SOAH DOCKET NO. 582-15-2082
TCEQ DOCKET NO. 2015-0069-MSW

APPLICATION OF	§	**BEFORE THE STATE OFFICE**
130 ENVIRONMENTAL PARK. LLC	§	**OF**
FOR PROPOSED	§	**ADMINISTRATIVE HEARINGS**
PERMIT NO. 2383	§	

PREFILED TESTIMONY OF JOHNIE HALLIBURTON FOR PLUM CREEK CONSERVATION DISTRICT

Exhibits

PCCD Exhibit No. 1.0	Prefiled Testimony of Johnie Halliburton
PCCD Exhibit No. 1.1	PCCD Easements for Site 21 in Caldwell County
PCCD Exhibit No. 1.2	Original 1960 Plum Creek Watershed Work Plan
PCCD Exhibit No. 1.3	Initial 1960 NRCS & Plum Creek Conservation District Local Sponsor Agreement Pertaining to Site 21
PCCD Exhibit No. 1.4	Three sheets of the "as built" Site 21 structure drawings showing elevations
PCCD Exhibit No. 1.5	2014 Dam Inspection Report for Site 21
PCCD Exhibit No. 1.6	Excerpts from recent Final Report on Rehabilitation of Site 21

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PLUM CREEK CONSERVATION DISTRICT'S PREFILED TESTIMONY OF JOHNIE HALLIBURTON

Q: Please state your name for the record.

A: My name is Johnie Halliburton.

Q: Please state your employer for the record.

A: I am employed by Plum Creek Conservation District

Q: What is your position with Plum Creek Conservation District?

A: I am the District's Executive Manager.

Q: How long have you been with the District?

A: About 13years.

Q: What is Plum Creek Conservation District?

A: Plum Creek Conservation District is a Water Control and Improvement District existing under provisions of Chapters 49 and 51 of the Texas Water Code. The District was created by the Texas Legislature in 1957 under the authority of Article XVI, Section 59 of the Texas Constitution. The original 1957 PCCD Legislation was amended in 1989 by the Texas Legislature to also give the District powers of a Texas groundwater district that

are now contained in Chapter 36 of the Texas Water Code in accord with the language of that amending legislation.

Q: What area is within the District?

A: The District's area includes parts of Hays and Caldwell Counties. The District's offices are located in Lockhart, Texas.

Q: Does the District have a governing body?

A: Yes. Pursuant to its enabling legislation, the District is governed by a Board of six directors, four appointed by the Caldwell County Commissioners Court and two appointed by the Hays County Commissioners Court.

Q: Why did the Plum Creek Conservation District seek to become a party to this proceeding?

A: Plum Creek Conservation District is the primary local sponsor of a Small Watershed Protection Plan instituted by the Soil and Water Conservation Service of the United States Department of Agriculture under a United States statute known as Public Law 83-566. The Plan covers an area that includes all land in the area of the Plum Creek District boundaries and some additional land in Travis County that is not within the District's geographical boundaries. As Local Sponsor, the District acquired easements for use by what is now the Natural Resources Conservation Service for small dams to regulate floodwater flow and to contain eroded materials in the area draining into the lakes formed upstream of the dams.

Q: Here is Exhibit 1.2 to your Testimony. Can you tell us what Exhibit 1.2 is?

A: Yes. It is the Original Work Plan for Watershed Protection and Flood Prevention for the Plum Creek Watershed that was executed on April 24, 1960.

Q: Was the Work Plan implemented by NRCS and by Plum Creek Conservation District?

A: Yes, over a period of years.

Q: What are the duties of Plum Creek Conservation District as a "local sponsor for the Work Plan?

A: As shown in Exhibit 1.2, the District is the Primary Local Sponsor and, as such, was responsible for acquiring easements for the "works of improvement" that were constructed under the Plan. Then, after construction, Plum Creek Conservation District has the responsibility to operate and maintain the floodwater retarding structures installed under the Plan.

Q: Are there some responsibilities for Plum Creek Conservation District and other Local Sponsoring organizations that are also parties to the Plan?

A: Yes. Again as shown in Exhibit 1.2 the local sponsoring organizations have responsibilities to obtain agreements from at least 50% if the landowners above each of the floodwater retaining structures to carry our conservation farm or ranch plans on their lands, to assure the installation of land treatment measures and then, finally, to encourage landowners and operators to operate and maintain those measures

Q: Have there been any amendments to the original Work Plan as shown on Exh1.2.

A: Yes. The most recent Amendment was Amendment No. V signed in September, 2011.

Q: In general, what types of things did the various Amendments do?

A: Amendments did various things. For example, some of the Amendments deleted some of the structures that were originally planned for construction. Two of the Amendments were to allow rehabilitation of dams after the dams were reclassified from "low hazard" dams to "high hazard" dams under dam safety rules that came into existence after the

original Work Plan was executed. Amendments also added language to the Work Plan addressing various requirements of new Federal laws and programs that had come into existence in the interval between the time the original Work Plan was developed and the time of the Amendments.

Q: In addition to being the primary Local Sponsor under the NRCS Work Plan for the Plum Creek Watershed are there any other reasons that the District sought Party Status in this Hearing?

A: Yes. The District not only has easements for the dams constructed under the NRCS Work Plan but also has regulatory control of dams constructed under the terms of the Work Plan. One of those dams is on property on which the Applicant is proposing to have operations so the District has responsibilities under the Texas Dam Safety Act contained in that Act and under regulations for that program administered by the Texas Commission on Environmental Quality. The District also has jurisdiction over groundwater within its boundaries, and groundwater quality is an issue in landfill permitting. The Board believed it had a duty to insure the project did not threaten groundwater quality. So the Board of the District voted to seek party status in the hearing so it could learn about and contribute information about potential impacts of the proposed landfill on the District's various obligations associated with its role as a Local Sponsor for the Small Watershed Protection Plan, its easements, Texas Dam Safety Act rules, to protect groundwater quality and because of the District's statutory powers.

Q: Is the Plum Creek Watershed Work Plan the only Small Watershed Work Plan having PCCD as a local sponsor?

A: No. There is also a Lower Plum Creek Watershed Work Plan on which the District is the local sponsor.

Q: Is the same watershed, the Plum Creek Watershed in Hays, Travis and Caldwell Counties, involved in both work plans?

A: Yes. In general terms, the Lower Plum Creek Plan has dams below Highway 20 or, in other words, dams south in the Plum Creek Watershed from those in the Plum Creek Watershed Work Plan. The Plum Creek Plan covers dams in the northern part of the watershed.

Q: How many dams does the District have responsibility for under one or the other of the Plum Creek Plans?

A: 28 in total. There were more described in the two plans, but some were never constructed and, eventually, deleted from the two Work Plans.

Q: What purposes do the District's easements serve?

A: The easements obtained by the District grant property rights to the District for use in connection with the objectives of the one or the other of the Watershed Work Plans.

Q: Is the area of land sought to be used by the Applicant for its operations pursuant to the terms of any permit issued by TCEQ as a result of this hearing on land that is included in the area covered by the Small Watershed Protection Plan for the Plum Creek Watershed?

A: Yes.

Q: Which of the dams described in the Work Plan is in the area of the Applicant's proposed operations?

A: Site 21 is the dam on Property optioned by the Applicant for its operations.

Q: Was a dam constructed by NRCS under the terms of the Work Plan at Site 21?

A: Yes.

Q: Let me hand you Exhibit 1.3. Can you identify Exhibit 1.3?

A: Yes. After a dam was constructed by NRCS and put into service, there was Watershed Protection Operation and Maintenance Agreement signed for that dam. Exhibit 1.3 is a copy of the original Maintenance Agreement for the dam at Site 21 that was entered into by the Soil Conservation Service (now NRCS) and Plum Creek Conservation District.

Q: Are duties of each party to the Agreement described in the Agreement?

A: Yes.

Q: In general, what are the duties of Plum Creek Conservation District?

A: As shown in the Exhibit, the District is responsible for operation of the structure to assure that it functions in the manner for which it was designed. Generally, that means making inspections and doing various maintenance chores associated with the proper functioning of the entire area that is used in connection with the floodwater and sediment capture functions of the dam and impoundment at Site 21.

Q: Does the District hold an easement for the purpose of construction and operations of a dam at Site 21?

A: Yes.

Q: Let me hand you a copy of Exhibit 1.1 to your Testimony. Can you identify Exhibit 1.1 for the record?

A: Yes. It is a collection of the original easements acquired by the District for use in connection with the Floodwater retarding structure at Site 21.

Q: How many landowners were there at the time the easements were acquired for the area now used by the District in connection with operations at Site 21?

A: I do not know how many landowners were involved originally, but there are 12 separate easements, plus a Resolution of the County for temporary closure of a county road.

Q: You have previously testified that the Applicant's operations are on property that has been optioned by the Applicant for its proposed operations. Do you know which easement in Exhibit 1.1 is the easement for what will become the Applicants property and the site of the Applicant's operations?

A: I believe the dam is on property covered by the easement originally executed by W.D. Moore and his wife.

Q: Is that land now at least a part of what is known as the Hunter Tract?

A That is how I refer to that tract. I have not made of study of all the current names of owners of all of the lands covered by the District's easements at Site 21 but I think a large portion of the District's easements are on the Hunter Tract.

Q: Is the entire Hunter tract covered by the easement held by PCCD?

A: No. I think that the area covered by the easement held by the District is not included in the area of the Hunter tract that is described for permitting in this application. However, because of drainage patterns and proximity of proposed operations to the District's easements all of the drainage from the Site of Applicant's operations will flow only a short distance until it enters the area of the District's easement.

Q: How does the District use its easements on what is now the Hunter Tract?

A: As I stated earlier, because the District is the primary local sponsor for the NRCS project at Site 21, the District has continuing responsibilities under an Agreement with the Natural Resources Conservation Service related to the Small Watershed Protection Work Plan that includes the area that could be impacted by the applicants operations. .

Q: What can the landowners do with land that is covered by the District's easements?

A: The easements all state that the landowner can make any use of the property covered by one of the District's easements that is not inconsistent with the District's use of its easement rights. The easement rights of the District include its responsibilities under the maintenance agreement that it has with what is now the NRCS. Some of the District's easements also contain special provisions dealing with particular items that were negotiated when the easement was obtained.

Q: How do the landowners and the District know what land is in the easement area at Site 21?

A: When the dam at Site 21, and the other dam sites in the Watershed Work Plans were constructed, NRCS produced drawings that showed the locations of the completed dams as built.

Q: Is there such a drawing for Site 21?

A: Yes.

Q: I will hand you Exhibit 1.4. Can you identify that Exhibit?

A: Yes. It is a copy of three pages of the "as built" drawing for Site 21 that were prepared by NRCS following the construction of the dam there.

Q: When was the dam at Site 21 completed and placed into service?

A: According to the documents it was completed and placed into service in late 1962.

Q: Does Exhibit 1.4 show anything about the area that is covered by the easement held by PCCD for Site 21?

A: Yes. The third sheet of Exhibit1.4 has a depiction of the area covered by the easement at Site 21.

Q: Since the dam at Site 21 has been completed and placed into service in connection with the Work Plan, has there been any change in its configuration of the dam or its appurtenant facilities that would alter the area depicted on Exhibit 1.4?

A: None that I am aware of.

Q: Do you know how the area depicted on Exhibit 1.4 was determined?

A: Based upon my thirteen years as Executive Manager at Plum Creek, and my understanding after reviewing records of the District is that the area covered is determined by NRCS based on the basis of benchmark elevations of the completed dam and related improvements, and that it shows an area that has an elevation above Mean Sea Level or "MSL" that is two feet higher than the MSL elevation of the emergency spillway crest. As shown on the second sheet of the drawings in Exhibit 1.4, that elevation was determined by NRCS to be 517.0 MSL so the extent of the easement is the area above, or upstream from the dam at Site 21, to elevation 519.0 MSL

Q: Did the District make those calculations or do the survey?

A: No, the calculations and survey were performed under the control of NRCS, which was responsible for construction of the dam. As the Local Sponsor, Plum Creek accepts and assumes responsibility for the Site post-completion.

Q: Are you saying that the limits of the easement held by PCCD and used for the dam and area to be covered by water impounded behind, or upstream, from the dam at Site 21 is based on an elevation of the land surface above Mean Sea Level upstream of the constructed dam?

A: Yes.

Q: When was the area covered by the easement determined?

A: At the time the original construction of the dam was completed and it was placed into service.

Q: Has that means of determining the area covered by an easement ever been questioned?

A: No.

Q: Have there ever been any problem for PCCD related to that means of describing the easement area at Site 21 since the dams construction?

A: None as far as I know at Site 21. There have been some problems at other dams.

Q: What kind of problems?

A: The primary one has been when there is some development or change in the originally depicted easement area that a landowner desires to make that could change the MSL elevation of lands or the drainage patterns in the area covered by an easement.

Q: Has that happened?

A: Yes.

Q: What does PCCD do when that has happened?

A: When the District becomes aware of any change, or proposed change in an area on depicted easements, the District requests information about what the landowner intends to do and, in appropriate cases, asks for detailed engineering drawings with some analysis of the impacts of the proposal. The primary question that is asked is whether the change will result in a reduction of the volumetric water storage capacity for water impounded by a dam.

Q: Does the District then make an evaluation of the information it receives about changes in surface elevations in its easements?

A: No. The District sends the information to NRCS asking for its review to determine whether there will be any reduction in storage volume for the water impounded behind a dam.

Q: Is that the only question that the District asks NRCS to evaluate?

A: No. The District will ask NRCS for an evaluation of whether the intended change will alter other aspects of easement use such as directing water on land that would not otherwise have water under similar conditions or would direct water on land area that is not within the District's easement area as first established after dam construction. The District also asks for NRCS' evaluation of whether the proposed change will impair the integrity of the dam or the operation of the Site for its intended purpose.

Q: What happens if NRCS makes a determination that some proposed action would diminish the available volume for water storage or would direct water on areas that would not otherwise have water or would direct water outside the easement area?

A: There would have to be discussions with the landowner making the proposal and, if possible, there would be an agreement reached on a plan that would not cause those kinds of impacts.

Q: What would happen if there were no agreement on changes?

A: The Board of the District takes the position that it will assert its rights over the area covered by its easements as depicted on the "as built" drawings and the District does not consent to changes that alter the easement area to cover other lands, particularly lands not owned by the person suggesting the change without consent of the owner, and the District will not consent to reductions in storage volume as a result of any alteration of surface elevations within the easement area.

Q: Has the question of whether there will be any alterations of elevations within the easement area on the Hunter Tract been examined?

A: As I stated, one of the reasons that PCCD requested Party Status in this hearing was to learn whether such alterations were planned and, if so, what the proposed changes would be. Based on the information the District had available at the time the hearing process began, the District's understanding is that no landfill operations are planned for the area within PCCD's easement. Unless that information changes, PCCD will not have to make a request to NRCS for a determination of the questions I have stated. However, that is not the only reason that PCCD has an interest in this proceeding. Because of its Agreement with NRCS and because of its statutory charges, the District has other responsibilities that could be impacted by landfill operations.

Q: Is there something that describes the responsibilities to NRCS the District related to Site 21?

A: Yes.

Q: What is that?

A: The Agreement between NRCS and the District as Local Sponsor stating the responsibilities of the Local Sponsor for each of PCCD's sites. I have identified the one for Site 21 as being Exhibit 1.3.

Q: What purpose do operations at Site 21 on the Hunter Tract Easement have under the Work Plan?

A: One purpose of the dam and area that could be covered by water at Site 21 after a rain is to control the flow of water released into the streams below the dam. There are also other benefits of the various structures in the Work Plan.

Q: Are the anticipated benefits associated with the Work Plan for Plum Creek Watershed described anywhere?

A: Yes.

Q: Where?

A: On Page 2 of the Executed Work Plan, attached to the Agreement that is Exhibit 1.2 has a list of anticipated benefits following the implementation of the Plan. The benefits include: floodwater damage reduction, sediment reduction, flood plain erosion damage reduction, indirect damage reduction, benefits from changed land use, and benefits outside the project area.

Q: Do the floodwater structures capture anything other than runoff water?

A; Again as noted on page 31 of the Work Plan that is Exhibit 1.2, there was also an analysis of a 50-year sediment storage requirement associated with each structure. All of the area proposed for permitting and landfilling operations by the Applicant will drain into the area where runoff is captured by the dam at Site 21 unless the Applicant has plans to move some of the water that could originate on its property outside that area.

Q: Could these flows add to the sediment loading at Site 21 over time?

A: Possibly. That is another reason the District is participating in this hearing – we want to learn more about the Project.

Q; Are you aware of any such plans by the Applicant to divert water?

A: No.

Q: Did the Work Plan look at other potential benefits of having the structures in place?

A: Yes.

Q: Where are those other benefits described in the Plan?

A: There is a discussion in the Plan beginning on Page 40 about benefits of the structures.

Q; Previously in your testimony you identified Exhibit 1.3 as being the Local Sponsorship Agreement in place between the District and NRCS. Are the obligations of PCCD with respect to operation of the dam at Site 21 described completely in Exhibit 1.3?

A: No. It just describes the obligations of the District to NRCS because of the "local sponsor" arrangement for the Work Plan.

Q: What other obligations are there for PCCD for dams it maintains?

A: As I stated, PCCD has obligations under the Texas Dam Safety Act and Rules adopted under the Act by TCEQ.

Q: Does the District inspect its dams every year?

A: Yes, the District conducts annual inspections accompanied by representatives of NRCS.

Q: Are there other inspections of the dams?

A: Yes. The dam safety division of TCEQ also inspects the dams from time to time.

Q: Does NRCS inspect the dams for purposes other than compliance with the requirements of the Work Plan and Maintenance Agreement?

A: Yes. NRCS also inspects dams for their structural safety.

Q: Has the dam at Site 21 ever been inspected by TCEQ to determine its safety?

A: Yes.

Q: When?

A: The most recent inspection of the dam at Site 21 for dam safety in 2014.

Q: Is there a report of that inspection?

A: Yes.

Q: I will hand you Exhibit 1.5. Can you identify that document?

A: Yes. It is the Dam Safety Inspection Report that was generated by NRCS after the 2014 inspection.

Q: Does the 2014 Dam Safety Inspection Report show the hazard classification of the dam at Site 21?

A: Yes. On page 5 of Exhibit 1.5 it shows that when constructed the dam at Site 21 was classified as a low hazard dam but at some point it became classified as a High Hazard dam by both NRCS and TCEQ because of development downstream from the dam's location

Q: Did that change in classification lead to some other action being taken by the District.

A: Yes. There were a couple of things that have happened. One is that the District was required to prepare an Emergency Action Plan for the dam.

Q: What is an Emergency Action Plan?

A: An Emergency Action Plan is a document that is to be prepared by the person or entity having the responsibility to maintain the dam. It is required by TCEQ Rules and is described in those Rules and guidance documents. The Plan is to set out actions to be followed in the event of a threat of a dam emergency.

Q: You said a couple of things have happened. What was the second?

A: NRCS asked the District to participate in a study of possible rehabilitation of the dam at Site 21. In this instance, Rehabilitation means actions that are designed to address the change in hazard classification since the time of the dam's construction.

Q; Is the plan final?

A: Yes, it has recently been finalized. The Final Plan was delivered to the District during the week of June 13, 2016.

Q: Has Plum Creek Conservation District gone through the same process now underway for the dam at Site21 for other dams for which it is local sponsor?

A: Yes. A couple of years ago the dam at Site 5 went through the rehabilitation process and was altered to conform to high hazard requirements. In addition the dam at Site 6 in the Work Plan is currently in the middle of its rehabilitation process. That dam is also being significantly altered to bring it into compliance with the high hazard standards. The work at Site 6 resulted in Amendment V to the original Watershed Work Plan and to the Plan is now a collection of the provisions from the original Work Plan as well as provisions that were changed by Amendment V.

Q: Do you know yet how the recommendations for Site 21's rehabilitation might change the operations of or the requirements placed on the District?

A: Not yet, but I can relate what some of what happened at Sites 5 and 6.

Q: What did the District have to do for rehabilitation at those sites?

A: At Site 5 the rehabilitation action selected required that the easement area be expanded. At Site 6 there was no expansion of the easement area but there was a significant alteration in the design of the dam. That work is currently underway and is expected to be completed in 2017.

Q: Does the District know whether there will be additional easement area required for Site 21?

A: I can relate what the June 2016 NRCS Final Rehabilitation Evaluation Report says.

Q: I will hand you Exhibit 1.6. Can you identify Exhibit 1.6?

A: Yes. It is a portion of a Report with the title "Final Supplemental Watershed Plan No. VI and Environmental Evaluation for the Rehabilitation of ..." several of the structures in

the Plum Creek Watershed project. The portion of the proposed Report that I have attached is specific to what is being recommended for rehabilitation of the dam at Site 21.

Q: Why is there only a portion of the Work Plan contained in the Exhibit?

A: The Proposed Amendment is for three structures in the Plum Creek Watershed: Site 10, Site 12 and Site 21. Only the sections of the specific findings on Site 21, the Site that is downstream from the area of Applicant's proposed operations, is included in Exhibit 1.6.

Q: Does the Proposed Amended Work Plan VI indicate that there would be a need for additional easement area in connection with the rehabilitation of the dam at Site 21?

A: Yes. On Page 8 of 9 there is a note by NRCS that while the current easements held by the District that meet or exceed the minimum NRCS and State of Texas requirements and also correspond to the elevation greater than the 1,000 year, 24- hour storm event the proposed Amendment to the Work Plan also includes language that first appeared in connection with the rehabilitation of the Dam at Site 6 dated August, 2011. NRCS seems now to recommend land rights be obtained for an area up to the elevation of the top of the rehabilitated dam. There had been an earlier Agreement for remediation for Site 5 in 2008 that did not have that suggestion. There is also a note in the discussion of the option on rehabilitation that approximately 2 acres of additional land may be needed for the extension of the downstream toe made necessary because of raising the embankment crest and flattening the embankment slope. At the same time, there are no construction plans indicating exactly what land, if any, might be required for rehabilitation.

Q: Has the Board of the District consented to this proposed Amendment to the Work Plan for Site 21?

A: Not at this time. There was an Agenda item for consideration of the Proposed Amendment at the June, 2016 PCCD Board meeting. Because the District had received the Proposed Amendment the prior week and had not had a chance to review it for all the included sites, the Board took no action to give the Directors, my staff and myself an opportunity to consider the details in the Proposed Plan Amendment.

Q: Can the Board suggest changes to things in the Proposed Amendment?

A: My understanding is that the delivered Plan Amendment contains the final language requested by NRCS. The District's Board has previously made suggestions for changes when a draft of the Agreement Amendment was presented. When this version of the Plan was presented the information given was that all the Board's suggested changes considered possible by NRCS had been incorporated by NRCS and this was the "final" version.

Q: Assuming that the Board agrees with the Proposed Amendment, what would happen?

A: Based on previous experiences, actions will be then be taken by NRCS to request preparation of detailed plans and specifications for rehabilitation of the dam at Site 21 and efforts will be initiated to obtain appropriation and then funding on a National level for NRCS action. Ultimately, a new Maintenance Agreement is prepared that will go into effect following site rehabilitation. The New Maintenance Agreement for the Site would be for a term of 80 years for the rehabilitated structure's evaluated life after 2 years for construction. So, if the Amendment is signed in 2016 it would be in effect until approximately 2098, depending on when funding for construction becomes available.

Q: What happens at the end of the NRCS period of evaluated life?

A: The District has several of its dams that have reached that interval. In the past, with the exception of those being considered for rehabilitation through NRCS action, the District has received a letter from NRCS noting that the evaluated life period has ended and stating that NRCS will continue to be involved as levels of NRCS funding and NRCS time constraints allow. At that point, the District would have the obligation for maintenance and compliance with Texas Dam Safety Act provisions but may not have access to any federal funding for those obligations.

Q: Have you seen anything in the Amendment for Site 21 that refers to rehabilitation needs related to the proposed Landfill operations?

A: No, not to date.

Q: Do you know if there could be something in plans developed for rehabilitation that might cause the Applicant alter its plans for construction or operation of its landfill that is under consideration today?

A: No. I assume that the design of the structure when detailed rehabilitation plans are developed those will take the landfill into consideration in some manner, depending on the status of the landfill permitting and construction at the time rehabilitation gets underway, but I don't have an idea about how the two things would work, if there is any conflict. Of course, there may not be a conflict. The only way to know is for detailed rehabilitation plans to be developed.

Q: Do you know whether there could be additional costs that would have to be incurred in rehabilitation of the dam at Site 21 should this permit for a landfill be granted?

A: No, not at this time. Based on my experience with dealing with results of the way the dams have functioned during the years I have been with the District, however, I do have

some concerns about what things have been taken into account in design of water control structures at the landfill.

Q: What are your experiences?

A: My duties for the District include things like the maintenance of grass covers on the dams and spillways, as well as making sure that appropriate repairs are made in cases of observed damages. There have been times that the dams on structures have had erosion damage and slides of material that had been placed on the dams.

Q: Do you have specific observations in mind that you want to mention?

A: Yes. Almost everything that is maintained has a grass cover established over the dam surface and on the emergency spillways that are constructed of native soil materials. I have learned how important it is to make sure that the grass or vegetative cover is appropriate and well maintained. Even when it is, there are times when there can be a failure.

Q: Can you mention anything more specific?

A: Sure. During the rains last October there some of the rainfall runoff was heavy enough that the main outlet of several of the dams the District maintains normally a pipe inside a concrete riser that regulates how fast water is released in normal operating conditions, could not release enough water flowing into the impoundment area upstream of the dam to keep levels below that at which the emergency spillway began to pass the additional volume of incoming water. Although we had used every effort to maintain an emergency spillway grass cover, the volume and rate of water entering the spillway and passing over its surface was so large that scouring took place in the spillway soils with severe erosion of the spillway surface. The estimate to repair that erosional damage to the spillway of

one of our dams is in excess of $100,000. It was such a surprise to everyone, even those with NRCS, that NRCS sent a team to look over the results of that rainfall to make determinations about how to present such things from happening in this area in the future. Basically, it is my understanding that the soil types and methods of construction are such that the kind of damage that resulted then may be related to the soils in our area so that even if there is what is judged to be adequate grass cover there can still be significant damage.

Q: How does that observation concern you with respect to the proposed landfill?

A: The landfill will drain into Site 21. So, if there are any failures of water control structures or erosion from the landfill, the impoundment area at Site 21 will catch all of the material that runs off. In effect, the dam and impoundment at Site 21 is a system that is already in place that will help with any accidental releases. At the same time, any such releases could have impacts on continued operations at Site 21 without some remediation. In this instance I am just thinking of water volume and sediment volume, and not water quality. However, if some of the berms that are designed to control contaminated water from the landfill also fail for similar reasons that I have observed with the soil conditions for the District's dams, then water quality in the impoundment behind Site 21 could also be adversely affected. There is a potential, then, that the landfill operations, if not designed, constructed and operated correctly, could be inconsistent with the District's use of its easement rights.

Q: How does the easement area held by the District at Site 21 relate to the 100 year flood elevation?

A: I am not sure. My understanding is that the easement that is held by the District covers an area that is related to the original construction of the dam at Site 21. The easement takes into account hydraulic information on rainfall intensity, rainfall duration, and runoff characterizations of the area in the drainage basin above the dam at Site 21 as those things were known at the time of the design of the dam back in the 1960s. In the early 1960s, there was no FEMA flood plain designation for Site 21. My understanding is that the District's easement area and the 100 year flood elevation today are about the same, but they could be different in some respects for a number of reasons. I think that there may be FEMA maps of the area that show the 100 year flood elevation line, but the District is concerned with its easement area, not the 100 year flood elevation area. In addition, I have pointed out what the NRCS final Remediation report states about calculated rainfall event probability but I don't know how that probability relates to a 100 year flood plain calculation.

Q: Does Plum Creek Conservation District have any flood plain responsibility in the area covered by the Work Plans in which the District is local sponsor?

A; No.

Q: In your testimony you mentioned the Groundwater powers of the District. Have any concerns arisen related to groundwater in the area of the easement at Site 21?

A: Yes. The District's consulting geologist has expressed to the Board his concerns about the possibility of any contamination carried in drainage from operations at the Applicant's site entering a formation used for water supply that he believes outcrops under the impoundment area at Site 21. Because the impoundment area is not in the area of proposed landfill operations and because the draft permit terms prohibit the escape of

any contaminated water from the landfill the concern is just an expressed concern. The District's Board has not yet asked the geologist to make recommendations for any studies or for suggestions for any courses of action in response to his expressed concerns.

Q: Early in your testimony you were asked why Plum Creek Conservation District sought to become a party to this hearing. Do you recall that question and your response?

A: Yes.

Q: Was the decision to request party status to the hearing made by the District's Board?

A: Yes. That decision was made in early 2016 shortly before the first SOAH hearing at a duly posted public meeting.

Q: Did the Board choose to take any position on whether the application should be granted by TCEQ?

A: No. The Board was of the opinion that it would neither be in favor or opposed to the granting of this application by TCEQ, but wanted to participate as a party to insure that the permit, if granted, would not adversely impact or imperil its easement rights and the functioning of Site 21 or otherwise impact the Board's responsibilities

Q: Did the Board express any reasoning related to appearing and participating in this hearing?

A: Yes. As was noted by the Board's President, if the permit is granted and the landfill constructed the Landfill and the District's dam will be neighbors for a long time. As a result, the Board did not want there to be any surprises associated with the District's responsibilities that might conflict with the plans of the Applicant. I think the Board decided to participate in the hearing to gather information. At the time of its initial review of the application the District did not see consideration being given or information

presented or required about the District's operations or to the fact that the property where the landfill is to be located is in a Small Watershed Protection Program area or within the boundaries of the District and the District desired to make that information available for use by the other parties in connection with planning and permitting. During preparation for the hearing the District was pleased to learn that the permit, if granted, will not change any obligations of the applicant to comply with requirements of the Small Watershed Protection Program or to requirements that might be put into place by the District in connection with the District's use of its easements or in connection with its regulatory powers as a Water Control and Improvement District that also has groundwater regulatory authority.

Q: If the District were to sign the "Proposed Supplemental Watershed Plan VI for the Plum Creek Watershed", a portion of which is Exhibit 1.6, are there any requirements for the District as Local Sponsor dealing with development upstream from the Dam and impoundment at Site 21?

A: Yes. In the notes about land rights there is a paragraph that states that "Where appropriate, the Sponsors will inform representatives of municipality government ... and/or County government of the potential flood risks to upstream development below top of dam elevation. Upon request, the Sponsors will provide assistance to representatives of municipality government ... and/or County government and/or real estate businesses to inform upstream landowners of the flood potential of new or existing development below the top of dam elevation." Among other things that might be done, by participating in this Hearing, the District is trying to comply with that directive even

though the new Proposed Work Plan Supplement has not yet been approved by the District's Board.

Q: Do you have any information to quantify the flood risk potential below the top of the dam elevation?

A: No. I assume that NRCS has some because they mentioned it in the Final Supplemental Work Plan but I saw nothing in the Final Report discussing its quantification.

Q: I noticed that there is also a statement in that paragraph that "the Sponsors do not have the legal authority to restrict upstream development". Did you see that sentence?

A: Yes.

Q: Do you know whether that statement is correct?

A: No. I am not a lawyer and I am not sure of any limits on the language in the statement. As I have noted previously, I think that the District does have authority to restrict upstream development in the easement area because the District has done that. In addition, it is my understanding that if some prospective development had the effect of restricting the District's exercise of its easement rights the District would have power to oppose that kind of development. However, if the reference is to the legal authority to regulate something not related to property rights, any answer to that question really requires a legal opinion.

Q: Does this conclude your testimony at this time?

A: Yes. I reserve the right to amend my testimony if any additional information becomes available to me before or during the hearing.

PCCD Exhibit No. 1.0

Prefiled Testimony of Johnie Halliburton

PCCD Exhibit No. 1.1

PCCD Easements for Site 21in Caldwell County

site No. 21

EASEMENT

For and in consideration of One Dollar ($1.00) and other good and valuable considerations (and in consideration of the future mutual benefits to be received by both grantor and grantee), the receipt whereof is acknowledged, W. T. Moore, Jr., individually and as Independent Executor of the Estate of W. T. Moore, Sr., deceased, joined herein by his wife, Doris Moore, both (Name) of Lockhart (Address) Texas, Grantor, does hereby grant, bargain, sell, convey and release unto Plum Creek Conservation District of Lockhart, Texas, its successors and assigns, Grantee, an easement in, over and upon the following described land situated in the County of Caldwell, State of Texas, to-wit: Approximately 327 acres of land out of the Isaac Jackson and J. M. Bowman Surveys of Caldwell County, Texas, and being part of a tract consisting of 1,245.71 acres of land, more or less which 1,245.71 acres consists of eighteen (18) tracts.

References to metes and bounds descriptions (recorded in the Deed Records of Caldwell County, Texas) of each of the eighteen tracts are attached hereto and made a part hereof as Appendix A to this easement.

for the purposes of:
For or in connection with the construction, alteration, operation, maintenance and inspection of the following described works of improvement to be located on the above described land; for the flowage of any waters in, over, upon or through such works of improvements; and for the permanent storage and temporary detention, either or both, of any waters that are impounded, stored or detained by such works of improvement: Floodwater retarding structure, consisting of an earthen dam, emergency spillway, work site adjacent to construction area, and portions of the sediment, sediment reserve and detention storage pools, including an area that will be inundated during emergency spillway flow. Project involves approximately 327 acres of the herein described lands.

1. In the event construction of the above described works of improvement is not commenced within ... years from the date hereof, the rights and privileges herein granted shall at once revert to and become the property of the Grantor, his heirs and assigns.
2. This easement includes the right of ingress and egress at any time over and upon the above described land of the Grantor and any other land of the Grantor adjoining said land.
3. There is reserved to the Grantor, his heirs and assigns, the right and privileges to use the above described land of the Grantor at any time, in any manner and for any purpose not inconsistent with the full use and enjoyment by the Grantee, its succesors and assigns, of the rights and privileges herein granted.
4. The rights and privileges herein granted are subject to all easements, rights-of-way, mineral reservations or other rights now outstanding in third parties.
5. The Grantee is responsible for operating and maintaining the above described works of improvements.
6. The Grantee shall control the water level in the sediment storage pool until adequate vegetation is established and thereafter as necessary for maintenance or repair of the works of improvement.

7. The Grantee shall have the right to construct fences with gates or gaps around the works of improvement, and such fences, gates, or gaps shall not be changed in any way without consent of the Grantee. Any livestock found within such fences, except as authorized in writing by the Grantee, may be ejected therefrom by the Grantee.

8. Special Provisions: (a) Grantor is solely responsible for maintaining property lines and repairing property lines fences. (b) Grantor is aware of the fact that two farm ponds used for stock water will be inundated for periods following rainfall sufficient to produce appreciable amounts of run-off. One is located approximately 1,300 feet North of the earthen dam to be constructed and will be in the sediment reserve pool. One is approximately 1,100 feet in a northeasterly direction from the east end of the earthen dam to be constructed and will be in the detention pool. Since the sediment pool will provide and assure a more dependable source of water than these two ponds, no compensation for their inundation is or will be made by grantee.

TO HAVE AND TO HOLD the aforesaid easement in, over and upon the above described land of the Grantor, with all the rights, privileges and appurtenances thereto belonging or in anywise appertaining unto the Grantee, its successors and assigns, forever.

IN WITNESS WHEREOF the Grantor has executed this instrument in triplicate originals on the

28 day of June, 1960.

_____ (SEAL) _____ (SEAL)

(Signature of Grantor) (Signature of Grantor)

_____ (SEAL)

693—JOINT ACKNOWLEDGMENT—(Rev. Mar., 1952) The Steck Co., Austin

STATE OF TEXAS,

County of CALDWELL,

BEFORE ME, the undersigned authority, on this day personally appeared W. D. Moore, Jr. and his wife Doris Moore known to me to be the persons whose names are subscribed to the foregoing instrument, and acknowledged to me that they executed the same for the purposes and consideration therein expressed. And the said wife having been examined by me, privily and apart from her husband, and having the same fully explained to her, she acknowledged such instrument to be her act and deed, and declared that she had willingly signed the same for the purposes and consideration therein expressed, and that she did not wish to retract it.

Given under my hand and seal of office, this 28th day of June A. D. 1960

Notary Public, Caldwell County

APPENDIX A

of

An easement on approximately 327 acres of land out of the Isaac Jackson and J. H. Bowman Surveys granted to Plum Creek Conservation District, Lockhart, Texas, by W. D. Moore, Jr., Individually and as Independent Executor of the Estate of W. D. Moore, Sr., deceased, joined herein by his wife, Doris Moore, on June 28 1960, for the purpose of constructing and operating a floodwater detention structure, Site 21.

First Tract: Being a part of the Isaac Jackson League and containing 130 acres of land, more or less. Being the same tract of land conveyed by A. A. Storey et ux to Fannie Jackson by deed dated Feb 6, 1936, which deed is recorded in Vol. 170, page 231, of the Deed Records of Caldwell County, Texas. Also described in deed from Bennet D. Smith et ux to W. D. Moore, recorded in Vol. 193, page 333.

Second Tract: Being 337.75 acres of land, more or less, out of the Isaac Jackson Survey, Patent No. 513, Vol. 6, and being the same land conveyed to Banker's Life Company by Sheriff's deed dated April 14, 1939, and recorded in Vol. 191, page 354, of the Deed Records of Caldwell County, Texas.

Third Tract: Being a part of the Isaac Jackson League in Caldwell County, Texas, and containing 40 acres of land. This being the same tract of land conveyed to W. D. Moore by Wallie P. Kelley by deed dated May 19, 1941, recorded in Vol. 199, page 283, of the Deed Records of Caldwell County, Texas.

Fourth Tract: Being 81 acres of land, more or less, out of the Isaac Jackson League, Patent No. 513, Vol. 6, being the West one-half of Lot No. 6 of the subdivision of the J. W. Jackson Estate, and being described by metes and bounds in Deed of Trust Records of Caldwell County, Texas, recorded in Vol. 199, page 439.

Fifth Tract: Being 46½ acres of land, part of the J. H. Bowman Survey, this tract of land being Lot No. 7 of a subdivision referred to in Partition Deed executed by E. B. Medaris and Wife, Louisa Medaris, and other parties, dated October 27, 1911, of record in the Deed Records of Caldwell County, Texas, in Vol. 46, page 554, and being the tract of land set apart to Louisa Medaris by said Partition Deed. The said tract or parcel of land is the one described in Deed of Trust recorded in Deed Records of Caldwell County, Texas, in Vol. 206, page 258.

Sixth Tract: A part of the Isaac Jackson League and containing 152 acres of land, less however and EXCEPTING 20 acres thereof heretofore sold off of same. Recorded in Deed Records of Caldwell County, Texas, in Vol. 210, page 610.

Seventh Tract: Lot No. 2 as shown in the partition of the Kelley Estate lands recorded in Vol. 46, page 554, of the Deed Records of Caldwell County, Texas, a part of the J. H. Bowman League and containing 30 acres of land, more or less, and being also described in Deed Records of Caldwell County, Texas, in Vol. 223, page 99, EXCEPT 14 acres conveyed by W. D. Moore, Jr., to Andy Burton by deed dated October 9, 1947, recorded in Vol. 223, page 436, Caldwell County (Texas) Deed Records, leaving 16 acres in this tract.

Eighth Tract: Being a part of the I. Jackson League in Caldwell County, Texas, and containing 40 acres of land, more or less, and being the same land described in Deed Records of Caldwell County, Texas, in Vol. 223, page 99.

Ninth Tract: Being a part of the Isaac Jackson League and containing 40 acres of land, more or less, out of 160 acres owned by E. B. Medaris and recorded in Deed Records of Caldwell County, Texas, in Vol. 214, page 104.

Tenth Tract: Being a part of the J. H. Bowman original Survey and containing 44 acres of land, being Lot No. 5 in the partition of Charles Kelley Estate allotted to Walter Kelley by partition deed recorded in Vol. 46, page 554, of the Deed Records of Caldwell County, Texas. Also being that tract of land described in Vol. 211, page 611, of the Deed Records of Caldwell County, Texas.

Eleventh Tract: Being a part of the J. H. Bowman Survey and containing 42 acres of land being Lot No. 6 in the said partition allotted to William Kelley in above mentioned partition deed; being the same tract of land conveyed to Sam J. Kelley by deed recorded in Vol. 166, page 222, Deed Records of Caldwell County, Texas, and also described in Vol. 211, page 611.

Twelfth Tract: Being a part of the Isaac Jackson League and containing 40 acres of land; being the same land described in Vol. 211, page 611, of the Deed Records of Caldwell County, Texas

Thirteenth Tract: An 80 acre tract of land, being out of and a part of the Isaac Jackson Survey, Patent No. 513, Vol. 6, and being also a portion of 170 acres conveyed to Charles Kelley by Isaac Jackson and Wife, Louisa Jackson, by deed dated December 25, 1874, and recorded in Vol. 4, page 291, of the Deed Records of Caldwell County, Texas. And also being the same land described in Vol. 211, page 611, of the Deed Records of Caldwell County, Texas.

Fourteenth Tract: A part of the J. H. Bowman Survey and being Lot No. 4, as shown on corrected plot of partition between Samuel J. Kelley, et al, of certain lands, which corrected plot is of record in Vol. 46, page 628, Deed Records of Caldwell County, Texas, and containing 36 acres of land, by the tract set apart to Edward Kelley in said partition as of record in Vol. 46, page 554, of the Deed Records of Caldwell County, Texas; and being the same land described in Vol. 211, page 611, of the Deed Records of Caldwell County, Texas.

Fifteenth Tract: A part of the J. H. Bowman Survey and containing 18.4 acres of land, more or less; and being the same land described in Deed Records of Caldwell County, Texas, in Vol. 223, page 437.

Sixteenth Tract: A tract of land out of the Isaac Jackson League containing 10 acres of land, more or less, and being the same land described in Deed Records of Caldwell County, Texas, in Vol. 228, page 374.

Seventeenth Tract: Being a part of the I. Jackson League and a part of a 332-acre survey and situated in Caldwell County and containing 4.38 acres of land, more or less; and being the same land described in Deed Records of Caldwell County, Texas, in Vol. 229, page 141.

Eighteenth Tract: Being 94.08 acres of land out of the J. H. Bowman Survey, abstract No. 54, in Caldwell County, Texas, being a part of that certain tract of land described in Deed of Trust from J. A. Cardwell to Mrs. Pearl Carter, dated January 13, 1938, recorded in Vol. 20, page 448, of the Caldwell County Deed Records; and being the same 94.08 acres of land, according to Survey by T. A. Breeze, State Licensed Hays County Land Survey, dated May 12, 1954; and being the same land described in Deed Records of Caldwell County, Texas, in Vol. 255, page 55.

ORDER PROBATING WILL GRANTING LETTERS TESTAMENTARY AND APPOINTING APPRAISERS

No. 3002

ESTATE OF W. D. Moore

DECEASED

IN THE COUNTY COURT,

Caldwell COUNTY, TEXAS.

On this, the 2nd day of May, 1949, came on to be heard the application of W. D. Moore, Jr., for the probate of the last will and testament of W. D. Moore, deceased, now produced in court and the evidence, which was committed to writing and subscribed to in open court by the witness, a statement of which is filed in this cause, being heard and fully considered by the court, and it appearing to the court that citation thereof has been duly made as required by law, to which no objection has been made, and that the said W. D. Moore, Jr., is named and appointed in said will independent executor thereof and that he is not disqualified therefor.

It is, therefore, ordered, adjudged, and decreed by the court that the said last will and testament of the said W. D. Moore, deceased, dated December 24, 1948, witnessed by W. R. Bellamy and O. T. Moore, Jr., is hereby admitted to probate and such will together with the testimony and application for probate thereof is ordered recorded in the minutes of this court. It is further ordered by the court that letters testamentary thereof be granted to the said W. D. Moore, Jr. upon taking the oath required by law.

And it further appearing to the court that A. L. Campbell, Lee Williams, and W. R. Bellamy are citizens of Caldwell County, Texas, and disinterested persons in said estate. They are hereby appointed to appraise the estate, both real and personal, of W. D. Moore, ex, deceased, any two of whom may act.

Edward H. [illegible]

County Judge

EASEMENT

For and in consideration of One Dollar ($1 00) and other good and valuable considerations (and in consideration of the future mutual benefits to be received by both grantor and grantee), the receipt whereof is acknowledged, Andy Burton and Wife, Anna Burton (Name) of Lockhart (Address) Texas, Grantor, does hereby grant, bargain, sell, convey and release unto Plum Creek Conservation District of Lockhart, Texas, its successors and assigns, Grantee, an easement in, over and upon the following described land situated in the County of Caldwell, State of Texas, to-wit: Approximately 28 acres of land being out of four tracts (all of the J. H. Bowman Survey) conveyed to grantor by Warranty Deeds of record in the Deed Records of Caldwell County, Texas, as follows:

First Tract: Containing 40 acres of land, more or less.

Second Tract: Containing 15.71 acres of land, more or less.

Third Tract: "Containing 35 acres of land, LESS AND EXCEPT however the most East 18.4 acres" conveyed by Andy Burton and Wife to P. D. Moore, Jr., by deed dated Oct 9, 1947, and recorded in Vol. 223, page 437. This tract of land being the same tract conveyed to Andy Burton by A. L. Coker by deed recorded in Vol. 203, page 304.

Fourth Tract: Containing 14 acres of land, more or less.

Metes and bounds descriptions of the above four tracts of land are contained in Appendix A attached hereto and made a part hereof.

for the purposes of:
For or in connection with the construction, alteration, operation, maintenance and inspection of the following described works of improvement to be located on the above described land; for the flowage of any waters in, over, upon or through such works of improvements; and for the permanent storage and temporary detention, either or both, of any waters that are impounded, stored or detained by such works of improvement: Floodwater retarding structure No. 21, the dam of which will be constructed on other lands. The project involves approximately 28 acres of the herein described lands, consisting of portions of the sediment reserve and detention storage pools, including an area that will be inundated during emergency spillway flow.

1. In the event construction of the above described works of improvement is not commenced within 10 years from the date hereof, the rights and privileges herein granted shall at once revert to and become the property of the Grantor, his heirs and assigns
2. This easement includes the right of ingress and egress at any time over and upon the above described land of the Grantor and any other land of the Grantor adjoining said land.
3. There is reserved to the Grantor, his heirs and assigns, the right and privileges to use the above described land of the Grantor at any time, in any manner and for any purpose not inconsistent with the full use and enjoyment by the Grantee, its succesors and assigns, of the rights and privileges herein granted.
4. The rights and privileges herein granted are subject to all easements, rights-of-way, mineral reservations or other rights now outstanding in third parties
5. The Grantee is responsible for operating and maintaining the above described works of improvements.
6. The Grantee shall control the water level in the sediment storage pool until adequate vegetation is established and thereafter as necessary for maintenance or repair of the works of improvement.
7. The Grantee shall have the right to construct fences with gates or gaps around the works of improvement, and such fences, gates, or gaps shall not be changed in any way without consent of the Grantee. Any livestock found within such fences, except as authorized in writing by the Grantee, may be ejected therefrom by the Grantee.
8. Special Provisions:

Grantor is solely responsible for maintaining property lines and replacing any property lines fences that may be removed during construction of works of improvement on site No. 21.

TO HAVE AND TO HOLD the aforesaid easement in, over and upon the above described land of the Grantor, with all the rights, privileges and appurtenances thereto belonging or in anywise appertaining unto the Grantee, its successors and assigns, forever.
IN WITNESS WHEREOF the Grantor has executed this instrument in triplicate originals on the 22nd day of July, 1960.

Andy Burton (SEAL) Anna Burton (SEAL)
(Signature of Grantor) (Signature of Grantor)

_____ (SEAL) _____ (SEAL)
(Signature of Grantor) (Signature of Grantor)

APPENDIX A

of

An easement on approximately 28 acres of land out of the J. H. Bowman Survey granted to Plum Creek Conservation District, Lockhart, Texas, by Andy Burton and Wife, Anna, on _____196___, for the purpose of constructing and operating a floodwater detention structure.

Metes and bounds description of four tracts of land:

FIRST TRACT: Being a part of the J. H. Bowman Survey and being Lot No. 3 in the partition of the Kelley lands and as conveyed to Samuel Kelley by partition deed, recorded in Volume 46, page 554 of the Caldwell County Deed Records and BEGINNING at the NE corner of Lot No. 2 set apart to John B. Kelley stake from which a mesquite mkd X S 2 W 6 vrs;
THENCE N 45 E 222 vrs to the SE corner of a 143 acre tract of land, a stake in the Lockhart and Lytton Springs road on the old colony line;
THENCE N 45 W 800 vrs stake from which a L O mkd X brs N 1½ vrs;
THENCE S 3 E 614 vrs to stake and pile of stone on the N line of Lot No. 2;
THENCE S 81 E 417 vrs to the beginning, containing 40 acres of land, and conveyed to Andy Burton by B. J. Bellamy, Trustee, by deed recorded in Volume 155, page 119, Caldwell County Deed Records.

SECOND TRACT: Being a part of the J. H. Bowman Survey and Beginning at the SW corner of the Camp 173 acre tract a P O. mkd X on E bank of Ravine;
THENCE N 45 E 581 vrs to a rock on Lytton Springs road on the NW line of the Camp tract;
THENCE S 4 E 472 vrs to a stake on S line of Camp 173 acre tract from which a P O mkd X brs N 4 W 6.3 vrs;
THENCE N 81 W with S line of Camp tract 376 vrs to the beginning, containing 15.71 acres of land, more or less, conveyed by L. M. McCurdy to Andy Burton by deed recorded in Volume 157, page 144, Caldwell County Deed Records.

THIRD TRACT: Being part of the J. H. Bowman Survey and being Lot No. 1 in partition of Kelley lands, recorded in Volume 46, page 554 of Caldwell County Deed Records, and described as
BEGINNING at a stake and pile of stone the SW corner of a 143 acre tract of land on the E line of the I. Jackson League and N line of the J. H. Bowman Survey the same being the NW corner of the Jim Cardwell tract of land;
THENCE N 9 W 216 vrs to stake and pile of stone for corner;
THENCE S 81 E 113 vrs to stake from which a P O mkd X brs N 55 W 1½ vrs;
THENCE S 45 W 256 vrs to post oak stump on the E bank of the ravine the SW corner of the said 143 acre tract;
THENCE N 82 W 856 vrs to the place of beginning, containing 35 acres of land, less and except however the most East 18.4 acres of the above described 35 acres conveyed by Andy Burton and wife, to W. D. Moore, Jr., by deed dated October 9, 1947, and recorded in Volume 223, page 437, of Caldwell County Deed Records. The above 35 acres of land being the same tract conveyed to Andy Burton by H. E. Coker et ux by deed recorded in Volume 203, page 304, Caldwell County Deed Records.

FOURTH TRACT: Being a part of the J. H. Bowman Survey and being part of Lot 2 in the partition of the Kelley Estate lands recorded in Volume 46, page 554 of Caldwell County Deed Records and
BEGINNING at the most NE corner of said 30 acre tract;
THENCE N 81 W 612 vrs set stake in the North line of said 30 acres;
THENCE S 9 W 140 vrs set stake in the south line of said 30 acres for the SW corner of this tract;
THENCE S 89 E 512 vrs to the SE corner of said 30 acre tract;
THENCE N 45 E 174 vrs to the place of beginning, and containing 14 acres of land, more or less. Being the same land conveyed by W. D. Moore, Jr., and wife to Andy Burton by deed recorded in Volume 223, page 436, Caldwell County Deed Records, and containing 86.21 acres, more or less.

THE STATE OF Texas

COUNTY OF Caldwell:

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared Ivan Burton and Ozzona Burton, his wife, both known to me to be the persons whose names are subscribed to the foregoing instrument and acknowledged to me that they each executed the same for the purposes and consideration therein expressed, and the said Ozzona Burton, wife of the said Ivan Burton having been examined by me privily and apart from her husband, and having the same fully explained to her, she, the said Ozzona Burton, acknowledged such instrument to be her act and deed, and she declared that she had willingly signed the same for the purposes and consideration therein expressed, and that she did not wish to retract it.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this, the [illegible] day of [illegible], A. D. 19[illegible]

SEAL

M. W. Carlton

Notary Public in and for Caldwell County, Texas

My Commission Expires June 1961

THE STATE OF ______

COUNTY OF ______:

BEFORE ME the undersigned, a Notary Public in and for said County and State, on this day personally appeared ______ known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that ______ executed the same for the purposes and consideration therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this, the ____ day of ______, A. D. 19____

SEAL

______

Notary Public in and for ______ County, ______

My Commission Expires ______

Site 21

BE IT REMEMBERED that on the 9th day of January, A. D. 1 9 6 1, the Commissioners' Court of Caldwell County, Texas, being duly and regularly convened, said session being held in the Courthouse of the City of Lockhart, Caldwell County, Texas, the same then and there being the regular meeting place of said Court, there being the following members present and in attendance, towit:

Edgar Black, Jr. . . . . County Judge
Tom P. Brown, Commissioner, Precinct No. 1
George Wilson, Commissioner, Precinct No. 2
Roland Meadows, Commissioner, Precinct No. 3
W. J. Harris, Commissioner, Precinct No. 4

And among other proceedings had was the following:

There came on to be heard the request of Plum Creek Conservation District, a Hays and Caldwell County water control and conservation district, acting by and through its secretary, R. W. Carlton, for permission to inundate a section about 1200 feet in length of a County road in Caldwell County, Texas, for and during construction of Dam Site No. 21, according to the plans and specifications prepared by Plum Creek Conservation District, and during times of extremely high runoff thereafter, said request being made in accordance with Article 6703, V.A.T.S. and Article 7585, V.A.T.S.: said County road being the following road, to-wit:

> That certain County Road known locally in Caldwell County, Texas, as Kelley Road, and being that certain road separating the properties of W. D. Moore from the properties of P. S. King.

And it appearing to the Court that it would be to the advantage of Caldwell County, Texas, that permission be given to temporarily inundate the above named road during construction of Dam Site No. 21, according to the plans and specifications of Plum Creek Conservation District, and during times of extremely high runoff thereafter:

THEREFORE, motion was duly made by George L. Wilson and seconded by Tom P. Brown, - - - - that permission be given to inundate said above described road, and the motion having been put to a vote with all members present voting "AYE", permission to temporarily inundate said road was unanimously given by the Commissioners' Court

of Caldwell County, Texas;

Further, an alternate road for use during and while the said above described road is inundated is hereby set and designated as Farm to Market Road No. 1185 and U. S. Highway No. 183, both of said roads being equal to the road being inundated.

S/ EDGAR BLACK, Sr.
Edgar Black, Sr., County Judge.

S/ TOM R. BROWN
Tom R. Brown, Commissioner,
Precinct No. 1.

S/ GEO. D. WILSON
George Wilson, Commissioner,
Precinct No. 2.

S/ ROLAND MEADOWS
Roland Meadows, Commissioner,
Precinct No. 3.

S/ W. J. HARRIS
W. J. Harris, Commissioner,
Precinct No. 4.

Site No. 21

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6/1/60

EASEMENT

For and in consideration of One Dollar ($1.00) and other good and valuable considerations (and in consideration of the future mutual benefits to be received by both grantor and grantee), the receipt whereof is acknowledged, P. S. King and Wife, Onita King (Name) of Lockhart (Address) Texas, Grantor, does hereby grant, bargain, sell, convey and release unto Plum Creek Conservation District of Lockhart, Texas, its successors and assigns, Grantee, an easement in, over and upon the following described land situated in the County of Caldwell, State of Texas, to-wit: Approximately 45.2 acres of land out of two adjoining tracts as follows:

First Tract: 116.83 acres, more or less, in the T. J. Halton Survey, as more fully described in Warranty Deed dated January 1, 1936, from Alamo Lumber Co., San Antonio, Texas, to P. S. King, recorded in Vol. 170, page 110; and

Second Tract: 100 acres of land, more or less, in the T. J. Halton Survey, as more fully described in Warranty Deed dated October 5, 1939, from Aetna Life Insurance Company, Hartford, County of Hartford, Connecticut, to Patton S. King, recorded in Vol. 193, page 406, to which reference is made for all purposes.

for the purposes of:
For or in connection with the construction, alteration, operation, maintenance and inspection of the following described works of improvement to be located on the above described land; for the flowage of any waters in, over, upon or through such works of improvements; and for the permanent storage and temporary detention, either or both, of any waters that are impounded, stored or detained by such works of improvement: Floodwater retarding structure No. 21, the dam of which will be constructed on other lands. The project involves approximately 45.2 acres of the above described lands, consisting of portions of the sediment reserve and detention storage pools, including an area that will be inundated during emergency spillway flow.

1. In the event construction of the above described works of improvement is not commenced within _____ years from the date hereof, the rights and privileges herein granted shall at once revert to and become the property of the Grantor, his heirs and assigns.
2. This easement includes the right of ingress and egress at any time over and upon the above described land of the Grantor and any other land of the Grantor adjoining said land.
3. There is reserved to the Grantor, his heirs and assigns, the right and privileges to use the above described land of the Grantor at any time, in any manner and for any purpose not inconsistent with the full use and enjoyment by the Grantee, its succesors and assigns, of the rights and privileges herein granted.
4. The rights and privileges herein granted are subject to all easements, rights-of-way, mineral reservations or other rights now outstanding in third parties
5. The Grantee is responsible for operating and maintaining the above described works of improvements.
6. The Grantee shall control the water level in the sediment storage pool until adequate vegetation is established and thereafter as necessary for maintenance or repair of the works of improvement.
7. The Grantee shall have the right to construct fences with gates or gaps around the works of improvement, and such fences, gates, or gaps shall not be changed in any way without consent of the Grantee Any livestock found within such fences, except as authorized in writing by the Grantee, may be ejected therefrom by the Grantee.
8. Special Provisions: See Appendix A for full description of all Special Provisions.

TO HAVE AND TO HOLD the aforesaid easement in, over and upon the above described land of the Grantor, with all the rights, privileges and appurtenances thereto belonging or in anywise appertaining unto the Grantee, its successors and assigns, forever.
IN WITNESS WHEREOF the Grantor has executed this instrument in triplicate originals on the 28th day of June, 1960.

_____ (SEAL) P. S. King (SEAL)
(Signature of Grantor) (Signature of Grantor)

_____ (SEAL) Onita King (SEAL)
(Signature of Grantor) (Signature of Grantor)

APPENDIX A

of

An easement on approximately 45.2 acres of land out of the T. J. Hulton Survey granted to Plum Creek Conservation District, Lockhart, Texas, by P. S. King and Wife, Onita King, on June 28 1960, for the purpose of constructing and operating a floodwater detention structure.

8. Special Provisions:

a. Grantor is solely responsible for maintaining property lines and replacing property lines fences.

b. Grantor understands the following works of improvement will be flooded when the floodwater detention structure is built and in operation:

(1) A well the curb of which is at approximate elevation 512.6 feet.

(2) A storage tank which is at approximate elevation 517.1 feet.

(3) A shed on ground level approximately 517.8 feet.

(4) A farm pond used for stock water whose spillway elevation is approximately 517.6 feet.

c. The spillway crest elevation of the detention structure (earthen dam and grassed spillway) will be at approximately 517.0 feet. It is designed for a maximum depth of flow of 5.3 feet. The average number of times the spillway is expected to function is three times every 100 years.

Nevertheless and with full knowledge flood damage and inconvenience will result from this flooding no compensation will be given by grantee to grantor, because the overall benefits of the works of improvement to grantor will be greater than any damages or inconveniences that may result from their installation and operation.

THE STATE OF Texas

COUNTY OF Caldwell:

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared [illegible] King and [illegible], his wife, both known to me to be the persons whose names are subscribed to the foregoing instrument and acknowledged to me that they each executed the same for the purposes and consideration therein expressed, and the said Unita King, wife of the said [illegible], having been examined by me privily and apart from her husband, and having the same fully explained to her, she, the said Unita King, acknowledged such instrument to be her act and deed, and she declared that she had willingly signed the same for the purposes and consideration therein expressed, and that she did not wish to retract it.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this, the [illegible] day of June, A. D. 19

SEAL

[signature]

Notary Public in and for Caldwell County, [illegible]

My Commission Expires [illegible]

THE STATE OF

COUNTY OF:

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that executed the same for the purposes and consideration therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this, the ____ day of ____, A. D.

SEAL

Notary Public in and for ____ County, ____

My Commission Expires ____

EASEMENT

For and in consideration of One Dollar ($1.00) and other good and valuable considerations (and in consideration of the future mutual benefits to be received by both grantor and grantee), the receipt whereof is acknowledged, Andy Burton and Wife, Anne Burton (Name) of Lockhart (Address) Texas, Grantor, does hereby grant, bargain, sell, convey and release unto Plum Creek Conservation District of Lockhart, Texas, its successors and assigns, Grantee, an easement in, over and upon the following described land situated in the County of Caldwell, State of Texas, to-wit: Approximately 28 acres of land being out of four tracts (all of the J. H. Bowman Survey) conveyed to grantor by Warranty Deeds of record in the Deed Records of Caldwell County, Texas, as follows:

First Tract: Containing 40 acres of land, more or less.

Second Tract: Containing 15.71 acres of land, more or less.

Third Tract: "Containing 35 acres of land, LESS AND EXCEPT however the most East 18.4 acres" conveyed by Andy Burton and Wife to W. D. Moore, Jr., by deed dated Oct 9, 1947, and recorded in Vol. 223, page 437. This tract of land being the same tract conveyed to Andy Burton by M. E. Coker by deed recorded in Vol. 203, page 304.

Fourth Tract: Containing 14 acres of land, more or less.

Metes and bounds descriptions of the above four tracts of land are contained in Appendix A attached hereto and made a part hereof.

for the purposes of:
For or in connection with the construction, alteration, operation, maintenance and inspection of the following described works of improvement to be located on the above described land; for the flowage of any waters in, over, upon or through such works of improvements; and for the permanent storage and temporary detention, either or both, of any waters that are impounded, stored or detained by such works of improvement: Floodwater retarding structure No. 21, the dam of which will be constructed on other lands. The project involves approximately 28 acres of the herein described lands, consisting of portions of the sediment reserve and detention storage pools, including an area that will be inundated during emergency spillway flow.

1. In the event construction of the above described works of improvement is not commenced within 10 years from the date hereof, the rights and privileges herein granted shall at once revert to and become the property of the Grantor, his heirs and assigns.
2. This easement includes the right of ingress and egress at any time over and upon the above described land of the Grantor and any other land of the Grantor adjoining said land.
3. There is reserved to the Grantor, his heirs and assigns, the right and privileges to use the above described land of the Grantor at any time, in any manner and for any purpose not inconsistent with the full use and enjoyment by the Grantee, its succesors and assigns, of the rights and privileges herein granted.
4. The rights and privileges herein granted are subject to all easements, rights-of-way, mineral reservations or other rights now outstanding in third parties.
5. The Grantee is responsible for operating and maintaining the above described works of improvements.
6. The Grantee shall control the water level in the sediment storage pool until adequate vegetation is established and thereafter as necessary for maintenance or repair of the works of improvement.
7. The Grantee shall have the right to construct fences with gates or gaps around the works of improvement, and such fences, gates, or gaps shall not be changed in any way without consent of the Grantee. Any livestock found within such fences, except as authorized in writing by the Grantee, may be ejected therefrom by the Grantee.
8. Special Provisions:

Grantor is solely responsible for maintaining property lines and replacing any property lines fences that may be removed during construction of works of improvement on site No. 21.

TO HAVE AND TO HOLD the aforesaid easement in, over and upon the above described land of the Grantor, with all the rights, privileges and appurtenances thereto belonging or in anywise appertaining unto the Grantee, its successors and assigns, forever.
IN WITNESS WHEREOF the Grantor has executed this instrument in triplicate originals on the 27th day of July, 1960.

Andy Burton (SEAL) Anne Burton (SEAL)
(Signature of Grantor) (Signature of Grantor)

_____ (SEAL) _____ (SEAL)
(Signature of Grantor) (Signature of Grantor)

APPENDIX A

of

An easement on approximately 28 acres of land out of the J. H. Bowman Survey granted to Plum Creek Conservation District, Lockhart, Texas, by Andy Burton and Wife, Anna, on _____ 196___, for the purpose of constructing and operating a floodwater detention structure.

Metes and bounds description of four tracts of land:

FIRST TRACT: Being a part of the J. H. Bowman Survey and being Lot No. 3 in the partition of the Kelley lands and as conveyed to Samuel Kelley by partition deed, recorded in Volume 46, page 554 of the Caldwell County Deed Records and BEGINNING at the NE corner of Lot No. 2 set apart to John B. Kelley stake from which a mesquite mkd X S 2 W 6 vrs;
THENCE N 45 E 222 vrs to the SE corner of a 143 acre tract of land, a stake in the Lockhart and Lytton Springs road on the old colony line;
THENCE N 45 W 800 vrs stake from which a L O mkd X brs N 1¼ vrs;
THENCE S 3 E 614 vrs to stake and pile of stone on the N line of Lot No. 2;
THENCE S 81 E 417 vrs to the beginning, containing 40 acres of land, and conveyed to Andy Burton by B. J. Bellamy, Trustee, by deed recorded in Volume 155, page 119, Caldwell County Deed Records.

SECOND TRACT: Being a part of the J. H. Bowman Survey and Beginning at the SW corner of the Camp 173 acre tract a P O. mkd X on E bank of Ravine;
THENCE N 45 E 581 vrs to a rock on Lytton Springs road on the NW line of the Camp tract;
THENCE S 4 E 472 vrs to a stake on S line of Camp 173 acre tract from which a P O mkd X brs N 4 W 6.3 vrs;
THENCE N 81 W with S line of Camp tract 376 vrs to the beginning, containing 15.71 acres of land, more or less, conveyed by L. H. McCurdy to Andy Burton by deed recorded in Volume 157, page 144, Caldwell County Deed Records.

THIRD TRACT: Being part of the J. H. Bowman Survey and being Lot No. 1 in partition of Kelley lands, recorded in Volume 46, page 554 of Caldwell County Deed Records, and described as
BEGINNING at a stake and pile of stone the SW corner of a 143 acre tract of land on the E line of the I. Jackson league and N line of the J. H. Bowman Survey the same being the NW corner of the Jim Cardwell tract of land;
THENCE N 9 W 216 vrs to stake and pile of stone for corner;
THENCE S 81 E 113 vrs to stake from which a P O mkd X brs N 55 W 1½ vrs;
THENCE S 45 W 256 vrs to post oak stump on the E bank of the ravine the SW corner of the said 143 acre tract;
THENCE N 82 W 856 vrs to the place of beginning, containing 35 acres of land, less and except however the most East 18.4 acres of the above described 35 acres conveyed by Andy Burton and wife, to W. D. Moore, Jr., by deed dated October 9, 1947, and recorded in Volume 223, page 437, of Caldwell County Deed Records. The above 35 acres of land being the same tract conveyed to Andy Burton by H. E. Coker et ux by deed recorded in Volume 203, page 304, Caldwell County Deed Records.

FOURTH TRACT: Being a part of the J. H. Bowman Survey and being part of Lot 2 in the partition of the Kelley Estate lands recorded in Volume 46, page 554 of Caldwell County Deed Records and
BEGINNING at the most NE corner of said 30 acre tract;
THENCE N 81 W 612 vrs set stake in the North line of said 30 acres;
THENCE S 9 W 140 vrs set stake in the south line of said 30 acres for the SW corner of this tract;
THENCE S 89 E 512 vrs to the SE corner of said 30 acre tract;
THENCE N 45 E 174 vrs to the place of beginning, and containing 14 acres of land, more or less. Being the same land conveyed by W. D. Moore, Jr., and wife to Andy Burton by deed recorded in Volume 223, page 436, Caldwell County Deed Records, and containing 86.21 acres, more or less.

THE STATE OF Texas

COUNTY OF Hardin:

BEFORE ME the undersigned, a Notary Public in and for said County and State, on this day personally appeared Wm. Burton and Emma Burton, his wife, both known to me to be the persons whose names are subscribed to the foregoing instrument and acknowledged to me that they each executed the same for the purposes and consideration therein expressed, and the said Emma Burton, wife of the said Wm. Burton, having been examined by me privily and apart from her husband, and having the same fully explained to her, she, the said Emma Burton, acknowledged such instrument to be her act and deed, and she declared that she had willingly signed the same for the purposes and consideration therein expressed, and that she did not wish to retract it.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this, the 21 day of [illegible], A. D. 1961

SEAL

Wm Burton

Notary Public in and for [illegible]

My Commission Expires June 1961 Caldwell County, Texas

THE STATE OF [illegible]

COUNTY OF [illegible]:

BEFORE ME the undersigned, a Notary Public in and for said County and State, on this day personally appeared [illegible] known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that [illegible] executed the same for the purposes and consideration therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this, the [illegible] day of [illegible], A. D. 19[illegible]

SEAL

[illegible]

Notary Public in and for [illegible]

My Commission Expires [illegible] County, [illegible]

Site No. 21

Vol. 244 Pg 1
6/29/60

EASEMENT

For and in consideration of One Dollar ($1 00) and other good and valuable considerations (and in consideration of the future mutual benefits to be received by both grantor and grantee), the receipt whereof is acknowledged, P. S. King and wife, Anita King of Lockhart (Name) (Address) Texas, Grantor, does hereby grant, bargain, sell, convey and release unto Plum Creek Conservation District of Lockhart, Texas, its successors and assigns, Grantee, an easement in, over and upon the following described land situated in the County of Caldwell, State of Texas, to-wit: Approximately 45.2 acres of land out of two adjoining tracts as follows:

First Tract: 116.83 acres, more or less, in the T. J. Halton Survey, as more fully described in Warranty Deed dated January 2, 1936, from Alamo Lumber Co., San Antonio, Texas, to P. S. King, recorded in Vol. 170, page 110; and

Second Tract: 100 acres of land, more or less, in the T. J. Halton Survey, as more fully described in Warranty Deed dated October 5, 1939, from Aetna Life Insurance Company, Hartford, County of Hartford, Connecticut, to Patton S. King, recorded in Vol. 193, page 406, to which reference is made for all purposes.

for the purposes of:
For or in connection with the construction, alteration, operation, maintenance and inspection of the following described works of improvement to be located on the above described land; for the flowage of any waters in, over, upon or through such works of improvements; and for the permanent storage and temporary detention, either or both, of any waters that are impounded, stored or detained by such works of improvement: Floodwater retarding structure No. 21, the dam of which will be constructed on other lands. The project involves approximately 45.2 acres of the above described lands, consisting of portions of the sediment reserve and detention storage pools, including an area that will be inundated during emergency spillway flow.

1. In the event construction of the above described works of improvement is not commenced within ..... years from the date hereof, the rights and privileges herein granted shall at once revert to and become the property of the Grantor, his heirs and assigns.
2. This easement includes the right of ingress and egress at any time over and upon the above described land of the Grantor and any other land of the Grantor adjoining said land.
3. There is reserved to the Grantor, his heirs and assigns, the right and privileges to use the above described land of the Grantor at any time, in any manner and for any purpose not inconsistent with the full use and enjoyment by the Grantee, its succesors and assigns, of the rights and privileges herein granted.
4. The rights and privileges herein granted are subject to all easements, rights-of-way, mineral reservations or other rights now outstanding in third parties.
5. The Grantee is responsible for operating and maintaining the above described works of improvements.
6. The Grantee shall control the water level in the sediment storage pool until adequate vegetation is established and thereafter as necessary for maintenance or repair of the works of improvement.
7. The Grantee shall have the right to construct fences with gates or gaps around the works of improvement, and such fences, gates, or gaps shall not be changed in any way without consent of the Grantee. Any livestock found within such fences, except as authorized in writing by the Grantee, may be ejected therefrom by the Grantee.
8. Special Provisions: See Appendix / for full description of all Special Provisions.

TO HAVE AND TO HOLD the aforesaid easement in, over and upon the above described land of the Grantor, with all the rights, privileges and appurtenances thereto belonging or in anywise appertaining unto the Grantee, its successors and assigns, forever.
IN WITNESS WHEREOF the Grantor has executed this instrument in triplicate originals on the 28th day of June, 1960.

_____ (SEAL)	P S King (SEAL)
(Signature of Grantor)	(Signature of Grantor)
_____ (SEAL)	Anita King (SEAL)
(Signature of Grantor)	(Signature of Grantor)

APPENDIX A

of

An easement on approximately 45.2 acres of land out of the T. J. Halton Survey granted to Plum Creek Conservation District, Lockhart, Texas, by P. S. King and Wife, Onita King, on June 28 1960, for the purpose of constructing and operating a floodwater detention structure.

8. Special Provisions:

a. Grantor is solely responsible for maintaining property lines and replacing property lines fences.

b. Grantor understands the following works of improvement will be flooded when the floodwater detention structure is built and in operation:

(1) A well the curb of which is at approximate elevation 512.6 feet.

(2) A storage tank which is at approximate elevation 517.1 feet.

(3) A shed on ground level approximately 517.8 feet.

(4) A farm pond used for stock water whose spillway elevation is approximately 517.6 feet.

c. The spillway crest elevation of the detention structure (earthen dam and grassed spillway) will be at approximately 517.0 feet. It is designed for a maximum depth of flow of 5.3 feet. The average number of times the spillway is expected to function is three times every 100 years.

Nevertheless and with full knowledge flood damage and inconvenience will result from this flooding no compensation will be given by grantee to grantor, because the overall benefits of the works of improvement to grantor will be greater than any damages or inconveniences that may result from their installation and operation.

THE STATE OF Texas

COUNTY OF Caldwell:

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared [illegible] and [illegible], his wife, both known to me to be the persons whose names are subscribed to the foregoing instrument and acknowledged to me that they each executed the same for the purposes and consideration therein expressed, and the said [illegible] wife of the said [illegible], having been examined by me privily and apart from her husband, and having the same fully explained to her, she, the said [illegible] acknowledged such instrument to be her act and deed, and she declared that she had willingly signed the same for the purposes and consideration therein expressed, and that she did not wish to retract it.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this, the 26th day of June, A. D. 1953

SEAL

Notary Public in and for Caldwell

My Commission Expires [illegible] — County, Texas

THE STATE OF _____

COUNTY OF _____:

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared _____ known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that _____ executed the same for the purposes and consideration therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this, the _____ day of _____, A. D. 19____

SEAL

Notary Public in and for _____

My Commission Expires _____ _____ County, _____

EASEMENT

For and in consideration of One Dollar ($1.00) and other good and valuable considerations (and in consideration of the future mutual benefits to be received by both grantor and grantee), the receipt whereof is acknowledged, Andy Burton and wife, Anna Burton (Name) of Lockhart (Address) Texas, Grantor, does hereby grant, bargain, sell, convey and release unto Plum Creek Conservation District of Lockhart, Texas, its successors and assigns, Grantee, an easement in, over and upon the following described land situated in the County of Caldwell, State of Texas, to-wit: Approximately 28 acres of land being out of four tracts (all of the J. H. Bowman Survey) conveyed to grantor by Warranty Deeds of record in the Deed Records of Caldwell County, Texas, as follows:

First Tract: Containing 40 acres of land, more or less.

Second Tract: Containing 15.71 acres of land, more or less.

Third Tract: "Containing 35 acres of land, LESS AND EXCEPT however the most East 18.4 acres" conveyed by Andy Burton and wife to . D. Moore, Jr., by deed dated Oct 9, 1947, and recorded in Vol. 223, page 437. This tract of land being the same tract conveyed to Andy Burton by . . Coker by deed recorded in Vol. 2-3, page 3-4.

Fourth Tract: Containing 14 acres of land, more or less.

Metes and bounds descriptions of the above four tracts of land are contained in Appendix A attached hereto and made a part hereof.

for the purposes of:
For or in connection with the construction, alteration, operation, maintenance and inspection of the following described works of improvement to be located on the above described land; for the flowage of any waters in, over, upon or through such works of improvements; and for the permanent storage and temporary detention, either or both, of any waters that are impounded, stored or detained by such works of improvement: Flooduator retarding structure No. 21, the dam of which will be constructed on other lands. The project involves approximately 28 acres of the herein described lands, consisting of portions of the sediment reserve and detention storage pools, including an area that will be inundated during emergency spillway flow.

1. In the event construction of the above described works of improvement is not commenced within ____ years from the date hereof, the rights and privileges herein granted shall at once revert to and become the property of the Grantor, his heirs and assigns.
2. This easement includes the right of ingress and egress at any time over and upon the above described land of the Grantor and any other land of the Grantor adjoining said land.
3. There is reserved to the Grantor, his heirs and assigns, the right and privileges to use the above described land of the Grantor at any time, in any manner and for any purpose not inconsistent with the full use and enjoyment by the Grantee, its succesors and assigns, of the rights and privileges herein granted.
4. The rights and privileges herein granted are subject to all easements, rights-of-way, mineral reservations or other rights now outstanding in third parties.
5. The Grantee is responsible for operating and maintaining the above described works of improvements
6. The Grantee shall control the water level in the sediment storage pool until adequate vegetation is established and thereafter as necessary for maintenance or repair of the works of improvement.
7. The Grantee shall have the right to construct fences with gates or gaps around the works of improvement, and such fences, gates, or gaps shall not be changed in any way without consent of the Grantee. Any livestock found within such fences, except as authorized in writing by the Grantee, may be ejected therefrom by the Grantee.
8. Special Provisions:

Grantor is solely responsible for maintaining property lines and replacing any property lines fences that may be removed during construction of works of improvement on site No. 21.

TO HAVE AND TO HOLD the aforesaid easement in, over and upon the above described land of the Grantor, with all the rights, privileges and appurtenances thereto belonging or in anywise appertaining unto the Grantee, its successors and assigns, forever.
IN WITNESS WHEREOF the Grantor has executed this instrument in triplicate originals on the 22nd day of July, 1960.

Andy Burton (SEAL) Anna Burton (SEAL)
(Signature of Grantor) (Signature of Grantor)

_____ (SEAL) _____ (SEAL)
(Signature of Grantor) (Signature of Grantor)

APPENDIX A

of

An easement on approximately 28 acres of land out of the J. H. Bowman Survey granted to Plum Creek Conservation District, Lockhart, Texas, by Andy Burton and Wife, Anna, on _____196____, for the purpose of constructing and operating a floodwater detention structure.

Notes and bounds description of four tracts of land:

FIRST TRACT: Being a part of the J. H. Bowman Survey and being Lot No. 3 in the partition of the Kelley lands and as conveyed to Samuel Kelley by partition deed, recorded in Volume 46, page 554 of the Caldwell County Deed Records and BEGINNING at the NE corner of Lot No. 2 set apart to John B. Kelley stake from which a mesquite mkd X S 2 W 6 vrs;
THENCE N 45 E 222 vrs to the SE corner of a 143 acre tract of land, a stake in the Lockhart and Lytton Springs road on the old colony line;
THENCE N 45 W 800 vrs stake from which a L O mkd X brs N 1½ vrs;
THENCE S 3 E 614 vrs to stake and pile of stone on the N line of Lot No. 2;
THENCE S 81 E 417 vrs to the beginning, containing 40 acres of land, and conveyed to Andy Burton by B. J. Bellamy, Trustee, by deed recorded in Volume 155, page 119, Caldwell County Deed Records.

SECOND TRACT: Being a part of the J. H. Bowman Survey and Beginning at the SW corner of the Camp 173 acre tract a P O. mkd X on E bank of Ravine;
THENCE N 45 E 581 vrs to a rock on Lytton Springs road on the NW line of the Camp tract;
THENCE S 4 E 472 vrs to a stake on S line of Camp 173 acre tract from which a P O mkd X brs N 4 W 6.3 vrs;
THENCE N 81 W with S line of Camp tract 376 vrs to the beginning, containing 15.71 acres of land, more or less, conveyed by L. M. McCurdy to Andy Burton by deed recorded in Volume 157, page 144, Caldwell County Deed Records.

THIRD TRACT: Being part of the J. H. Bowman Survey and being Lot No. 1 in partition of Kelley lands, recorded in Volume 46, page 554 of Caldwell County Deed Records, and described as
BEGINNING at a stake and pile of stone the SW corner of a 143 acre tract of land on the E line of the I. Jackson League and N line of the J. H. Bowman Survey the same being the NW corner of the Jim Cardwell tract of land;
THENCE N 9 W 216 vrs to stake and pile of stone for corner;
THENCE S 81 E 113 vrs to stake from which a P O mkd X brs N 55 W 1½ vrs;
THENCE S 45 W 256 vrs to post oak stump on the E bank of the ravine the SW corner of the said 143 acre tract;
THENCE N 82 W 856 vrs to the place of beginning, containing 35 acres of land, less and except however the most East 18.4 acres of the above described 35 acres conveyed by Andy Burton and wife, to W. D. Moore, Jr., by deed dated October 9, 1947, and recorded in Volume 223, page 437, of Caldwell County Deed Records. The above 35 acres of land being the same tract conveyed to Andy Burton by H. E. Coker et ux by deed recorded in Volume 203, page 304, Caldwell County Deed Records.

FOURTH TRACT: Being a part of the J. H. Bowman Survey and being part of Lot 2 in the partition of the Kelley Estate lands recorded in Volume 46, page 554 of Caldwell County Deed Records and
BEGINNING at the most NE corner of said 30 acre tract;
THENCE N 81 W 612 vrs set stake in the North line of said 30 acres;
THENCE S 9 W 140 vrs set stake in the south line of said 30 acres for the SW corner of this tract;
THENCE S 89 E 512 vrs to the SE corner of said 30 acre tract;
THENCE N 45 E 174 vrs to the place of beginning, and containing 14 acres of land, more or less. Being the same land conveyed by W. D. Moore, Jr., and wife to Andy Burton by deed recorded in Volume 223, page 436, Caldwell County Deed Records, and containing 86.21 acres, more or less.

THE STATE OF Texas

COUNTY OF Caldwell:

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared Andy Burton and Annie Burton, his wife, both known to me to be the persons whose names are subscribed to the foregoing instrument and acknowledged to me that they each executed the same for the purposes and consideration therein expressed, and the said Annie Burton, wife of the said Andy Burton, having been examined by me privily and apart from her husband, and having the same fully explained to her, she, the said Annie Burton, acknowledged such instrument to be her act and deed, and she declared that she had willingly signed the same for the purposes and consideration therein expressed, and that she did not wish to retract it.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this, the 22 day of July, A. D. 19 60

SEAL

M. A. Carlton

Notary Public in and for Caldwell County, Texas

My Commission Expires June 1961

THE STATE OF ____________

COUNTY OF ____________

BEFORE ME the undersigned, a Notary Public in and for said County and State, on this day personally appeared ____________ known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that ____________ executed the same for the purposes and consideration therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this, the ____ day of ______ , A. D. 19

SEAL

____

Notary Public in and for ____________

My Commission Expires ____________ County,

[illegible] IT REMEMBERED that on the [illegible] day of [illegible], A. D. 1961, the Commissioners' Court of Caldwell County, Texas, being duly and regularly convened, and [illegible] in [illegible] being held in the Courthouse of the City of Lockhart, Caldwell County, Texas, the same then and there being the regular meeting place of said Court, there being the [illegible] members present and in attendance, to-wit:

[illegible]dgar Black, Sr. . . . . County Judge
Tom R. Brown, Commissioner, Precinct No. 1
[illegible] Wilson, Commissioner, Precinct No. 2
Roland [illegible], Commissioner, Precinct No. 3
[illegible] Harris, Commissioner, Precinct No. 4

And among other proceedings had was the following:

There came on to be heard the request of Plum Creek Conservation District, a Hays and Caldwell County Water Control and Conservation District, acting by and through its [illegible], W. [illegible] Carlton, for permission to inundate [illegible] road in Caldwell County, Texas, for and during construction of [illegible] Site No. 21, according to the plans and specifications prepared by Plum Creek Conservation District, and during times of extremely high runoff thereafter, said request being made in accordance with Article 6703, V.A.C.S., and Article [illegible], V.A.C.S., said County road being the following road, to-wit:

That certain County Road known locally in Caldwell County, Texas, as [illegible] road, and being that certain road separating the properties of [illegible] from the properties of [illegible].

And it appearing to the Court that it would be to the advantage of Caldwell County, Texas, that permission be given to temporarily inundate the above named road during construction of [illegible] Site No. 21, according to the plans and specifications of Plum Creek Conservation District, and during times of extremely high runoff thereafter;

EASEMENT

For an in consideration f D lar ($1.0) and the goo d val able co sideration d sideration of the future e fits h hereto to a be received b grantor grantee) the receipt whereof is acknowledged

(Name) of (Address)

Grantor, does hereby t b rgain el e nvey and elease unto Plum Creek Conservation District of Lockhart Texas its uccessors and assig . Grantee an easement in over nd p the following described land situated in the County of , State f Texas, t wit:

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for the purposes of:

For r in connection with the construction, alteration, operation, maintenance and inspection of the following described works of improvement to be located on the above described land; for the flowage f any waters in, over, upon or through such works of improvements; and f r the permanent storage and temporary detention, either or both, of any water that are impounded, stored or detained by such works of improvements.

RING

1. In the event construction of the above described works of improvement is not commenced within *10* years from the date hereof, the rights and privileges herein granted shall at once revert to and become the property f the Grantor, his heirs and assigns.

2. This easement includes the right of ingress and egress at any time over and upon the above described land of the Grantor and any other land of the Grantor adjoining said land.

3. There is reserved to the Grantor, his heirs and assigns, the right and privileges to use the above described land of the Grantor at any time, in any manner and for any purpose not inconsistent with the full use and enjoyment by the Grantee, its successors and assigns, of the rights and privileges herein granted.

4. The rights and privileges herein granted are subject to all easements, rights-of-way, mineral reservations or other rights now outstanding in third parties.

5. The Grantee is responsible for operating and maintaining the above described works of improvements.

6. The Grantee shall control the water level in the sediment storage pool until adequate vegetation is established and thereafter as necessary for maintenance or repair of the works of improvement.

7. The Grantee shall have the right to construct fences with gates or gaps around the works of improvement and such fences, gates, or gaps shall not be changed in any way without consent of the Grantee. Any livestock found within such fences, except as authorized in writing by the Grantee, may be ejected therefrom by the Grantee.

. Special Provisions:

TO HAVE AND TO HOLD the aforesaid easement in, over and upon the above described land of the Grantor, with all the rights, privileges and appurtenances thereto belonging or in anywise appertaining unto the Grantee, its successors and assigns, forever.

IN WITNESS WHEREOF the Grantor has executed this instrument on this the *31st* day of *January*, 19*61*

[signature]

(Signature of Grantor) (Signature of Grantor)

[signature]

(Signature of Grantor) (Signature of Grantor)

THE STATE OF TEXAS

COUNTY OF MADISON:

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared LOWARD STARNES and JOYCE STARNES, his wife, both known to me to be the persons whose names are subscribed to the foregoing instrument and acknowledged to me that they each executed the same for the purposes and consideration therein expressed, and the said JOYCE STARNES, wife of the said [illegible], having been examined by me privily and apart from her husband, and having the same fully explained to her, she, the said JOYCE STARNES, acknowledged such instrument to be her act and deed, and she declared that she had willingly signed the same for the purposes and consideration therein expressed, and that she did not wish to retract it

GIVEN UNDER MY HAND AND SEAL OF OFFICE this, the 31st day of JANUARY A. D. 1961

SEAL

Boyd M. Bailey

Notary Public in and for [illegible]

My Commission Expires June 1, 1961 MADISON County, Texas

THE STATE OF TEXAS

COUNTY OF [illegible]:

BEFORE ME the undersigned, a Notary Public in and for said County and State, on this day personally appeared [illegible] known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that [illegible] executed the same for the purposes and consideration therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this, the [illegible] day of [illegible], A. D. 19[illegible]

SEAL

[illegible]

Notary Public in and for [illegible]

My Commission Expires [illegible] [illegible] County, [illegible]

EASEMENT

THE STATE OF TEXAS

COUNTY OF Madison :

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared LEO STARNES and JOYCE STARNES, his wife, both known to me to be the persons whose names are subscribed to the foregoing instrument and acknowledged to me that they each executed the same for the purposes and consideration therein expressed, and the said J C JAMES wife of the said LOUISA JAMES, having been examined by me privily and apart from her husband, and having the same fully explained to her, she, the said STARNES, acknowledged such instrument to be her act and deed, and she declared that she had willingly signed the same for the purposes and consideration therein expressed, and that she did not wish to retract it.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this, the 31st day of January, A. D. 1961

SEAL

Boyd M. Bisling

Notary Public in and for

My Commission Expires June 1, 1961 Madison County, Texas

THE STATE OF TEXAS

COUNTY OF

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that executed the same for the purposes and consideration therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this, the day of , A. D. 19

SEAL

Notary Public in and for

My Commission Expires County,

SITE NO. 21

EASEMENT

For and in consideration of One Dollar ($1.00) and other good and valuable considerations (and in consideration of the future mutual benefits to be received by both grantor and grantee), the receipt whereof is acknowledged, H. W. Cope, Dorothy Thompson and Husband, Otis Thompson of Caldwell (Address) Co., Texas, Grantor, does hereby grant, bargain, sell, convey and release unto Plum Creek Conservation District of Lockhart, Texas, its successors and assigns, Grantee, an easement in, over and upon the following described land situated in the County of Caldwell, State of Texas, to-wit: All of our undivided right, title and interest in and to approximately 7.1 acres near the N. W. corner and being part of a tract containing 220 acres of land, more or less, out of the J. H. Bowman Survey, Patent 225, Vol. 3, Abstract 54, a part of a 338-acre tract of land, more or less; and containing 4.1 acres, more or less, of the above mentioned tract, being the same land conveyed by J. T. Gillett, Jr., to Webster Ritter by deed recorded in Vol. 37, page 362, of the Deed Records of Caldwell County, Texas; and containing 10 acres, more or less, conveyed by Jas. G. Blanks and J. T. Gillett, Jr., to J. S. McDaris by deed recorded in Vol. 37, page 402, of said Deed Records as more fully described in a Warranty Deed dated October 13, 1937, from The Federal Land Bank of Houston to H. W. Cope, recorded in Vol. 184, page 179, of the Deed Records of Caldwell County, Texas, to which reference is made for all purposes. D. T. C.

DESCRIBED METES AND B UNDS DESCRIPTION OF 8.1 ACRES OF LAND OUT OF THE J. H. BOWMAN SURVEY, CALDWELL COUNTY, TEXAS, SAID METES AND B UNDS DESCRIPTION OF SAID 8.1 ACRES BEING AS FOLLOWS TO WIT: BEGINNING AT THE NORTHWEST CORNER OF THAT 220 ACRE TRACT DESCRIBED BY METES AND BOUNDS IN A DEED FROM THE FEDERAL LAND BANK TO H. W. COPE RECORDED IN CALDWELL COUNTY DEED RECORDS IN VOL. 184 PAGE 180 AND DATED OCTOBER 13, 1937. SAID POINT BEING ALSO THE N. E. CORNER OF THE WEBSTER RITTER 104 ACRE TRACT WHICH WAS DESCRIBED AS THE "1st Tract Excepted" IN THE ABOVE REFERENCE DEED. THENCE SOUTH 81 EAST ALONG THE NORTH LINE OF SAID H. W. COPE TRACT A DISTANCE OF 1100 FEET TO A POINT; THENCE SOUTH 63 WEST A DISTANCE OF 1100 FEET TO A POINT IN THE WEST LINE OF SAID COPE 220 ACRE TRACT BEING ALSO THE EAST LINE OF SAID 104 ACRE TRACT; THENCE NORTH 9 WEST ALONG SAID WEST BOUNDARY LINE OF THE COPE TRACT A DISTANCE OF 1175 FT. TO THE PLACE OF BEGINNING, 8.1 AC. H W C

for the purposes of: For or in connection with the construction, alteration, operation, maintenance and inspection of the following described works of improvement to be located on the above described land; for the flowage of any waters in, over, upon or through such works of improvements; and for the permanent storage and temporary detention, either or both, of any waters that are impounded, stored or detained by such works of improvement: Floodwater retarding structure No. 21, the dam of which will be constructed on other lands. The project involves approximately 7.1 acres of the above described lands, consisting of portions of the sediment, sediment reserve and detention storage pools, including an area that will be inundated during emergency spillway flow.

1. In the event construction of the above described works of improvement is not commenced within 10 years from the date hereof, the rights and privileges herein granted shall at once revert to and become the property of the Grantor, his heirs and assigns.
2. This easement includes the right of ingress and egress at any time over and upon the above described land of the Grantor and any other land of the Grantor adjoining said land.
3. There is reserved to the Grantor, his heirs and assigns, the right and privileges to use the above described land of the Grantor at any time, in any manner and for any purpose not inconsistent with the full use and enjoyment by the Grantee, its succesors and assigns, of the rights and privileges herein granted.
4. The rights and privileges herein granted are subject to all easements, rights-of-way, mineral reservations or other rights now outstanding in third parties.
5. The Grantee is responsible for operating and maintaining the above described works of improvements.
6. The Grantee shall control the water level in the sediment storage pool until adequate vegetation is established and thereafter as necessary for maintenance or repair of the works of improvement.
7. The Grantee shall have the right to construct fences with gates or gaps around the works of improvement, and such fences, gates, or gaps shall not be changed in any way without consent of the Grantee. Any livestock found within such fences, except as authorized in writing by the Grantee, may be ejected therefrom by the Grantee.
8. Special Provisions:

Grantor is solely responsible for maintaining property lines and replacing property lines fences that may be removed between grantor and W. D. Moore, Jr., and Andy Burton during the period of construction of the works of improvement.

TO HAVE AND TO HOLD the aforesaid easement in, over and upon the above described land of the Grantor, with all the rights, privileges and appurtenances thereto belonging or in anywise appertaining unto the Grantee, its successors and assigns, forever.

IN WITNESS WHEREOF the Grantor has executed this instrument in triplicate originals on the 30th day of December, 1960.

H. W. Cope (SEAL) Dorothy Thompson (SEAL)
(Signature of Grantor) (Signature of Grantor)

Otis Thompson (SEAL) _____ (SEAL)
(Signature of Grantor) (Signature of Grantor)

THE STATE OF Texas

COUNTY OF Caldwell:

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared Otis Thompson and Dorothy Thompson his wife, both known to me to be the persons whose names are subscribed to the foregoing instrument and acknowledged to me that they each executed the same for the purposes and consideration therein expressed, and the said Dorothy Thompson, wife of the said Otis Thompson, having been examined by me privily and apart from her husband, and having the same fully explained to her, she, the said Dorothy Thompson, acknowledged such instrument to be her act and deed, and she declared that she had willingly signed the same for the purposes and consideration therein expressed, and that she did not wish to retract it.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this, the 21st day of January, A. D. 1941

SEAL

Notary Public in and for Caldwell

My Commission Expires June 1 1941 County, Texas

THE STATE OF Texas

COUNTY OF Caldwell:

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared H. W. Cope known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and consideration therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this, the 21st day of January, A. D. 1941

SEAL

Notary Public in and for Caldwell

My Commission Expires June 1 1941 County Texas

APPENDIX A

of

An easement on approximately 45.2 acres of land out of the T. J. Halton Survey granted to Plum Creek Conservation District, Lockhart, Texas, by P. S. King and Wife, Onita King, on _____196___, for the purpose of constructing and operating a floodwater detention structure.

8. Special Provisions:

a. A Land Rights Work Map covering the general area of structure site No. 21 is on file in the office of Plum Creek Conservation District, Lockhart, Texas, andreference is here made to said map for all pertinent purposes.

b. Grantor is solely responsible for maintaining property lines and replacing property lines fences.

c. Grantor understands the following works of improvement will be flooded when the floodwater detention structure is built and in operation:

(1) A well the curb of which is at approximate elevation 512.6 feet.

(2) A storage tank which is at approximate elevation 517.1 feet.

(3) A shed on ground level approximately 517.8 feet.

(4) A farm pond used for stock water whose spillway elevation is approximately 517.6 feet.

d. The spillway crest elevation of the detention structure (earthen dam and its grassed spillway) will be at approximately 517.0 feet. It is designed for a maximum depth of flow of 5.3 feet. The average number of times the spillway is expected to function is three times every 100 years.

Nevertheless and with full knowledge flood damage and inconvenience will result from this flooding no compensation will be given by grantee to grantor, because the overall benefits of the works of improvement to grantor will be greater than any damages or inconveniences that may result from their installation and operation.

APPENDIX A

of

An easement on approximately 45.2 acres of land out of the T. J. Halton Survey granted to Plum Creek Conservation District, Lockhart, Texas, by P. S. King and Wife, Onita King, on _____ 196___, for the purpose of constructing and operating a floodwater detention structure.

8. Special Provisions:

a. A Land Rights Work Map covering the general area of structure site No. 21 is on file in the office of Plum Creek Conservation District, Lockhart, Texas, andreference is here made to said map for all pertinent purposes.

b. Grantor is solely responsible for maintaining property lines and replacing property lines fences.

c. Grantor understands the following works of improvement will be flooded when the floodwater detention structure is built and in operation:

(1) A well the curb of which is at approximate elevation 512.6 feet.

(2) A storage tank which is at approximate elevation 517.1 feet.

(3) A shed on ground level approximately 517.8 feet.

(4) A farm pond used for stock water whose spillway elevation is approximately 517.6 feet.

d. The spillway crest elevation of the detention structure (earthen dam and its grassed spillway) will be at approximately 517.0 feet. It is designed for a maximum depth of flow of 5.3 feet. The average number of times the spillway is expected to function is three times every 100 years.

Neverthsless and with full knowledge flood damage and inconvenience will result from this flooding no compensation will be given by grantee to grantor, because the overall benefits of the works of improvement to grantor will be greater than any damages or inconveniences that may result from their installation and operation.

Site No. 21

Page 57
6/21/6

EASEMENT

For and in consideration of One Dollar ($1.00) and other good and valuable considerations (and in consideration of the future mutual benefits to be received by both grantor and grantee), the receipt whereof is acknowledged, P. S. King and Wife, Onita King, (Name) of Lockhart Texas (Address), Grantor, does hereby grant, bargain, sell, convey and release unto Plum Creek Conservation District of Lockhart, Texas, its successors and assigns, Grantee, an easement in, over and upon the following described land situated in the County of Caldwell, State of Texas, to-wit: Approximately 45.2 acres of land out of two adjoining tracts as follows:

First Tract: 116.83 acres, more or less, in the T. J. Halton Survey, as more fully described in Warranty Deed dated January 1, 1936, from Alamo Lumber Co., San Antonio, Texas, to P. S. King, recorded in Vol. 170, page 110; and

Second Tract: 100 acres of land, more or less, in the T. J. Halton Survey, as more fully described in Warranty Deed dated October 5, 1939, from Aetna Life Insurance Company, Hartford, County of Hartford, Connecticut, to Patton S. King, recorded in Vol. 193, page 406, to which reference is made for all purposes.

for the purposes of:
For or in connection with the construction, alteration, operation, maintenance and inspection of the following described works of improvement to be located on the above described land; for the flowage of any waters in, over, upon or through such works of improvements; and for the permanent storage and temporary detention, either or both, of any waters that are impounded, stored or detained by such works of improvement: Floodwater retarding structure No. 21, the dam of which will be constructed on other lands. The project involves approximately 45.2 acres of the above described lands, consisting of portions of the sediment reserve and detention storage pools, including an area that will be inundated during emergency spillway flow.

1. In the event construction of the above described works of improvement is not commenced within 10 years from the date hereof, the rights and privileges herein granted shall at once revert to and become the property of the Grantor, his heirs and assigns.
2. This easement includes the right of ingress and egress at any time over and upon the above described land of the Grantor and any other land of the Grantor adjoining said land.
3. There is reserved to the Grantor, his heirs and assigns, the right and privileges to use the above described land of the Grantor at any time, in any manner and for any purpose not inconsistent with the full use and enjoyment by the Grantee, its succesors and assigns, of the rights and privileges herein granted.
4. The rights and privileges herein granted are subject to all easements, rights-of-way, mineral reservations or other rights now outstanding in third parties.
5 The Grantee is responsible for operating and maintaining the above described works of improvements.
6. The Grantee shall control the water level in the sediment storage pool until adequate vegetation is established and thereafter as necessary for maintenance or repair of the works of improvement.
7. The Grantee shall have the right to construct fences with gates or gaps around the works of improvement, and such fences, gates, or gaps shall not be changed in any way without consent of the Grantee. Any livestock found within such fences, except as authorized in writing by the Grantee, may be ejected therefrom by the Grantee.
8. Special Provisions: See Appendix A for full description of all Special Provisions.

TO HAVE AND TO HOLD the aforesaid easement in, over and upon the above described land of the Grantor, with all the rights, privileges and appurtenances thereto belonging or in anywise appertaining unto the Grantee, its successors and assigns, forever.
IN WITNESS WHEREOF the Grantor has executed this instrument in triplicate originals on the

____ day of ____________, 19__.

________________ (SEAL) (Signature of Grantor)	________________ (SEAL) (Signature of Grantor)
________________ (SEAL) (Signature of Grantor)	________________ (SEAL) (Signature of Grantor)

Site No. 21

6/28/66

EASEMENT

For and in consideration of One Dollar ($1.00) and other good and valuable considerations (and in consideration of the future mutual benefits to be received by both grantor and grantee), the receipt whereof is acknowledged, P. S. King and wife, Anna King, of Lockhart (Name) (Address) Texas, Grantor, does hereby grant, bargain, sell, convey and release unto Plum Creek Conservation District of Lockhart, Texas, its successors and assigns, Grantee, an easement in, over and upon the following described land situated in the County of Caldwell, State of Texas, to-wit: Approximately 45.2 acres of land out of two adjoining tracts as follows:

First Tract: 116.83 acres, more or less, in the T. J. Halton Survey, as more fully described in Warranty Deed dated January 1, 1936, from Alamo Lumber Co., an Antonio, Texas, to P. S. King, recorded in Vol. 170, page 110; and

Second Tract: 100 acres of land, more or less, in the T. J. Halton Survey, as more fully described in Warranty Deed dated October 5, 1939, from Aetna Life Insurance Company, Hartford, County of Hartford, Connecticut, to Patton S. King, recorded in Vol. 193, page 406, to which reference is made for all purposes.

for the purposes of:
For or in connection with the construction, alteration, operation, maintenance and inspection of the following described works of improvement to be located on the above described land; for the flowage of any waters in, over, upon or through such works of improvements; and for the permanent storage and temporary detention, either or both, of any waters that are impounded, stored or detained by such works of improvement: Floodwater retarding structure No. 21, the dam of which will be constructed on other lands. The project involves approximately 45.2 acres of the above described lands, consisting of portions of the sediment reserve and detention storage pools, including an area that will be inundated during emergency spillway flow.

1. In the event construction of the above described works of improvement is not commenced within years from the date hereof, the rights and privileges herein granted shall at once revert to and become the property of the Grantor, his heirs and assigns.
2. This easement includes the right of ingress and egress at any time over and upon the above described land of the Grantor and any other land of the Grantor adjoining said land.
3. There is reserved to the Grantor, his heirs and assigns, the right and privileges to use the above described land of the Grantor at any time, in any manner and for any purpose not inconsistent with the full use and enjoyment by the Grantee, its succesors and assigns, of the rights and privileges herein granted.
4. The rights and privileges herein granted are subject to all easements, rights-of-way, mineral reservations or other rights now outstanding in third parties.
5. The Grantee is responsible for operating and maintaining the above described works of improvements.
6. The Grantee shall control the water level in the sediment storage pool until adequate vegetation is established and thereafter as necessary for maintenance or repair of the works of improvement.
7. The Grantee shall have the right to construct fences with gates or gaps around the works of improvement, and such fences, gates, or gaps shall not be changed in any way without consent of the Grantee. Any livestock found within such fences, except as authorized in writing by the Grantee, may be ejected therefrom by the Grantee.
8. Special Provisions: See Appendix A for full description of all Special Provisions.

TO HAVE AND TO HOLD the aforesaid easement in, over and upon the above described land of the Grantor, with all the rights, privileges and appurtenances thereto belonging or in anywise appertaining unto the Grantee, its successors and assigns, forever.
IN WITNESS WHEREOF the Grantor has executed this instrument in triplicate originals on the day of , 19 .

(SEAL) (SEAL)
(Signature of Grantor) (Signature of Grantor)

(SEAL) (SEAL)
(Signature of Grantor) (Signature of Grantor)

Site No. 21 . 7/22/60 Page 247

EASEMENT

For and in consideration of One Dollar ($1.00) and other good and valuable considerations (and in consideration of the future mutual benefits to be received by both grantor and grantee), the receipt whereof is acknowledged, Andy Burton and Wife, Anna Burton of Lockhart
(Name) (Address)
Texas , Grantor, does hereby grant, bargain, sell, convey and release unto Plum Creek Conservation District of Lockhart, Texas, its successors and assigns, Grantee, an easement in, over and upon the following described land situated in the County of Caldwell , State of Texas, to-wit: Approximately 28 acres of land being out of four tracts (all of the J. H. Bowman Survey) conveyed to grantor by Warranty Deeds of record in the Deed Records of Caldwell County, Texas, as follows:

First Tract: Containing 40 acres of land, more or less.

Second Tract: Containing 15.71 acres of land, more or less.

Third Tract: "Containing 35 acres of land, LESS and EXCEPT however the most East 18.4 acres" conveyed by Andy Burton and Wife to W. D. Moore, Jr., by deed dated Oct 9, 1947, and recorded in Vol. 223, page 437. This tract of land being the same tract conveyed to Andy Burton by H. E. Coker by deed recorded in Vol. 203, page 304.

Fourth Tract: Containing 14 acres of land, more or less

Metes and bounds descriptions of the above four tracts of land are contained in Appendix A attached hereto and made a part hereof.

for the purposes of:
For or in connection with the construction, alteration, operation, maintenance and inspection of the following described works of improvement to be located on the above described land; for the flowage of any waters in, over, upon or through such works of improvements; and for the permanent storage and temporary detention, either or both, of any waters that are impounded, stored or detained by such works of improvement: Floodwater retarding structure No. 21, the dam of which will be constructed on other lands. The project involves approximately 28 acres of the herein described lands, consisting of portions of the sediment reserve and detention storage pools, including an area that will be inundated during emergency spillway flow.

1. In the event construction of the above described works of improvement is not commenced within 10 years from the date hereof, the rights and privileges herein granted shall at once revert to and become the property of the Grantor, his heirs and assigns.
2. This easement includes the right of ingress and egress at any time over and upon the above described land of the Grantor and any other land of the Grantor adjoining said land.
3. There is reserved to the Grantor, his heirs and assigns, the right and privileges to use the above described land of the Grantor at any time, in any manner and for any purpose not inconsistent with the full use and enjoyment by the Grantee, its succesors and assigns, of the rights and privileges herein granted.
4. The rights and privileges herein granted are subject to all easements, rights-of-way, mineral reservations or other rights now outstanding in third parties
5. The Grantee is responsible for operating and maintaining the above described works of improvements.
6. The Grantee shall control the water level in the sediment storage pool until adequate vegetation is established and thereafter as necessary for maintenance or repair of the works of improvement.
7. The Grantee shall have the right to construct fences with gates or gaps around the works of improvement, and such fences, gates, or gaps shall not be changed in any way without consent of the Grantee. Any livestock found within such fences, except as authorized in writing by the Grantee, may be ejected therefrom by the Grantee.
8. Special Provisions: Grantor is solely responsible for maintaining property lines and replacing any property lines fences that may be removed during construction of works of improvement on site No. 21.

A Land Rights Work Map covering the general area of structure site No. 21 is on file in the office of Plum Creek Conservation District, Lockhart, Texas, and reference is here made to said map for all pertinent purposes.

TO HAVE AND TO HOLD the aforesaid easement in, over and upon the above described land of the Grantor, with all the rights, privileges and appurtenances thereto belonging or in anywise appertaining unto the Grantee, its successors and assigns, forever.
IN WITNESS WHEREOF the Grantor has executed this instrument in triplicate originals on the

..... day of ...., 19.....

______________ (SEAL)		______________	(SEAL)
(Signature of Grantor)		(Signature of Grantor)	
______________ (SEAL		______________	(SEAL)
(Signature of Grantor)		(Signature of Grantor)	

Site No. 21

Vol. 254 Page 247
7/22/60

EASEMENT

For and in consideration of One Dollar ($1.00) and other good and valuable considerations (and in consideration of the future mutual benefits to be received by both grantor and grantee), the receipt whereof is acknowledged, Andy Burton and Wife, Anne Burton (Name) of Lockhart (Address) Texas, Grantor, does hereby grant, bargain, sell, convey and release unto Plum Creek Conservation District of Lockhart, Texas, its successors and assigns, Grantee, an easement in, over and upon the following described land situated in the County of Caldwell, State of Texas, to-wit: Approximately 28 acres of land being out of four tracts (all of the J. H. Bowman Survey) conveyed to grantor by Warranty Deeds of record in the Deed Records of Caldwell County, Texas, as follows:

First Tract: Containing 40 acres of land, more or less.

Second Tract: Containing 15.71 acres of land, more or less.

Third Tract: "Containing 35 acres of land, LESS and EXCEPT however the most East 18.4 acres" conveyed by Andy Burton and Wife to W. J. Moore, Jr., by deed dated Oct 9, 1947, and recorded in Vol. 223, page 437. This tract of land being the same tract conveyed to Andy Burton by H. E. Coker by deed recorded in Vol. 203, page 304.

Fourth Tract: Containing 14 acres of land, more or less

Metes and bounds descriptions of the above four tracts of land are contained in Appendix A attached hereto and made a part hereof.

for the purposes of:
For or in connection with the construction, alteration, operation, maintenance and inspection of the following described works of improvement to be located on the above described land; for the flowage of any waters in, over, upon or through such works of improvements; and for the permanent storage and temporary detention, either or both of any waters that are impounded, stored or detained by such works of improvement: Floodwater retarding structure No. 21, the dam of which will be constructed on other lands. The project involves approximately 28 acres of the herein described lands, consisting of portions of the sediment reserve and detention storage pools, including an area that will be inundated during emergency spillway flow.

1. In the event construction of the above described works of improvement is not commenced within ____ years from the date hereof, the rights and privileges herein granted shall at once revert to and become the property of the Grantor, his heirs and assigns.
2. This easement includes the right of ingress and egress at any time over and upon the above described land of the Grantor and any other land of the Grantor adjoining said land.
3. There is reserved to the Grantor, his heirs and assigns, the right and privileges to use the above described land of the Grantor at any time, in any manner and for any purpose not inconsistent with the full use and enjoyment by the Grantee, its succesors and assigns, of the rights and privileges herein granted.
4. The rights and privileges herein granted are subject to all easements, rights-of-way, mineral reservations or other rights now outstanding in third parties.
5. The Grantee is responsible for operating and maintaining the above described works of improvements.
6. The Grantee shall control the water level in the sediment storage pool until adequate vegetation is established and thereafter as necessary for maintenance or repair of the works of improvement.
7. The Grantee shall have the right to construct fences with gates or gaps around the works of improvement, and such fences, gates, or gaps shall not be changed in any way without consent of the Grantee. Any livestock found within such fences, except as authorized in writing by the Grantee, may be ejected therefrom by the Grantee.
8. Special Provisions: Grantor is solely responsible for maintaining property lines and replacing any property lines fences that may be removed during construction of works of improvement on site No. 21.

A Land Rights Work Map covering the general area of structure site No. 21 is on file in the office of Plum Creek Conservation District, Lockhart, Texas, and reference is here made to said map for all pertinent purposes.

TO HAVE AND TO HOLD the aforesaid easement in, over and upon the above described land of the Grantor, with all the rights, privileges and appurtenances thereto belonging or in anywise appertaining unto the Grantee, its successors and assigns, forever.
IN WITNESS WHEREOF the Grantor has executed this instrument in triplicate originals on the

day of _____, 19____.

_____ (SEAL) _____ (SEAL)
(Signature of Grantor) (Signature of Grantor)

_____ (SEAL) _____ (SEAL)
(Signature of Grantor) (Signature of Grantor)

site no. 21

EASEMENT

For and in consideration of One Dollar ($1.00) and other good and valuable considerations (and in consideration of the future mutual benefits to be received by both grantor and grantee), the receipt whereof is acknowledged, H. W. Cope and Wife (Name) of Caldwell (Address) County, Tex., Grantor, does hereby grant, bargain, sell, convey and release unto Plum Creek Conservation District of Lockhart, Texas, its successors and assigns, Grantee, an easement in, over and upon the following described land situated in the County of Caldwell, State of Texas, to-wit: Approximately 7.1 acres near the N. W. corner and being part of a tract containing 220 acres of land, more or less, out of the J. H. Bowman Survey, Patent 225, Vol. 3, Abstract 54, a part of a 338 acre tract of land, more or less; and containing 4.1 acres, more or less, of the above mentioned tract, being the same land conveyed by J. T. Gillett, Jr., to Webster Hitter by deed recorded in Vol. 37, page 362, of the Deed Records of Caldwell County, Texas; and containing 10 acres, more or less, conveyed by Jas. G. Blanks and J. T. Gillett, Jr., to J. S. McDaris by deed recorded in Vol. 37, page 402, of said Deed Records as more fully described in a Warranty Deed dated October 13, 1937, from The Federal Land Bank of Houston to H. W. Cope, recorded in Vol. 124, page 179, of the Deed Records of Caldwell County, Texas, to which reference is made for all purposes.

for the purposes of:
For or in connection with the construction, alteration, operation, maintenance and inspection of the following described works of improvement to be located on the above described land; for the flowage of any waters in, over, upon or through such works of improvements; and for the permanent storage and temporary detention, either or both, of any waters that are impounded, stored or detained by such works of improvement: Floodwater retarding structure No. 21, the dam of which will be constructed on other lands. The project involves approximately 7.1 acres of the above described lands, consisting of portions of the sediment, sediment reserve and detention storage pools, including an area that will be inundated during emergency spillway flow.

1. In the event construction of the above described works of improvement is not commenced within 10 years from the date hereof, the rights and privileges herein granted shall at once revert to and become the property of the Grantor, his heirs and assigns.
2. This easement includes the right of ingress and egress at any time over and upon the above described land of the Grantor and any other land of the Grantor adjoining said land.
3. There is reserved to the Grantor, his heirs and assigns, the right and privileges to use the above described land of the Grantor at any time, in any manner and for any purpose not inconsistent with the full use and enjoyment by the Grantee, its succesors and assigns, of the rights and privileges herein granted.
4. The rights and privileges herein granted are subject to all easements, rights-of-way, mineral reservations or other rights now outstanding in third parties.
5. The Grantee is responsible for operating and maintaining the above described works of improvements.
6. The Grantee shall control the water level in the sediment storage pool until adequate vegetation is established and thereafter as necessary for maintenance or repair of the works of improvement.
7. The Grantee shall have the right to construct fences with gates or gaps around the works of improvement, and such fences, gates, or gaps shall not be changed in any way without consent of the Grantee. Any livestock found within such fences, except as authorized in writing by the Grantee, may be ejected therefrom by the Grantee.
8. Special Provisions: Grantor is solely responsible for maintaining property lines and replacing property lines fences that may be removed between grantor and W. D. Moore, Jr., and Andy Burton during the period of construction of the works of improvement.

A Land Rights Work Map covering the general area of structure site No. 21 is on file in the office of Plum Creek Conservation District, Lockhart, Texas, and reference is here made to said map for all pertinent purposes.

TO HAVE AND TO HOLD the aforesaid easement in, over and upon the above described land of the Grantor, with all the rights, privileges and appurtenances thereto belonging or in anywise appertaining unto the Grantee, its successors and assigns, forever.
IN WITNESS WHEREOF the Grantor has executed this instrument in triplicate originals on the

____ day of _____, 19____.

_____ (SEAL) _____ (SEAL)
(Signature of Grantor) (Signature of Grantor)

_____ (SEAL) _____ (SEAL)
(Signature of Grantor) (Signature of Grantor)

site no. 21

EASEMENT

For and in consideration of One Dollar ($1.00) and other good and valuable considerations (and in consideration of the future mutual benefits to be received by both grantor and grantee), the receipt whereof is acknowledged, H. D. Cope and wife (Name) of Caldwell (Address) County, Tex., Grantor, does hereby grant, bargain, sell, convey and release unto Plum Creek Conservation District of Lockhart, Texas, its successors and assigns, Grantee, an easement in, over and upon the following described land situated in the County of Caldwell, State of Texas, to-wit: Approximately 7.1 acres near the N. W. corner and being part of a tract containing 220 acres of land, more or less, out of the J. H. Bowman Survey, Patent 225, Vol. 3, Abstract 54, a part of a 338 acre tract of land, more or less; and containing 4.1 acres, more or less, of the above mentioned tract, being the same land conveyed by J. T. Gillett, Jr., to Webster Witter by deed recorded in Vol. 37, page 362, of the Deed Records of Caldwell County, Texas; and containing 10 acres, more or less, conveyed by Jas. G. Blanks and J. T. Gillett, Jr., to J. S. McDaris by deed recorded in Vol. 37, page 402, of said Deed Records as more fully described in a Warranty Deed dated October 13, 1937, from The Federal Land Bank of Houston to H. D. Cope, recorded in Vol. 164, page 179, of the Deed Records of Caldwell County, Texas, to which reference is made for all purposes.

for the purposes of:
For or in connection with the construction, alteration, operation, maintenance and inspection of the following described works of improvement to be located on the above described land; for the flowage of any waters in, over, upon or through such works of improvements; and for the permanent storage and temporary detention, either or both of any waters that are impounded stored or detained by such works of improvement; Floodwater Retarding Structure No. 21, the dam of which will be constructed on other lands. The project involves approximately 7.1 acres of the above described lands, consisting of portions of the sediment, sediment reserve and detention storage pools, including an area that will be inundated during emergency spillway flow.

1. In the event construction of the above described works of improvement is not commenced within years from the date hereof, the rights and privileges herein granted shall at once revert to and become the property of the Grantor, his heirs and assigns.
2. This easement includes the right of ingress and egress at any time over and upon the above described land of the Grantor and any other land of the Grantor adjoining said land.
3. There is reserved to the Grantor, his heirs and assigns, the right and privileges to use the above described land of the Grantor at any time, in any manner and for any purpose not inconsistent with the full use and enjoyment by the Grantee, its succesors and assigns, of the rights and privileges herein granted.
4. The rights and privileges herein granted are subject to all easements, rights-of-way, mineral reservations or other rights now outstanding in third parties.
5. The Grantee is responsible for operating and maintaining the above described works of improvements.
6. The Grantee shall control the water level in the sediment storage pool until adequate vegetation is established and thereafter as necessary for maintenance or repair of the works of improvement.
7. The Grantee shall have the right to construct fences with gates or gaps around the works of improvement, and such fences, gates, or gaps shall not be changed in any way without consent of the Grantee. Any livestock found within such fences, except as authorized in writing by the Grantee, may be ejected therefrom by the Grantee.

8. Special Provisions: Grantor is solely responsible for maintaining property lines and replacing property lines fences that may be removed between grantor and W. D. Moore, Jr., and Andy Burton during the period of construction of the works of improvement.

A Land Rights Work Map covering the general area of structure site No. 21 is on file in the office of Plum Creek Conservation District, Lockhart, Texas, and reference is here made to said map for all pertinent purposes.

TO HAVE AND TO HOLD the aforesaid easement in, over and upon the above described land of the Grantor, with all the rights, privileges and appurtenances thereto belonging or in anywise appertaining unto the Grantee, its successors and assigns, forever.
IN WITNESS WHEREOF the Grantor has executed this instrument in triplicate originals on the

day of , 19

(SEAL) (SEAL)
(Signature of Grantor) (Signature of Grantor)

(SEAL) (SEAL)
(Signature of Grantor) (Signature of Grantor)

Site No. 21

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6/28/60

EASEMENT

For and in consideration of One Dollar ($1.00) and other good and valuable considerations (and in consideration of the future mutual benefits to be received by both grantor and grantee), the receipt whereof is acknowledged, W. D. Moore, Jr., Individually and as Independent Executor of the Estate of W. D. Moore, Sr., deceased, joined herein by his Wife, Doris Moore, both of Lockhart (Name) (Address) Texas, Grantor, does hereby grant, bargain, sell, convey and release unto Plum Creek Conservation District of Lockhart, Texas, its successors and assigns, Grantee, an easement in, over and upon the following described land situated in the County of Caldwell, State of Texas, to-wit: Approximately 327 acres of land out of the Isaac Jackson and J. H. Bowman Surveys of Caldwell County, Texas, and being part of a tract consisting of 1,245.71 acres of land, more or less, which 1,245.71 acres consists of eighteen (18) tracts.

References to metes and bounds descriptions (recorded in the Deed Records of Caldwell County, Texas) of each of the eighteen tracts are attached hereto and made a part hereof as Appendix A to this easement.

for the purposes of:
For or in connection with the construction, alteration, operation, maintenance and inspection of the following described works of improvement to be located on the above described land; for the flowage of any waters in, over, upon or through such works of improvements; and for the permanent storage and temporary detention, either or both, of any waters that are impounded, stored or detained by such works of improvement: Floodwater retarding structure, consisting of an earthen dam, emergency spillway, work site adjacent to construction area, and portions of the sediment, sediment reserve and detention storage pools, including an area that will be inundated during emergency spillway flow. Project involves approximately 327 acres of the herein described lands.

1. In the event construction of the above described works of improvement is not commenced within 10 years from the date hereof, the rights and privileges herein granted shall at once revert to and become the property of the Grantor, his heirs and assigns.
2. This easement includes the right of ingress and egress at any time over and upon the above described land of the Grantor and any other land of the Grantor adjoining said land.
3. There is reserved to the Grantor, his heirs and assigns, the right and privileges to use the above described land of the Grantor at any time, in any manner and for any purpose not inconsistent with the full use and enjoyment by the Grantee, its successors and assigns, of the rights and privileges herein granted.
4. The rights and privileges herein granted are subject to all easements, rights-of-way, mineral reservations or other rights now outstanding in third parties.
5. The Grantee is responsible for operating and maintaining the above described works of improvements.
6. The Grantee shall control the water level in the sediment storage pool until adequate vegetation is established and thereafter as necessary for maintenance or repair of the works of improvement.
7. The Grantee shall have the right to construct fences with gates or gaps around the works of improvement, and such fences, gates, or gaps shall not be changed in any way without consent of the Grantee. Any livestock found within such fences, except as authorized in writing by the Grantee, may be ejected therefrom by the Grantee.
8. Special Provisions: (a) Grantor is solely responsible for maintaining property lines and replacing property lines fences. (b) Grantor is aware of the fact that two farm ponds used for stock water will be inundated for periods following rainfall sufficient to produce appreciable amounts of run-off. One is located approximately 1,300 feet North of the earthen dam to be constructed and will be in the sediment reserve pool. One is approximately 1,100 feet in a northeasterly direction from the East end of the earthen dam to be constructed and will be in the detention pool. Since the sediment pool will provide and assure a more dependable source of water than these two ponds, no compensation for their inundation is or will be made by grantee. (c) A Land Rights Work Map covering the general area of structure site No. 21 is on file in the office of Plum Creek Conservation District, Lockhart, Texas, and reference is here made to said map for all pertinent purposes.

TO HAVE AND TO HOLD the aforesaid easement in, over and upon the above described land of the Grantor, with all the rights, privileges and appurtenances thereto belonging or in anywise appertaining unto the Grantee, its successors and assigns, forever.
IN WITNESS WHEREOF the Grantor has executed this instrument in triplicate originals on the

_____ day of _____, 19____

_____ (SEAL) _____ (SEAL)
(Signature of Grantor) (Signature of Grantor)

_____ (SEAL) _____ (SEAL)
(Signature of Grantor) (Signature of Grantor)

Site No. 21

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6/28/60

EASEMENT

For and in consideration of One Dollar ($1.00) and other good and valuable considerations (and in consideration of the future mutual benefits to be received by both grantor and grantee), the receipt whereof is acknowledged, by his wife, Doris Moore, both of Lockhart (Name) (Address) W. D. Moore, Jr., individually and as Independent Executor of the Estate of W. D. Moore, Sr., deceased, joined herein

Texas, Grantor, does hereby grant, bargain, sell, convey and release unto Plum Creek Conservation District of Lockhart, Texas, its successors and assigns, Grantee, an easement in, over and upon the following described land situated in the County of Caldwell, State of Texas, to-wit: Approximately 327 acres of land out of the Isaac Jackson and J. E. Bowman Surveys of Caldwell County, Texas, and being part of a tract consisting of 1,245.71 acres of land, more or less, which 1,245.71 acres consists of eighteen (18) tracts.

References to metes and bounds descriptions (recorded in the Deed Records of Caldwell County, Texas) of each of the eighteen tracts are attached hereto and made a part hereof as Appendix A to this easement.

for the purposes of:
For or in connection with the construction, alteration, operation, maintenance and inspection of the following described works of improvement to be located on the above described land; for the flowage of any waters in, over, upon or through such works of improvements; and for the permanent storage and temporary detention, either or both, of any waters that are impounded, stored or detained by such works of improvement: Floodwater retarding structure, consisting of an earthen dam, emergency spillway, work site adjacent to construction area, and portions of the sediment, sediment reserve and detention storage pools, including an area that will be inundated during emergency spillway flow. Project involves approximately 327 acres of the herein described lands.

1. In the event construction of the above described works of improvement is not commenced within years from the date hereof, the rights and privileges herein granted shall at once revert to and become the property of the Grantor, his heirs and assigns.
2. This easement includes the right of ingress and egress at any time over and upon the above described land of the Grantor and any other land of the Grantor adjoining said land.
3. There is reserved to the Grantor, his heirs and assigns, the right and privileges to use the above described land of the Grantor at any time, in any manner and for any purpose not inconsistent with the full use and enjoyment by the Grantee, its succesors and assigns, of the rights and privileges herein granted.
4. The rights and privileges herein granted are subject to all easements, rights-of-way, mineral reservations or other rights now outstanding in third parties.
5. The Grantee is responsible for operating and maintaining the above described works of improvements
6. The Grantee shall control the water level in the sediment storage pool until adequate vegetation is established and thereafter as necessary for maintenance or repair of the works of improvement.
7. The Grantee shall have the right to construct fences with gates or gaps around the works of improvement, and such fences, gates, or gaps shall not be changed in any way without consent of the Grantee. Any livestock found within such fences, except as authorized in writing by the Grantee, may be ejected therefrom by the Grantee.
8. Special Provisions: (a) Grantor is solely responsible for maintaining property lines and replacing property lines fences. (b) Grantor is aware of the fact that two farm ponds used for stock water will be inundated for periods following rainfall sufficient to produce appreciable amounts of run-off. One is located approximately 1,300 feet North of the earthen dam to be constructed and will be in the sediment reserve pool. One is approximately 1,100 feet in a northeasterly direction from the East end of the earthen dam to be constructed and will be in the detention pool. Since the sediment pool will provide and assure a more dependable source of water than these two ponds, no compensation for their inundation is or will be made by grantee. (c) A Land Rights Work Map covering the general area of structure site No. 21 is on file in the office of Plum Creek Conservation District, Lockhart, Texas, and reference is here made to said map for all pertinent purposes.

TO HAVE AND TO HOLD the aforesaid easement in, over and upon the above described land of the Grantor, with all the rights, privileges and appurtenances thereto belonging or in anywise appertaining unto the Grantee, its successors and assigns, forever.
IN WITNESS WHEREOF the Grantor has executed this instrument in triplicate originals on the

___ day of _____, 19____.

_____ (SEAL) _____ (SEAL)
(Signature of Grantor) (Signature of Grantor)

_____ (SEAL) _____ (SEAL)
(Signature of Grantor) (Signature of Grantor)

PCCD Exhibit No. 1.2

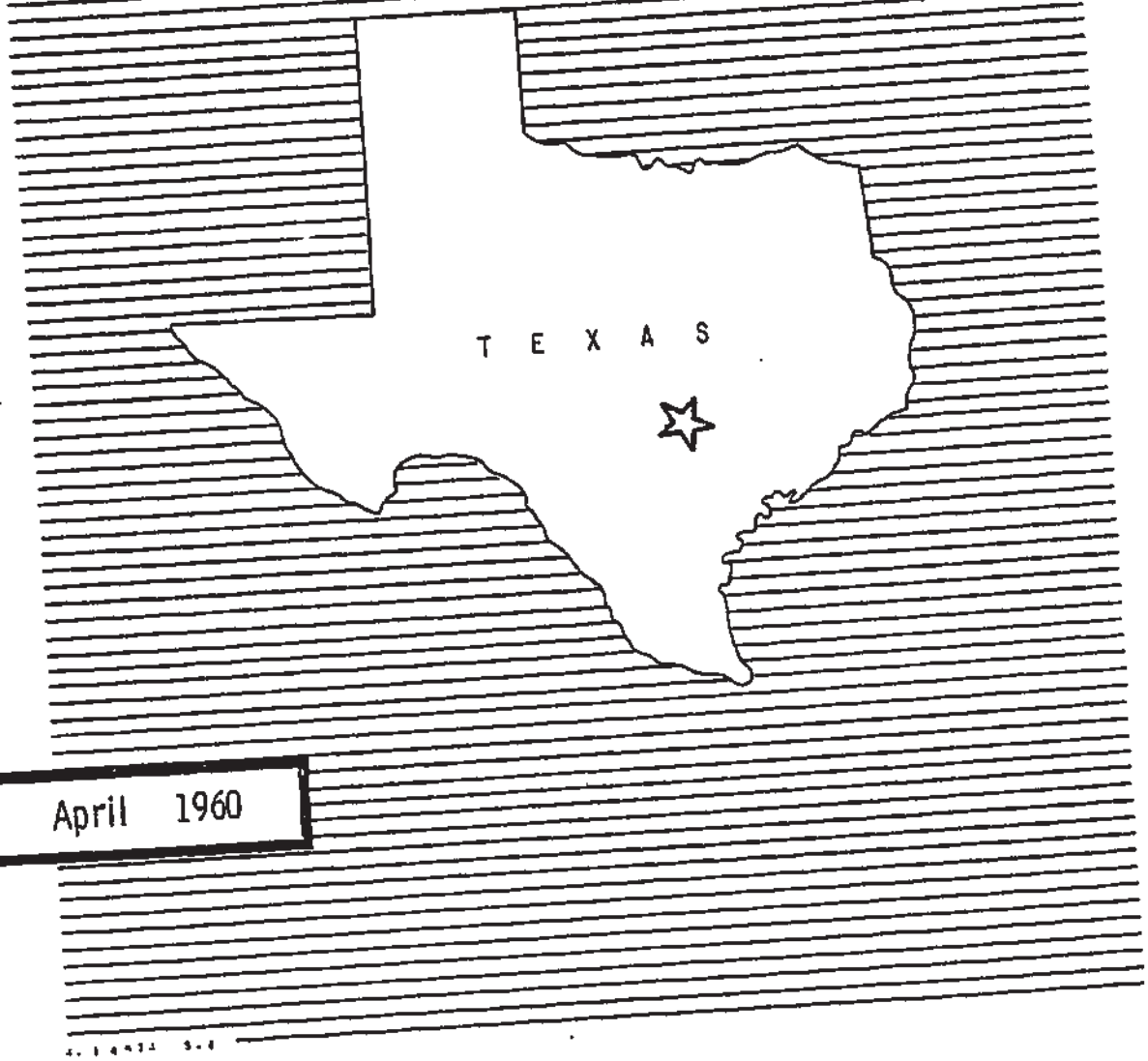
Original Plum Creek Watershed Work Plan

WORK PLAN

FOR WATERSHED PROTECTION
AND FLOOD PREVENTION

PLUM CREEK WATERSHED

HAYS, CALDWELL AND TRAVIS COUNTIES, TEXAS



April 1960

WATERSHED WORK PLAN AGREEMENT

between the

Hays-Caldwell-Travis Soil Conservation District
Local Organization

Plum Creek Conservation District
Local Organization

Local Organization

In the State of Texas
(hereinafter referred to as the Sponsoring Local Organization)

and the

Soil Conservation Service
United States Department of Agriculture
(hereinafter referred to as the Service)

Whereas, application has heretofore been made to the Secretary of Agriculture by the Sponsoring Local Organization for assistance in preparing a plan for works of improvement for the Plum Creek Watershed, State of Texas under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83d Congress; 68 Stat. 666), as amended by the Act of August 7, 1956 (Public Law 1018, 84th Congress; 70 Stat. 1088); and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, as amended, has been assigned by the Secretary of Agriculture to the Service; and

Whereas, there has been developed through the cooperative efforts of the Sponsoring Local Organization and the Service a mutually satisfactory plan for works of improvement for the Plum Creek Watershed, State of Texas, hereinafter referred to as the watershed work plan, which plan is annexed to and made a part of this agreement;

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4-16334 5-60

Now, therefore, in view of the foregoing considerations, the Sponsoring Local Organization and the Secretary of Agriculture, through the Service, hereby agree on the watershed work plan, and further agree that the works of improvement as set forth in said plan will be installed, within 5 years, and operated and maintained substantially in accordance with the terms, conditions, and stipulations provided for therein.

It is mutually agreed that in installing and operating and maintaining the works of improvement described in the watershed work plan:

1. The Sponsoring Local Organization will acquire without cost to the Federal Government such land, easements, or rights-of-way as will be needed in connection with the works of improvement. (Estimated cost $ 552,131 .)

2. The Sponsoring Local Organization will acquire or provide assurance that landowners or water users have acquired such water rights pursuant to State law as may be needed in the installation and operation of the works of improvement.

3. The percentages of construction costs of structural measures and land treatment measures for flood prevention to be paid by the Sponsoring Local Organization and by the Service are as follows:

Works of Improvement	Sponsoring Local Organization (percent)	Service (percent)	Estimated Construction Cost (dollars)
21 Floodwater Retarding Structures	0	100	1,733,270

The Sponsoring Local Organization will pay all of the costs allocated to purposes other than flood prevention, and irrigation, drainage, and other agricultural water management.

4. The Service will bear the cost of all installation services applicable to works of improvement for flood prevention. (Estimated cost $ 505,248 .)

   The Service will bear - percent of the cost of installation services applicable to works of improvement for agricultural water management and the Sponsoring Local Organization will bear - percent of the cost of such services. (Estimated cost $ - .)

   The Sponsoring Local Organization will bear the cost of all installation services applicable to works of improvement for nonagricultural water management. (Estimated cost $ - .)

5. The Sponsoring Local Organization will bear the costs of administering contracts. (Estimated cost $ 10,500 .)

6. The Sponsoring Local Organization will obtain agreements from owners of not less than 50 percent of the land above each floodwater retarding structure that they will carry out conservation farm or ranch plans on their land.

7. The Sponsoring Local Organization will provide assistance to landowners and operators to assure the installation of the land treatment measures shown in the watershed work plan.

8. The Sponsoring Local Organization will encourage landowners and operators to operate and maintain the land treatment measures for the protection and improvement of the watershed.

9. The Sponsoring Local Organization will be responsible for the operation and maintenance of the structural works of improvement by actually performing the work or arranging for such work in accordance with agreements to be entered into prior to issuing invitations to bid for construction work.

10. The costs shown in this agreement represent preliminary estimates. In finally determining the costs to be borne by the parties hereto, the actual costs incurred in the installation of works of improvement will be used.

11. This agreement does not constitute a financial document to serve as a basis for the obligation of Federal funds, and financial and other assistance to be furnished by the Service in carrying out the watershed work plan is contingent on the appropriation of funds for this purpose.

    Where there is a Federal contribution to the construction cost of works of improvement, a separate agreement in connection with each construction contract will be entered into between the Service and the Sponsoring Local Organization prior to the issuance of the invitation to bid. Such agreement will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.

12. The watershed work plan may be amended or revised, and this agreement may be modified or terminated, only by mutual agreement of the parties hereto.

13. No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

Hays-Caldwell-Travis Soil Conservation District
Local Organization

By R. S. Ting

Title Chairman

Date May 24, 1960

The signing of this agreement was authorized by a resolution of the governing body of the Hays-Caldwell-Travis Soil Conservation District
Local Organization

adopted at a meeting held on May 24, 1960

Max Ohlendorf
(Secretary, Local Organization)

Date May 24, 1960

Plum Creek Conservation District
Local Organization

By Charles H. Foote

Title President

Date May 24, 1960

The signing of this agreement was authorized by a resolution of the governing body of the Plum Creek Conservation District
Local Organization

adopted at a meeting held on May 24, 1960

W. N. Johnson
(Secretary, Local Organization)

Date May 24, 1960

Local Organization

By

Title

Date

The signing of this agreement was authorized by a resolution of the governing body of the
Local Organization

adopted at a meeting held on

(Secretary, Local Organization)

Date

Soil Conservation Service
United States Department of Agriculture

By
Administrator

Date

WORK PLAN

FOR

WATERSHED PROTECTION AND FLOOD PREVENTION

PLUM CREEK WATERSHED
Hays, Caldwell, and Travis Counties, Texas

Prepared Under the Authority of the Watershed Protection and Flood Prevention Act, (Public Law 566, 83rd Congress; 68 Stat. 666), as amended.

Prepared By: Hays-Caldwell-Travis Soil Conservation District
(Cosponsor)

Plum Creek Conservation District
(Cosponsor)

With Assistance By:

U. S. Department of Agriculture
Soil Conservation Service
April 1960

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SECTION 1

WATERSHED WORK PLAN

PLUM CREEK WATERSHED
Hays, Caldwell, and Travis Counties, Texas
April 1960

SUMMARY OF PLAN

General Summary

The work plan for the Plum Creek watershed, Texas, was prepared by the Hays-Caldwell-Travis Soil Conservation District and the Plum Creek Conservation District as the local cosponsoring organizations. Technical assistance was provided by the United States Department of Agriculture.

The watershed covers an area of 151.6 square miles, or 97,000 acres, in Hays, Caldwell, and Travis Counties, Texas. Approximately 67.2 percent of the watershed is cropland, 15.4 percent is pastureland, 10.9 percent is rangeland, 1.3 percent woodland, and 5.2 percent is in miscellaneous uses such as stream channels, towns, roads, and railroads.

There are no Federal lands in the watershed.

The work plan proposes installing, during a 5-year period, a project for the protection and development of the watershed at a total estimated installation cost of $3,445,769. The share of this cost to be borne by Public Law 566 funds will be $2,284,068. The remaining $1,161,701 will be borne by local and other funds.

Land Treatment Measures

The cost for land treatment measures is estimated to be $644,620 of which the share to be borne by other than Public Law 566 funds is $599,070. It is estimated that $34,150 will be available from Public Law 46 funds for technical assistance during the installation period. The share to be borne by Public Law 566 funds, consisting entirely of funds for accelerating technical assistance, is $45,550. The land treatment program will be installed over a 5-year period.

Structural Measures

The 21 floodwater retarding structures included in the plan will have an aggregate capacity of 46,757 acre-feet of floodwater detention and sediment storage. The total cost of these measures is $2,801,149 of which the local share is $562,631 and the Public Law 566 share is $2,238,518. The local share of the cost of structural measures includes: land, easements, and rights-of-way, including utility, road and improvement changes, 98.1 percent,

and administering contracts, 1.9 percent. The structural measures will be installed over a 5-year period.

Damages and Benefits

The estimated average annual floodwater, sediment, flood plain erosion and indirect damage without the project is $109,569, computed at long-term price levels. The estimated average annual damage with the project installed, including land treatment and structural measures, is $15,254, a reduction of 86.1 percent.

The average annual primary benefits accruing to structural measures, $146,106 are distributed as follows:

Floodwater damage reduction	$78,159
Sediment damage reduction (flood plain)	4,573
Flood plain erosion damage reduction	2,128
Indirect damage reduction	3,961
Benefits from changed land use	4,401
Benefits outside project area	52,884

The ratio of the average annual benefits $146,106 to the average annual cost of structural measures, $103,829 is 1.4 to 1.

The total benefits from land treatment measures were not evaluated in monetary terms since experience has shown these soil and water conservation measures produce benefits in excess of their costs.

Provisions for Financing Construction

The Plum Creek Conservation District has powers of taxation and eminent domain under applicable State laws and will provide all funds for financing the local share of the project costs for the 21 floodwater retarding structures.

Operation and Maintenance

Land treatment measures will be installed, operated, and maintained by the landowners and operators of the farms and ranches under agreement with the Hays-Caldwell-Travis Soil Conservation District.

Under the terms of an operation and maintenance agreement to be executed, the 21 floodwater retarding structures will be operated and maintained by the Plum Creek Conservation District.

DESCRIPTION OF WATERSHED

Physical Data

Plum Creek (figure 1) heads approximately 3 miles north of Kyle, Hays County, and flows east and south to its confluence with the San Marcos River about 4 miles southeast of Luling, Caldwell County, Texas. This drainage area has been divided into two watersheds to facilitate the planning, application, operation, and maintenance of works of improvement. The cosponsoring organizations have requested that the two watersheds be planned simultaneously since they are component parts of the larger watershed.

This work plan for watershed protection and flood prevention comprises that portion of the Plum Creek drainage area above State Highway 20 (figure 1). Brushy, Elm, and Dry Creeks are the major tributaries of Plum Creek. The area of the watershed is 151.6 square miles (97,000 acres).

The topography ranges from nearly level along the alluvial valley to gently rolling in the upland areas. Elevations range from 900 feet to 414 feet above mean sea level. The flood plain of Plum Creek is well defined and consists of 8,728 acres not including 535 acres of stream channels. The flood plain, as considered in the plan, is the bottomland area inundated by the runoff from the 25-year frequency storm based on gage records.

The watershed is all in the Blackland Prairie Land Resource Area and is underlain by limestone, shales, marls, and clays of the Upper Cretaceous system. Houston, Bell, Austin, Lewisville, Eddy, Trinity, Crockett, and Wilson are the major soil series found in the watershed.

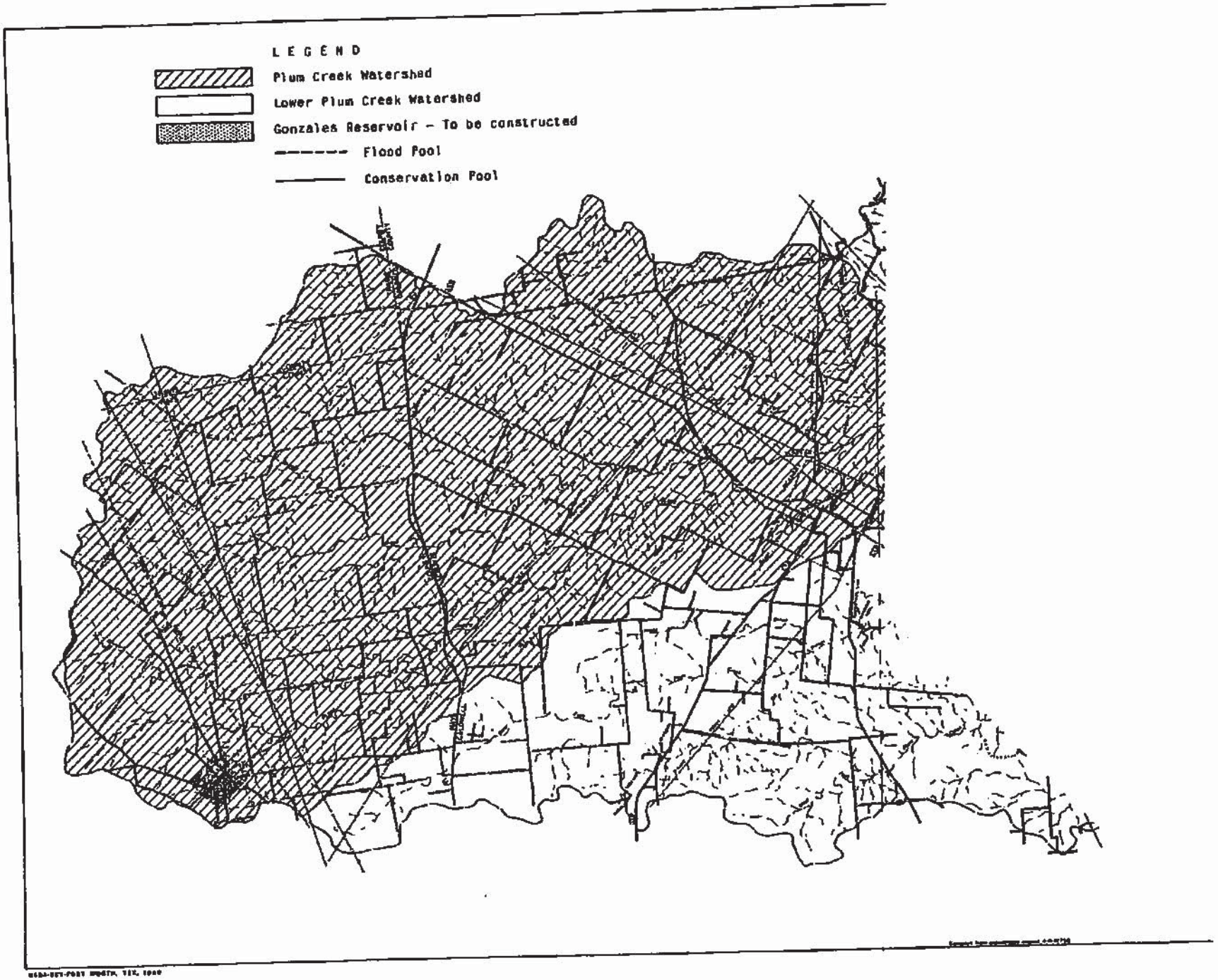
The over-all land use (table 4) for the watershed is as follows:

Land Use	Acres	Percent
Cropland	65,224	67.2
Pastureland	14,891	15.4
Rangeland	10,565	10.9
Woodland	1,274	1.3
Miscellaneous 1/	5,046	5.2
Total	97,000	100.0

1/ Includes road, highway, railroad right-of-way, urban areas, etc.

Land use in the flood plain is as follows: 46 percent in cultivation; 46 percent in pasture; 7 percent in woods, and 1 percent in miscellaneous uses.

The range sites found in the watershed are the Rolling Blackland, Mixed Blackland, and the Shallow Ridges. The soils of the Wilson and Crockett


LEGEND
Plum Creek Watershed
Lower Plum Creek Watershed
Gonzales Reservoir - To be constructed
Flood Pool
Conservation Pool

series are associated with the Mixed Blackland site on slopes of 2 to 5 percent. The climax vegetation consisted of little bluestem, Indian grass, and switchgrass. The present cover condition of the site is fair to good. The Rolling Blackland site is characterized by soils of the Houston and Houston Black Clay series on slopes from less than 1 to 12 percent. The climax vegetation of this site consisted of little bluestem, switchgrass, Indian grass, big bluestem, and Canada wildrye. The present cover condition is also fair to good. The Eddy Series, with its several phases, comprises the soils of the Shallow Ridges site. A miscellaneous land type, chalk outcrop, occurs within areas of Eddy soils. The topography of this site is a gently sloping to rolling upland with slopes of 2 to 8 percent. Climax grasses were little bluestem, big bluestem, and Indian grass. Present cover conditions are fair to good.

The mean annual rainfall is 33.00 inches as weighted from three gages in or near the watershed. The monthly averages range from 1.92 inches in August to 3.89 inches in May. Average temperatures range from 84.7 degrees Fahrenheit in the summer to 51.4 degrees in the winter. The normal frost-free period of 268 days extends from March 3 to November 26.

Water for livestock and rural domestic use is obtained from surface ponds and wells.

Economic Data

The region was settled by English-speaking colonists in the 1840's. Battles with the Comanche Indians were frequent in the area and the Lockhart State Park memorializes the battle of Plum Creek that on August 12, 1840 signaled the end of the last big Comanche raid.

The Plum Creek watershed is primarily a farming and livestock raising area located in South Central Texas. Cotton, corn, and grain sorghum are the main crops grown. Beef cattle production, dairying, and poultry raising are important in the watershed. According to the 1954 Census of Agriculture, the average size farm in Caldwell County is approximately 252 acres with an average value for land and buildings of $20,315.

The towns located wholly or partially within the watershed and their estimated population are: Lockhart, 7,000; Kyle, 888; Uhland, 140; and Neiderwald, 100. Lockhart, the county seat of Caldwell County, and Luling, located near the mouth of Plum Creek, are the principal marketing centers serving the watershed. Austin, San Marcos, and San Antonio are within easy driving distance of the watershed. These cities provide the needed marketing, educational, cultural, recreational, and medical facilities for the inhabitants of the area.

The watershed is adequately served by 232 miles of roads, 75 of which are paved (U. S. Highways 183, and 81; State Highways 142, 20, and 21; Farm to Market Roads 2001, and 150). Adequate rail facilities are provided by the Missouri, Kansas, and Texas and the Missouri-Pacific Railroads.

WATERSHED PROBLEMS

Floodwater Damage

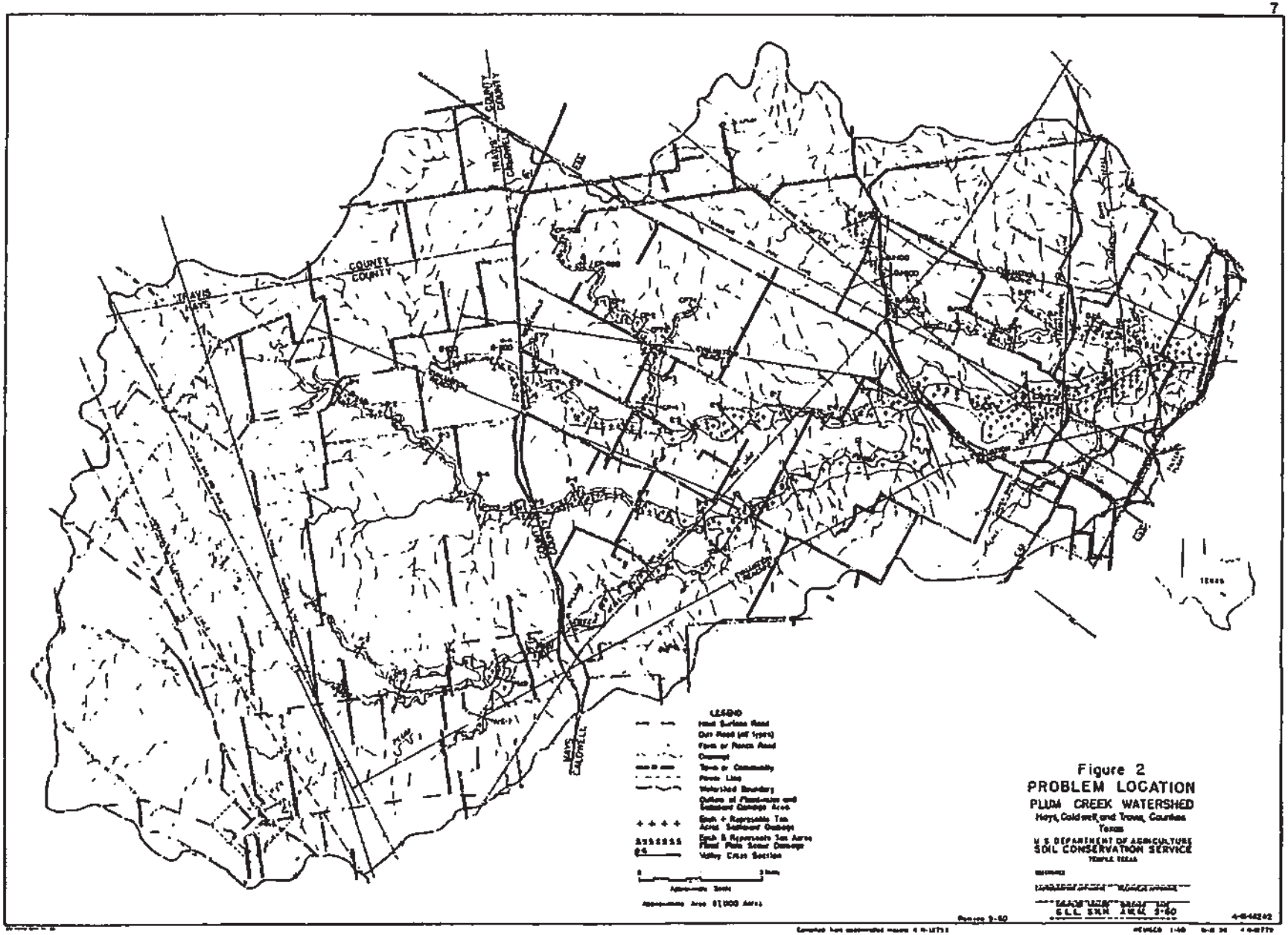
The bottomland of Plum Creek and its tributaries have long suffered from periodic flooding that has caused loss of life on several occasions and extensive damage to property as well as disruption of normal community activities. The largest and most damaging flood was in 1936. It was estimated that total damages in Plum Creek from this one flood were well in excess of $1,000,000. Sixteen lives were lost in the town of Uhland. Another serious flood in 1913 also caused damages amounting to more than $1,000,000. In addition to causing untold misery and hardship, these floods have prevented farmers from fully utilizing the highly productive bottomland in the Plum Creek watershed. Instead of corn, cotton, and grain sorghum, many farmers have been forced to put flood plain land into less valuable alternate uses such as pasture and meadow.

During the 29-year period, 1930-1958, there were 13 major floods which inundated more than half of the flood plain in the portion of the Plum Creek watershed included in this work plan (figure 2), as well as 89 minor floods which inundated less than half of the flood plain. Ten of the major floods and 73 of the minor floods occurred during the growing season causing heavy damage to growing crops. Less damaging floods occur during the winter months.

The adverse economic and physical effect of these floods has been felt throughout the entire watershed community and has prompted local participation in the alleviation of the flood problem. For the floods experienced during the period studied, the total direct agricultural and nonagricultural floodwater damages under present conditions were estimated to average $88,161 annually at long-term price levels (table 7), of which $72,698 is crop and pasture damage, $8,603 is other agricultural damage, and $6,860 is nonagricultural damage such as damage to roads, bridges and railroads. Indirect damage such as interruption of travel, re-routing of school bus and mail routes, losses sustained by businessmen in the area, and similar losses, are estimated to average $5,848 annually.

Sediment Damage

Damage by overbank deposition is moderate to severe in the watershed. Erosion in the upland areas has resulted in deposition of fine textured silty clays and clays on flood plain land. This damaging sediment is low in organic matter, crusts and puddles readily, and is generally low in productivity. The productive capacity has been reduced from 10 to 40 percent on an estimated 3,335 acres of flood plain by this process. The areas affected by overbank deposition are as follows:


COUNTY
COUNTY
TRAVIS
CALDWELL
HAYS
CALDWELL
TEXAS
LEGEND
Figure 2
PROBLEM LOCATION
PLUM CREEK WATERSHED
Hays, Caldwell, and Travis, Counties
Texas
U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

The flood plain of Plum Creek was mostly a lake during several flood periods in 1957. Damages on this farm alone were estimated at $5,000.

Floods of 1957. Flood plain scour has removed much topsoil. Rows of gravel remain where beds were prepared for planting.

Photos by The Luling Signal.

Evaluation Reach (Figure 2)	Acres Damaged: 10 percent	20 percent	30 percent	40 percent	Total
C	240	263	231	0	734
D	286	195	206	0	687
E	482	29	0	0	511
I	212	411	73	50	746
J	114	433	110	0	657
Total	1,334	1,331	620	50	3,335

The estimated average annual monetary damage by overbank deposition is $10,857 (table 7) at long-term price levels.

Erosion Damage

Erosion rates in the upland areas are moderate to high due to the steep slopes, a predominance of row-crop farming, and inadequate conservation treatment.

Sheet erosion is the major process in the upland areas, accounting for 92 percent of the annual gross erosion. Gully and streambank erosion account for 8 percent. The average annual rate of upland gross erosion is 3.36 acre-feet per square mile. Flood plain erosion is moderate in the watershed. It is estimated that 670 acres are being damaged annually by this process. The productive capacity of this area has been reduced from 10 to 70 percent by scour. Flood plain damage by evaluation reach is as follows:

Evaluation Reach (Figure 2)	Acres Damaged: 10 percent	20 percent	30 percent	40 percent	50 percent	70 percent	Total
C	32	0	50	19	0	0	101
D	0	0	0	117	26	25	168
E	16	31	28	180	10	0	265
I	0	0	68	0	18	0	86
J	0	0	38	0	12	0	50
Total	48	31	184	316	66	25	670

The estimated average annual monetary damage by flood plain scour is $4,703 (table 7) at long-term prices.

Problems Relating to Water Management

There is little or no activity relative to drainage, irrigation, or other agricultural water management in the watershed. Principal sources of fishing

in the watershed are farm ponds and they receive only light fishing use by landowners and their friends. Plum Creek is an intermittent stream that has poor quality habitat. Principal species are channel and flathead catfish, bluegill, and large-mouth bass. Although there is some waterfowl use of farm ponds, waterfowl hunting receives little attention in the watershed.

Even though adequate additional storage capacity is available at several floodwater retarding structure sites for municipal water storage, an engineering survey made by the City of Lockhart showed it to be more economical to secure additional water from new wells drilled near the existing city wells.

EXISTING OR PROPOSED WORKS OF IMPROVEMENT

The Plum Creek watershed is served by Soil Conservation Service work units at Lockhart, San Marcos, and Austin assisting the Hays-Caldwell-Travis Soil Conservation District. These work units have assisted farmers in preparing 363 basic and progressive soil and water conservation plans on 73,255 acres, representing 75.5 percent of the agricultural land within the watershed, and have given technical guidance in establishing and maintaining planned measures.

The over-all plan for development for the Guadalupe-Blanco River Basins, as developed by the Guadalupe-Blanco River Authority, proposes a conservation storage reservoir on Plum Creek, a Corps of Engineers reservoir on the San Marcos River near Gonzales, and a Bureau of Reclamation reservoir on the Guadalupe River near Hochheim.

The Corps of Engineers is authorized by the Flood Control Act of 1954 to construct the Gonzales Reservoir on the San Marcos River approximately 12 miles below its confluence with Plum Creek. The conservation and flood pools of this reservoir will inundate the lower part of the bottomland of Lower Plum Creek (figure 1). This work plan was developed considering the Gonzales Reservoir to be in place.

This project will have no known detrimental effect on these downstream projects. It will complement the projects by providing needed protection to flood plain lands on Plum Creek which would not be provided by the Gonzales or Hochheim Reservoirs, and will reduce delivery of sediment from this watershed to the downstream reservoirs.

WORKS OF IMPROVEMENT TO BE INSTALLED

Land Treatment Measures for Watershed Protection

An effective conservation program based upon the use of each acre of agricultural land within its capabilities and its treatment in accordance with its needs, such as is now being carried out by the Hays-Caldwell-Travis Soil Conservation District, is necessary for a sound watershed protection and flood prevention program on the watershed. Basic to reaching this objective is the establishment and maintenance of all applicable soil and water

conservation and plant management practices essential to proper land use. Emphasis will be placed on accelerating the establishment of land treatment practices which have a measurable effect on the reduction of floodwater, sediment, and erosion damages.

Approximately 76,711 acres of the total watershed area of 97,000 acres lie above the planned floodwater retarding structures. Land treatment is especially important for protection of these watershed lands to support and supplement the structural measures. Land treatment constitutes the only planned measures on the remaining upland area. Land treatment measures on the 6,843 acres of flood plain lands not within the pools of proposed structures are also important in reducing floodwater and erosion damages.

The amounts and estimated costs of the measures that will be installed by the landowners and operators are shown in Table 1. The estimated total cost of planning and installing these measures is $644,620, including $45,550 of Public Law 566 funds for the acceleration of technical assistance during the 5-year installation period to help owners and operators to plan and speed up the application of conservation practices.

Land treatment measures will decrease erosion damage and sediment production from fields and pastures by providing improved soil-cover conditions. These measures include conservation cropping systems, cover cropping, use of rotation hay and pasture, crop residue utilization for cropland, and pasture planting to establish good cover on grassland and formerly cultivated lands. They also include brush control to allow grass to improve and replace the poor brush cover; construction of farm ponds to provide adequate watering places to prevent cover-destroying seasonal concentrations of livestock and proper use and rotation grazing of pasture and rangeland to provide improvement, protection, and maintenance of grass stands. These measures also effectively improve soil conditions which allow rainfall to soak into the soil at a more rapid rate.

In addition to the soil improvement and cover measures, land treatment includes contour farming, terracing, and diversion construction and the waterway development necessary to serve these measures, all of which have a measurable effect in reducing peak discharge by slowing the runoff of water from watershed lands. These measures also help the soil improvement and cover measures to reduce erosion damage and sediment production.

Structural Measures for Flood Prevention

A system of 21 floodwater retarding structures will be installed to provide needed protection for flood plain land that cannot be attained by the land treatment measures described above. This system of structures will temporarily detain runoff from 79.0 percent of the entire watershed. The 21 floodwater retarding structures will have floodwater detention capacity to detain an average of 5.52 inches of runoff from the watershed area above them. This is the equivalent of 4.37 inches of runoff from the entire 97,000-acre watershed.

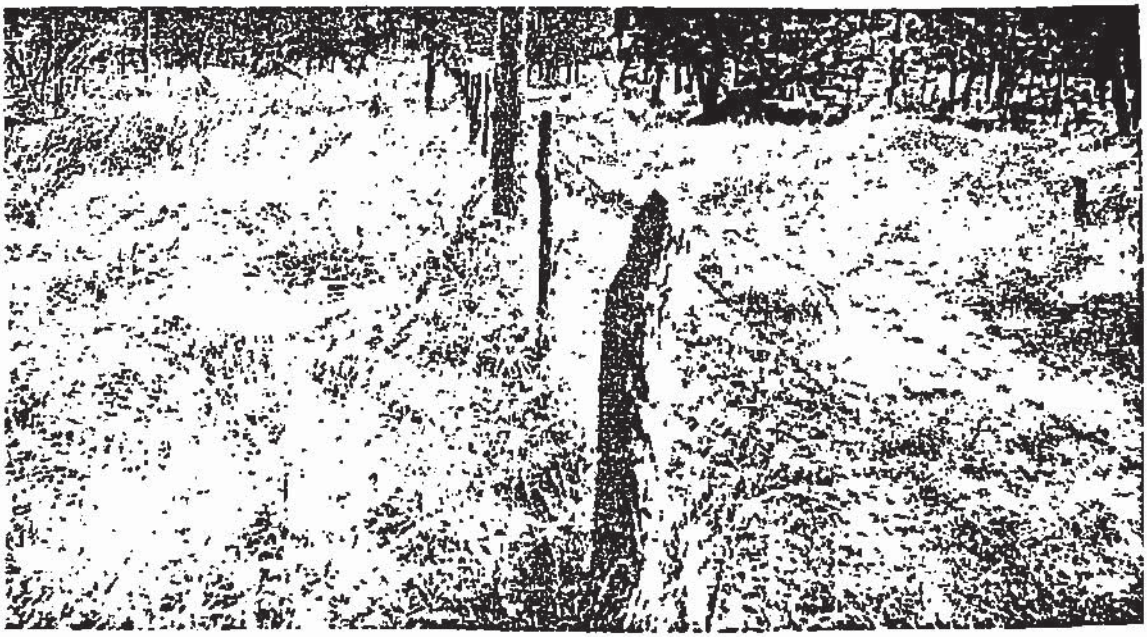
TABLE 1 - ESTIMATED PROJECT INSTALLATION COST 1/
Plum Creek Watershed, Texas
Price Base: 1959

Installation Cost Item	Unit	Number to be Applied	Estimated Cost: Public Law 566 Funds (dollars)	Estimated Cost: Other Funds (dollars)	Total (dollars)
LAND TREATMENT FOR					
Watershed Protection					
Soil Conservation Service					
Cropland					
Contour Farming	Acre	6,460	-	16,150	16,150
Conservation Cropping System	Acre	16,750	-	0	0
Cover Cropping	Acre	10,992	-	60,456	60,456
Crop Residue Utilization	Acre	21,848	-	49,155	49,155
Rotation Hay and Pasture	Acre	6,410	-	38,460	38,460
Diversion Construction	Mile	22	-	6,160	6,160
Terracing	Mile	575	-	109,250	109,250
Grassed Waterways	Acre	516	-	20,640	20,640
Pastureland					
Brush Control	Acre	5,190	-	62,280	62,280
Pasture Planting	Acre	6,215	-	77,690	77,690
Proper Use	Acre	9,093	-	0	0
Rotation Grazing	Acre	12,340	-	0	0
Pond Construction	Each	140	-	70,000	70,000
Rangeland					
Brush Control	Acre	4,112	-	49,344	49,344
Deferred Grazing	Acre	2,370	-	2,370	2,370
Proper Use	Acre	4,858	-	0	0
Range Seeding	Acre	593	-	2,965	2,965
Rotation Grazing	Acre	6,470	-	0	0
Technical Assistance			45,550	34,150	79,700
Subtotal			45,550	599,070	644,620
TOTAL LAND TREATMENT			45,550	599,070	644,620
STRUCTURAL MEASURES					
Soil Conservation Service					
Floodwater Retarding Structures	No.	21	1,733,270	-	1,733,270
Subtotal			1,733,270	-	1,733,270
Subtotal - Construction			1,733,270	-	1,733,270
Installation Services					
Soil Conservation Service					
Engineering Service			346,654	-	346,654
Other			158,594	-	158,594
Subtotal			505,248	-	505,248
Subtotal - Installation Services			505,248	-	505,248
Other Costs					
Land, Easements, & Right-of-way			-	552,131	552,131
Administration of Contracts			-	10,500	10,500
Subtotal - Other			-	562,631	562,631
TOTAL STRUCTURAL MEASURES			2,238,518	562,631	2,801,149
TOTAL PROJECT			2,284,068	1,161,701	3,445,769
SUMMARY					
Subtotal SCS			2,284,068	1,161,701	3,445,769
TOTAL PROJECT			2,284,068	1,161,701	3,445,769

1/ No Federal lands involved.

April 1960

Crop residue utilization is being carried out on approximately 21,000 acres. Volunteer plants provide a green manure crop. The terrace empties into a waterway vegetated with KR bluestem grass.



Fence line contrast of neighboring ranches. Shows come-back of little bluestem and Indiangrass after 3 six-month deferments. Pasture has been grazed during winter months. Deep Upland Range Site.

Figure 3 shows a section of a typical floodwater retarding structure.

The location of the structural measures is shown on the Planned Structural Measures, Figure 4.

The total estimated cost of installing the structural works of improvement is $2,801,149, of which $562,631 will be borne by local interests and $2,238,518 will be borne by Public Law 566 funds (table 1).

The estimated annual equivalent cost of installation, $98,765, with an estimated annual operation and maintenance cost of $5,064 makes a total annual cost of $103,829.

Sufficient detention storage can be developed at all structure sites to make possible the use of vegetative spillways, thereby effecting a substantial reduction in cost over concrete or similar type of spillway. All applicable State water laws will be complied with in the design and construction of the floodwater retarding structures.

BENEFITS FROM WORKS OF IMPROVEMENT

The following tables are a summary of the damage reductions expected with the proposed works of improvement:

	Without Project	With Project
Area Flooded by Largest Storm studied in 29-year period (acres)	8,728	5,475
Reduction (percent)	-	37.3
Average Annual Damage (dollars)	109,569	15,254
Reduction (percent)	-	86.1
Flood events in Evaluation Series (No.)	102	83
Major Flood events in Evaluation Series (number)	13	2

Evaluation Reach (Figure 2)	AVERAGE ANNUAL AREA FLOODED: Present (acres)	AVERAGE ANNUAL AREA FLOODED: With Land Treatment and Structures (acres)	DAMAGE REDUCTION 1/: With Land Treatment and Structures (percent)
C	940	458	84.9
D	1,173	156	82.1
E	1,387	557	75.9
I	2,200	1,080	70.6
J	643	304	66.4
Total	6,343	2,555	-
Reduction (percent)		59.7	76.3

1/ Does not include value of restoration of productivity.

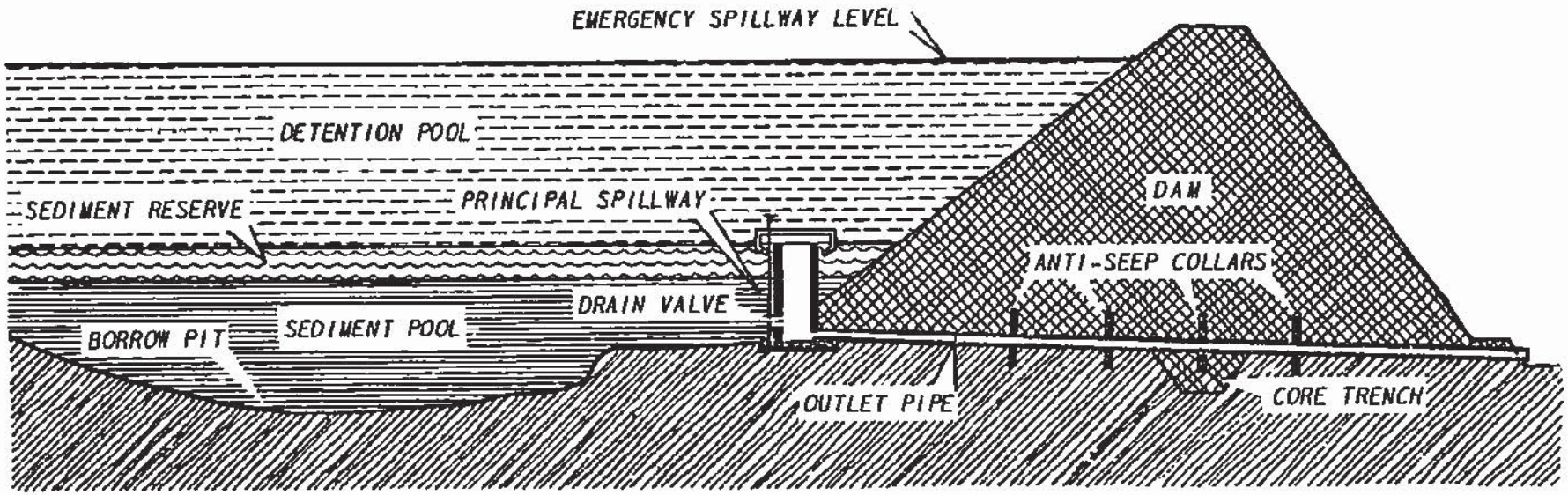


Figure 3

SECTION OF A TYPICAL FLOODWATER RETARDING STRUCTURE

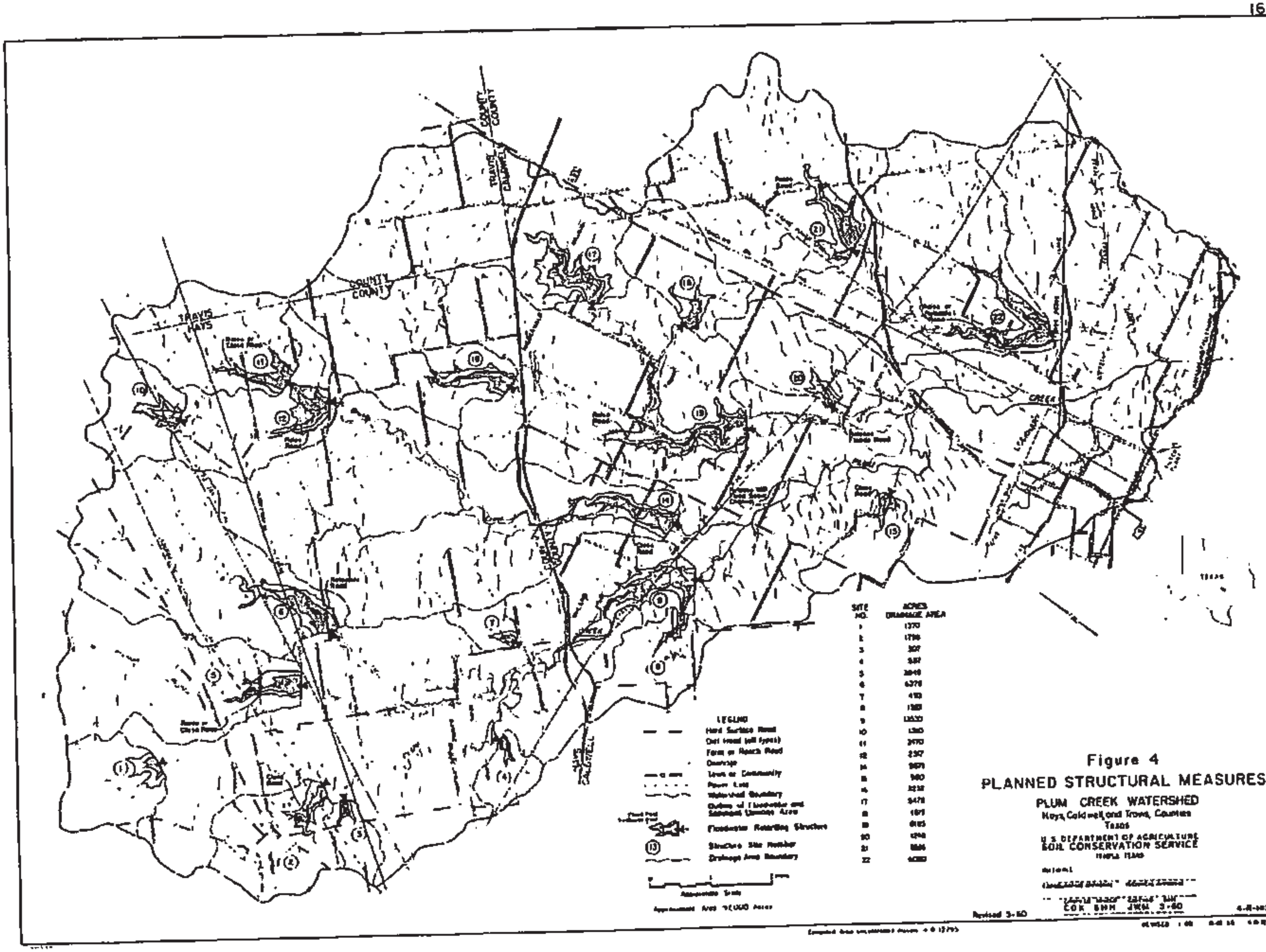


Figure 4
PLANNED STRUCTURAL MEASURES
PLUM CREEK WATERSHED
Hays, Caldwell and Travis Counties
Texas
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

After protection from flooding and adapted soil improving crop rotations have been put into effect, 3,002 acres of the 3,335 acres damaged by overbank deposition and 386 acres of the 670 acres damaged by flood plain scour can be fully productive again, while the remaining acres damaged are not fully recoverable. A monetary reduction of 57.3 percent in sediment damage will occur after the installation of the complete project, with 15.2 percent resulting from land treatment measures and the remaining 42.1 percent from structural measures. A monetary reduction of 50.0 percent in scour damage will occur after the installation of the project, with 4.8 percent due to land treatment and the remaining 45.2 percent attributed to structural measures (table 5). The installation of the planned land treatment program can be expected to reduce the total annual upland gross erosion in the watershed from 509 acre-feet to 417 acre-feet, a reduction of 18 percent.

The estimated average annual floodwater, sediment, erosion, and indirect damages (table 7) within the watershed, including an allowance for restoration of former productivity, will be reduced from $109,569 to $15,254, a reduction of 86.1 percent. Approximately 94.2 percent, $88,821, of the expected reduction in the average annual damage will result from the system of floodwater retarding structures. The installation of the complete project will reduce the amount of sediment delivered to the authorized Gonzales Reservoir from this watershed by an average of 91 acre-feet annually.

Owners and operators of flood plain lands say that if adequate flood protection is provided, they will restore some land now in pasture or meadow to production of cotton, corn, and grain sorghum. All of this land was in cultivation at one time, but is now chiefly used for hay or pasture because of the frequency of flooding. None of the benefits claimed come from an increase in the acreage of allotment crops in the watershed; however, it is expected that approximately 433 acres of cotton will be shifted from upland to more productive flood plain land as a result of the project. The upland cotton will be replaced by better adapted crops. It is estimated that net income from such restoration of land to former productivity will amount to $45,243 (long-term price levels) annually. This loss from the original production has been considered a crop and pasture damage and its restoration a benefit in Table 7. A smaller acreage, now largely in woods, will be cleared and used for improved pasture and crops. The average annual benefit from this change in land use, after deduction of associated costs and discounting for time needed for development, is estimated to be $4,401.

In addition to benefits accruing in this watershed, the project will reduce floodwater, sediment, and erosion damages downstream on Lower Plum Creek and sediment deposition within the authorized Gonzales Reservoir. The annual benefits accruing to the project from these downstream areas are estimated to be $52,884 annually.

The total flood prevention benefits as a result of structural measures are estimated to average $146,106 annually.

COMPARISON OF BENEFITS AND COSTS

The ratio of average annual benefits from planned structural measures for flood prevention ($146,106) to the average annual equivalent cost ($103,829) is 1.4 to 1 (table 8).

The project will increase the level of economic activity in the watershed and in neighboring communities by providing greater purchasing power and an increased flow of agricultural products for processing, transportation and consumption. This community benefit is not included in the economic justification of the project. In addition, there are other unevaluated benefits, such as a greater sense of security, diminished hazards to life, improved fish and wildlife habitat, and improved recreational opportunities that will follow installation of the proposed measures.

A reconnaissance study by the Fish and Wildlife Service, USDI, indicates that fish and wildlife resources generally will be benefited by the watershed protection measures contemplated.

ACCOMPLISHING THE PLAN

Federal assistance for carrying out the works of improvement on non-Federal land, as described in this work plan, will be provided under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress; 68 Stat. 666), as amended.

Land Treatment Measures

The land treatment measures itemized in Table 1 will be established by farmers and ranchers during the 5-year installation period in cooperation with the Hays-Caldwell-Travis Soil Conservation District which is giving assistance in the planning and application of the conservation measures in the watershed.

Since the drainage areas above Sites 3, 4, 6, 7, 10, 12, 14, 17, and 18 have high erosion rates, construction will be delayed on these sites until 75 percent of the land treatment practices, as outlined in the Blackland Prairies Land Resource Area Land Capabilities Guide, have been installed or are in the process of being installed.

The governing body of the Hays- Caldwell-Travis Soil Conservation District will assume aggressive leadership in getting an accelerated land treatment program under way, with the Plum Creek Conservation District assisting in arranging for meetings according to a definite schedule. By this means and by individual contacts, the landowners within the watershed will be encouraged to adopt and carry out soil and water conservation plans on their farms and ranches. District-owned equipment will be made available to the landowners and operators in accordance with existing arrangements for equipment usage in the district. The Guadalupe-Blanco River Authority will continue to make its equipment available for the installation of land treatment measures.

The soil conservation district governing body will make, or cause to be made, periodic inspections of the completed conservation measures within the watershed. The Soil Conservation Service will assign additional technicians and aids to the Hays-Caldwell-Travis Soil Conservation District to assist landowners and operators cooperating with the district in accelerating the preparation and application of soil, and water conservation plans.

The soil and water conservation loan program of the Farmers Home Administration is available to all eligible individual farmers and ranchers in the area. Educational meetings will be held in cooperation with other agencies to outline the services available and eligibility requirements. Present FHA clients will be encouraged to cooperate in the program.

The County ASC committees will cooperate with the governing bodies of the soil conservation districts by selecting and providing financial assistance for those ACPS practices which will accomplish the conservation objectives in the shortest possible time.

The Extension Service will assist in the educational phase of the program by conducting general information and local farm meetings, preparing press, radio, and television releases, and using other methods of getting information to landowners and operators in the Plum Creek watershed. This activity will help to get both the land treatment practices and the structural measures for flood prevention carried out.

Structural Measures for Flood Prevention

The Plum Creek Conservation District has the right of eminent domain, under applicable State law and will obtain the necessary land, easements, and rights-of-way including utility, road and improvement changes; will provide necessary legal, administrative, and clerical personnel, facilities, supplies, and equipment to advertise, award, and administer contracts; and will determine the legal adequacy of easements, permits, etc., for the construction of the 21 floodwater retarding structures included in the plan. Funds for the local share of the above project costs including land, easements, rights-of-way, and administration of contracts will be raised through a district-wide ad valorem tax.

All of the proposed structural works of improvement are considered to be one construction unit.

The estimated schedule of obligation for the complete 5-year installation period, covering installation of both land treatment and structural measures, is as follows:

Fiscal Year	Measure	Public Law 566 Funds (dollars)	Other Funds (dollars)	Total (dollars)
1st	Sites 1, 5, 15, 16, 21, and Land Treatment	620,700	206,129	826,829
2nd	Sites 2, 8, 11, 20, 22, and Land Treatment	467,128	209,213	676,341
3rd	Sites 3, 4, 7, 10, and Land Treatment	200,756	155,122	355,878
4th	Sites 6, 12, 17, 18, and Land Treatment	372,085	263,093	635,178
5th	Sites 9, 14, 19, and Land Treatment	623,399	328,144	951,543
Total		2,284,068	1,161,701	3,445,769

This schedule will be adjusted from year to year on the basis of any significant changes found to be mutually desired, and in the light of appropriations and accomplishments actually made.

The structural measures will be constructed during a 5-year installation period pursuant to the following conditions:

1. The required land treatment in the drainage area above structures has been installed or is in process of being installed (at least 75 percent on drainage areas of Sites 3, 4, 6, 7, 10, 12, 14, 17, and 18).

2. All land, easements, and rights-of-way have been secured or a written statement is furnished by the Plum Creek Conservation District that its right of eminent domain will be used, if needed, to secure any remaining easements within the project installation period and that sufficient funds are available for paying for those easements, permits, and rights-of-way.

3. Court orders have been obtained from the Commissioners Court showing that county roads affected by structural works of improvement will either be relocated or raised two feet above emergency spillway crest elevation at no cost to the Federal Government, closed, or permission granted to temporarily inundate the road, provided equal alternate routes can be provided.

4. The contracting agency is prepared to discharge its responsibilities.

5. Project and operation and maintenance agreements have been executed.

6. Public Law 566 funds are available.

Technical assistance will be provided by the Soil Conservation Service to assist in the design, preparation of plans and specifications, supervision of construction, preparation of contract payment estimates, final inspection, execution of certificate of completion and related tasks necessary to establish the planned structural measures for flood prevention.

The various features of cooperation between the cooperating parties have been covered in appropriate memoranda of understanding and working agreements.

PROVISIONS FOR OPERATION AND MAINTENANCE

Land Treatment Measures

Land treatment measures will be maintained by the landowners and operators of the farms and ranches on which the measures are applied, under agreements with the Hays-Caldwell-Travis Soil Conservation District. Representatives of the soil conservation district will make periodic inspections of the land treatment measures to determine maintenance needs and encourage landowners and operators to perform the management practices and maintenance needs. They will make district-owned equipment available for this purpose.

Structural Measures for Flood Prevention

The estimated annual operation and maintenance cost is $5,064 (table 6) based on long-term price levels. The Plum Creek Conservation District will be responsible for operation and maintenance of the 21 floodwater retarding structures. The necessary maintenance work will be accomplished through the use of contributed labor and equipment, by contract, by force account, or a combination of these methods. The Plum Creek Conservation District will establish a permanent reserve fund for this purpose in the following manner and amounts: As floodwater retarding structures are completed, $200 per year per structure will be placed in a reserve fund for operation and maintenance until the sum of $18,000 is established. The permanent reserve fund will be maintained at this level by replacing used funds at the rate of $200 per structure per year.

The floodwater retarding structures will be inspected by the Plum Creek Conservation District after each heavy streamflow or at least annually. A Soil Conservation Service representative will participate in these inspections at least annually. Items of inspection will include, but will not be limited to, the condition of the principal spillway and its appurtenances, the earth fill, the emergency spillway, the vegetative cover of the

earth fill and the emergency spillway, and fences and gates installed as a part of the structure.

The Soil Conservation Service, through the Hays-Caldwell-Travis Soil Conservation District, will participate in operation and maintenance only to the extent of furnishing technical assistance to aid in inspections and furnishing technical guidance and information necessary for the operation and maintenance program.

Provisions will be made for free access of representatives of the cosponsoring organizations and Federal representatives to inspect and provide maintenance for all structural measures and their appurtenances at any time.

The soil conservation district and the Plum Creek Conservation District fully understand their obligations for operation and maintenance and will execute specific operation and maintenance agreements prior to the issuance of invitation to bid on construction of the structural measures.

COST SHARING

Public Law 566 funds are expected to provide technical assistance in the amount of $45,550 during the 5-year installation period to accelerate the installation of land treatment measures included in the plan for reduction of erosion and peak rates of runoff. These Public Law 566 funds will be in addition to $34,150 of Public Law 46 funds under going program criteria. Local interests will install these measures at an estimated cost of $599,070 which includes ACPS payments based on present program criteria (table 1).

The installation cost of the 21 floodwater retarding structures, $2,801,149 will be shared $2,238,518 (construction, $1,733,270 and installation services, $505,248) by Public Law 566 funds and $562,631 (land, easements, and rights-of-way, $385,305, and changes in utilities, roads, and improvements, $166,826, and administration of contracts, $10,500) by other than Public Law 566 funds.

The total cost of structural measures, $2,801,149 will be shared 79.9 percent, $2,238,518 by Public Law 566 funds and 20.1 percent, $562,631, by other than Public Law 566 funds.

The total project cost of $3,445,769 will be shared 66.3 percent, $2,284,068 by Public Law 566 funds and 33.7 percent, $1,161,701 by other than Public Law 566 funds. In addition, the cost of operation and maintenance ($5,064 annually) will be borne by local interests.

CONFORMANCE OF PLAN TO FEDERAL LAWS AND REGULATIONS

The installation of the watershed protection and flood prevention project on this watershed will make a definite contribution to the objectives of the over-all Guadalupe-Blanco River Authority development program.

This project conforms to all Federal laws and regulations and will have no known detrimental effects on any downstream projects which are now in existence or which might be constructed in the future.

SECTION 2

INVESTIGATIONS, ANALYSES, AND SUPPORTING TABLES

INVESTIGATIONS AND ANALYSES

Project Formulation

Project Objectives

Watershed problems were discussed with the cosponsoring local organizations and the following project objectives reached:

1. Determine the needed land treatment measures, based on current needs, which remain to be applied in the watershed and which contribute directly to watershed protection, flood prevention and sediment control.

2. Obtain, as nearly uniform as possible, a reduction of 70 to 80 percent in average annual flood damage, exclusive of benefits from restoration of productivity, to the flood plain lands. If waterflow control measures are required, as much of the control as possible will be obtained by use of floodwater retarding structures. Channel improvement will be planned only if necessary to attain the desired degree of control.

3. Inform the City of Lockhart of structure sites in which additional storage can be provided for supplemental municipal water supply and, or fish and wildlife development.

4. Inform the Plum Creek Conservation District of structure sites in which additional storage can be provided for irrigation.

Land Treatment Measures

The status of land treatment measures for the watershed was developed by supervisors of the Hays-Caldwell-Travis Soil Conservation District with assistance from personnel of the Soil Conservation Service Work Units at Lockhart, San Marcos, and Austin. The measures needed and those already applied were tabulated for each farm or group of farms on which conservation plans were available. This information was expanded to represent the watershed. Amounts of land treatment practices already applied, soil conditions, trends in farming operations, grassland cover conditions, and other pertinent data were used in estimating future land treatment needs. Estimates were made of the practices that will be applied during the 5-year installation period for the entire watershed. The cost of applying the land treatment measures was based on current costs and going program criteria, (table 1).

Structural Measures

The procedures used to determine the most feasible plan of structural measures to meet the objectives of the sponsoring local organizations that could not be accomplished by land treatment measures were as follows:

1. A base map of the watershed was prepared showing watershed boundary, drainage pattern, systems of roads and railroads, utility lines, and other pertinent information.

2. Using a copy of the base map, a current ownership map of all farms in the watershed was prepared by the Plum Creek Conservation district.

3. Photographic study supplemented by field examination indicated the limits of flood plain subject to flood damage.

4. Map and photo studies and field investigations indicated the watershed should be one evaluation unit, since all structural measures will be interrelated.

5. By means of a stereoscopic photo study and field examination, all possible floodwater retarding structure sites were located. Sites which did not have sufficient storage capacities were dropped from further consideration.

6. Twenty-five sites which appeared to have sufficient storage capacity were recommended to the local sponsoring organizations for further consideration and detail survey. A list of landowners whose farms probably would be affected by the floodwater retarding structures was prepared for each site and submitted to the local sponsoring organization to facilitate their study of these structures.

7. After agreement was reached with the local sponsoring organization on location of floodwater retarding structure sites for further consideration and detail survey, topographic maps with 4-foot contour intervals and a scale of 8 inches equal 1 mile were prepared for each site. Topographic maps with 2-foot contour interval and a scale of 1 inch equals 100 feet were prepared for each emergency spillway. These surveys provided the necessary information to determine if the required sediment and floodwater detention storage could be obtained, an estimate of all installation costs, and the most economical design of each structure. Criteria outlined in Soil Conservation Service, Washington Engineering Memorandum 27, and Texas State Manual Supplement 2441 were used to determine the sediment and floodwater detention storage requirements, structure classification, principal and emergency spillway design. Sites which did not

have sufficient storage capacities, or which would cause relocation or alteration of expensive improvement were dropped from further consideration. Sites 9, 14, 19, and 22 were considered key locations, which would be needed to meet the objectives for reduction of floodwater damages. Sites 8 and 9 were placed in series to prevent inundation of business houses, residences, and streets in the town of Uhland by the floodwater detention pool of Site 9. Sites 10, 11, and 12 were placed in series, because they represented the most economical systems which could be installed. The remaining series sites were needed to provide flood protection to the intervening flood plain areas.

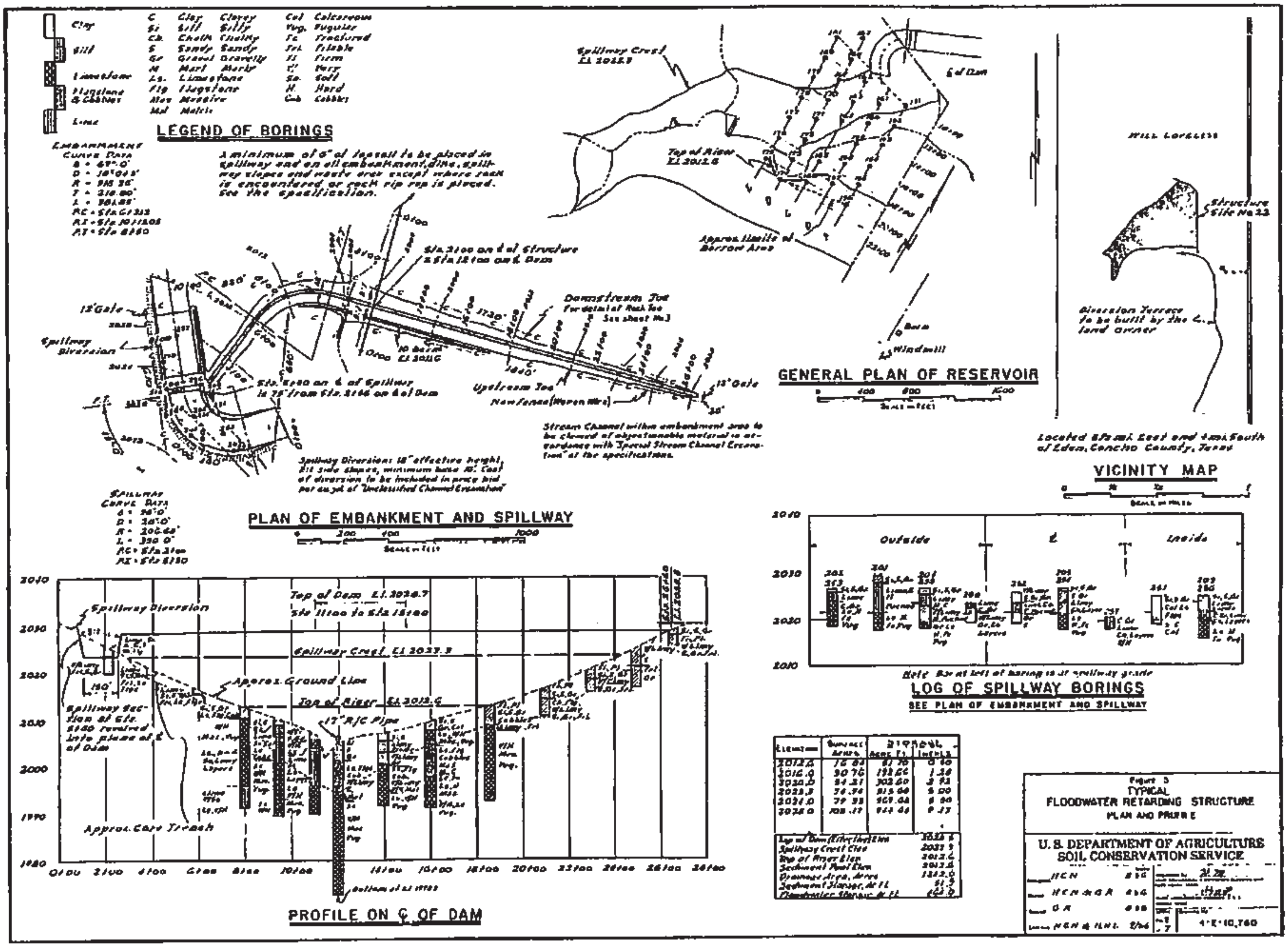
8. Data obtained in land treatment needs studies for the watershed, as well as hydrologic, geologic, sedimentation, and economic investigations provided the necessary means for evaluating various combinations and locations of floodwater retarding structures. As a result of this analysis, it was determined that a system of 21 floodwater retarding structures would be the most economical system to install and would provide the degree of protection desired by the cosponsoring organizations. Plans of a floodwater retarding structure, typical of those planned for the watershed, are illustrated by Figures 5 and 5A.

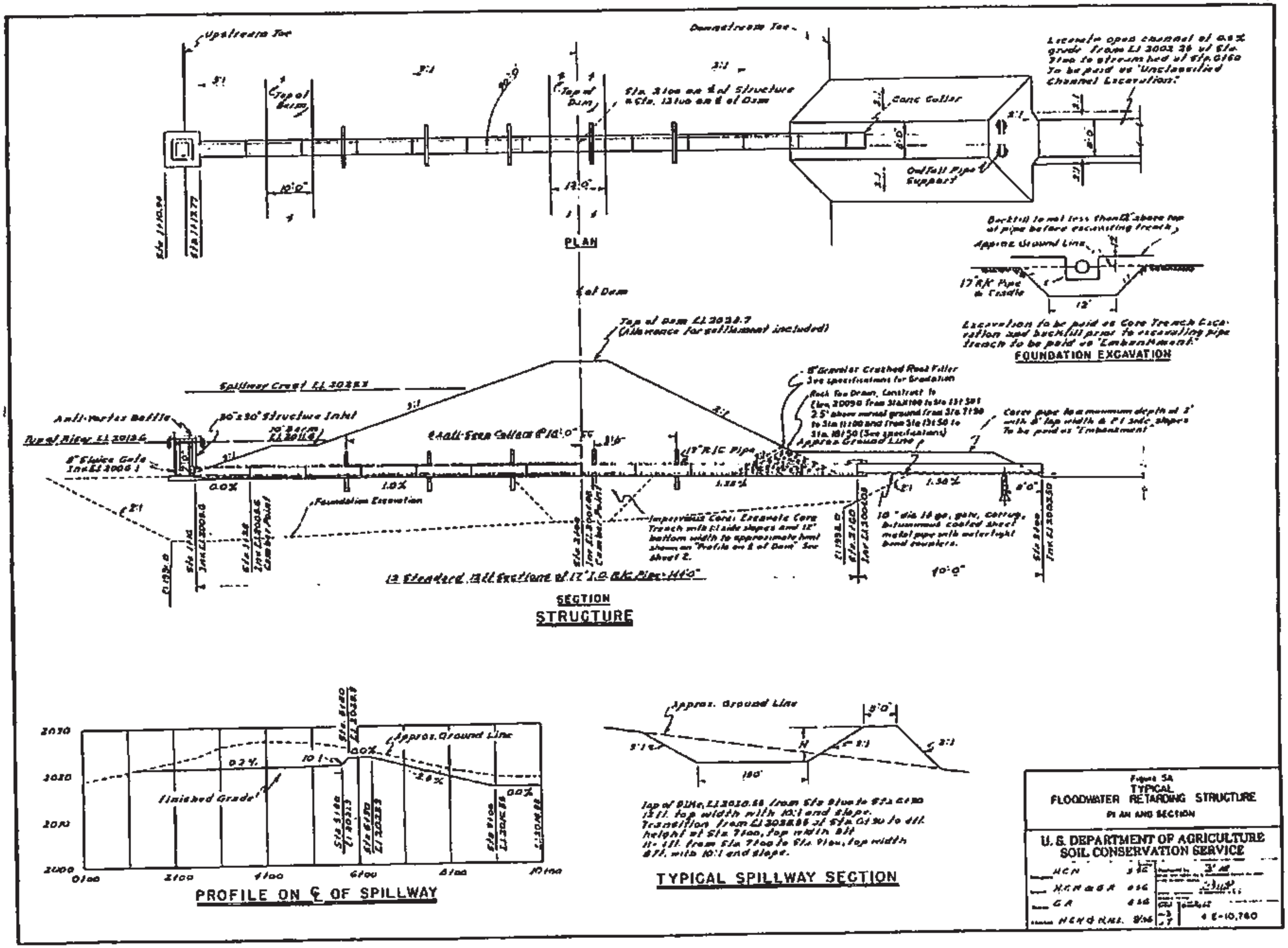
9. Tentative capacity-cost curves for Sites 19 and 21 were developed to determine the cost of providing additional storage for fish and wildlife development. These curves plus additional factors such as location, accessibility and topography were considered in determining that these sites would not be desirable for the inclusion of storage for fish and wildlife development.

10. The City of Lockhart employed a private engineering firm to determine the feasibility of obtaining additional storage in Sites 21 and 22 to supplement the existing municipal water supply. The results of this study indicated that it would be more economical to drill wells to obtain additional water.

11. Although a limited amount of additional storage for irrigation can be obtained in most of the floodwater retarding structure sites, there was insufficient interest to develop these sites for this purpose at this time.

12. Cost distribution (Table 2) and structure data table (Table 3) were prepared to show for each structure the estimated cost, drainage areas, capacity needed for detention and for sediment storage in acre-feet and in


LEGEND OF BORINGS
PLAN OF EMBANKMENT AND SPILLWAY
PROFILE ON ℄ OF DAM
GENERAL PLAN OF RESERVOIR
VICINITY MAP
Located 6¾ mi. East and 4 mi. South of Eden, Concho County, Texas
LOG OF SPILLWAY BORINGS
SEE PLAN OF EMBANKMENT AND SPILLWAY
Figure 5
TYPICAL
FLOODWATER RETARDING STRUCTURE
PLAN AND PROFILE
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE


PLAN
SECTION
STRUCTURE
FOUNDATION EXCAVATION
PROFILE ON ℄ OF SPILLWAY
TYPICAL SPILLWAY SECTION
Figure 5A
TYPICAL
FLOODWATER RETARDING STRUCTURE
PLAN AND SECTION
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
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inches of runoff from the drainage area, release rate of the principal spillways, acres inundated by the sediment and detention pools, volume of fill in the dams, and other pertinent data.

13. The entire watershed is considered as one construction unit.

Hydraulic and Hydrologic Investigations

The following steps were taken as part of the hydrologic investigations and determinations:

1. Basic meteorologic and hydrologic data were tabulated from Climatological Bulletins, U. S. Weather Bureau and Water Supply Papers, U. S. Geological Survey and analyzed to determine average precipitation depth-duration relationships, seasonal distribution of precipitation, the historical flood series to be used in the evaluation of the project, relationship of geology, soils, and climate to runoff depth for single storm events.

2. Engineering surveys were made of channel and valley cross sections selected to adequately represent the stream hydraulics and flood plain area. Preliminary locations for cross sections were made by stereoscopic examination of aerial photographs of the flood plain. The final locations were selected on the ground, giving due consideration to the needs of the economist and the geologist. The evaluation reaches were delineated in conference with the economist and geologist. Ten of the 34 mainstem valley cross sections were from the Corps of Engineers survey and were modified by a new survey of the channel segment. The Corps of Engineers data were determined to adequately reflect present conditions after comparing four additional typical sections with new surveys.

3. The present hydrologic conditions of the watershed for evaluation computations were determined by comparing the weighted rainfall with the gaged runoff from United States Geological Survey stream gage on Plum Creek near Luling. The Temple and Cameron rainfall records were used. The present hydrologic condition and runoff curve numbers for sites were determined by investigating the soil-cover condition of representative site drainage areas. These data were expanded to the entire watershed and the resulting cover complex curve number compared favorably to that obtained from the gaged runoff. The future hydrologic condition of the watershed was determined by obtaining from the work unit conservationists the changes in land use and treatment that could be expected with an accelerated land

treatment program during the installation period. Runoff curve numbers were used with Figure 3.10-1, National Engineering Handbook, Section 4, Supplement A, to determine the depth of runoff from individual storms in the historical evaluation storm series.

4. Cross-section rating curves were computed from field survey data listed in item 2, above, by solving water surface profiles for various discharges, using Doubt's Method as described on pages 3.14-7 to 3.14-13 of the NEH, Section 4, Supplement A.

5. The relationship of peak discharge and drainage area was determined to be 10,700 cubic feet per second per inch of runoff at 356 square miles of drainage area. The exponent of the concordant flow equation is 0.5.

6. Stage-area inundated curves were developed from field survey data for each portion of the valley represented by a cross section. Composite runoff-area inundation curves were developed for each evaluation reach by routing selected volumes of runoff downstream by concordant flow procedures and summating the area flooded for each portion of the valley represented by a cross section in the evaluation reach. Similarly a family of runoff-area inundation curves were developed to reflect the effect of the system of floodwater retarding structures.

7. From a tabulation of cumulative departure from normal precipitation, the period 1930 through 1958 was determined to be representative of normal precipitation on the watershed, and is the period from which the historical evaluation series was developed. The evaluation flood series was limited to storms which did not exceed 25-year frequency.

8. Determinations were made of the area that would have been inundated by each storm in the evaluation series under each of the following conditions:

   a. The present conditions of the watershed remaining static.

   b. The installation of land treatment measures for watershed protection.

   c. The installation of land treatment measures and floodwater retarding structures.

   d. Alternative systems of structures.

9. The evaluation series contained 102 storms that would produce flooding at the smallest cross section, or an average of

3.5 floods per year. Peak discharges were converted to depth of runoff in inches by means of the runoff-peak discharge relationship. Maximum annual values of discharge and runoff were used to develop annual flood frequency lines and, from these, partial duration lines were developed as needed.

10. The largest flood in the 29-year period occurred on July 1, 1936. The gage records indicate 5.68 inches of runoff and a peak discharge of 78,500 cubic feet per second. The annual flood frequency line, developed by means of peak discharges from 29 years of gage records, indicates a frequency of once in 83 years for this storm.

The reference section is valley cross section 29, which is near the mouth of Plum Creek. The following table indicates the flows at which flood damages begin in the various evaluation reaches.

Evaluation Reach (Figure 2)	Capacity of Smallest Section in Reach	Discharge at Reference Section (29) when Capacity of Minimum Section is Reached
	(c.f.s.)	(c.f.s.)
C	100	902
D	875	1,628
E	100	616
I	200	649
J	240	1,430

11. The minimum floodwater detention volume in the structures as determined in accordance with Washington Engineering Memorandum 27 using Yarnell's 6-hour 25-and 50-year frequency rainfall amounts, revised to conform to Technical Paper No. 25, is 3.78 and 4.51 inches respectively. In accordance with Texas State Manual Supplement 2441 the recommended detention storage volume for this watershed varies from 5.15 inches for Class A structures to 7.30 inches for Class B structures depending on size of drainage area. The recommended detention storage volume for Class A and Class B structures less the volume which will be released through the principal spillway during a 2-day period was used as the minimum detention storage volume for all floodwater retarding structures. Detention volumes in excess of those recommended in accordance with Texas State Manual Supplement 2441 were used in a number of sites to obtain a more economical or desirable emergency spillway or structure design. Percent chance of use of emergency spillways based on regional analysis of gaged runoff from similar watersheds, was determined by adding to the actual detention storage the volume which would be released by the principal spillways during a 2-day period.

12. Average principal spillway release rates range from 5 to 12 csm with 8 csm being the average for the watershed. The higher rates were used in some structures to decrease the period of time valuable cultivated land would be inundated or to provide less frequent use of emergency spillways.

13. The appropriate emergency spillway and freeboard design storms were selected from Figures 3.21-1 and 3.21-4 of NEH Section 4, Supplement A, in accordance with criteria contained in Washington Engineering Memorandum 27, and Texas State Manual, Supplement 2441.

14. Spillway hydrographs were developed for each site in the watershed. The principal spillway hydrographs represented a flood event that will not be exceeded, on the average, more often than once in 25 years for Class A structures or 50 years for Class B structures. For Class A structures the emergency spillway and freeboard hydrographs were computed using moisture condition II with 0.5 and 1.23 respectively, of the adjusted point rainfall for the 6-hour storm. Emergency spillway hydrographs and freeboard hydrographs for Class B structures were developed in the same manner except that .75 and 1.73 of the adjusted point rainfall, respectively, were used. Since use of the emergency spillway hydrographs resulted in either no flow or very shallow flow through emergency spillways, the dimensions of the emergency spillways were determined from the freeboard hydrographs. Hydrographs were developed for each of the floodwater retarding structures by the distribution graph method. The combination of emergency spillway width and depth, and the elevation of top of dam for the most economical structure was estimated by an empirical equation. The final design was made by the flood routing method described on page 5.8-12 of the NEH, Section 5.

Sedimentation Investigations

Sediment Source Studies

Sediment source studies to determine the 50-year sediment storage requirements were made in the drainage areas of the 21 planned structures according to the following procedures:

1. Detailed investigations were made in the drainage areas of 11 of the planned structures. Estimates of sediment rates were made for the remaining 10 sites based on similarity of these drainage areas to areas which had been surveyed in detail.

2. Field surveys included: mapping soil units by slope in percent; slope length in feet; present land use; present land

treatment on cultivated land; present cover condition classes on pasture and woodland; land capability classes; lengths, widths, and depths, of all gullies; lengths, widths, and depths of all stream channels affected by erosion; and the estimated annual lateral erosion of gullies and stream channels in feet.

3. Office computations included summarizing erosion by sources (sheet, gully and streambank erosion) in order to fit these data into formulas for computation of annual gross erosion in acre-feet.

   The following formula was used for computing sheet erosion:

   E = A x F x SF x CF x RF, where
   E = Sheet erosion in acre-feet per year
   A = Area in acres
   F = Basic erosion rate of soil unit in feet per year
   SF = Slope factor, based on percent and length of slope
   CF = Cover factor, based on present cover and land treatment
   RF = Rainfall factor based on maximum two-year 30-minute rainfall intensity

   The following formula was used for computing gully and streambank erosion:

   E = N x L x P x H x W ÷ 43,560, where
   E = Erosion in acre feet per year
   N = Number of banks affected
   L = Length of gully or streambank in feet
   P = Percent of gully or streambank affected by erosion
   H = Average height of bank in feet
   W = Estimated annual lateral erosion in feet

4. Field surveys to determine the estimated sediment rates for the remaining 10 structures under present conditions consisted of mapping the land use and arranging the sites to be estimated into homogeneous groups.

5. Office computations to determine the estimated sediment rates for the 10 structures not investigated in detail under present conditions consisted of preparation of sediment source summary sheets based on the homogeneous grouping of the sites and the detailed investigations.

6. The sediment rates were then adjusted to reflect the effect of expected land treatment on the drainage areas of the planned structures. The computed sediment storage requirement for each site is based on a gradual improvement of watershed conditions as a result of the installation of needed land treatment measures expected to be installed during the first

10 years and maintaining these measures at 75 percent effectiveness during the next 40 years.

7. The ratio of sediment storage volume in the pools to soil in place was estimated to be 1.4 for all structures.

8. The allocation of sediment to the structure pools was based on 15 percent deposition in the detention pool and 85 percent in the sediment pool.

The sediment source studies indicated that the erosion rates in the watershed are moderate to high with the drainage areas above nine sites having excessively high sediment rates. These sites are: 3, 4, 6, 7, 10, 12, 14, 17 and 18.

A summation shows the annual sediment yields above the 21 planned structures to be 162.68 acre-feet. The average annual rate of sediment delivered to the structures is 1.35 acre-feet per square mile of watershed area. The detailed sediment source studies in the upland areas were used as a basis for determining the annual gross erosion that would result from sheet erosion and from gully and streambank erosion. A realistic estimate of the needed land treatment measures that will be applied during the installation period maintained at 75 percent effectiveness was used in determining the reduction of sediment production from the upland areas.

The benefits obtained by reduction of the 91 acre-feet of sediment deposited annually in the authorized Gonzales Reservoir were determined in the following manner:

Annual gross erosion from all sources was computed for present conditions. A delivery rate was estimated and used to determine the volume of sediment delivered to the Gonzales site under present condition.

Reduction of the volume of sediment delivered under future conditions was based on (1) the effect of land treatment measures in reducing annual gross erosion rates and (2) the extent of areal control provided by the floodwater retarding structures in the watershed.

Due consideration was given to the entire watershed area above the authorized Gonzales Reservoir and to this watershed individually in order to arrive at the total annual sediment contribution to the site for both present and future conditions.

Flood Plain Sedimentation and Scour

The following sedimentation and scour damage investigations were made to evaluate the nature and extent of physical damage to flood plain land, giving due consideration to agronomic and other land treatment practices, soils, crop yields, and land capabilities.

1. Borings with a power soil sampler and hand auger were made along each of the valley cross sections (figure 2) making note of the depth and texture of the deposit, soil condition, scour channels, sheet scour areas, stream channel degradation or aggradation, and other pertinent factors contributing to flood plain damage.

2. The elevation of the original flood plain before modern deposition began was estimated for each valley section.

3. Estimates of past physical flood plain damage were obtained through interviews with landowners and operators.

4. A damage table was developed to show percent damage by texture and depth increment for deposition and percent damage by depth and width for scour.

5. The depth and width of the modern alluvial deposits and scour areas were measured and tabulated.

6. The damage areas were grouped by segments, which consisted of the area between two to five valley sections.

7. Within each of the segments the area for each depth increment of deposition and scour was computed.

8. The damage to the productive capacity of the flood plain was assessed, by percent, for each category of damage.

9. The sedimentation and scour damages were summarized by evaluation reaches for the entire flood plain and adjusted for recoverability of productive capacity. Estimates for recoverability of productive capacity were developed as a result of field studies and interviews with farmers.

10. Using the average annual erosion rates as a basis, the average annual sediment yields at selected valley sections along the flood plain were estimated for present conditions and with land treatment and structures installed. The results were compared to show the average reduction of overbank deposition in the watershed. The estimated reduction of scour damage due to installation of the complete project is based on reduction of depth and area inundated.

Geologic Investigations

Preliminary geologic dam site investigations were made at each of the planned structure sites. These included studies of valley slopes, alluvium, channel banks, and exposed geologic formations. Borings with a power soil sampler and hand auger were made at all sites to obtain preliminary information on the nature and extent of embankment material and problems in emergency spillway excavation that will be encountered in construction.

Description of Problems

Formations of the Austin, Taylor, and Navarro groups of the Upper Cretaceous series, and formations of the Midway and Wilcox groups of the Eocene series crop out in the watershed.

The Austin group is typified by chalky massive limestone evenly bedded in strata for six inches to several feet in thickness. The soils associated with this group are black clays and silty clays generally classified as CL, and CH (Unified Soil Classification System). Site 1 is the only site located in the Austin. Some rock excavation in the emergency spillway is anticipated.

The Taylor group is represented in the watershed by marly clays and soft shales interstratified with thin partings of sand and clay. Almost everywhere on the outcrop, chert gravel occurs from a few inches to several feet in thickness. This gravel deposit is thought to be the remnants of a recent high terrace originating from the Ancient Edwards Plateau. The soils associated with this group are black clays, silty clays and gravelly clays, generally montmorillonitic, and classified CL, CH, and GC. Sites 2, 3, 4, 5, 6, 7, 10, 11, and 12 are located within the outcrop of the Taylor group. There should be no rock excavation at these sites. Due to the abundance of gravel, foundation drainage will probably be necessary at all the above listed sites.

The Navarro group consists of clays and marls with thin sandstone layers and limestone concretions. Chert gravel occurs over the Navarro in the same manner as described for the Taylor. The soils associated with the Navarro group are black clays, silty clays and gravelly clays, generally classified CL, ML, CH, and GC. Sites 8, 9, 14, 16, 17, 18, and 19 are located within this outcrop. No rock excavation is anticipated at these sites. Due to the abundance of gravel in this area, foundation drainage may be necessary at all sites listed above.

The Midway group consists of all the strata between the Upper Cretaceous and the sands of the Wilcox group. Two formations made up the Midway, the Kincaid and the Wills Point. These formations in the Plum Creek area consist mainly of Wills Point sediments with only small, indistinct layers of the Kincaid. For the purpose of this plan, only the Wills Point will be described as being significant.

The Wills Point formation consists of stratified clay layers that are distinctly laminated. The laminations are especially wavy and uneven. Paper thin partings of silt are contained throughout the clay. Calcareous concretions are abundant throughout the formation. The soils of the Wills Point are yellowish brown, sandy and silty clays, generally classified CL, ML, CH, and SC. Sites 15, 20, and 22 are located within the Midway group. No rock excavation is anticipated at these sites. Because of the sandy nature of the foundation and gravel occurrences, some foundation drainage may be necessary.

The Wilcox group is represented in the watershed by a heterogeneous series, several hundred feet thick, of sandy, lignitiferous clays, cross-bedded

river sands, compact, noncalcareous clays and stratified deltaic silts. Iron bearing concretions are in evidence throughout the group. The soils of the Wilcox consist of sands, sandy clays, sandy silts, and clays generally classified as SC, CL, ML, and CH. Site 21 is located within the Wilcox outcrop. Some rock excavation in the form of soft sandstone may be encountered at this site. Due to the very sandy nature of the area, foundation drainage may be necessary.

The formations in the watershed when stripped of vegetative cover are very susceptible to erosion. Embankments and emergency spillways will be vegetated as soon as possible after construction. Maximum permissable velocities for the emergency spillway hydrographs of the sites will be 8 feet per second, as recommended in Soil Conservation Service Technical Paper 61.

Detailed investigations, including exploration with the core-drilling equipment, will be made at all sites prior to their construction. Laboratory tests will be made to determine the suitability and handling of embankment, and foundation material.

Economic Investigations

Determination of Annual Benefits from Reduction in Damages

Agricultural damage estimates were based on schedules obtained in the field which cover approximately 35 percent of the flood plain of this watershed, and its tributaries. These schedules covered land use, crop distribution under present conditions, crop yields, changes made in land use because of flooding, probable restoration of production, land use changes that would be made if flooding were reduced, and historical data on flooding and flood damage. Analysis of this information formed the basis for determining damage rates for various depths and seasons of flooding. In calculating crop and pasture damage, expenses saved, such as costs of harvesting, were deducted from the gross value of the damage. The applicable rates of damages were applied, flood by flood, to the floods covering the period 1930 through 1958 and an adjustment was made to take into account the effect of recurrent flooding when several floods occurred within one year.

The flood plain land use was mapped in the field. Estimates of normal yields were based on data obtained from the schedules supplemented by information obtained from agricultural workers in the area.

It was found that significant differences in land use, crop yield, frequency of flooding, and future land use changes existed. The flood plain was therefore divided into five evaluation reaches, each with its own damageable value. The evaluation reaches (figure 2) are:

Reach C - From State Highway 20 upstream to valley section 16, and Dry Creek.

Reach D - From valley section 16 upstream to a point half-way between valley sections 13 and 12.

Reach E - From a point half-way between valley sections 13 and 12 upstream to valley section 1 and cross sections A4 to A1, MS-7 and MS-8.

Reach I - Elm Creek to its confluence with the mainstem of Plum Creek, including Cowpen Creek.

Reach J - Brushy Creek to its confluence with the mainstem of Plum Creek.

Floodwater, scour, and sediment damages were calculated under present conditions and under conditions that will prevail after completion of each class of measure to be installed. The difference between average annual damages at the time of initiation of each class of measure and those expected after its installation constitutes the benefits brought about by that group through reduction of damages. Benefits from reduction of crop and pasture damages and flood plain scour resulted from the combined effects of reduction in area inundated and reduced depth of inundation. Benefits from reduction of sediment damage, derived from each class of measure were determined on the basis of estimated reduction in rate of sediment production and in area flooded after installation of each class of measure.

Estimates of damages to other agricultural property such as fences, livestock, farm equipment and levees were obtained from analysis of flood damage schedules and correlated with size of floods. Estimates of damages to roads and bridges in the flood plain were obtained from the county judges and commissioners in Caldwell and Hays County and from the State Highway Department maintenance foreman. These estimates were supplemented by information obtained from local farmers.

Indirect damages in this watershed primarily involve additional travel time for farmers, school busses, and mail deliveries; costs for extra feed for livestock during and following floods, and the like. From an analysis of the data, indirect damages were estimated to be 10 percent of the direct damage not including the value of restoration of productivity.

Farmers in the flood plain were asked to state changes made in land use as a result of past flooding. This information, together with landowner's and operator's estimates of changes in land use and crop distribution as a result of reduction in flood extent and frequency, was the basis for estimating benefits from restoration of productivity. Benefits from restoration of productivity are included as crop and pasture benefits. Consideration was given to increased damage after restoration of productivity and net benefits remaining after production, harvesting, and all other allied costs were deducted. All benefits from restoration of productivity were discounted to provide for a 5-year lag in accomplishment and totaled $45,243 annually at long-term price levels, ARS projection of September 1957.

Analysis of the schedules, the degree of protection and the physical

capabilities of the flood plain indicated that about 294 additional acres of flood plain now in wooded pasture would be cleared and put into more productive use as open pasture or cropland after installation of the project. The average annual benefit from this source after deduction of additional damage, associated cost and added overhead, and discounting for the lag in accrual is estimated at $4,401. Neither the restoration in productivity, nor this change in flood plain land use will involve an increase in the acreage of cotton in the watershed, since increases in cotton acreage in the flood plain will be compensated by decreases in the upland. The table on the following page shows the crop distribution and yields, net return and net benefits from restoration of productivity and changed land use with and without the project.

Areas that will be inundated by the sediment and detention pools of floodwater retarding structures were excluded from the damage calculations. An estimate was made, however, of the value of production lost in these areas after the installation of the project. In this appraisal, it was considered that there would be no production in the sediment pools. The land covered by the detention pools was assumed to be converted to grassland under project conditions. The costs of land, easements, and rights-of-way for the 21 structures were determined by individual appraisal in cooperation with representatives of the Plum Creek Conservation District. The average annual net loss in production within the sites was calculated and this value was compared with the amortized cost of the land required for the structures. The larger amount was used in the economic appraisal of the project to insure a conservative appraisal.

Determination of Annual Benefits Outside Watershed Resulting from Project

Benefits to Plum Creek watershed below State Highway 20 accrue to works of improvement in this watershed. In determining benefits from outside the project area, a complete evaluation was made of the entire Plum Creek watershed affected by works of improvement in this project area. Standard procedures, as previously outlined, were used in calculating damages and benefits outside the project area. Benefits were apportioned to works of improvement in this watershed in proportion to the reduction in flooding resulting from them.

Data from the Corps of Engineers Report on the Survey of the Guadalupe and San Antonio Rivers and tributaries were analyzed. The authorized Gonzales Reservoir was considered in place. Benefits from reduction in sediment yield from this watershed to the Gonzales Reservoir by the planned structures were calculated and apportioned to them according to their sediment storage capacity.

Details of Methodology

Details of the procedure used in the investigations are described in the Soil Conservation Service, Economics Guide for Watershed Protection and Flood Prevention, December 1958.

Crop Distribution and Net Returns 1/ for Areas on Which Restoration of Productivity and Flood Plain Changed Land Use Benefits were Calculated

Crop Distribution	Without Project			With Project			Difference in Net Return
	Acres	Yield	Net Return	Acres	Yield	Net Return	
			(dollars)			(dollars)	(dollars)
Cotton	302	300 lbs. lint	7,870	735	300 lbs. lint	19,154	11,284
Corn	302	40 bu.	6,713	735	40 bu.	16,339	9,626
Grain Sorghum	1,405	26 cwt.	37,612	3,427	26 cwt.	91,741	54,129
Johnsongrass Meadow	292	3.0 tons	4,506	35	3.0 tons	540	3,966
Sudan	292	4.0 aum	1,460	35	4.0 aum	175	1,285
Pasture	2,345	2.5 aum	9,966	265	2.5 aum	1,126	8,840
Wooded Pasture	327	0.8 aum	245	33	0.8 aum	25	220
Miscellaneous	81	-	-	81	-	-	-
Total	5,346		68,372	5,346		129,100	60,728
				Difference in Net Returns			60,728
				Less Associated Costs 2/			5,566
				Less Discount for Lag in Conversion			5,518
				Net Benefits from Restoration of Productivity and Changed Land Use 3/			49,644

1/ Long-term prices, ARS Projection of September 1957.

2/ Including damages to increased values from remaining flooding, increased taxes and overhead, and cost of clearing or other land development.

3/ Restoration of productivity benefits discounted for a 5-year lag in accrual, changed land use benefits discounted 10 years.

Fish and Wildlife Investigations

The following is a summary of a reconnaissance study made by the Fish and Wildlife Service, USDI, and concurred in by the Texas Game and Fish Commission.

"Our reconnaissance study of the proposed project for Plum Creek Watershed indicates that fish and wildlife resources generally will be benefited by the watershed protection measures contemplated.

Floodwater-detention structures with permanent pools will offer opportunities for fish and wildlife enhancement and fishing needs of residents of the watershed will be more fully realized. Reduction of floods will benefit ground-nesting species in the bottom lands, and an increase in permanent water will provide an opportunity for attracting migrating ducks.

Some of the proposed measures will have an adverse effect on wildlife habitat. Clearing of woody vegetation for grassed waterways will eliminate wildlife cover. Flood protection on bottom lands along Plum Creek will result in loss of additional wildlife cover as more of the area is devoted to intensive cropping.

Local interests have expressed a desire to include fish and wildlife in the watershed development. Certain measures, if carried out in coordination with the plan for watershed improvement, would compensate for much of the adverse effects on fish and wildlife habitat. The establishment of wildlife food and cover patches around detention reservoirs would replace a portion of lost habitat.

Provisions for reserving water-storage capacity in the sediment pools of detention reservoirs for fish and wildlife would insure minimum habitat requirements for adequate fishing and waterfowl hunting.

It is recommended:

(1) That wildlife food and cover plants be established around floodwater-detention reservoirs to replace, in part, wildlife habitat lost as a result of the project.

(2) That clearing specifications for reservoir sites, waterway developments, and channel straightening allow for the retention of all possible woody vegetation.

(3) That sediment-pool capacity of floodwater-detention reservoirs, where possible, be reserved for fish and wildlife purposes.

(4) That floodwater-detention reservoirs be fenced to exclude livestock.

(5) That, if water is required for livestock, the impoundment be designed to provide a tank outside of the enclosure to which water may be piped for stock water.

There are good opportunities to enhance the fishing and hunting potential of the proposed project features. Increased storage capacity in detention reservoirs for fish and wildlife purposes would create additional habitat. Management techniques such as water-level control, adequate harvest of fish, and planting of millet and other waterfowl foods would increase the productivity of reservoirs. Adequate utilization and the realization of fishing and hunting opportunities would be furthered by providing public access to fish and wildlife sites."

TABLE 2 - ESTIMATED STRUCTURE COST DISTRIBUTION

Plum Creek Watershed, Texas
Price Base: 1959

Structure Site Number	Installation Cost - Public Law 566 Funds: Construction: Engineer's Estimate (dollars)	Construction: Contingencies (dollars)	Installation Services: Engineering (dollars)	Installation Services: Other (dollars)	Total Public Law 566 (dollars)	Installation Cost - Other Funds: Adm. of Contracts (dollars)	Easements and R/W (dollars)	Other Total (dollars)	Total Installation Cost (dollars)
Floodwater Retarding Structures									
1	92,400	9,240	20,328	9,300	131,268	500	7,255	7,755	139,023
2	66,900	6,690	14,718	6,733	95,041	500	16,770	17,270	112,311
3	19,500	1,950	4,290	1,963	27,703	500	2,755	3,255	30,958
4	35,800	3,580	7,876	3,603	50,859	500	2,660	3,160	54,019
5	78,700	7,870	17,314	7,921	111,805	500	18,830	19,330	131,135
6	104,700	10,470	23,034	10,538	148,742	500	73,454	73,954	222,696
7	36,900	3,690	8,118	3,714	52,422	500	2,825	3,325	55,747
8	61,500	6,150	13,530	6,190	87,370	500	5,900	6,400	93,770
9	175,000	17,500	38,500	17,614	248,614	500	99,810	100,310	348,924
10	42,700	4,270	9,394	4,298	60,662	500	25,068	25,568	86,230
11	68,600	6,860	15,092	6,905	97,457	500	17,425	17,925	115,382
12	53,000	5,300	11,660	5,334	75,294	500	25,265	25,765	101,059
14	157,100	15,710	34,562	15,812	223,184	500	38,100	38,600	261,784
15	53,500	5,350	11,770	5,385	76,005	500	3,450	3,950	79,955
16	100,800	10,080	22,176	10,146	143,202	500	26,295	26,795	169,997
17	44,800	4,480	9,856	4,509	63,645	500	32,160	32,660	96,305
18	53,000	5,300	11,660	5,334	75,294	500	10,400	10,900	86,194
19	100,300	10,030	22,066	10,095	142,491	500	68,920	69,420	211,911
20	55,100	5,510	12,122	5,546	78,278	500	5,215	5,715	83,993
21	105,100	10,510	23,122	10,578	149,310	500	27,985	28,485	177,795
22	70,300	7,030	15,466	7,076	99,872	500	41,589	42,089	141,961
GRAND TOTAL	1,575,700	157,570	346,654	158,594	2,238,518	10,500	552,131	562,631	2,801,149

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TABLE 3 - STRUCTURE DATA - FLOODWATER RETARDING STRUCTURES

Plum Creek Watershed, Texas

Item	Unit	Structure Number 1	2	3	4	5	6	7	8	9	10	11
Drainage Area	Sq.Mi.	2.14	2.81	0.48	0.87	6.17	8.40	0.77	2.07	1/ 21.14	1.89	3.86
Storage Capacity												
Sediment Pool (200 ac. or less)	Ac.Ft.	91	199	64	93	197	197	86	166	192	181	200
Sediment Reserve Below Riser	Ac.Ft.	0	41	0	0	230	833	0	0	1,612	0	47
Sediment in Detention Pool	Ac.Ft.	12	30	8	9	66	90	12	22	225	20	41
Floodwater	Ac.Ft.	885	764	154	267	1,777	2,643	243	596	4,995	575	1,132
Total	Ac.Ft.	988	1,034	226	369	2,270	3,763	341	784	7,024	776	1,420
Surface Area												
Sediment Pool 2/	Acre	27	43	11	12	71	167	11	22	250	34	48
Floodwater Pool	Acre	106	120	32	32	197	355	32	63	540	96	136
Volume of Fill	Cu.Yd.	205,400	147,400	43,500	78,200	177,200	241,400	83,300	140,500	343,300	95,500	150,400
Elevation Top of Dam	Foot	763.7	662.7	662.6	621.0	668.0	642.6	606.3	561.9	537.2	685.6	645.9
Maximum Height of Dam	Foot	32	35	25	37	33	36	35	41	46	34	33
Emergency Spillway												
Crest Elevation	Foot	758.5	658.5	660.0	617.0	663.0	638.5	603.0	557.0	531.2	681.0	641.0
Bottom Width	Foot	150	150	100	80	310	350	100	110	650	100	220
Type		Veg.	Veg.	Veg.	Veg.	Veg.	Veg.	Veg.	Veg.	Veg.	Veg.	Veg.
Percent Chance of Use 3/		1.27	3.33	2.50	2.77	2.88	2.33	2.63	3.03	3.77	3.13	3.24
Average Curve No. - Condition II		81	81	81	81	82	81	81	81	82	81	81
Emergency Spillway Hydrograph												
Storm Rainfall (6-hour) 4/	Inch	10.97	7.25	7.64	7.53	6.97	6.84	7.65	7.33	6.36	7.35	7.14
Storm Runoff	Inch	8.58	5.04	5.40	5.30	4.88	4.65	5.33	5.11	4.32	5.12	4.94
Velocity of Flow (Vc) 5/	Ft./Sec.	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.5
Discharge Rate 6/	c.f.s.	218	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	138	326
Maximum Water Surface Elev. 6/	Foot	759.6	-	-	-	-	-	-	-		681.9	642.0
Freeboard Hydrograph												
Storm Rainfall (6-hour) 7/	Inch	25.24	17.75	18.72	18.45	17.08	16.76	18.52	17.96	14.38	18.00	17.49
Storm Runoff	Inch	22.45	15.21	16.17	15.91	15.00	14.23	15.97	15.42	12.04	15.46	14.95
Velocity of Flow (Vc) 8/	Ft./Sec.	9.7	8.6	6.5	8.4	9.4	8.4	7.5	9.5	10.0	9.2	9.4
Discharge Rate 6/	c.f.s.	4,423	3,065	847	1,520	8,093	6,421	1,405	2,950	20,987	2,478	5,816
Maximum Water Surface Elev. 6/	Foot	763.7	662.7	662.6	621.0	668.0	642.6	606.3	561.9	537.2	685.6	645.9
Principal Spillway												
Capacity - (Maximum)	c.f.s.	27	35	8	11	77	104	10	26	615	12	24
Capacity Equivalents												
Sediment Volume (200 Ac. or less)	Inch	0.80	1.33	2.50	2.00	0.60	0.44	2.10	1.50	0.17	1.80	0.97
Sediment Reserve Volume Below Riser	Inch	xx	0.27	xx	xx	0.70	1.86	xx	xx	1.43	xx	0.23
Sediment in Detention Pool	Inch	0.10	0.20	0.30	0.20	0.20	0.20	0.30	0.20	0.20	0.20	0.20
Detention Volume	Inch	7.75	5.10	6.03	5.75	5.40	5.90	5.90	5.40	4.43	5.70	5.50
Spillway Storage	Inch	5.60	3.90	3.77	3.15	3.34	3.70	2.85	2.25	3.22	5.05	3.90
Class of Structure	-	B	A	A	A	A	A	A	A	A	A	A

(Footnotes on next page)

TABLE 3 - STRUCTURE DATA - FLOODWATER RETARDING STRUCTURES

Plum Creek Watershed, Texas

Item	Unit	STRUCTURE NUMBER 12	14	15	16	17	18	19	20	21	22	Total
Drainage Area	Sq.Mi.	1/ 3.62	1/15.11	1.50	5.05	8.56	2.53	1/12.79	1.95	8.65	1/ 9.50	119.86
Storage Capacity												
Sediment Pool (200 Ac. or less)	Ac.Ft.	199	193	112	199	196	198	198	166	198	198	3,523
Sediment Reserve Below Riser	Ac.Ft.	187	1,177	0	232	580	31	962	0	448	309	6,689
Sediment in Detention Pool	Ac.Ft.	58	161	16	54	91	27	136	21	92	50	1,241
Floodwater	Ac.Ft.	1,139	4,206	448	1,845	2,552	769	4,420	593	2,514	2,787	35,304
Total	Ac.Ft.	1,583	5,737	576	2,330	3,419	1,025	5,716	780	3,252	3,344	46,757
Surface Area												
Sediment Pool 2/	Acre	89	177	15	73	152	44	193	26	130	127	1,722
Floodwater Pool	Acre	228	435	43	229	375	120	588	70	332	419	4,548
Volume of Fill	Cu.Yd.	105,600	319,000	124,600	226,600	95,200	116,900	201,400	122,400	204,500	138,800	3,361,100
Elevation Top of Dam	Foot	619.8	541.0	515.6	558.8	548.9	540.4	498.4	493.3	522.3	458.5	xxx
Maximum Height of Dam	Foot	27	42	46	50	32	35	36	34	39	30	xxx
Emergency Spillway												
Crest Elevation	Foot	615.0	536.0	511.0	554.0	544.0	535.5	493.5	488.5	517.0	453.0	xxx
Bottom Width	Foot	400	750	120	450	340	140	600	120	300	300	xxx
Type	-	Veg.	Veg.	Veg.	Veg.	Veg.	Veg.	Veg.	Veg.	Veg.	Veg.	xxx
Percent Chance of Use 3/	-	2.82	3.39	3.31	1.85	3.03	3.08	2.08	2.94	2.93	2.82	xxx
Average Curve No. - Condition II		81	81	83	83	83	83	83	83	84	84	xxx
Emergency Spillway Hydrograph												
Storm Rainfall (6-Hour) 4/	Inch	6.28	6.54	7.42	10.58	6.83	7.27	6.63	7.35	6.81	6.78	xxx
Storm Runoff	Inch	4.14	4.38	5.42	8.46	4.87	5.28	4.68	5.36	4.96	4.93	xxx
Velocity of Flow (Vc) 5/	Ft./Sec.	0.0	1.3	1.8	2.5	1.2	1.3	0.0	1.1	0.0	0.0	xxx
Discharge Rate 6/	c.f.s.	0.0	1,047	280	1,999	415	196	0.0	92	0.0	0.0	xxx
Maximum Water Surface Elevation 6/	Foot	-	537.1	512.3	555.8	545.0	536.6	-	489.2	-	-	xxx
Freeboard Hydrograph												
Storm Rainfall (6-hour) 7/	Inch	15.39	15.39	18.17	24.34	16.72	17.81	16.25	18.00	16.71	16.60	xxx
Storm Runoff	Inch	12.88	12.88	15.92	21.55	14.49	15.57	14.02	15.75	14.63	14.52	xxx
Velocity of Flow (Vc) 8/	Ft./Sec.	8.9	9.2	9.2	9.3	9.3	9.3	9.3	9.3	9.3	9.8	xxx
Discharge Rate 6/	c.f.s.	8,990	16,747	3,000	11,110	8,755	3,604	15,309	3,082	8,463	9,143	xxx
Maximum Water Surface Elev. 6/	Foot	619.8	541.0	515.6	558.8	548.9	540.4	498.4	493.3	522.3	458.5	xxx
Principal Spillway												
Capacity - (Maximum)	c.f.s.	59	153	10	41	55	16	191	18	87	182	xxx
Capacity Equivalents												
Sediment Volume (200 Ac. or less)	Inch	1.03	0.24	1.40	0.74	0.43	1.47	0.29	1.60	0.43	0.39	xxx
Sediment Reserve Volume Below Riser	Inch	0.97	1.46	xx	0.86	1.27	0.23	1.41	xx	0.97	0.61	xxx
Sediment in Detention Pool	Inch	0.30	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.10	xxx
Detention Volume	Inch	5.90	5.22	5.60	6.85	5.59	5.70	6.48	5.70	5.45	5.50	xxx
Spillway Storage	Inch	6.95	2.88	2.80	4.80	4.56	5.00	5.22	3.50	4.50	5.40	xxx
Class of Structure	-	A	A	A	B	A	A	A	A	A	A	xxx

1/ Excluding the area from which runoff is controlled by other structures.
2/ Surface area to the top of the riser.
3/ Is the percent chance that the emergency spillway will function in any given year.
4/ For Class A structures 0.5 x P of the 6-hour rainfall shown by figure 3.21-1, NEH-4, Supplement A, and 0.75 x P for Class B structures.
5/ Where velocity is shown it was obtained from the formula $V = \frac{Q}{A}$ and was determined from the routed Hp and Q. Critical velocity was not attained by outflow of the emergency spillway hydrographs.
6/ Values obtained from routing.
7/ For Class A structures 1.23 x P, Class B structures 1.73 x P, for 6-hour rainfall shown on figure 3.21-1, NEH, Sec. 4, Suppl. A.
8/ Obtained from curves drawn from figure 4-R-11472 revised 3/59 and ES 98 dated 4-27-55, based on flows obtained from graphical routing of the Freeboard Hydrograph.

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TABLE 4 - SUMMARY OF PHYSICAL DATA

Plum Creek Watershed, Texas

Item	Unit	Quantity Without Project	Quantity With Project
Watershed Area	Sq. Mi.	151.6	xxx
Watershed Area	Acre	97,000	xxx
Area of Cropland	Acre	65,224	65,224
Area of Pastureland	Acre	14,891	13,968
Area of Rangeland	Acre	10,565	10,565
Area of Woodland	Acre	1,274	791
Miscellaneous Area	Acre	5,046	1/ 6,452
Overflow Area Subject to Damage	Acre	2/ 8,728	2/ 5,475
Area Damaged By:			
Overbank Deposition	Acre	3/ 3,335	4/ 433
Flood Plain Scour	Acre	3/ 670	4/ 217
Annual Rate of Erosion			
Sheet	Ac. Ft.	468.44	210.72
Gully	Ac. Ft.	30.32	11.03
Streambank	Ac. Ft.	10.61	10.61
Scour	Ac. Ft.	52.32	16.74
Sediment Accumulation in Authorized Reservoir (Gonzales)	Ac.Ft./Yr.	151.24	59.61
Average Annual Rainfall	Inch	33.00	xxx

1/ Includes area inundated by sediment pools of the planned floodwater retarding structures.
2/ Area inundated by the 25-year frequency storm, based on gaged runoff.
3/ Acreage on which some production loss occurs each year.
4/ The acreage on which production loss will occur each year after all recovery has taken place. Applies to all flooding up to the area inundated by the largest storm in the 29-year series.

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TABLE 5 - SUMMARY OF PLAN DATA

Plum Creek Watershed, Texas

Item	Unit	Quantity
Years to Complete Project	Year	5
Total Installation Cost		
Public Law 566 Funds	Dollar	2,284,068
Other	Dollar	1,161,701
Annual O and M Cost		
Public Law 566 Funds	Dollar	-
Other	Dollar	5,064
Average Annual Monetary Benefits 1/	Dollar	146,106
Agricultural	Percent	93.1
Nonagricultural	Percent	6.9
Structural Measures		
Floodwater Retarding Structures	Each	21
Area Inundated by Structures		
Flood Plain		
Sediment Pool	Acre	1,164
Detention Pool	Acre	721
Upland		
Sediment Pool	Acre	558
Detention Pool	Acre	2,105
Watershed Area Above Structures	Acre	76,711
Reduction of Floodwater Damage	Dollar	81,280
By Land Treatment Measures		
Watershed Protection	Percent	3.6
By Structural Measures	Percent	88.7
Reduction of Sediment Damage	Dollar	6,220
By Land Treatment Measures		
Watershed Protection	Percent	15.2
By Structural Measures	Percent	42.1
Reduction of Erosion Damage	Dollar	2,354
By Land Treatment Measures		
Watershed Protection	Percent	4.8
By Structural Measures	Percent	45.2
Flood Prevention Benefit from Changed Land Use	Dollar	4,401
Benefits Outside of Watershed	Dollar	52,884 2/

1/ From structural measures

2/ $4,381 from reduction in sediment yield to the authorized Gonzales Reservoir and $48,503 in benefits from Plum Creek outside the project area.

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TABLE 6 - ANNUAL COST

Plum Creek Watershed, Texas

Measures	Amortization of Installation Costs 1/	Operation and Maintenance Cost 2/		Total
		Other	Total	
	(dollars)	(dollars)	(dollars)	(dollars)
Floodwater Retarding Structures 1 through 12 and 14 through 22 3/	98,765	5,064	5,064	103,829
Total	98,765	5,064	5,064	103,829

1/ Price Base: 1959 prices amortized for 50 years at 2.5 percent.

2/ Long-term prices as projected by ARS, September 1957.

3/ Interrelated measures.

April 1960

TABLE 7 - MONETARY BENEFITS FROM STRUCTURAL MEASURES

Plum Creek Watershed, Texas
Price Base: Long-Term 1/

Item	Estimated Average Annual Damage: Without Project (dollars)	After Land Treatment for W/S Protection (dollars)	With Project (dollars)	Average Annual Monetary Benefits (dollars)
Floodwater Damage				
Crop and Pasture	72,698	70,672	5,872	64,800
Other Agricultural	8,603	7,987	326	7,661
Nonagricultural (Road, Bridge, Railroad, Urban.)	6,860	6,381	683	5,698
Subtotal	88,161	85,040	6,881	78,159
Sediment Damage				
Overbank Deposition	10,857	9,210	4,637	4,573
Subtotal	10,857	9,210	4,637	4,573
Erosion Damage				
Flood Plain Scour	4,703	4,477	2,349	2,128
Subtotal	4,703	4,477	2,349	2,128
Indirect Damage	5,848	5,348	1,387	3,961
Total, All Damages	109,569	104,075	15,254	88,821
Changed Land Use to Crop Production	xxx	xxx	xxx	4,401
Benefits Outside Project Area 2/	xxx	xxx	xxx	52,884
TOTAL FLOOD PREVENTION BENEFITS	xxx	xxx	xxx	146,106
TOTAL PRIMARY BENEFITS	xxx	xxx	xxx	146,106
TOTAL MONETARY BENEFITS	xxx	xxx	xxx	146,106

1/ As projected by ARS, September 1957.

2/ Benefits from reduction of flood damages in Plum Creek outside project area and reduction of sediment yield to Gonzales Reservoir.

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TABLE 8 - BENEFIT COST ANALYSIS

Plum Creek Watershed, Texas

Measures	AVERAGE ANNUAL BENEFITS 1/ Flood Prevention						Average Annual Cost 3/	Benefit-Cost Ratio
	Flood-water	Sediment	Erosion	Indirect	Other 2/	Total		
	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	
Floodwater Retarding Structures								
1 through 12, and 14 through 22 4/	78,159	4,573	2,128	3,961	57,285	146,106	103,829	1.4:1
GRAND TOTAL	78,159	4,573	2,128	3,961	57,285	146,106	103,829	1.4:1

1/ Price Base: Long-term prices as projected by ARS, September 1957.

2/ Changed land use benefits and benefits outside Plum Creek watershed.

3/ Derived from installation costs based on 1959 price level and operation and maintenance cost based on long-term price levels, as projected by ARS, September 1957.

4/ Interrelated measures.

April 1960

PCCD Exhibit No. 1.3

Initial NRCS & Plum Creek Conservation District Local Sponsor Agreement Pertaining to Site 21

10-60

WATERSHED PROTECTION OPERATION AND MAINTENANCE AGREEMENT

Plum Creek Conservation District

Plum Creek Watershed

Hays, Caldwell, and Travis Counties, Texas

THIS AGREEMENT, made and entered into on the 8th day of November, 1960, by and between the Soil Conservation Service, United States Department of Agriculture, hereinafter referred to as the "Service", the Hays-Caldwell-Travis Soil Conservation District, hereinafter referred to as the "District" and the Plum Creek Conservation District, hereinafter referred to as the "Local Sponsoring Organization", relates to the operation and maintenance of the following described Works of Improvement

Earthfill Floodwater Retarding Structures 1 through 12 and 14 through 22

as shown in Figure 4 of the WORK PLAN for Watershed Protection and Flood Prevention, PLUM CREEK WATERSHED ...., April, 1960, including such revision as the Local Sponsoring Organization and the Service agree will provide maximum flood protection and benefits.

I. OPERATION

The parties hereto agree as follows to the operation of the above described Works of Improvement:

A. The Service will:

1. Provide through the District such technical services as are available for assistance in the proper operation of the Works of Improvement.

B. The Local Sponsoring Organization will:

1. Be responsible for operation of the Works of Improvement simultaneously with acceptance of the work from the contractor and for vegetated areas after satisfactory initial establishment of vegetation. In carrying out this responsibility, the Local Sponsoring Organization will:

a. Prohibit the installation of gates or other obstructions of any kind being placed in any portion of the principal or emergency spillway(s) or embankment without prior approval of the Service.

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b. Prohibit the closing of portholes in the principal spillways and prohibit any works to raise any portion of the spillways above the planned elevation or to deflect or decrease the planned flow through the spillways in any manner without prior approval of the Service.

c. Prohibit the installation of dikes or other structures which may decrease the capacity of the flood channel or deflect the flow from the constructed channel bottom.

d. Prohibit grazing on vegetated areas except as may be needed for proper maintenance.

e. Take all other necessary steps to insure that the structure(s) are permitted to function in the manner for which they were designed.

II. MAINTENANCE

The parties hereto agree as follows to the maintenance of the above described Works of Improvement

A. The Service will:

1. Inspect the described Works of Improvement at least annually.

2. Prepare a report of inspection findings, recommending maintenance work needed, and indicating when such work should be completed. A copy of this report will be furnished the Local Sponsoring Organization and the District.

3. Provide such technical services as are needed and available for preparing plans, designs and specifications and for maintenance items requiring this service.

B. The District will:

1. Assume aggressive leadership in accelerating the land treatment program in the watershed.

2. Encourage landowners and operators within the watershed to adopt and carry out soil and water conservation plans with emphasis on those practices which will reduce floodwater and sediment damage.

3. Make periodic inspections of land treatment measures to determine maintenance needs and encourage performance of maintenance of such measures.

4. To the extent practical and available, make District-owned equipment available to landowners and operators for maintenance of practices.

5. Participate, to the extent authorized by law, with the Local Sponsoring Organization in the maintenance of the floodwater retarding structures.

6. Participate in inspections of floodwater retarding structures and in maintaining records of inspections and maintenance.

C. The Local Sponsoring Organization will:

1. Be responsible for maintenance of the Works of Improvement simultaneously with acceptance of work from the contractor and for vegetated cover on the Works of Improvement after satisfactory initial establishment.

2. Authorize grazing of established vegetation only to extent needed for maintenance of most satisfactory cover.

3. Inspect the Works of Improvement with representatives of the District and the Service participating to the extent possible, at least annually and after every major storm or the occurrence of any other unusual condition that might adversely affect the Works of Improvement to insure proper functioning of the structures and to check for possible damage or deterioration. Items to be checked at time of inspection will include, but not be limited to, the following:

a. Principal spillways:

(1) Damage or obstructions.
(2) Condition of outlet and riser.

(a) Signs of seepage or leakage.
(b) Separation of joints.
(c) Cracks or breaks.
(d) Brush, logs and trash around outlet works.

(3) Sediment level in relation to top of riser.

b. Emergency spillways - drainage ways.

(1) Erosion.
(2) Sedimentation.
(3) Weeds, logs and other obstructions or accumulations reducing channel capacity.
(4) Conformity with original design (deposition or sloughing)
(5) Condition of vegetative cover.

c. Reservoir areas.

(1) Undesirable vegetative growth.
(2) Cut or fallen trees.
(3) Slash and other debris.

d. Embankments.

(1) Settlement or cracking.
(2) Erosion.
(3) Leakage or seepage.
(4) Rodent, wildlife or livestock damage.
(5) Condition of vegetative cover. Need for weed control, fertilizer, etc.
(6) Brush, logs and trash on embankment.
(7) Functioning of relief wells.

e. Flood Channel.

(1) Sedimentation.
(2) Bank cutting.
(3) Debris accumulation.
(4) Brush and trees in channel.
(5) Condition of ripraps and other works.

(a) Undermining.
(b) Damage or deterioration.
(c) Adjacent channel scouring.

(6) Adjacent property damage.

f. Fences and Gates.

(1) General condition - Repairs needed.

(a) Loose or damaged posts.
(b) Loose or broken wires.
(c) Removed or changed fences.
(d) Open, damaged or changed gates.

(e) Vegetated areas grazed in excess of proper maintenance needs.

4. Perform all maintenance needs indicated by Service and/or Local Sponsoring Organization inspection reports promptly and in such manner as not to damage the structures in any way.

5. Prepare a report for each inspection performed and furnish one copy to the Service. Maintain a record of all maintenance work performed and make such records available for review by the Service.

6. Perform Operation and Maintenance by means of force account, contracts, and/or such other local agreements as may be necessary. Major repairs, or desired alterations permissible under the easements, will be made according to plans approved by the Service.

7. When all Works of Improvement have been completed, it is estimated that the annual cost of operating and maintaining the Works of Improvement herein described will be $5,064.00, based on present construction costs.

The Local Sponsoring Organization will obtain the following funds for the operation and maintenance of the Works of Improvement from a tax not to exceed 15¢ per hundred dollar valuation, which is expected to yield $15,600.00 per annum. This tax was voted September 26, 1959, and is being currently collected.

A reserve fund for maintenance will be created by setting aside $200.00 per year, per structure, until a total permanent reserve fund of $25,000.00 has been established for the two projects, of the Sponsoring Local Organization, Plum Creek and Lower Plum Creek. Approximately 30 percent of this figure shall be applicable to the Plum Creek Project.

All funds used from the established reserve fund for operation and maintenance will be replenished at the rate of $200.00 per year per structure so that the permanent reserve will be maintained.

III. IT IS MUTUALLY AGREED THAT:

A. Government representatives shall have the right of free access to inspect the Works of Improvement at any time.

6--Watershed Protection Operation and Maintenance Agreement,
Plum Creek CD

B. Whenever possible the parties to this agreement will make their annual inspections of the Works of Improvement jointly. Annual inspections will be made during the month of June. Any supplemental inspections when determined necessary will be scheduled and agreed to at this time.

C. In the event any of the structures become severely damaged during storms of extreme intensity to the extent that repairs would approach replacement and the damage is not due to lack of adequate maintenance on the part of the Sponsoring Organization, as determined by the Service, the parties will mutually determine whether the structure will be replaced or abandoned.

No member of or Delegate to Congress, or resident Commissioner shall be admitted to any share of part of this agreement or to any benefit to arise therefrom. This provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

Plum Creek Conservation District
Local Sponsoring Organization

By: /s/ Charles F. Foote

Title: President

Date: October 6, 1960

The signing of this agreement was authorized at an official meeting of the Plum Creek Conservation District Board of Directors on 6th day of October, 1960, at Lockhart, Texas

/s/
Attest: W. H. Schroeder, Sec'y

Hays-Caldwell-Travis Soil Conservation District
Local Sponsoring Organization

By: /s/ P. S. King

Title: Chairman

Date: October 6, 1960

This action authorized at an official meeting of the Hays-Caldwell-Travis Soil Conservation District Board of Supervisors on 6th day of October, 1960, at Lockhart, Texas

Attest: /s/ Max Ohlendorf, Sec'y

United States Department of Agriculture
Soil Conservation Service

By: /s/ H. N. Smith

Title: State Conservationist

Date: 11-8-60

I hereby certify that the foregoing six (6) pages are a true and correct copy of Watershed Protection Operation and Maintenance Agreement dated November 8, 1960, entered into by and between United States Department of Agriculture, Soil Conservation Service and Plum Creek Conservation District.

PLUM CREEK CONSERVATION DISTRICT

by M. W. Carlton
Executive Secretary

PCCD Exhibit No. 1.4

Three sheets of the "as built" Site 21 structure drawings showing elevations

PLUM CREEK WATERSHED PROJECT

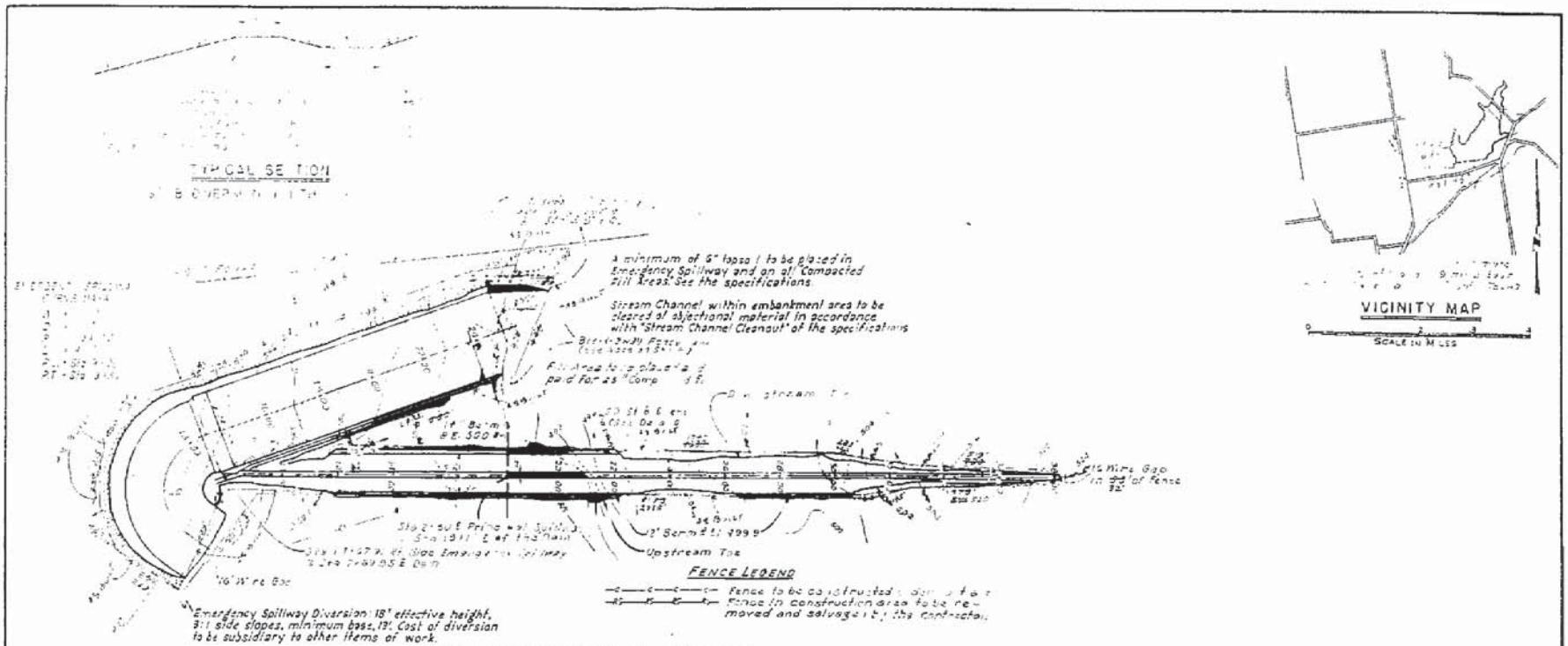
FLOODWATER RETARDING DAM NO. 21

DRAINAGE AREA	5536 ACRES
TOTAL STORAGE	3283 AC. FT.
WATER SURFACE AREA	57 ACRES
HEIGHT OF DAM	30 FEET
VOLUME OF FILL	207,350 CU.YDS.

BUILT UNDER THE WATERSHED PROTECTION
AND FLOOD PREVENTION ACT
BY
HAYS-CALDWELL-TRAVIS SOIL CONSERVATION DISTRICT
AND
PLUM CREEK CONSERVATION DISTRICT
WITH THE ASSISTANCE OF
SOIL CONSERVATION SERVICE
OF THE
U. S. DEPARTMENT OF AGRICULTURE
1961

As Built Plan
Const. Complete

CONSTRUCTION DRAWINGS APPROVED



EMBANKMENT PLAN AND PROFILE

FLOODWATER RETARDING STRUCTURE SITE No.

PLUM CREEK WATERSHED

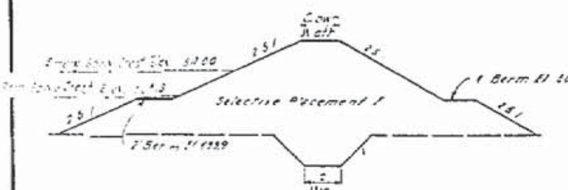
IN

WILLIAMSON AND TRAVIS COUNTIES TEXAS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

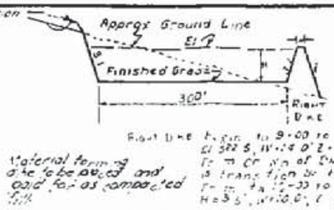
Sheet No. 2 of 9 Sheets

4-E-15,942



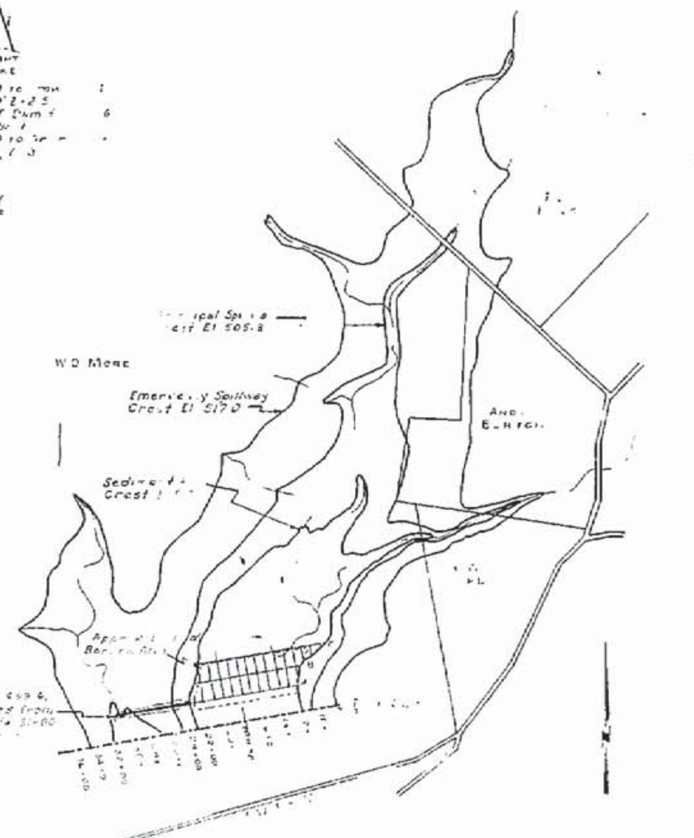
TYPICAL SECTION

SELECTIVE PLACEMENT FILL					
LAB TEST					
Modified Standard		Min Dry Density	Moisture Range		
Max Dry Den	Optm Moist	Lbs Per Cu Ft	Percent		
			From	To	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	173	102.0	12.0	[illegible]	[illegible]
[illegible]	135	97.0	19.0	[illegible]	[illegible]
[illegible]	18.0	[illegible]	17.3	[illegible]	[illegible]
[illegible]	14.5	62.5	[illegible]	[illegible]	3



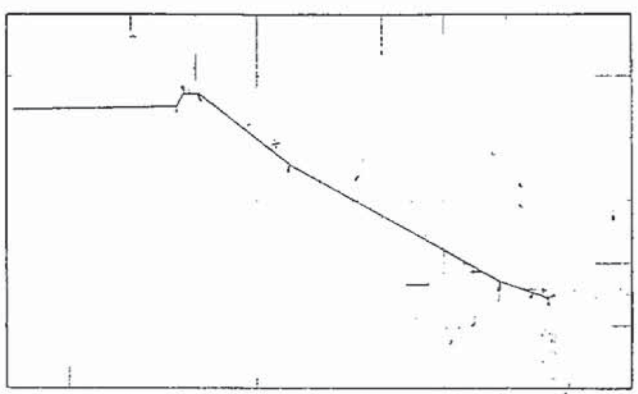
TYPICAL SECTION
EMERGENCY SPILLWAY

ELEVATION	SURFACE ACRES	STORAGE ACRE FEET	STORAGE INCHES
488	0.0	0.00	0
492	0.6	1.20	0
496	17.4	37.2	0.33
500	51.0	174.00	0.38
500.4	56.95	195.59	0.42
504	110.5	497.00	1.08
505.3	120.55	653.05	1.42
505.9	138.37	733.44	1.59
508	169.2	1056.41	2.29
512	236.0	1866.81	4.05
516	311.5	2961.81	6.42
517	331.28	3283.20	7.12
520	390.6	4366.02	9.46
522.3	437.24	5318.03	11.53
524	471.7	6090.24	13.20
Top of Dam (Effective) Elev.			522.3
Emergency Spillway Crest Elev.			517.0
Principal Spillway Crest Elev.			505.3
Sediment Pool Elev.			500.4
Drainage Area, Acres			5534
Sediment Storage, Acre Feet			[illegible]
Floodwater Storage, Acre Feet			[illegible]
Max Emergency Spillway Cap., cfs			85.2



GENERAL PLAN OF RESERVOIR

SCALE IN FEET



PROFILE ON ℄ OF EMERGENCY SPILLWAY

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

4 E 5,54

PCCD Exhibit No. 1.5

Dam Inspection Report for Site 21

DAM SAFETY SECTION
CRITICAL INFRASTRUCTURE DIVISION

Dam Safety Inspection Report

GENERAL INFORMATION

INVENTORY NO.: TX03428

DAM: Plum Creek WS SCS Site 21

SPONSORS: Caldwell Travis County Soil and Water Conservation District (SWCD) #304

Plum Creek Conservation District

STREAM: Dry Creek

BASIN: Guadalupe River

COUNTY: Caldwell

GENERAL LOCATION: 5.5 miles Northeast of Lockhart

DAM HEIGHT: 41 feet

SIZE CLASSIFICATION: Intermediate

NORMAL CAPACITY: 196 acre-feet

MAXIMUM CAPACITY: 5,318 acre-feet

NORMAL WATER LEVEL: 505.3 feet-msl

CURRENT WATER LEVEL: 497.1 feet-msl

PREVIOUS INSPECTION DATE: November 3, 2009

CURRENT INSPECTION DATE: July 31, 2014

INSPECTION BY TCEQ PERSONNEL: Joseph L. Strouse, P.E. and Leigh Gatlin, P.E.

PERSONNEL CONTACTED: Mr. Todd Marek, P.E., NRCS – Temple

Mr. Isidro Morales, NRCS District Conservationist – Lockhart

Mr. Johnie Halliburton, Manager, Plum Creek Conservation District

SUMMARY

Plum Creek WS SCS Site 21 Dam, an intermediate size earthen dam, was inspected by TCEQ staff on July 31, 2014, as part of the TCEQ regular inspection schedule. The sponsors were notified of the inspection in June of 2014. The dam was found in overall good condition. The primary issues of concern include: excessively tall vegetation growth along the upstream heel, the service spillway outlet and plunge pool area, and the downstream channel; bare areas along the crest and downstream slope; rutting along the crest; erosion from cattle traffic; wave-action erosion along the upstream waterline; animal burrows on the upstream slope; and the hydraulic inadequacy of the dam. A final version of the Emergency Action Plan (EAP) has not been received. A verbal exit interview, explaining the results of the inspection, was conducted on the same day of the inspection with Mr. Johnie Halliburton.

BACKGROUND

According to TCEQ records, Plum Creek WS SCS Site 21 Dam was constructed by the Soil Conservation Service (SCS) in 1962 as a class "a" floodwater retarding structure. Per TCEQ records, the structure has been inspected twice previously (both inspections in 2009), the first was on January 21, 2009 by the Natural Resource Conservation Service (NRCS). The dam was found in overall good condition. Observations included poor grass cover due to drought and overgrazing, minor erosion at the normal water level, cattle trails throughout the dam and spillways, rust and damage to the metal fabrications and debris guards, cracks in the concrete were noted on the drop inlet at the bolts that attach the debris guard, the low flow slide gate framework showed severe rust and corrosion, and the concrete outlet pipe was slightly damaged with the steel sleeve exposed at the end. The second inspection, again by the NRCS, was on November 3, 2009. The dam was found in overall good condition. Observations included a recovering grass cover, minor wave erosion, rust on metal parts of the inlet and end of the outlet, and a scour area at the outlet end of the stilling basin. Correspondence from the Plum Creek Conservation District in April of 2010 indicated that the rusted debris guards were replaced in March of 2009 and the low flow slide gate was replaced with a stainless steel gate in September of 2009. Also indicated were plans to repair the concrete cracks with flexcrete or a similar product, and the monitoring of the wave erosion, sedimentation, and downstream woody vegetation.

PRE-INSPECTION MEETING

A brief pre-inspection meeting was held at the Lockhart NRCS office on July 31, 2014 with Mr. Johnie Halliburton Prior to the inspection of the Lower Plum Creek WS SCS Site 24, Plum Creek WS SCS Site 18 and 21 Dams, all of which were inspected that day. Mr. Johnie Halliburton was present for the full duration of the inspections.

INSPECTION FINDINGS

Figure 1 is a location map. Figure 2 is an aerial photo of the dam with contours. Figure 3 is an aerial photo of the dam showing immediate downstream hazards. Figure 4 is an aerial photo of the dam and surrounding area, indicating photo locations. Note that right and left indications are from the perspective of an observer looking downstream. Field measurements taken during the inspection were done using a hand-level and survey rod. NRCS as-built drawings indicate an effective crest elevation of 522.3 feet-msl. The water level was at approximately 497.1 feet-msl, or 8.2 feet below a normal pool of 505.3 feet-msl.

CREST

- The 15-foot wide crest of the dam had a bare crest with a tall-grass cover generally on the right half of the crest. Photos 1-5.
- The crest was found to be generally straight with no tree or tall vegetation growth. Ant mounds were observed along the crest. Photo 4.
- The crest was found to be uneven in some areas. Rutting was observed along the crest of the dam and measured at approximately 6 inches deep at the right end of the dam.
- The crest was found to be in generally fair condition.

UPSTREAM SLOPE

- The 2.5 horizontal to 1 vertical [2.5 H:1 V] upstream slope had a well-established, tall grass cover with some emerging non-grassy vegetation along the heel of the slope at the fence. Photos 6-11.
- Benching was noted along the upstream slope. One area to the right of the service spillway inlet was measured to be 2 feet tall.
- A cattle trail was noted along the waterline. Photo 8.
- Shallow animal burrows, less than 3 inches deep, were observed on the left end of the upstream slope.
- The upstream slope was found to be in generally good condition.

DOWNSTREAM SLOPE

- The 2.5 H:1 V downstream slope had a generally well-established, tall grass cover with large bare areas along the top of the slope and at the far left and right ends. Photos 12-17.
- Erosion was observed at some of the bare areas, which may be due to cattle access. At the left end of the embankment, the bare slope extended to the toe. Photos 14 and 17.
- The downstream slope was found to be in generally good condition.

SERVICE SPILLWAY

- The service spillway is located just east of the midpoint of the embankment. Photos 18-21.
- The service spillway consists of a concrete drop inlet connected to a 30-inch diameter concrete-lined steel outlet pipe. The manual control for a slide gate is located on the upstream side of the inlet and the stage and rainfall recorder instrument system is on top of the inlet. Photos 18-20.
- The lower port openings are supplemental ports that were requested by the original landowner and added in 1968 to maintain a lower water level in the reservoir. These ports were blocked with wood timbers in previous inspections. During this inspection the ports were unblocked. Photo 19.
- The cracks in the concrete of the drop inlet at the bolts that attach the upper debris guards (noted in the 2009 inspection) were observed during this inspection. The cracks did not appear to have worsened. Photos 18a and 18b.
- The trash guard on the right side of the service spillway inlet was bent out of alignment. Photo 19.
- The service spillway outlet pipe was in fair condition due to spalling of the concrete at the bottom of the conduit, exposing steel. No water flow was observed from the outlet pipe. Photo 20.
- The plunge pool was lined with rock rip rap. Vegetation was observed growing over the rip rap and around the service spillway outlet conduit. The scour area at the downstream end of the plunge pool noted in the previous inspection was observed during this inspection. The area appeared to have healed, no further erosion had occurred and vegetation was established. Photo 21.
- The source of the water in the plunge pool
- The service spillway was found to be in overall good condition.

EMERGENCY SPILLWAY

- The emergency spillway is located at the east end of the embankment. Photos 22-24.
- The emergency spillway consists of a 300-foot wide uncontrolled earthen channel.
- The emergency spillway had a well-established, tall grass cover, clear of trees and vegetation except at the spillway exit.
- The crest of the control section of the emergency spillway was measured with a hand level to be 4.5 feet below the crest of the dam (shown to be 522.5 ft msl at the left end of the dam, per NRCS as-built drawings). NRCS as-built drawings show the emergency spillway crest at 517 feet msl. The 1 foot difference between these two elevations is noted and could be attributed to measurement error.
- The emergency spillway was found to be in good condition.

LOW FLOW OUTLET AND DRAIN

- The low flow outlet is a slide gate with a manual control that connects to bottom of the service spillway's drop inlet.
- The low flow slide gate was replaced with a stainless steel gate in September of 2009, per correspondence from the Plum Creek Conservation District.
- The low flow slide gate could not be observed due to water within the reservoir. The functional status of the low flow outlet system was not requested at the time of the inspection.

STAGE AND RAINFALL RECORDER INSTRUMENT SYSTEM

- The stage and rainfall recorder instrument system provides real-time electronic information to the Plum Creek Conservation District to monitor rainfall and the water elevation within the reservoir.
- The stage and rainfall recorder was located on top of the service spillway drop inlet. Photo 18a.

DOWNSTREAM CHANNEL

The channel downstream of the spillway was in generally good condition with light tree growth along the channel immediately downstream of the service spillway outlet and plunge pool. Photo 25.

CONFIDENTIAL: DOWNSTREAM HAZARDS

This dam is classified, by both the NRCS and TCEQ, as a high hazard dam due to downstream development. It should be noted that the hazard classification is not a description of the condition of the structure, but rather, a description of the potential for loss of downstream life or property in the event of a failure of the dam. The high hazard classification indicates that some potential for loss of life exists.

Farm-to-Market Road 1185 is approximately 1000 feet from the downstream toe of the dam, and this road is classified by the TCEQ as a major highway. Approximately 1,000-1,500 feet downstream, there are two residences on the east side of Dry Creek. A large residential development exists along Alamo Road on the west side of Dry Creek, from approximately 1,000 feet downstream to over a mile downstream. About a mile downstream there is a residence on the east side of Dry Creek and Dry Creek crosses Old Lyton Springs road, which is classified by the TCEQ as a minor highway. All mentioned residences exist at an elevation at or below the effective crest of the dam, all of which could be impacted in the event of a breach. More roads and development could be impacted along the creek farther downstream along the simplified breach inundation length of nearly 16 miles.

HYDROLOGIC / HYDRAULIC ANALYSES

This dam is required to safely pass 75% of the Probable Maximum Flood (PMF), given that the following provisions are satisfied:

1. Emergency Action Plan (EAP) completed/finalized
2. Operation & Maintenance (O&M) Plan generated
3. Implementation of Owner's Routine Inspection Program
4. Submits an Annual Report to TCEQ documenting compliance with provisions 2 & 3 above.

The dam was designed as a class "a" dam, which, depending on the location of a dam in Texas, is comparable to 20-25% of the PMF. Therefore, the dam and its spillways are considered hydraulically inadequate.

OPERATION AND MAINTENANCE (O&M) PLAN

Mr. Halliburton stated that the O&M plan for the dam is being implemented but there currently is no written plan.

EMERGENCY ACTION PLAN (EAP)

A draft EAP was submitted on April 21, 2011. Comments were provided by letter on November 17, 2011. A final version has not been received. Two updates have been received from the Plum Creek Conservation District concerning the breach analysis flood mapping but the EAP remains in draft form.

REQUIREMENTS/RECOMMENDATIONS

The following requirements and/or recommendations are provided:

1. Please finalize your EAP by addressing any remaining comments provided in the TCEQ comment letter dated November 17, 2011 and insure the EAP reflects the most current EAP guidance document. Please refer to the TCEQ's Dam Safety webpage at http://www.tceq.state.tx.us/field/damsafetyprog.html for the EAP requirements.

2. It is recommended that a Licensed Texas Professional Engineer (LTPE) perform an updated hydrologic and hydraulic analysis using current methodology to determine hydraulic capacity of the dam and determine the needed improvements to upgrade the structure to safely pass 75% of the PMF. TCEQ's "Hydrologic and Hydraulic Guidelines for Dams in Texas" (GI-364) is available at: http://tceq.texas.gov/publications/gi/gi-364.html. The H&H analysis and any such dam modification, rehabilitation, or removal plans must be submitted to our office for review and approval prior to the beginning of any work.

3. The benching erosion occurring to the right of the service spillway inlet should be repaired. Some type of erosion protection (e.g. appropriately sized rock rip rap, articulated concrete blocks, etc.) should be installed to prevent continued erosion. An LTPE with dam experience should be consulted for guidance on material selection and installation.

4. A written Operation and Maintenance (O&M) plan is required. Please refer to the above webpage for TCEQ's *Guidelines for the Operation and Maintenance of Dams in Texas*. The items below were noted during the inspection and are to be included in the Operation and Maintenance plan. The method and the time frame for addressing are left up to the sponsors, and it is recognized that finances may govern when the work can be undertaken. The following are recommendations for addressing the maintenance items noted during the inspection:

   a. Continue with the excellent maintenance of the embankment.
   b. Vegetation and trees less than 4 inches in diameter should be removed from the heel of the upstream slope; all trees, regardless of diameter, and any non-grassy vegetation should be removed from the area around the service spillway outlet, the plunge pool and rip rap, and the downstream channel.
   c. Bare areas along the crest and downstream slope should be vegetated with grass in order to prevent erosion.
   d. The rutting on the crest should be filled with soil, re-compacted, and vegetated with grass in order to prevent further erosion and ponding water. Vehicle access to the embankment should be discouraged and minimized.
   e. Cattle access to the embankment should be restricted. The path on the upstream slope contributes to a lack of vegetation and erosion. This area and the eroded area at the middle portion of the downstream slope should be repaired by filling the depression with soil and compacting, seeding, and a grass cover re-established.
   f. Burrowing animals should be discouraged from establishing habitat on the dam.
   g. Ant mounts should be periodically treated to discourage/prevent ant activity in the embankment.
   h. The shallow animal burrows on the upstream slope should be filled with soil, re-compacted and vegetated in order to minimize erosion-related problems and formation of a conduit for water to pass through the dam.
   i. The spalling concrete and exposed steel of the service spillway outlet should be repaired.
   j. The trash guard on the right side of the service spillway should be repaired.
   k. The concrete cracking at the bolt in the service spillway inlet should be repaired.
   l. Low-flow valves and gates should be exercised at least yearly to ensure their ability to perform in times of flooding or when it is necessary to lower the lake level for maintenance and/or repair. Gate frames should be maintained free of corrosion and the seat should be periodically lubricated.
   m. The fence across the emergency spillway should be maintained clear of debris.

n. The scour erosion at the downstream end of the plunge pool should be monitored for changes. If erosion continues, additional properly sized rock rip rap should be placed to achieve a well-graded mix to protect against erosion.
o. In addition to a regular dam maintenance program, it is recommended that routine safety inspections be conducted on a periodic basis and immediately after significant rain events to evaluate the condition of the structure and detect and address problems before they progress to a serious level. These inspections should include evaluation of the condition of the service spillway drop inlet and discharge pipe. These actions will minimize costs of dam maintenance and repair activities as well as minimize risks and liabilities associated with dam safety issues.
p. Observations associated with periodic inspections and routine monitoring should be documented in a written or electronic log and should include the date, name of the observer, description of the observation (flow quantity in gpm if observing seepage), lake level on the date of the observation, and dates and information associated with recent rain events.
q. The frequency of routine maintenance and monitoring activities should be specified in the written O&M plan.

CONCLUSION

The sponsors of this dam may be liable for downstream damages in the event of a spill or breach. It is the sponsors' responsibility to maintain the dam in a safe condition in order to prevent loss of life and limit the potential for property loss. In addition, regular maintenance may reduce future rehabilitation and repair costs. This structure will be scheduled for reinspection in 5 years, or in conjunction with any modifications.

Leigh E. Gatlin, P.E.
Dam Safety Section
Critical Infrastructure Division

Joseph W. Strouse, P.E.
Dam Safety Section
Critical Infrastructure Division

Figure 1: Location Map

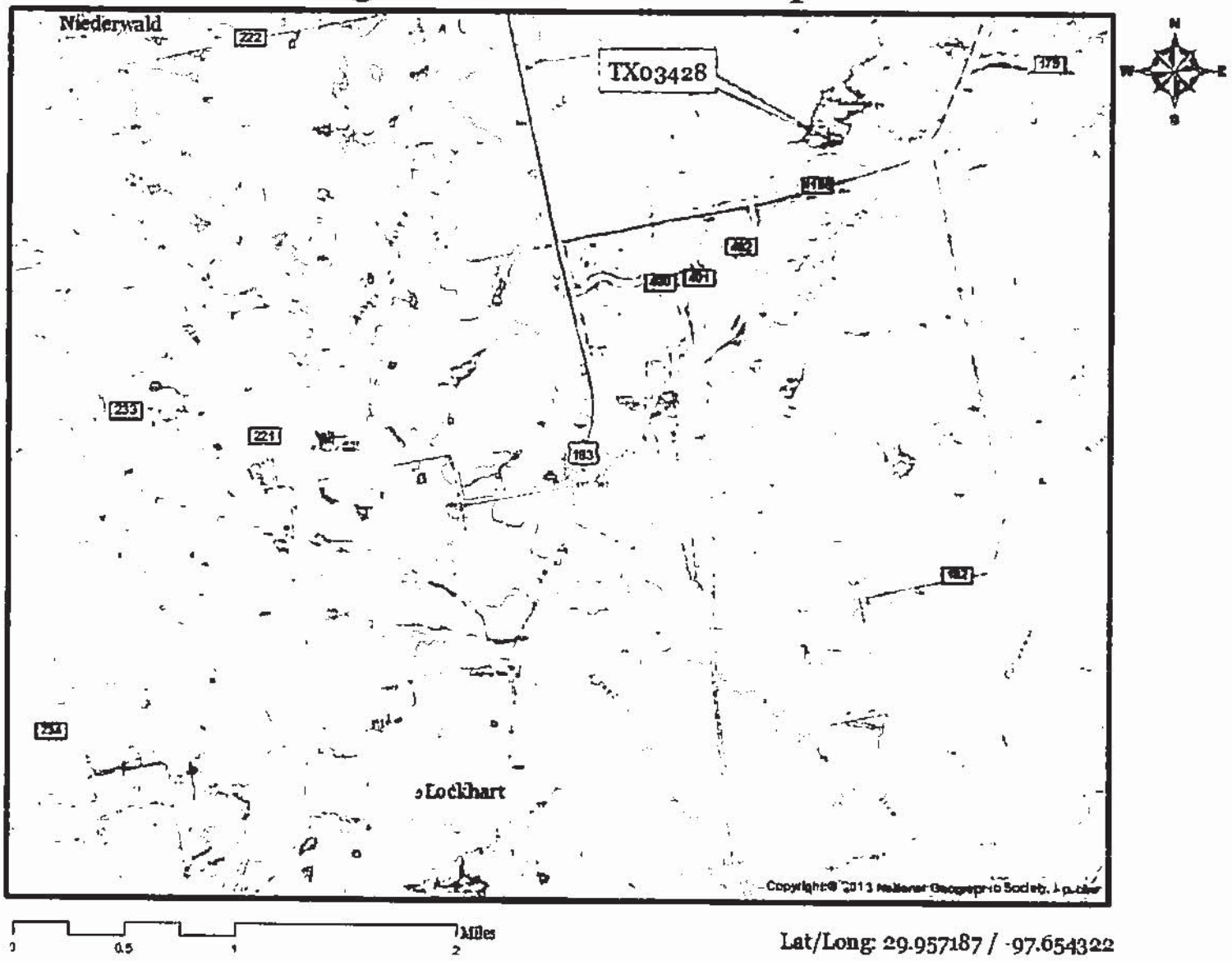


Figure 2: 2014 Aerial Photograph with 10 Foot Contours

Lat/Long: 29.957187 / -97.654322

Figure 2: 2014 Aerial Photograph of Downstream Hazards

Lat/Long: 29.957187 / -97.654322

Figure 4: Photo Locations (2015 Aerial Photo)
Emergency Spillway
Service Spillway
Legend:
x ➤ indicates photo location and direction.
Google

Photo 1: The crest of the embankment, looking west from the left end. Note the lack of grass cover and vehicle tracks.

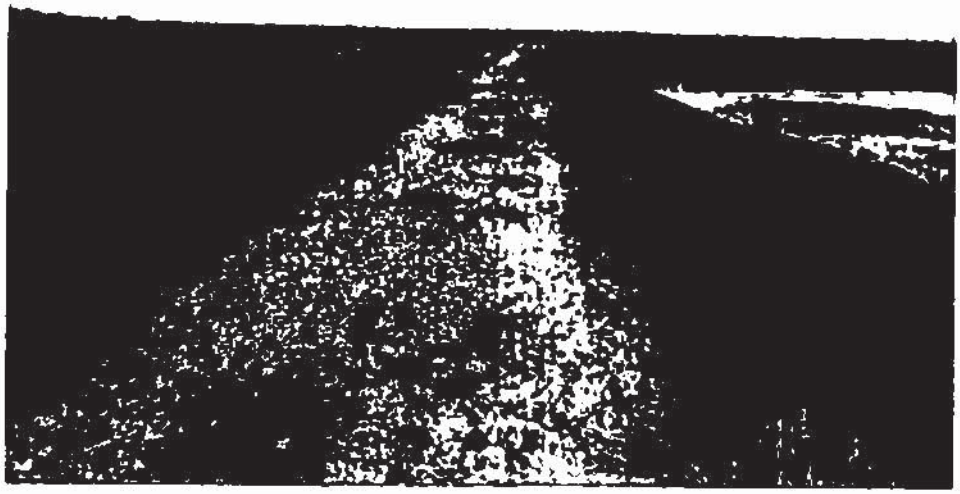


Photo 2: The crest of the embankment, looking west from left of the service spillway. Note the lack of vegetation along the center of the crest.

Photo 3: The crest of the embankment, looking west from the approximate midpoint of the embankment. Note the bare areas along the downstream side of the crest.

Photo 4: The crest of the embankment, looking east from the approximate midpoint of the embankment. Note the large ant mound.

Photo 5: The crest of the embankment, looking west from the right end of the dam. Note the more established grass cover.

Photo 6: Upstream slope of the embankment, view east from the right end. Note the well-established, tall grass cover.

Photo 7: Upstream slope of the embankment, view east from the right end. Note the well-established, tall grass cover.

Photo 8: Upstream slope of the embankment, view east from the approximate midpoint of the dam. Note the cattle trail along the waterline.

Photo 9: Upstream slope of the embankment to the left of the service spillway, view to the west. Note the well-established, tall grass cover.

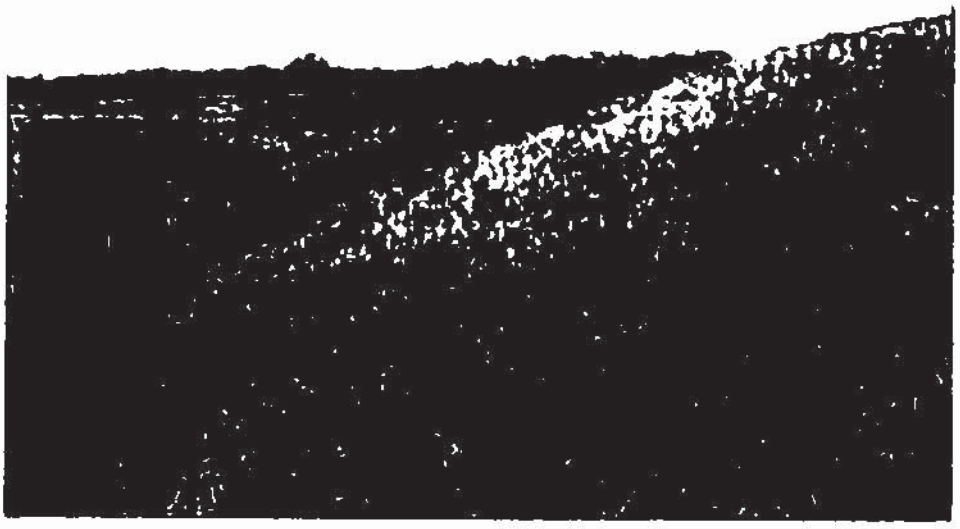


Photo 10: Upstream slope of the embankment at the left end, view to the east. Note the well-established, tall grass cover.

Photo 11: Left end of the upstream slope of the embankment, looking west. Note the well-established, tall grass cover.

Photo 12: Downstream slope from the right end, view to the east. Note the large bare areas along the downstream slope.

Photo 13: Downstream slope from the right end of the dam, view to the east. Note the well-established grass cover.

Photo 14: Downstream slope at the approximate midpoint of the embankment, view to the east. Note the eroded area, possibly from cattle access.

Photo 15: Toe of the downstream slope from the approximate midpoint of the embankment, view to the east. Note the thick, tall grass cover.

Photo 16: Downstream slope from the left end of the dam, view to the east. Note the thick, tall grass cover.

Photo 17: Left end of the downstream slope, looking east. Note the bare slope with patches of grass.

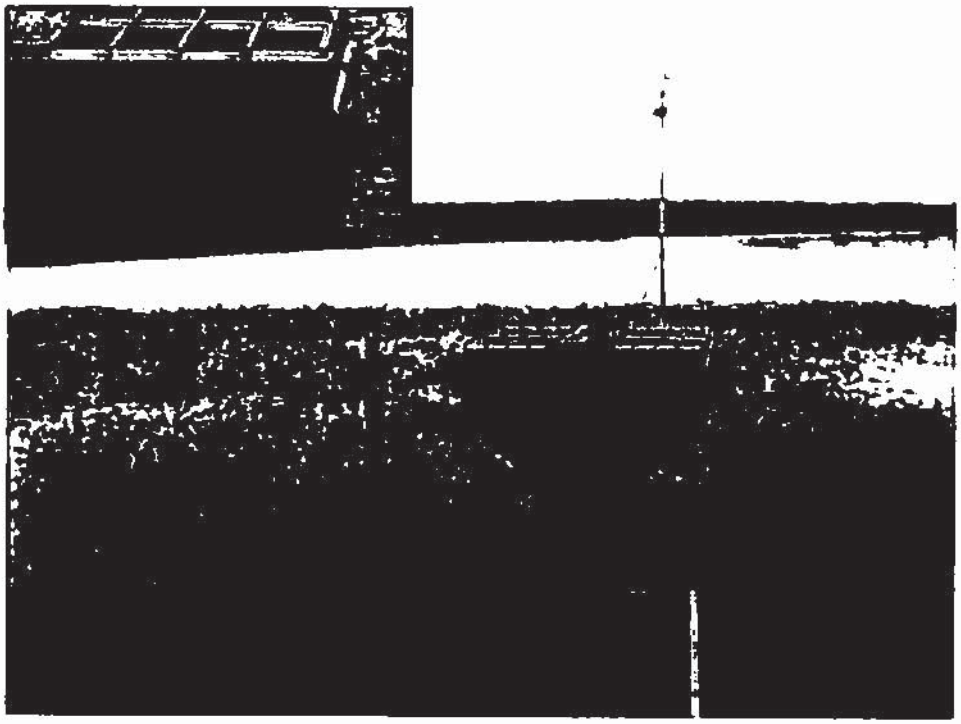


Photo 18a, 18b: Service spillway drop inlet. Note the manual control for a slide gate on the upstream side of the inlet, and the stage and rainfall recorder instrument system on top of the inlet. Insert b is a close-up of cracking in the concrete inlet at a bolt.

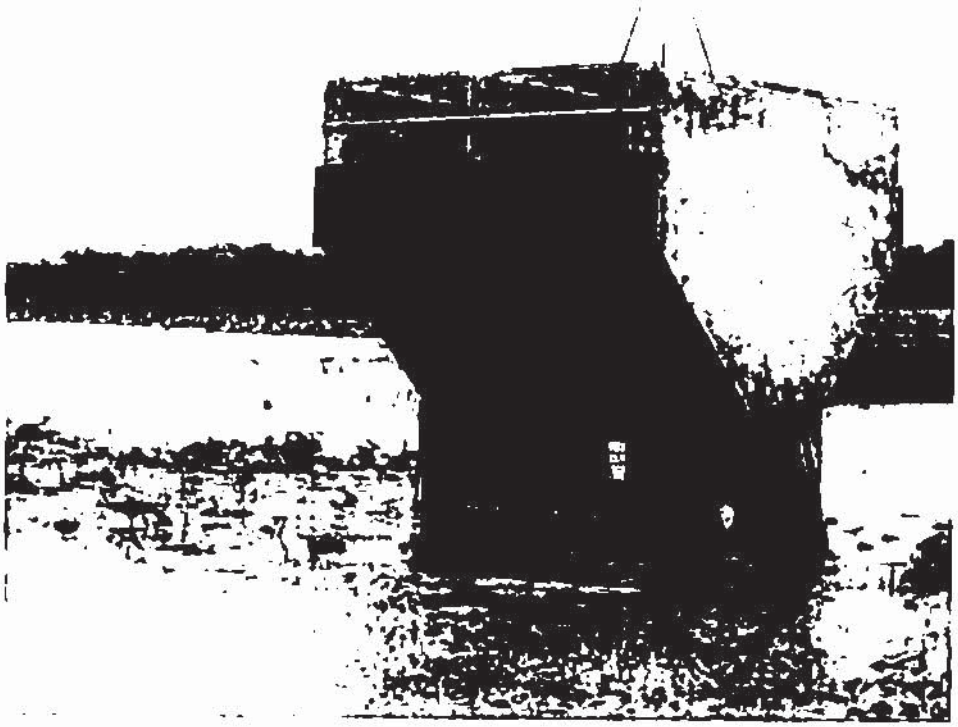


Photo 19: Service spillway inlet showing lower supplemental ports open with a trash guard. Note bent trash guard.

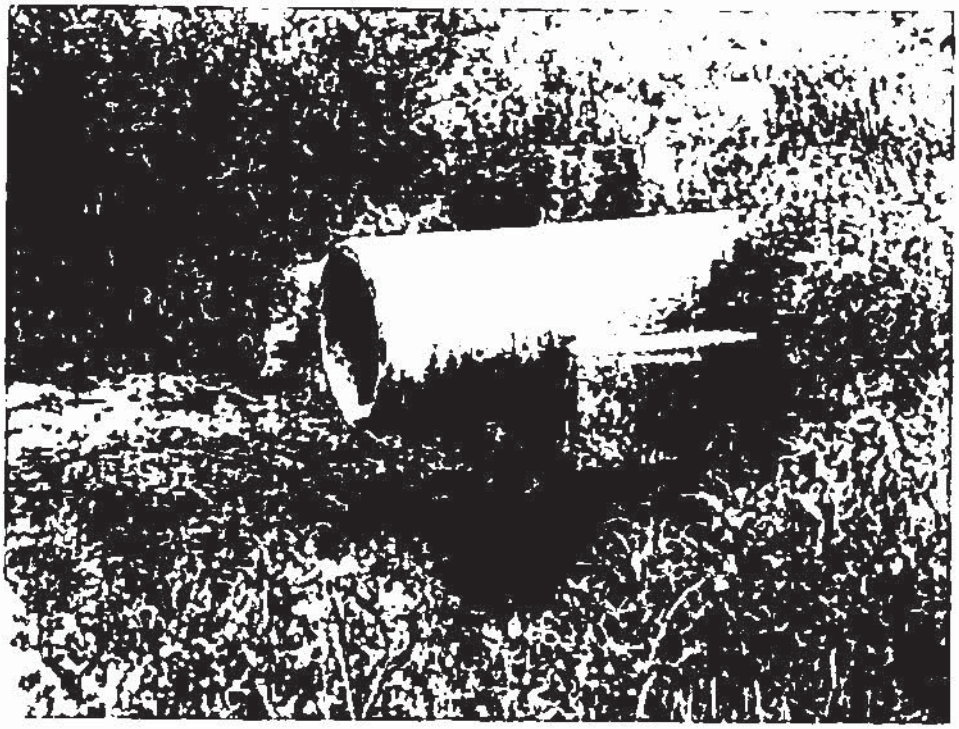


Photo 20: 30-inch inside diameter (I.D.) concrete-lined steel pipe outlet and concrete pipe cradle. Spalling of the concrete has left steel exposed around the bottom of the exit. Note thick brush around the cradle.

Photo 21: Service spillway outlet and plunge pool. Note the vegetation growth in the rock rip rap around the edge of the plunge pool. Also, note scour area from November 2009 inspection.

Photo 22: Emergency spillway crest, looking east. Note the well-established and tall grass cover.

Photo 23: Emergency spillway approach channel, looking north. Note the well-established short grass cover and the fence across the entrance of the spillway.

Photo 24: Emergency spillway exit channel, looking southwest. Note the well-established and tall grass cover that is generally clear of trees and vegetation. Trees are noted at the end of the channel.

Photo 25: Downstream channel. Note the tall trees lining the channel.

PCCD Exhibit No. 1.6

Excerpts from recent Report on Rehabilitation of Site 21

USDA United States Department of Agriculture

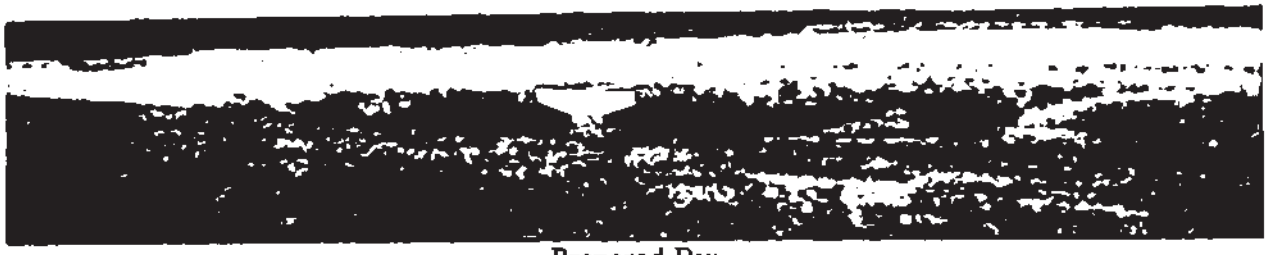
Natural Resources Conservation Service

FINAL
SUPPLEMENTAL WATERSHED PLAN NO. VI
and
Environmental Evaluation
for the Rehabilitation of
Floodwater Retarding Structures No. 10, 12, & 21
of the
Plum Creek Watershed
Hays, Caldwell, and Travis Counties, Texas

Plum FRS No. 10

Plum FRS No. 12

Plum FRS No. 21



Prepared By:
U.S. Department of Agriculture - Natural Resources Conservation Service

In Cooperation With:

Hays County Soil and Water Conservation District
Caldwell-Travis Soil and Water Conservation District
Plum Creek Conservation District
June 2016

PLUM CREEK WATERSHED

FRS No. 21

U.S. Department Agriculture Natural Resources Conservation Service July 2015 **Watershed Rehabilitation Worksheet** **Plum Creek Watershed,** Sponsoring Local Organization(s): Plum Creek Conservation District, Hays County SWCD, Caldwell-Travis SWCD	Watershed: Plum Creek Watershed County(s): Caldwell State(s) TX Hydrologic Unit Code(s) 121002030404 Watershed Project Number: 482029 Watershed Site Number: 21 NID Number: TX03428

A. Authority and Program Criteria

Original Program Authority	Public Law 83-566					
Current Program Authority	Section 14 of Public Law 83-566					
Current Hazard Classification	High					
Design Hazard Classification	Low					
Status of Operation and Maintenance (O&M)	O&M inspections are done annually by representatives of the 3 SLOs and a NRCS representative. Routine brush management, weed control and fertilization are conducted as needed. Based on O&M reports and site visits to FRS 21 the O&M is considered adequate					
Sedimentation rates (acre-feet/year)[1]	Originally Planned	14.67	Actual	1.79	Future	1 68
Evaluation of Potential Rehabilitation Projects			Updated	Yes		
Sponsor's Application Submission date		5 7 2012	NRCS acknowledges valid application			6 19 2012
Will upstream land rights be obtained to top-of-dam elevation per NWPM 505.36G?[2]						No
Are basic assumptions and decisions (Investigation and Analysis) included in the administrative record?						Yes
Is the Investigation and Analysis (I&A) attached to the Plan-EE?						Yes
Does planning and analyses comply with 1983 P&G?						Yes

[1] Future sediment storage is provided for 80 years. See Section L. Sedimentation

[2] See Section L. Rationale for Land Rights Below Top of Dam.

B. Purpose and Need:

There is a need for continued flood protection in the Plum Creek Watershed and to meet current safety standards The original purpose of the Plum Creek Watershed Plan was flood prevention The purpose of this supplemental watershed plan is to meet current safety and performance standards for a high-hazard dam and to provide continued flood protection for downstream properties for a 100-year, 24-hour flood event. In particular, there are 17 residences and five road crossings that are all located downstream which would be impacted by a dam failure of FRS No. 21. The risk of loss of life and property damage due to potential overtopping breach of the dam during an extreme flood event (probable maximum flood, PMF) is the reason that FRS No 21 needs to be rehabilitated See Section L Summary of Effects From a Catastrophic Event for more information concerning dam failure Within the 100-yr floodplain, the dam currently protects about 146 acres of agricultural and urban land, 2 residences, and 4 roads

C. National Economic Development (NED) Account

NED Benefits and Costs	No Action Alt 1	Dam Decommissioning Alt 2	Dam Rehabilitation Alt 3
Project Investment	$1,040,700	$4,650,400	$6,285,600
NRCS		$1,699,100	$4,360,400
Sponsors	$1,040.700	$2,951,300	$1,925,200
NED Plan[3]		○	◉
Beneficial Annual	$0	$97,600	$193,900
Adverse Annual	$0	$159,500	$216,600
Net Beneficial	$0	($61,900)	($22,700)
Benefit to Cost Ratio		0.6	0.9
Comparison of NED Benefits and Costs (Table 6) [4]	**No Action**	**Dam Decommissioning**	**Dam Rehabilitation**
Agricultural Related		$0	$21,800
Non-Agricultural Related		$61,700	$136,200
Other - Cost Avoidance	NA	$35,900	$35,900
Other Purpose			
Total Benefits	$0	$97,600	$193,900

U.S. Department Agriculture Natural Resources Conservation Service **Watershed Rehabilitation Worksheet** **Plum Creek Watershed,** Sponsoring Local Organization(s): Plum Creek Conservation District, Hays County SWCD, Caldwell-Travis SWCD	Watershed Plum Creek Watershed County(s) Caldwell State(s): TX Hydrologic Unit Code(s) 121002030404 Watershed Project Number: 482029 Watershed Site Number 21 NID Number TX03428

Average Annual NED Costs (Table 4)	No Action	Dam Decommissioning	Dam Rehabilitation
Amortized Installation	$35,400	$158,000	$213,600
Other Direct Costs			
Operation, Maintenance, and Replacement	$500	$1,500	$3,000
Total Adverse [4]	$35,900	$159,500	$216,600
Average Annual Flood Damage Reduction (Table 5)	**No Action**	**Dam Decommissioning**	**Dam Rehabilitation**
Agricultural			
Floodwater - Crop and Pasture	$39,600	$39,600	$26,400
Floodwater - Other Ag	$7,600	$7,600	$2,300
Sediment and Erosion - Sediment Deposition	$8,500	$8,500	$5,200
Sediment and Erosion - Channel Filling			
Other			
Sub-total Ag Damages	$55,700	$55,700	$33,900
Non-Agricultural			
Floodwater - Urban [7]	$14,400	$0	$0
Other: Road and Bridge	$158,000	$110,700	$36,200
Indirect - Damage reduction benefit			
Sub-total Non-Ag Damages	$172,400	$110,700	$36,200
Total Damages	$228,100	$166,400	$70,100

[3] See Section L National Economic Development Plan

[4] Price base, 2015

[5] The No Action (Future Without Project) alternative has $1,040,700 of construction costs associated with the sponsor's breach In the NED Account display, this Adverse Annual cost of $35,900 (construction cost amortized at 3.125% for 82 years plus O&M) is tracked as other cost avoidance (benefit) for the rehabilitation and decommission alternatives

[6] Price base 2015, amortization term (82 years) and discount rate of 3.125 percent used for analysis.

[7] For Alternative 3, damages and benefits will accrue from floods of greater magnitude than the 500-year frequency event, but these were not evaluated

D. Regional Economic Development (RED) Account

The RED Account was not evaluated in the plan since it was not identified as an issue during plan development

U.S. Department Agriculture Natural Resources Conservation Service July 2 15 **Watershed Rehabilitation Worksheet** **Plum Creek Watershed,** Sponsoring Local Organization(s): Plum Creek Conservation District, Hays County SWCD, Caldwell-Travis SWCD	Watershed: Plum Creek Watershed County(s): Caldwell State(s): TX Hydrologic Unit Code(s) 121002030404 Watershed Project Number: 482029 Watershed Site Number 21 NID Number: TX03428

E. Other Social Effects (OSE) Account

Record additional social effects of the alternatives to the human environment not covered in the P&G National Economic Development Account or in the NRCS-CPA-52.

Resource Concerns	No Action Amount, Status, Description (Document both short and long term impacts)	Dam Decommissioning Amount, Status, Description (Document both short and long term impacts)	Dam Rehabilitation Amount, Status, Description (Document both short and long term impacts)
Parklands	No Effect	No Effect	No Effect
	Upon review, no effect	Upon review, no effect.	Upon review, no effect
Regional water resource plans	No Effect	No Effect	No Effect
	Upon review, no effect	Upon review, no effect	Upon review, no effect
Land Values	May Effect	May Effect	No Effect
	Negative impact to 2 properties currently in floodplain and 146 acres due to induced flood damages	Negative impact to 2 properties currently in floodplain and 146 acres due to induced flood damages.	Land Values will be maintained.

F. Environmental Quality (EQ) Account

Record additional environmental quality effects of the alternatives to the human environment not covered in the NRCS-CPA-52

Resource Concerns	No Action Amount, Status, Description (Document both short and long term impacts)	Dam Decommissioning Amount, Status, Description (Document both short and long term impacts)	Dam Rehabilitation Amount, Status, Description (Document both short and long term impacts)
Groundwater Sole Source Aquifer	No Effect	No Effect	No Effect
	Upon review, not applicable	Upon review, not applicable.	Upon review, not applicable
Other Scoped Concerns			

G. Potential Modes of Dam Failure	Potential Failure	Ranking
Stability	Yes	2
Hydrologic	Yes	1
Seismic	No	N A
Seepage	Yes	3
Material Deterioration	Yes	4
Sedimentation	Yes	5

U S Department Agriculture Natural Resources Conservation Service July 2015 **Watershed Rehabilitation Worksheet** **Plum Creek Watershed,** Sponsoring Local Organization(s): Plum Creek Conservation District, Hays County SWCD, Caldwell-Travis SWCD	Watershed: Plum Creek Watershed County(s) Caldwell State(s): TX Hydrologic Unit Code(s) 121002030404 Watershed Project Number 482029 Watershed Site Number 21 NID Number: TX03428

Reasoning for Potential Failure:

Hydrologic - FRS No. 21 was originally designed to retain 2,550 ac-ft of floodwater It was designed as a low-hazard dam and is currently performing as intended. However, due to past downstream development, it does not currently meet dam safety criteria for a high-hazard dam, as required by the NRCS to prevent breaching of the auxiliary spillway and/or embankment Therefore, FRS No 21 is categorized as having high potential to fail due to deficient hydrologic capacity.

Stability - FRS No 21 does not show visible signs of slope failure, including sloughing or other signs of embankment instability There is some minor wave erosion apparent on the front slope of the embankment, but the embankment is in good overall condition. Monitoring of the embankment should continue in the future; however, the risk of embankment slope failure is judged to be low

Seepage - FRS No. 21 shows no visible signs of seepage, including piping and sloughing The embankment and auxiliary spillway are in good condition, though the grass cover on each is recovering from drought and overgrazing Therefore, potential failure due to seepage is judged to be low, but monitoring should continue in the future.

Material Deterioration - The riser and principal spillway are in good condition, with a few minor exceptions The outlet end of the conduit is damaged (including exposed steel) and some rust is apparent over the metal fabrications. A scour area also appears at the upstream end of the stilling basin, and it should be monitored in the future. Video from an internal camera shows small cracks within the conduit. Therefore, potential failure of the existing dam due to material deterioration is estimated to be low FRS No 21 should continue to be monitored, however, especially after significant storm events.

Sedimentation - Total sediment storage for FRS No 21 was originally planned at 733 4 ac-ft Recent bathymetric surveys indicate that 95 ac-ft were deposited during the past 53 years. Recent predictive soil loss equations and reservoir sedimentation evaluations completed in 2015 indicate that 168.2 ac-ft are needed for the next 100 years at the present land use and erosion rates At present land use conditions, there is enough capacity for 387 years of sediment storage. Therefore, the potential for FRS No. 21 to fail as a result of a lack of sediment storage is judged to be low

H. Consultation and Public Participation [8/]

Agency/Public Participation	Meeting/Contact	Date Complete	Site Visit	Date Complete
USFWS - ESA Sec 7/ Sec 12 PL -566	E-Mail	2 2 2016	No	
USACE District - Fort Worth	E-Mail	2 2 2016	No	
EPA Region - 6				
Other Federal - List				
Texas Parks and Wildlife Department	E-Mail	3 9 2015	Yes	3 4 2015
State level EPA				
State Conservation Commission				
Texas Historical Commission	E-Mail	11 20 2015	No	
Plum Creek FRS No. 10 Steering Committee	Other-Explain	12 17 2014	No	
Public Participation	Open House	12 17 2014	Yes	10 20 2014
Environmental Consultation and Public Comments -				

[8/] Consultation correspondence and agency letters reside in the administrative record file

Cultural Resources [9]

Literature Review	5 1 2015
Pedestrian Survey	11 19 2015
Consultation with State Archaeological Survey	10 30 2015
Consultation with State Historic Preservation Office	10 30 2015
Consultation with State Tribal Historic Preservation Office	
Consultation with Tribes	
Tribes Contacted - *None; no tribes listed with claims to a land area that includes Caldwell County, Texas*	
Cultural Resources identified in area of potential effect - None	
Cultural Resource Consultation and Public Comments - Consultation with SHPO complete	

[9/] Consultation correspondence and agency letters reside in the administrative record file.

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I. Land Use -Affected Area [10/]

Land Use -Affected Area (Acres)	Existing Conditions	No Action	Dam Decommissioning	Dam Rehabilitation
Residential	9 7	38 1	38 1	9 7
Commercial				
Cropland				
Farmstead				
Pasture and Rangeland	20 1	45 6	45 6	20 1
Forest	39.4	58.7	58 7	39 4
Water	26 6			41.9
Wetlands				
Transportation	1 3	2 7	2.7	1.3
Other	0 6	0.7	0 7	0 6
Total	97.7	145.8	145.8	113.0

[10/] Other Land Use acreage denotes area in length of tributary downstream of dam.

J. Risk and Uncertainty

Environmental (Wetlands and Fish/Wildlife Habitat) - During the planning process, an evaluation was undertaken to determine what effects or consequences the selected alternatives would have on the environment. NRCS biologists, environmental coordinators and hydraulic engineers conducted multiple field reviews and determined that best professional judgment was appropriate to make fish and wildlife habitat determinations. While technically the Nominal Group method was used, there was no reason to rank the solutions (alternatives) because all planning team members were in agreement on the alternatives, the adverse impacts, and the benefits due to the minor, temporary nature of the impacts.

Cultural Resources - No cultural resources were found in the areas of potential new disturbance associated with rehabilitation measures at FRS No. 21, and overall, there appears to be low potential for intact subsurface cultural deposits in these areas. No prior cultural resources identification activities have taken place in association with the original FRS No. 21 project. Also, no Native American tribes are listed as having claims to a land area that includes Caldwell County, Texas.

Economics - The risk and uncertainty in the analysis for flood damage reduction could be reduced for the economic analysis, but that would require more intensive primary and secondary data collection. The reasoning for work is to meet the purpose and need of the project which is to continue flood protection while meeting the present safety and performance standards. The identification of the NED alternative is not distorted by the use of these procedures. Thus, it was determined that increased investment in analysis was not necessary, and any reduction in risk and uncertainty would not result in a different identification of the NED alternative.

Hydrology - The areas of risk and uncertainty associated with this project lie in the accuracy of estimating flood flows and flood elevations. The uncertainty of flood flows and water surface elevations has the potential for increased damages as new properties are converted from agricultural to residential and commercial use. It is possible these uncertainties could lead to increased risk to human life in the event of a dam breach. Hydrologic methods and computer modeling used in this analysis are consistent with the standards of practice at this time. However, the tributary is not gauged, and no verification of storm flows is possible. The potential impacts for each alternative are estimated using techniques that relate potential damage to lost opportunity. However, these methods are in part based on professional judgment, and actual experience could be different.

Engineering - The areas of risk and uncertainty associated with this project lie in the accuracy of estimating costs associated with each alternative. Cost estimates were developed from available historic data. Factors discovered during actual design, notably the bearing capacity of the existing structure and availability of suitable material for construction, could affect these estimates. The potential impacts for each alternative are estimated using techniques that relate potential damage to lost opportunity. However, these methods are in part based on professional judgment, and actual experience could be different. Within the context of this study effort, all alternatives were considered on a comparable basis. There does not appear to be any area that, by using different procedures or making more intensive studies, would have resulted in a different decision.

Other -

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K. List of Preparers

Name	Current Position Years	Education	Experience (Years)	Applicable Certifications
NRCS				
Ronnie Skala, Hydraulic Engineer	26	B S Ag. Engineering	36	P E ,CFM
David Strakos, Civil Eng Tech	38	High School diploma	38	
Todd Marek, Civil Engineer	25	B S Ag Engineering	25	P.E
Jim Kelly, Wildlife Biologist	10	M.S. Forestry	13	
Carl Homeyer, Agricultural Economist	3	M S Ag. Land Economics and Real Estate	24	
Lori Ziehr, Landscape Conservation and Planning Leader	2	M S. Biology	17	
State Conservation Commission				
Engineering/Consulting Firm				
Steve Uselton, Resource Planning, M&E	2	BS, Agricultural Education	35	
James Featherston, Agricultural Economist, M&E	2	M S. Agricultural Economics	37	
Dennis Medlin, Agricultural Engineering, M&E	14	B.S Agricultural Engineering	46	P E
James Neighbors, Resource Planning, M&E	10	B S Agronomy, M.S. Range Management	41	
Roy Crutchfield, Geologist, M&E	11	B S. Geology	41	
Trent Street, Civil Engineer, M&E	2	B S. Agricultural Engineering	36	P.E
Larry Goertz, Hydraulic Engineer, M&E	11	M S Civil Engineering	41	P.E.
Glen Ketcham, CET CADD, M&E	14	Associate Degree Computer Drafting	14	
James Moore, Civil Engineer, M&E	1	BS, Agricultural Engineering	34	P E.
Jeff Irvin, Project Manager, AECOM	10	MSCE Water Resources Engineering, MSCE Geotechnical Engineering, BS	40	P E
Monica Wedo, Hydrology SITES, AECOM	13	B S Civil Engineering, M.S. Environmental and Water Resources Engineering	14	P E
Chris Wright, Dam Breach Modeling, AECOM	9	B S Civil Engineering	9	P E
Luke Lunsford, Dam Breach Modeling, AECOM	3	B S Civil Engineering	3	
Chelsea Burkett, H&H Modeling, AECOM	2	B S Civil Engineering	2	E I T
Justin Baker, H&H Modeling, AECOM	1	B.S Chemistry, M.S. Environmental and Water Resources Engineering	2	E.I.T

U.S. Department Agriculture Natural Resources Conservation Service July 2 15 **Watershed Rehabilitation Worksheet** **Plum Creek Watershed,** Sponsoring Local Organization(s): Plum Creek Conservation District, Hays County SWCD, Caldwell-Travis SWCD	Watershed: Plum Creek Watershed County(s): Caldwell State(s): TX Hydrologic Unit Code(s) 121002030404 Watershed Project Number: 482029 Watershed Site Number: 21 NID Number: TX03428

Mariel Polter, Economic Analysis, AECOM	1.5	B.S. Civil Engineering, M.E Environmental Engineering	1.5	E.I.T.
Jason Weiss, Economic Analysis, AECOM	8	M.S Resource Economics and Policy, B.i.e., Industrial Engineering	20	CFM
Michael Lenherr, Rehab. Alt. Analysis, AECOM	18	B.S Civil Engineering	34	P.E.
Nevin Durish, Ecologist, AECOM	9	B S Zoology	12	
Jennifer Oakley, Ecologist, AECOM	1	B S. Biology, B.S. Environmental Science, M.S. Wildlife Ecology	7	Wetland Training
Steve Ahr, Cultural Resources, AECOM	8	B.A. Anthropology, M.A. Anthropology, Ph.D. Geology	20	

L. Additional Notes and Comments

Sedimentation: The total sediment volume for storage in Plum Creek No. 21 was originally planned at 733.4 ac-ft. The submerged sediment storage of 653.1 ac-ft was planned below the principal spillway crest at elevation 505.58 ft NAVD 88, with 195.59 ac-ft of that storage being below a port elevation of 500.68 ft NAVD 88. The remaining 80.3 ac-ft of storage would be that calculated below elevation 506.18 ft NAVD 88, and deposited as aerated sediment in the flood pool.

Recent predictive soil loss equations and reservoir sedimentation evaluations completed in 2015 indicate that 84.1 ac-ft of sediment storage will be required for the next 50 years with current land use conditions. This would amount to 168 2 ac-ft for 100-year storage. At the current PS crest elevation, for the 100-year storage, there would be a requirement of 143.6 ac-ft of submerged sediment below the PS crest and 24.6 ac-ft of aerated sediment in the flood pool. With current conditions maintained, the required sediment storage would be 1.68 ac-ft per year in total and 1.44 ac-ft per year below the principal spillway crest.

Recent bathymetric surveys indicate that actually 95 ac-ft of submerged deposition occurred during the land use of the past 53 years since the reservoir construction The surveyed amount of sediment storage remaining below the principal spillway crest is currently 558 1 ac-ft. This would allow for 311 79 years of storage at the past deposition rate, and under current land use conditions, it would allow the 100-year storage of 143.6 ac-ft It is estimated that by lowering the PS crest elevation to 500.0 ft NAVD 88, there would be 116 ac-ft of sediment storage capacity Therefore, the storage available with the project will not accommodate a 100-year design life Using the 1.44 ac-ft per year rate results in about 80 years of sediment storage capacity remaining after installation of Alternative 3, which results in an 82-year period of analysis for the project (80 years evaluation period plus 2 years installation period). The accumulated sediment in the reservoir storage areas will not be disturbed during the rehabilitation of Plum Creek FRS No. 21.

For Alternative 3, the maximum sediment storage capacity below the principal spillway crest elevation is 116 ac-ft. The required submerged storage capacity for a 100-year period has been estimated to be 143.6 ac-ft. The estimate of storage available does not take into account any borrow volume excavated for rehabilitation below the principal spillway crest, which could increase the available sediment storage volume. The table below reflects the difference in elevations for Alternative 3 and a rehab option that has 100-years of sediment storage.

Item	*Alternative 3*	*100-yrs Sediment Storage Option*
Volume (ac-ft)	116	143.6
PS Crest (ft)	500.0	500 7
RCC-Step Crest (ft)	517.4	517.6
Top of Dam (ft)	526.5	526 6

Although the differences in elevation are minor, there would be $11,800 in additional costs (earthwork, engineering services, etc.) to provide 100 years of sediment storage below the principal spillway crest elevation. Both options would produce identical benefits Therefore, the option maximizing net benefits at the least cost would be Alternative 3.

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Rationale for Land Rights Below Top of Dam Elevation: The sponsors will acquire such real property as will be needed in connection with the works of improvement. According to NRCS policy for dam rehabilitation, if the structure has an auxiliary spillway, minimum land rights elevation may not be lower than the higher elevation of either the auxiliary spillway crest or the elevation of the water surface during passage of the 100-year, 24-hour storm through the dam. The sponsors currently hold easements for Plum Creek FRS No. 21 that meet or exceed the minimum NRCS and the State of Texas requirements (519.3 ft NAVD88, which is existing auxiliary spillway crest plus 2.0 feet). The current easements correspond to the elevation greater than the 1,000-year, 24-hour storm event. However, these easements are at an elevation below top of dam elevation and would cost approximately $590,000. The additional land rights cost would have a minimum reduction of flood risk to upstream properties. The sponsors are not securing upstream land rights to the top of dam elevation for the following reasons: (1) the incremental costs do not justify the economic benefit of reducing the flood risks to upstream properties, therefore, the alternative would not be the NED plan and would not qualify for cost-share assistance; (2) securing additional upstream land rights has the potential to result in legal actions or proceedings resulting in project delays; and (3) the rehabilitation project needs to proceed to implementation to protect the public and downstream properties at risk. The sponsors acknowledge the risk and liability for not securing land rights to the top of dam elevation.

The Sponsors do not have the legal authority to restrict upstream development. Where appropriate, the Sponsors will inform representatives of municipality government (i.e., City Council Members) and/or County government (i.e., County Floodplain Manager) of the potential flood risks to upstream development below top of dam elevation. Upon request, the Sponsors will provide assistance to representatives of municipality government (i.e., City Council Members) and/or County government (i.e., County Floodplain Manager) and/or real estate businesses to inform upstream landowners of the flood potential of new or existing development below the top of dam elevation.

National Economic Development Plan: The national economic development (NED) plan is the federally assisted alternative with the greatest net economic benefits. This removes Alternative 1 (No Action or Future Without Project) as a NED plan option where human life is at risk in the event of catastrophic failure of an existing dam. Even though both federally assisted alternatives have negative net benefits, the NED plan is Alternative 3, the rehabilitation option, which has fewer negative net benefits than Alternative 2. In this instance, benefits have only been quantified monetarily. In water resources projects, non-monetary benefits are usually present and are measured qualitatively. For each alternative, these are explained in the NRCS-CPA-52 form, which is a part of this document. The primary reason FRS No. 21 was reclassified to high hazard was due to the threat of risk of loss of life should the dam fail. Both federally assisted alternatives would reduce the threat of risk of loss of life. However, Alternative 3 provides more benefits from a quantitative and qualitative perspective and is the preferred alternative of the sponsors.

Summary of Effects From a Catastrophic Breach Event:

Plum Creek FRS No. 21 does not meet current dam design and safety requirements. The dam was originally constructed in 1962 as a low-hazard structure for the purpose of protecting downstream agricultural lands from flooding. The NRCS and the TCEQ - Dam Safety Program both agreed on the classification of the structure as "high hazard". The high hazard classification is based on the risk of loss of life concerning at-risk properties located in the downstream dam breach inundation area.

As a result of population growth and rural development, 17 residences and 5 road crossings [FM 1185, CR 183 (2 crossings), CR 182, and FM 672] are now at risk from a catastrophic breach of FRS No. 21. Buildings would experience floodwater depths from first floor elevation to 5.9 feet.

If the dam failed, breach studies indicate that the 5 road crossings would be overtopped by the following depths: FM 1185 - 6.7 ft; CR 183 east crossing - 10.9 ft; CR 183 west crossing - 11.3 ft; CR 182 - 7.4 ft; and FM 672 - 4.5 ft.

To estimate population at risk (PAR), the following was taken into consideration: 17 residences as well as motorists on the 5 roads downstream would be at-risk in the event of a breach. Using an average of 3 people per residence would result in 51 people at risk from a breach. Due to the estimated depth combined with the velocity of the breach floodwaters, there could be many other people (i.e., farm workers downstream) at risk of serious injuries. The 5 road crossings would be severely damaged as a result of a breach. It was estimated that 5 vehicles would be in harm's way. Considering an average of 2 occupants per vehicle, 10 motorists would be exposed to risk. Vehicles on the roads would be washed downstream, and the road surfaces would be damaged and impassable. Traffic would be disrupted for an extended time while the roadways were being repaired. Given the number of properties and vehicles located within the breach zone, it is estimated that at a minimum the number of people at risk due to a breach of FRS No. 21 would be 61.

US Department Agriculture Natural Resources Conservation Service July 2015 **Watershed Rehabilitation Worksheet** **Plum Creek Watershed,** Sponsoring Local Organization(s): Plum Creek Conservation District, Hays County SWCD, Caldwell-Travis SWCD	Watershed Plum Creek Watershed County(s) Caldwell State(s) TX Hydrologic Unit Code(s) 121002030404 Watershed Project Number: 482029 Watershed Site Number 21 NID Number TX03428

Total damages from a catastrophic breach of FRS No. 21 are estimated to be about $1,250,000 $500,000 for urban properties (includes contents and vehicles), $700,000 for the road crossings and other infrastructure, and $50,000 for affected agricultural lands Area flooded due to a breach of the dam would be about 1,030 acres.

Steering Committee Formed, Members Include:

Kharley Smith - Hays County Emergency Management Coordinator

Mark Jones - Hays County Commissioner

Dennis Guerra - Site 10 Landowner/Developer Manager

Joe Roland - Caldwell County Commissioner

James Lipscomb - PCCD Board Director, Caldwell County

Philip Hunter - Site 21 Landowner

Mack Reynolds - Site 21 Proposed Landfill Representative

Martin Ritchie - Caldwell County Emergency Management Coordinator

Fred Rothert - PCCD Board Director, Hays County

Watershed Rehabilitation Alternatives Table with Rationale for Level of Analysis for Plum Creek FRS No. 21

Alternative	Alternative Description	Cost	Carried Through Analysis	Rationale
No Action/Future Without Federal Project	This alternative does not involve Federal action or Federal funding. It includes excavating a breach in the dam of sufficient size to safely pass the 24-hour duration flood event of 100-year recurrence interval, with no influence on the water surface profile. This breach would be a minimum size opening in the dam from top of dam to the valley floor which would eliminate the structures ability to store water. To not impede flows through the breached embankment and to reduce certain safety and health factors, some of the principal spillway components would also be removed. The excavated material (about 70,000 cu. yd.) would be placed in the present easement area, and the remaining portion of the embankment and the land currently covered by the sediment pool would be maintained as a greenbelt area. Downstream (DS) flooding conditions would be similar to those that existed prior to the construction of the dam. The 100-year floodplain DS would be enlarged from about 71 acres to about 146 acres. All exposed areas would have vegetation established for erosion and sediment control (approximately 58 acres). Construction activities would require that a Storm Water Pollution Prevention Plan (SWP3) be in effect. Since the 100-year floodplain DS would be enlarged due to the absence of flood protection, potential future DS development would be restricted. Floodwaters from a 100-year storm event would overtop FM 1185 by 2.7 ft, County Road (CR) 183 (Old Lytton Springs Rd.) east crossing by 5.4 ft, CR 183 west crossing by 6.3 ft, CR 182 (Dry Ck. Rd.) by 5.5 ft, FM 672 by 3.5 ft. NOTE: The 100-year floodwater depths over CR 182 and FM 672 are influenced by effects of uncontrolled areas below FRS No. 21	$1,040,700	Yes	No Action

Watershed Rehabilitation Alternatives Table with Rationale for Level of Analysis for Plum Creek FRS No. 21

Alternative	Alternative Description	Cost	Carried Through Analysis	Rationale
Dam Decommissioning	This alternative involves federal action and consists of removing the storage function of the dam and reconnecting, restoring, and stabilizing the stream and floodplain functions. Although complete removal of the embankment is sometimes required for decommissioning, a partial removal of the embankment would take place. This would consist of excavating a breach in the dam of sufficient size to safely pass a 24-hour duration flood event of 100-year recurrence interval, with no influence on the water surface profile. This would eliminate the structure's ability to store water. DS flooding conditions would be similar to those that existed prior to construction of the dam. Therefore, 2 residences would need to be relocated. The remaining portion of the embankment and land currently covered by the sediment pool would be maintained as a greenbelt area. Excavated material (approximately 91,000 cu. yd.) would be placed in the sediment and detention pool areas and all exposed areas would be vegetated as needed for erosion control (approximately 60 acres). Channel work would be performed to reconnect the stream channel through the sediment pool. Riparian vegetation would be established along the stream channel (about 12 acres). A grade stabilization structure would be installed to stabilize sediment and prevent stream headcutting. To not impede flows through the breached embankment and to reduce certain safety and health factors, some of the principal spillway components would also be removed. Construction activities will require that a SWP3 be in effect. Stream crossings on FM 1185, CR 183 (two crossings), and FM 672 would need to be modified to accommodate the 100-year flood event. The 100-year floodplain DS would be enlarged from about 71 acres to about 146 acres due to the absence of flood protection. Potential future downstream development would be restricted.	$4,650,400	Yes	Removes the storage function of the dam and reconnects, restores, and stabilizes the stream and floodplain functions. Two residences would need to be relocated and four road crossings modified.

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Watershed Rehabilitation Alternatives Table with Rationale for Level of Analysis for Plum Creek FRS No. 21

Alternative	Alternative Description	Cost	Carried Through Analysis	Rationale
Dam Rehabilitation	This alternative consists of removing the existing principal spillway system; installing a new principal spillway system consisting of a standard inlet tower, crest at elevation 500 ft (5.58 feet lower than as-built) and a 42 inch-diameter conduit discharging into the stilling basin of a new roller compacted concrete (RCC) spillway; adding a 300-foot-wide RCC-step auxiliary spillway through the main embankment at elevation 517.4 ft (0.12 foot higher than the as-built earthen auxiliary spillway crest elevation, but 0.65 foot lower than the NRCS survey elevation) and closing off the original auxiliary spillway channel; raising the dam crest approximately 3.9 feet to elevation 526.5 ft; flattening the upstream and downstream embankment slopes to 3:1, and reconstructing an upstream wave berm and adding rock riprap for wave protection. Additional land rights (approximately 2 acres) may be needed for the extension of the downstream toe from raising the embankment crest and flattening the embankment slope. Best management practices during construction will be utilized to avoid and minimize any potential adverse impacts. Construction activities will result in the disturbance of approximately 38 acres and will require that a SWP3 be in effect. All disturbed areas will be revegetated using adapted and/or non-invasive native species. Planting equipment will be cleaned and certified seed will be used as measures to prevent the spread of invasive species. No compensatory mitigation will be required as a result of implementing this alternative. All of the proposed works of improvement are on the dam and abutment maintenance areas.	$6,285,600	Yes	Meet Purpose and Need of the Project
Dam Rehabilitation to Low Hazard classification with Nonstructural measures	This alternative considered the purchase of deed restrictions of all land outside of the current 100-year floodplain but within the breach area, relocating residences within the breach area, and modifying the roadways downstream to ensure traffic would not be at risk from a breach. Enacting this alternative would cause the dam to be reclassified as a low-hazard dam, resulting in no population at risk within the breach area of the dam.	$8.2 million	No	Meets purpose and need but not reasonable due to extreme cost and potential disruption of community cohesion.

Table 3 – Structural Data—Dams with Planned Storage Capacity
FRS No. 21 Plum Creek Watershed, Texas

Item	Unit	Structure
Class of structure		High
Seismic zone		0
Uncontrolled drainage area	mi^2	8.56
Controlled drainage area	mi^2	0.00
Total drainage area	mi^2	8.56
Runoff curve No. (1-day) (AMC II)		72.2
Time of concentration (Tc)	hrs	2.58
Elevation top dam [1]	ft	526.5
Elevation crest auxiliary spillway [2]	ft	517.4
Elevation crest high stage inlet [3]	ft	500.0
Elevation crest low stage inlet	ft	N/A
Auxiliary spillway type		RCC-Step
Auxiliary spillway bottom width	ft	300
Auxiliary spillway exit slope	percent	N/A
Maximum height of dam	ft	34
Volume of fill [4]	yd^3	258,210
Total capacity [2]	acre ft	2,978
Sediment submerged	acre ft	116
Sediment aerated	acre ft	20
Beneficial use (identify use)	acre ft	N/A
Floodwater retarding	acre ft	2,862
Between high and low stage	acre ft	N/A
Surface area		
Sediment pool [3]	acres	42
Beneficial use pool (identify use)	acres	N/A
Floodwater retarding pool [2]	acres	333
Principal spillway design		
Rainfall volume (1-day)	in	10.4
Rainfall volume (10-day)	in	16.7
Runoff volume (10-day)	in	9.80
Capacity of low stage (max.)	ft^3/s	N/A

Table 3 – Structural Data—Dams with Planned Storage Capacity
FRS No. 21 Plum Creek Watershed, Texas

Item	Unit	Structure
Capacity of high stage (max.)	ft^3/s	257.7
Dimensions of conduit	ft or in	42
Type of conduit		Concrete-lined, steel cylinder pipe
Frequency operation-auxiliary spillway	percent chance	1.0
Auxiliary spillway hydrograph		
Rainfall volume	in	13.59
Runoff volume	in	9.86
Storm duration	hrs	6
Velocity of flow (Ve)	ft/s	N/A
Max. reservoir water surface elev.	ft	519.9
Freeboard hydrograph		
Rainfall volume	in	45.0
Runoff volume	in	40.7
Storm duration	hrs	24
Max. reservoir water surface elev.	ft	526.5
Capacity equivalents		
Sediment volume	in	0.25
Floodwater retarding volume	in	6.27
Beneficial volume (identify use)	in	N/A

[1] All elevations are recorded in North American Vertical Datum 1988 (NAVD88).

[2] Crest of RCC-step structural auxiliary spillway.

[3] Crest of principal spillway.

[4] Total volume of fill in dam 258,210 CY (includes additional 50,860 CY needed in rehabilitation project).

Comparison Table of Structural Options
FRS No. 21 Plum Creek Watershed, Texas

Item	Unit	As-Built [1]	Existing Condition	Alt 1 No Action	Alt 2 Decom	Alt 3 Rehab
Class of structure		Low	High	N A	N A	High
Seismic zone		0	0			0
Uncontrolled drainage area	mi^2	8.65	8.56			8.56
Controlled drainage area	mi^2	0.00	0.00			0.00
Total drainage area	mi^2	8.65	8.56			8.56
Runoff curve No. (1-day) (AMC II) [2]	number	84	72.2			72.2
Time of concentration (Tc)	hrs	Unknown	2.58			2.58
Elevation top dam [3]	ft	522.6	522.5			526.5
Elevation crest auxiliary spillway	ft	517.3	518.1			517.4
Elevation crest high stage inlet	ft	505.6	505.9			500.0
Elevation crest low stage inlet	ft	500.7	501.0			N A
Elevation crest add. low stage inlet [4]	ft	498.4	498.8			N A
Auxiliary spillway type	type	Vegetated	Vegetated			RCC Step
Auxiliary spillway bottom width	ft	300	300			300
Auxiliary spillway exit slope	percent	4.00	3.80			N A
Length of Dam	ft	2,982	2,982			3,542
Maximum height of dam	ft	30	30			34
Volume of fill	yd^3	207,350	207,350			258,210 [10]
Total capacity [5]	acre ft	3,283	3,189			2,974
Sediment submerged	acre ft	653	558			116
Sediment aerated	acre ft	80	N A			20
Beneficial use (identify use)	acre ft	N/A	N A			N A
Floodwater retarding	acre ft	2,550	2,631			2,862
Between high and low stage	acre ft	543	478			N A
Surface area						
Sediment pool [6,7]	acres	130	125			42
Beneficial use pool (identify use)	acres	N/A	N A			N A
Floodwater retarding pool [5]	acres	331	347			333
Principal spillway design						
Rainfall volume (1-day)	in	Unknown	10.4			10.4
Rainfall volume (10-day)	in	Unknown	16.7			16.7
Runoff volume (10-day)	in	Unknown	9.80			9.80
Capacity of low stage (max.)	ft3/s	Unknown	Unknown			N A
Capacity of high stage (max.)	ft3/s	87	115			258
Dimensions of conduit	in	30	30			42
Type of conduit		Concrete lined steel cylinder pipe	Concrete lined steel cylinder pipe			Concrete lined steel cylinder pipe
Frequency of operation-auxiliary spillway (earthen)	percent chance	2.93	Unknown			N A
Frequency of operation-auxiliary spillway (structural) [7]	percent chance	N/A	N A			1

Comparison Table of Structural Options
FRS No. 21 Plum Creek Watershed, Texas

Item	Unit	As-Built [1]	Existing Condition	Alt 1 No Action	Alt 2 Decom	Alt 3 Rehab
Auxiliary spillway hydrograph						
Rainfall volume [8]	in	6.81	13.59			13.59
Runoff volume	in	4.96	9.86			9.86
Storm duration	hrs	6	6			6
Velocity of flow (Ve)	ft/s	Unknown	7.9			-
Max. reservoir water surface elev.	ft	Unknown	521.0			519.9
Freeboard hydrograph						
Rainfall volume [9]	in	16.71	45.0			45.0
Runoff volume	in	14.63	40.7			40.7
Storm duration	hrs	6	24			24
Max. reservoir water surface elev.	ft	522.3	Overtops			526.5
Capacity equivalents						
Sediment volume	in	1.42	1.22			0.25
Floodwater retarding volume	in	5.53	5.76			6.27
Beneficial volume (identify use)	in	N/A	N A			N A

[1] Total Capacity and Surface Area entries are from stage-storage table on original as-built drawings (adjusted to North American Vertical Datum 1988 (NAVD88)).

[2] CN in original Watershed Plan indicates CN is "Average CN - Condition II" The CN for Alt 3 is the Adjusted AMC II CN

[3] All elevations are to be recorded in North American Vertical Datum 1988 (NAVD88).

[4] The original as-built plans indicate two 16" orifice plates at the high stage inlet elevation 505.58 ft In 1968, these orifice plates were removed and two additional low-level ports were added at elevation 498.42 ft, dimensions 16" high x 25" wide each

[5] Crest of vegetated auxiliary spillway for As-Built and Existing condition, crest of RCC-step structural auxiliary spillway for Alt 3

[6] Crest of principal spillway riser. For the As-Built and Existing condition, this corresponds to the high stage crest.

[7] The 130 acres shown for the As-Built condition reflects the surface area presented in the original plans in the stage-storage table at the principal spillway riser crest elevation of 505.6 ft. The surface area interpolated from this same table for the additional low stage inlet at 498 4 ft is 35.4 acres. Present day analysis of LiDAR and survey data indicate that at the surveyed, additional low stage inlet crest elevation of 498 81 ft, the surface area is 26.6 acres (current normal operating level) Therefore, lowering the principal spillway riser crest from 505.6 ft (or 505 94 ft per survey) to 500.0 ft results in an normal operating pool area increase from 26.6 acres to 41.9 acres, per present day available data

[8] Rainfall volume in inches was taken as 0 5P of the 6-hour rainfall shown by Figure 3 21-1, NEH-4, Supplement 3A for original design

[9] Rainfall volume in inches was taken as 1.23P of the 6-hour rainfall shown by Figure 3.21-1, NEH-4, Supplement 3A for original design

[10] Total volume of fill in dam 258,210 CY (includes additional 50,860 CY needed in rehabilitation project).

U.S. Department of Agriculture
Natural Resources Conservation Service

ENVIRONMENTAL EVALUATION WORKSHEET

A. Client Name: Plum Creek Conservation District, Hays Co SWCD, Caldwell-Travis SWCD, Hays County SWCD

B. Conservation Plan ID # (as applicable): PC 21 Sup WS Plan/EE
Program Authority (optional): Watershed Rehabilitation

D. Client's Objective(s) (purpose):
Sponsors want to comply with current safety and performance standards and provide continued flood protection for downstream properties. Dam needs to be rehabilitated to meet current performance and safety criteria.

C. Identification # (farm, tract, field #, etc. as required):
Plum Creek FRS No. 21 5 miles northeast of Lockhart, Caldwell County, Texas, National Dams ID TX03428, as shown on the Lockhart North USGS quadrangle map.

E. Need for Action:
Plum Creek FRS No. 21 has been reclassified as a high hazard dam and does not meet the minimum criteria for safety and performance standards.

G. Alternatives

Alternative 1 √ if RMS ☐	Alternative 2 √ if RMS ☐	Alternative 3 √ if RMS ☐
Future without project: Control breach of the dam without federal assistance to remove the risk of a catastrophic breach from overtopping.	Decommission Dam. Control breach of the dam to remove the risk of a catastrophic breach from overtopping, stabilize the stored sediment with a grade stabilization structure (GSS) and restore the riparian zone.	Replace existing inlet tower with standard inlet tower; lower crest 5.58', install 42" conduit discharging into a roller compacted concrete spillway; add 300' wide RCC-step auxiliary spillway through the main embankment at elevation 517.4' close off original earthen auxiliary spillway channel; raise dam crest 3.9', flatten the upstream & downstream slopes to 3:1 & reconstruct upstream wave berm and add rock riprap for wave protection

Resource Concerns

In Section "F" below, analyze, record, and address concerns identified through the Resources Inventory process.
(See FOTG Section III - Resource Planning Criteria for guidance).

F. Resource Concerns and Existing/ Benchmark Conditions (Analyze and record the existing/benchmark conditions for each identified concern)	H. Effects of Alternatives — Alternative 1: Amount, Status, Description (Document both short and long term impacts)	√ if does NOT meet PC	Alternative 2: Amount, Status, Description (Document both short and long term impacts)	√ if does NOT meet PC	Alternative 3: Amount, Status, Description (Document both short and long term impacts)	√ if does NOT meet PC
SOIL: *EROSION*						
Excessive bank erosion from streams, shorelines or water conveyance channels Current conditions do not show active erosion	Short Term: Breach of the dam would cause excessive streambank erosion downstream and within the drained sediment pool. Long Term: Ongoing erosion from increased flows until riparian zone revegetates	☐ NOT meet PC	Short Term: Breach of the dam would cause excessive streambank erosion downstream and within the drained sediment pool until the riparian zone was restored and the sediment is stabilized. Long Term: Erosion minimized by riparian restoration	☐ NOT meet PC	Short term: minor temporary erosion due to construction activities. Long term: all disturbed areas stabilized with vegetation, and wave berm stabilized with rock rip rap. Erosion impacts would be returned to pre-existing conditions	☐ NOT meet PC
Concentrated flow Current conditions indicate no gully erosion caused by concentrated flow	Short Term: Stored sediment becomes unstable and potentially moves downstream following controlled breach. Long Term: Stable outlets upstream potentially become unstable	☐ NOT meet PC	Short term: Stored sediment is stabilized by GSS. Long term: vegetated riparian zone stabilizes stored sediment, but sediment from upstream erosion will no longer be trapped	☐ NOT meet PC	Upon review: no change from current conditions in short or long term	☐ NOT meet PC
SOIL: *SOIL QUALITY DEGRADATION*						
No resource concern identified	Breach results in increased sedimentation downstream due to loss of sediment pool in short and long term	☐ NOT meet PC	Decommission of the dam would cause increased sedimentation downstream due to loss of sediment pool in short and long term	☐ NOT meet PC	Upon review: no change from current conditions in short or long term	☐ NOT meet PC
		☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
WATER: *EXCESS / INSUFFICIENT WATER*						
Excess (Ponding, flooding, seasonal high water table, seeps, and drifted Current conditions indicate no excessive flooding conditions	Controlled breach results in excessive flooding downstream due to loss of flood protection in short and long term	☐ NOT meet PC	Decommission of the dam would cause excessive flooding downstream due to the loss of flood protection in short and long term	☐ NOT meet PC	Upon review: no change from current conditions in short or long term	☐ NOT meet PC
WATER: *WATER QUALITY DEGRADATION*						
Excessive sediment in surface waters Excessive suspended sediment and turbidity is confined to sediment pool following rainfall events	Breach of the dam allows sediment from upstream erosion to move downstream decreasing water quality in short and long term	☐ NOT meet PC	Short term: Stored sediment would be stabilized by the vegetation of the riparian zone and GSS. Long term: sediment from upstream erosion would be transported downstream degrading the water quality	☐ NOT meet PC	Short term impacts to WQ during construction. After construction WQ would be the same as current conditions. Best management practices (BMPs) and a Stormwater Pollution Prevention Plan (SWP3) would be implemented	☐ NOT meet PC

		☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
7. Resource Concerns and Existing/ Benchmark Conditions (Analyze and record the existing/benchmark conditions for each identified concern)	**5. (continued)** **Alternative 1** **Amount, Status, Description** *(Document both short and long term impacts)*	√ if does NOT meet PC	**Alternative 2** **Amount, Status, Description** *(Document both short and long term impacts)*	√ if does NOT meet PC	**Alternative 3** **Amount, Status, Description** *(Document both short and long term impacts)*	√ if does NOT meet PC
AIR: *AIR QUALITY IMPACTS*						
No resource concern identified Caldwell County is not in a non-attainment area	Short term Only minor dust during construction activities Long Term no change from current conditions	☐ NOT meet PC	Short term Only minor dust during construction activities BMPs will be utilized. Long Term no change from current conditions	☐ NOT meet PC	Short term Only minor dust during construction activities BMPs will be utilized. Long Term no change from current conditions	☐ NOT meet PC
		☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
The area in and around the perimeter of the sediment pool at FRS No 21 currently supports wetland plant communities	Short term Breach of the dam would eliminate the impounded water resulting in a loss of aquatic conditions suitable to support wet and vegetation Long term associated wetland vegetation would be converted to upland vegetation Wetland values would be lost	☐ NOT meet PC	Short term Breach of the dam would eliminate the impounded water resulting in a loss of aquatic conditions suitable to support wetland vegetation Long term associated wetland vegetation would be converted to upland vegetation. Wetland values would be lost.	☐ NOT meet PC	Short term minor impacts to wetland communities during construction Long term increased normal pool will likely increase area of wetland plant communities following rehabilitation activities	☐ NOT meet PC
		☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
ANIMALS: *INADEQUATE HABITAT FOR FISH AND WILDLIFE*						
Other The sediment pool currently provides 25 1 ac of shallow water habitat and 1.6 ac of deep water habitat for wildlife	Short and long term Breach of the dam would eliminate 25 1 ac of shallow water habitat and 1 6 ac of deep water habitat as it would be converted to unimproved riparian habitat or floodplain. Long term stream habitats would be reestablished	☐ NOT meet PC	Short and long term Breach of the dam would eliminate 25 1 ac of shallow water habitat and 1 6 ac of deep water habitat as it would be converted to improved riparian habitat or floodplain Long term stream habitats would be reestablished	☐ NOT meet PC	Short term Minor temporary impacts during construct on due to draining the sediment pool. Habitat would be returned to pre-existing conditions following rehabilitation and would not effect the continued existence of these wildlife species and habitat. Long term normal operating pool would be increased to 37 1 ac of shallow water aquatic habitat and 4 9 ac of deep water aquatic habitat	☐ NOT meet PC
ANIMALS: *INADEQUATE HABITAT FOR FISH AND WILDLIFE*						
Other The sediment pool currently provides food resources to wildlife such as migratory birds	Breach of the dam would convert open water food resources to stream resources, unimproved riparian habitat, or floodplain	☐ NOT meet PC	Breach of the dam would convert open water food resources to stream resources improved riparian habitat or floodplain	☐ NOT meet PC	Short term Minor temporary impacts during construction due to draining the sediment pool Long term: 15 3 ac increase in normal pool would add to shallow and deep-water habitats These impacts would not effect the continued existence of these wildlife species and habitat	☐ NOT meet PC
ANIMALS: *LIVESTOCK PRODUCTION LIMITATION*						
Inadequate livestock water The sediment pool currently holds water for livestock	Breach of dam would eliminate livestock water supply from sediment pool in the short and long term	☐ NOT meet PC	Breach of dam would eliminate livestock water supply from sediment poo in the short and long term	☐ NOT meet PC	Short term Minor temporary impacts during construction due to draining the sediment pool Long term increase in normal pool would provide additional shoreline for livestock access	☐ NOT meet PC

		☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
ENERGY: INEFFICIENT ENERGY USE						
No resource concern identified	Upon review no effects.	☐ NOT meet PC	Upon review no effects	☐ NOT meet PC	Upon review, no effects	☐ NOT meet PC
		☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
HUMAN: ECONOMIC AND SOCIAL CONSIDERATIONS						
Public Health and Safety The dam currently fails to meet safety and performance standards for high hazard dam	Controlled breach of dam would reduce threat to loss of life however, it would cause more frequent flooding downstream in the short and long term		Controlled breach of dam would reduce threat to loss of life however it would cause more frequent flooding downstream in the short and long term		Reduced threat to loss of life and level of flood protection continued	
Land Use Currently a floodwater retarding structure with impounded sediment pool	Floodwater retarding structure converted to greenbelt		Floodwater retarding structure converted to improved greenbelt		No change in land use	

Special Environmental Concerns: Environmental Laws, Executive Orders, policies, etc.

In Section "G" complete and attach Environmental Procedures Guide Sheets for documentation as applicable. Items with a "•" may require a federal permit or consultation/coordination between the lead agency and another government agency. In these cases, effects may need to be determined in consultation with another agency. Planning and practice implementation may proceed for practices not involved in consultation.

G. Special Environmental Concerns (Document existing/ benchmark conditions)	H. Impacts to Special Environmental Concerns					
	Alternative 1		Alternative 2		Alternative 3	
	Document all impacts (Attach Guide Sheets as applicable)	√if needs further action	Document all impacts (Attach Guide Sheets as applicable)	√if needs further action.	Document all impacts (Attach Guide Sheets as applicable)	√if needs further action
•Clean Air Act *Guide Sheet FS1 FS-2* Caldwell County is not in a non-attainment area	No Effect Upon review, no action needed.	☐	No Effect Upon review no action needed	☐	No Effect Upon review no action needed	☐
•Clean Water Act / Waters of the U.S *Guide Sheet Fact Sheet* Assume that Waters of the U.S may be present on site	May Effect Proposed action could result in discharge of fill material into waters of the U.S. 404 permit may be required	☐	May Effect Proposed action would most likely be authorized by NWP 27 for stream restoration	☐	May Effect Proposed action would most likely be authorized by NWP 3 without PCN	☐
•Coastal Zone Management *Guide Sheet Fact Sheet* Not present in Area of Potential Effect (APE)	No Effect Upon review not applicable	☐	No Effect Upon review not applicable	☐	No Effect Upon review not applicable	☐
Coral Reefs *Guide Sheet Fact Sheet* Not present within the APE.	No Effect Not present within the site	☐	No Effect Not present within the site	☐	No Effect Not present within the site	☐
•Cultural Resources / Historic Properties *Guide Sheet Fact Sheet* Not present in APE	May Effect CR survey required on all areas of new disturbance	☑	May Effect CR survey required on all areas of new disturbance	☑	No Effect Based on on-site survey no NRHP eligible properties or SALs present (document on FOI) monitor during construction	☑
•Endangered and Threatened Species *Guide Sheet Fact Sheet* Not present within the APE however, the potential exists for species to occur	May Effect Not present within the APE according to site assessment; however, there is the potential for species to occur	☐	May Effect Not present within the APE according to site assessment, however there is the potential for species to occur	☐	No Effect Not present within the APE according to site assessment; however there is the potential for species to occur. In addition, freshwater mussel surveys and an aquatic recovery relocation plan (ARRP) are not required per TPWD coordination on March 9, 2015.	☐
Environmental Justice *Guide Sheet Fact Sheet* Although project area population does not exhibit much diversity, roads within project area are utilized by a diverse population.	May Effect No EJ group present in flood area. There would be loss of flood protection DS regardless of economic status or diversity (inhabitants and motorists)	☐	May Effect No EJ group present in flood area There would be loss of flood protection DS regardless of economic status or diversity (inhabitants and motorists)	☐	No Effect No EJ group present in flood area. Flood protection continued for DS population and motorists.	☐

•Essential Fish Habitat *Guide Sheet* *Fact Sheet* Not present within the APE.	No Effect Upon review not present	☐	No Effect Upon review not present	☐	No Effect Upon review, not present.	☐
Floodplain Management *Guide Sheet* *Fact Sheet* 100-year floodplain downstream currently benefited by PC 21	May Effect Floodplain benefits for all storm events removed	☐	May Effect Floodplain benefits for all storm events removed	☐	No Effect 100-year floodplain protection continued and drawdown time reduced to 10 days	☐
Invasive Species *Guide Sheet* *Fact Sheet* Invasive species not present in APE	No Effect This alt. not likely to cause spread of invasive species.	☐	No Effect This alt. not likely to cause spread of invasive species	☐	No Effect This alt. not likely to cause spread of invasive species. BMPs will be used to prevent invasive species introduction. All disturbed areas re-established to existing species. No change from existing conditions	☐
•Migratory Birds/Bald and Golden Eagle Protection Act *Guide Sheet* *Fact Sheet* Migratory birds occur in small numbers in the APE	May Effect Breach of dam and loss of fringe wetlands and impounded water may reduce nesting habitat for some species.	☐	May Effect Breach of dam and loss of fringe wetlands and impounded water may reduce nesting habitat for some species	☐	No Effect Minor temporary impacts during construction. Potential increase in wetland in riparian habitats due to larger normal operating pool	☐
Natural Areas *Guide Sheet* *Fact Sheet* Natural areas not present in the APE	No Effect Upon review, not present	☐	No Effect Upon review not present	☐	No Effect Upon review not present	☐
Prime and Unique Farmlands *Guide Sheet* *Fact Sheet* 213.4 acres are present in the APE.	No Effect 213.4 acres would be subject to more frequent and severe flooding.	☐	No Effect 213.4 acres would be subject to more frequent and severe flooding	☐	No Effect No adverse impact. Flood protection continued on 213.4 acres	☐
Riparian Area *Guide Sheet* *Fact Sheet* The project site supports riparian areas in the narrow band surrounding the sediment pool	May Effect Most likely would cause loss in riparian areas due to drained pool.	☐	No Effect Would re-establish riparian areas through drained pool	☐	No Effect Temporary impacts during construction. Riparian areas would reestablish in perimeter of larger normal operating pool following rehabilitation activities.	☐
Scenic Beauty *Guide Sheet* *Fact Sheet* Scenic beauty are not present in the APE	No Effect Upon review, not present	☐	No Effect Upon review not present	☐	No Effect Upon review not present	☐
•Wetlands *Guide Sheet* *Fact Sheet* Wetlands present within APE including 25.05 ac of shallow water habitat.	No Effect Loss of wetlands plant community due to breach of dam resulting in drained pool.	☐	May Effect Change in wetland types re-established riparian areas with associated wetland plant community and values	☐	May Effect Would maintain wetland plant communities and values however temporary impacts are possible during construction. Wetlands would be similar to pre-existing conditions. Increased 12 ac change in shallow water habitat	☐
•Wild and Scenic Rivers *Guide Sheet* *Fact Sheet* Not present in APE.	No Effect Upon review, not present.	☐	No Effect Upon review not present	☐	No Effect Upon review not present.	☐
K. Other Agencies and Broad Public Concerns	***Alternative 1***		***Alternative 2***		***Alternative 3***	
Easements, Permissions, Public Review, or Permits Required and Agencies Consulted.	All easements, permissions, review, and permits would be the responsibility of the sponsors.		All necessary easements and permits are the responsibility of the sponsors. Clean Water Act permit, probably NWP27		All necessary easements and permits are the responsibility of the sponsors. Clean Water Act permit, probably NWP3 without PCN	
Cumulative Effects Narrative (Describe the cumulative impacts considered, including past, present and known future actions regardless of who performed the actions)	NRCS has constructed 18 FRS in the Plum Creek watershed (WS) with 12 of them classified as high hazard. One dam has been rehabilitated in the WS and one is pending rehab construction. A scoping meeting was held on December 17, 2014 and all resource agencies were invited to a site visit on February 2, 2016. A second public meeting was held on February 3, 2016. No past, present, or future actions were identified by individuals or agencies. TPWD coordination took place regarding freshwater mussel surveys and the development of an ARRP on March 9 2015.		NRCS has constructed 18 FRS in the Plum Creek watershed (WS) with 12 of them classified as high hazard. One dam has been rehabilitated in the WS and one is pending rehab construction. A scoping meeting was held on December 17, 2014 and all resource agencies were invited to a site visit on February 2, 2016. A second public meeting was held on February 3, 2016. No past, present, or future actions were identified by individuals or agencies. TPWD coordination took place regarding freshwater mussel surveys and the development of an ARRP on March 9, 2015		NRCS has constructed 18 FRS in the Plum Creek watershed (WS) with 12 of them classified as high hazard. One dam has been rehabilitated in the WS and one is pending rehab construction. A scoping meeting was held on December 17, 2014 and all resource agencies were invited to a site visit on February 2, 2016. A second public meeting was held on February 3, 2016. No past, present, or future actions were identified by individuals or agencies. TPWD coordination took place regarding freshwater mussel surveys and the development of an ARRP on March 9, 2015	
L. Mitigation (Record actions to avoid, minimize, and compensate)	Unknown, not a federal action		No compensation mitigation required. Most likely authorized by NWP 27 for stream restoration. Significant impacts to the aquatic environment are anticipated. Avoidance and minimization will be done to maximum extent practicable. BMPs such as erosion control blankets, wetting soil, and revegetation will be used to control erosion and dust.		No mitigation required. Most likely authorized by NWP 3 for maintenance without PCN. Less than significant impacts are anticipated to the aquatic environment. Avoidance and minimization will be done to maximum extent practicable. BMPs such as erosion control blankets, wetting soil, and revegetation will be used to control erosion and dust	

M. Preferred Alternative	Preferred alternative	☐	☐	☑
	Supporting reason			This is the least environmentally damaging alternative that meets the objectives and purposes of the project

N. Context (Record context of alternatives analysis)	local	local	local

The significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality.

O. Determination of Significance or Extraordinary Circumstances

Intensity: Refers to the severity of impact. Impacts may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

If you answer ANY of the below questions "yes" then contact the State Environmental Liaison as there may be extraordinary circumstances and significance issues to consider and a site specific NEPA analysis may be required.

Yes	No	
☐	☑	• Is the preferred alternative expected to cause significant effects on public health or safety?
☐	☑	• Is the preferred alternative expected to significantly affect unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands prime farmlands wetlands, wild and scenic rivers or ecologically critical areas?
☐	☑	• Are the effects of the preferred alternative on the quality of the human environment likely to be highly controversial?
☐	☑	• Does the preferred alternative have highly uncertain effects or involve unique or unknown risks on the human environment?
☐	☑	• Does the preferred alternative establish a precedent for future actions with significant impacts or represent a decision in principle about a future consideration?
☐	☑	• Is the preferred alternative known or reasonably expected to have potentially significant environment impacts to the quality of the human environment either individually or cumulatively over time?
☐	☑	• Will the preferred alternative likely have a significant adverse effect on ANY of the special environmental concerns? Use the Evaluation Procedure Guide Sheets to assist in this determination This includes, but is not limited to concerns such as cultural or historical resources, endangered and threatened species, environmental justice wetlands floodplains coastal zones coral reefs essential fish habitat, wild and scenic rivers clean air riparian areas, natural areas and invasive species
☐	☑	• Will the preferred alternative threaten a violation of Federal State or local law or requirements for the protection of the environment?

P. To the best of my knowledge, the data shown on this form is accurate and complete:
In the case where a non-NRCS person (e.g. a TSP) assists with planning they are to sign the first signature block and then NRCS is to sign the second block to verify the information's accuracy.

Signature (TSP if applicable)	Project Ecologist	5/16/2016
	Title	Date
Lori Fiala	ASTC/Landscape Planning	6/6/2016
Signature (NRCS)	Title	Date

If preferred alternative is not a federal action where NRCS has control or responsibility and this NRCS-CPA-52 is shared with someone other than the client then indicate to whom this is being provided.

The following sections are to be completed by the Responsible Federal Official (RFO)

NRCS is the RFO if the action is subject to NRCS control and responsibility (e.g., actions financed, funded, assisted, conducted, regulated, or approved by NRCS). These actions do not include situations in which NRCS is only providing technical assistance because NRCS cannot control what the client ultimately does with that assistance and situations where NRCS is making a technical determination (such as Farm Bill HEL or wetland determinations) not associated with the planning process.

Q. NEPA Compliance Finding (check one)

The preferred alternative:		Action required
☐	1) is not a federal action where the agency has control or responsibility	Document in "R 1" below No additional analysis is required
☑	2) is a federal action ALL of which is categorically excluded from further environmental analysis AND there are no extraordinary circumstances as identified in Section "O".	Document in 'R 2' below No additional analysis is required
☐	3) is a federal action that has been sufficiently analyzed in an existing Agency state regional or national NEPA document and there are no predicted significant adverse environmental effects or extraordinary circumstances	Document in 'R 1' below No additional analysis is required
☐	4) is a federal action that has been sufficiently analyzed in another Federal agency's NEPA document (EA or EIS) that addresses the proposed NRCS action and its effects and has been formally adopted by NRCS NRCS is required to prepare and publish its own Finding of No Significant Impact for an EA or Record of Decision for an EIS when adopting another agency's EA or EIS document (Note: This box is not applicable to FSA)	Contact the State Environmental Liaison for list of NEPA documents formally adopted and available for tiering Document in "R 1" below No additional analysis is required
☐	5) is a federal action that has NOT been sufficiently analyzed or may involve predicted significant adverse environmental effects or extraordinary circumstances and may require an EA or EIS	Contact the State Environmental Liaison Further NEPA analysis required

C. Rationale Supporting the Finding	
C.1 Findings Documentation	
C.2 Applicable Categorical Exclusion(s) (more than one may apply) 7 CFR Part 650 Compliance With NEPA, subpart 650.6 Categorical Exclusions states prior to determining that a proposed action is categorically excluded under paragraph (d) of this section, the proposed action must meet six sideboard criteria. See NECH 610.116.	As a result of this environmental evaluation it is concluded that the preferred alternative is covered by categorical exclusions No 14 15 16 and 17 dealing with the rehabilitation of a floodwater retarding structure to meet current safety and performance standards No extraordinary circumstances or significant impacts were discovered during the evaluation or will result from the preferred alternative

I have considered the effects of the alternatives on the Resource Concerns, Economic and Social Considerations, Special Environmental Concerns, and Extraordinary Circumstances as defined by Agency regulation and policy and based on that made the finding indicated above.

D. Signature of Responsible Federal Official:

Signature	Title	Date
Lori Fiehr	ASTC/Landscape Planning	6-Jun-16

Additional notes

APPENDICES

APPENDIX A: Evaluation of Potential Rehabilitation Projects

APPENDIX B: Economic Table 2 – Estimated Cost Distribution

APPENDIX C: Investigation and Analysis Reports

APPENDIX D: Support Maps

APPENDIX E: Other Supporting Information