	Coastal Storm Damage Reduction	O&M	Operation and maintenance
DPR	Detailed Project Report	OMB	Office and Management and Budget
DQC	District Quality Control	OMRR&R	Operation, Maintenance, Repair, Replacement and Rehabilitation
DX	Directory of Expertise	OEO	Outside Eligible Organization
EA	Environmental Assessment	OSE	Other Social Effects
EC	Engineer Circular	PCX	Planning Center of Expertise
EIS	Environmental Impact Statement	PDT	Project Delivery Team
EO	Executive Order	PAC	Post Authorization Change
ER	Ecosystem Restoration	PMP	Project Management Plan
FDR	Flood Damage Reduction	PL	Public Law
FEMA	Federal Emergency Management Agency	QMP	Quality Management Plan
FRM	Flood Risk Management	QA	Quality Assurance
FSM	Feasibility Scoping Meeting	QC	Quality Control
GRR	General Reevaluation Report	RED	Regional Economic Development
HQUSACE	Headquarters, U.S. Army Corps of Engineers	RTS	Regional Technical Specialist
IEPR	Independent External Peer Review	USACE	U.S. Army Corps of Engineers
ITR	Independent Technical Review	WRDA	Water Resources Development Act
LRR	Limited Reevaluation Report		
MSC	Major Subordinate Command		