TANQUE VERDE CREEK MANAGEMENT STUDY--PHASE 1

REVIEW OF EXISTING INFORMATION

and

DEVELOPMENT OF ALTERNATIVES

by Johnson-Brittain & Associates

July 30, 1993

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HEC-1 and HEC-2 Output Files and Printouts

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Tanque Verde River Management Study Attachment 3 -- Geomorphic Assessment, CMG Drainage Engineering, Inc.; July 12, 1993.

ATTACHMENT 4

The files listed here are tranmitted separately on floppy disks. Attachment 4 includes printouts of all or representative portions of each to document the various analysis procedures.

ATTACHMENT 5

A Class I Archaeological Overview for the Tanque Verde Wash Flood Control Project Pima County, Arizona" by Cultural & Environmental Systems, Inc.

ATTACHMENT 6

Tanque Verde Creek River Management StudyPhase I Review of Existing Natural Resource Information, Wheat-Gallaher & Associates; July 20, 1993.

PART I
INTRODUCTION AND BACKGROUND DATA

Section 1
INTRODUCTION

Tanque Verde Creek has long posed a dilemma for residents and county officials alike. The watershed is large, taking in some 100 square miles and extending to the top of the Rincon Mountains. Much of that area lies within the mountainous confines of Coronado National Forest and Saguaro National Monument. The lower reaches cross the desert floor nourishing a scenic riparian area rich in natural habitat, wildlife and archeological resources. Tanque Creek has over the years attracted many residents who appreciate its quiet natural environment.

It is therefore somewhat ironic that Tanque Verde Creek, the source of beauty and values beloved by area residents, also poses such a hazard to them. The threat of flooding is real with several hundred homes currently located within the FEMA flood plain. A number of these lie within or near historic alignments of the main channel subjecting them to potential damage by erosion should a major avulsion or lateral migration occur. Recent events point up the fragility of access in the face of large storms as well as the costliness of providing relief, clean up, and repair of damage to private property and public infrastructure.

The dilemma for Pima County is the range of expectations by various segments of the public such as residents be protected from the dangers and nuisance of flooding, that visual and cultural resources be safe guarded, that the rights of property owners be preserved, the expenditure of tax dollars be minimized, and so forth. The visual quality, the abundance of natural and cultural resources, and the value of property make these issues particularly acute along Tanque Verde Creek.

River Management Plan. It is in this context that Pima County is proceeding to develop a master plan for managing Tanque Verde Creek. That plan would be based on an objective (in so far as that is possible) evaluation of effectiveness, initial and on-going monetary costs, and non-monetary impacts such as reduction of wildlife habitat, impact on visual quality, and loss or degradation of other resources valued by the community. That study would result in a recommended set of physical and institutional measures that best suits the overall needs of the area and the community.

Public Acceptance. A key to the success of that plan will be the public understanding and supporting it. This will be best accomplished through an extensive public involvement process that accomplishes the following:

(1) Informs the public of the range of options that exist. An understanding of expected benefit, and the true monetary and non-monetary costs is needed for informed decisions to be made, and for useful input to occur.

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(2) Gives good faith consideration of public input given in good faith. Again, this input must be informed input to be of value to the process.

Previous work by the county has shown that considerable public interest exists in Tanque Verde Creek, and that a wide range of perspectives can be expected.

Purpose of This Study. This study is the first step toward developing such a plan. Its purposes are to (1) develop a fundamental (quantitative where possible) understanding of the problems that exist, and (2) perform a cursory examination of possible management approaches identifying those that appear most plausible for further consideration. This "short list" of alternatives would be evaluated in more detail, and the ultimate management plan developed in a subsequent study. Public involvement would be an important element of that effort.

Reliance on Previous Work. Much of the evaluation performed here is based on a compilation of earlier work by others. Previous studies along Tanque Verde Creek have been performed to varying levels of detail. For example, the HEC-2 analysis performed by the U.S. Army Corps of Engineers in 1975 covers the entire project length, but using relatively old and inexact 4' contour interval mapping. A much more detailed analysis has recently been performed by Pima County in the vicinity of Forty Niners Country Club. As a result, the analyses reported here may not be sufficiently accurate for making final decisions. They are, however, certainly adequate for determining generally what the effectiveness and impacts of various approaches is likely to be, and to identify scenarios that warrant further study.

Comprehensive Structure. Another important aspect of this study is the development of a set of models which together constitute a comprehensive structure for developing and ultimately administering a river management plan. This structure consists of a variety of tools (primarily computer models) for evaluating for proposed scenarios (including "do-nothing") the hydrologic and hydraulic responses within the watershed, anticipated property damage, impacts on wildlife habitat, impacts on cultural resources, and so forth. In many cases these tools are linked in an automatic or semi-automatic fashion to improve the accuracy and speed with which the effects of a particular improvement can be determined. One example is feeding HEC-2 output reflecting a proposed channel improvement directly into the flood damage model to determine the reduction in property damage that would result.

The structure provided here, though comprehensive and well-conceived, is limited by the accuracy as the data of its various components. For example, the amount of damage to a particular structure is as accurate as the HEC-2 run that determines water surface elevation, the estimated finish floor elevation from which depth of flooding is determined, the accuracy which assessor's "full cash value" (with adjustment) reflects the true value of the property, the accuracy with which FEMA tables relate damage to property value and depth of flooding, and the rate and period used to compute present worth of average annual risk. The accuracy and reliability of the existing data used

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for these preliminary determinations is not in all cases well known. Some investigation into the sensitivity of various parameters is provided here, as are recommendations for strengthening the data base for various models.

Project Area. The location of this project is shown in Figure 1. The limits of the current study extend from Houghton Road eastward to the Coronado National Forest Boundary. Sheets 1 and 2 of Attachment 1 are a map and aerial photo of this area at scale of 1"=1,000'. Sheets 3a through 3d are 1"=400' drawings showing property lines, rights-of-way and similar information. This "property map" is actually a plot of several layers of an AutoCAD drawing that has been created for analysis as well as illustrative purposes.

This drawing also includes embedded information such as tax identification codes and location of HEC-2 cross-sections. The embedded tax codes, for example, provide specific location references to assessor data down-loaded for this project. For this particular example, tax codes have been extracted and used to relate assessor and damage model information to specific location. This has been accomplished using special "AutoLISP" routines created and run within AutoCAD.

Sheets 4a through 4d are more detailed 1"=400' aerial photos which have been rectified using the property map. They also show the configuration of cross-sections HEC-2 referenced later.

Remainder of Report. The remaining sections of this report provide the following:

PART I. BACKGROUND INFORMATION

SECTION 2. PREVIOUS WORK IN AREA. Besides this introduction, an overview of important work performed in the study area to date. The text discusses generally the work and results. Detailed synopses of key reports are included in Appendix A.

PART II. EXISTING CONDITIONS

SECTION 3. HYDROLOGIC AND HYDRAULIC MODELS. A discussion of the hydrologic and hydraulic models used for this study. These entail basically the HEC-1 model developed by Cella Barr Associates for their evaluation of the Houghton Road bridges in 1988, and a compilation of HEC-2 models used by the Corps and by Pima County for a variety of purposes at various times and locations. The "existing" condition will be evaluated and compared to previous results to test its accuracy. Also evaluated will be the "given" condition which assumes the proposed Forty Niners Country Club berm has been constructed. The given condition is considered to be the "base" condition.

SECTION 4. GEOMORPHOLOGY. A discussion of the geomorphology of the project area based on work by CMG Drainage Engineering as a subconsultant for this project.

SECTION 5. DAMAGE MODELS. A description of the "flood damage" and "erosion damage" models, explaining the bases and assumptions for each, and how they are tied to the project hydraulic model. The flood damage model is a Microsoft Excel spread sheet into which HEC-2 results are imported. The erosion damage model is a simpler concept based on historical loss of

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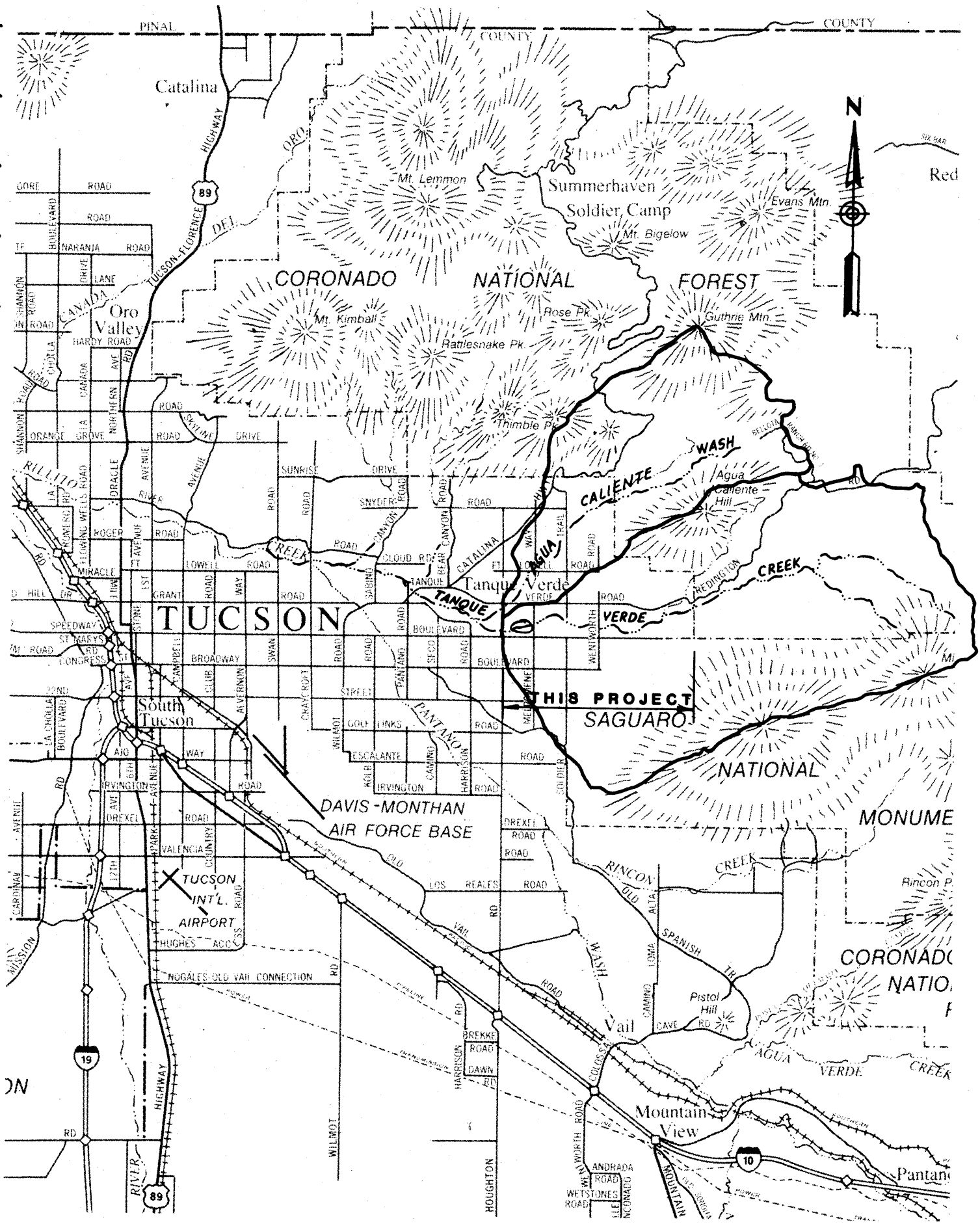


Figure 1. Location Map

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land. An evaluation of both existing and given conditions is provided. The use of assessor data to determine property values, mailing information, and so forth is an important part of this process.

SECTION 6. CULTURAL RESOURCES. An inventory of cultural (archaeological) resources in the area as determined by Cultural Environmental Systems, also a subconsultant for this project. That work is done on the basis of a "Class I" survey which involves only a literature review. No field work has been done.

SECTION 7. VISUAL RESOURCES AND WILDLIFE HABITAT. A discussion of visual resources and important wildlife habitat based on work by Wheat-Gallaher & Associates.

PART III. IDENTIFICATION OF ALTERNATIVES

SECTION 8. STRUCTURAL ALTERNATIVES. Identifies and discusses a range of possible channelization, berming, and detention approaches.

SECTION 9. NON-STRUCTURAL ALTERNATIVES. Identifies and discusses several institutional approaches such as purchase of endangered property, limiting the amount and type of future development, and other methods not entailing major construction. Flood and/or erosion-proofing measures for individual structures is also included in this class.

SECTION 10. NO ACTION. Discusses the costs and other impacts of doing nothing.

PART IV. EVALUATION AND RANKING OF ALTERNATIVES

SECTION 11. EVALUATION PROCEDURES AND CRITERIA. Identifies and discusses the criteria and methodology used to evaluate and rank the overall suitability of the various alternatives.

SECTION 12. EVALUATION RESULTS. Tabulate the results of the evaluation.

PART V. RECOMMENDATIONS

SECTION 13. RECOMMENDATIONS. Recommends those alternatives which appear most promising for more detailed evaluation. Also recommends areas for improving the evaluation model data bases prior to any further evaluation.

Supporting Documents. An important goal of this project is to lay out a workable structure and set of tools that can be used and built upon in the future planning and management of the Tanque Verde Creek watershed. Fairly detailed descriptions of the analyses and processes used are provided to meet this intent. To accomplish this and still keep this document at a manageable size, much of the detailed supporting information has been provided in the following separately bound attachments:

ATTACHMENT 1 is a set of 24"x36" diazo prints which includes maps, aerial photos, and plans too detailed or cumbersome to incorporate in a bound report.

ATTACHMENT 2 contains floppy disks and printouts for the various HEC-1 and HEC-2 analyses performed for this study. The floppy disks also contains the AutoCAD drawing files of the profile plots found in Attachment 1. The base AutoCAD drawing and the AutoLISP routine used to create the drawings directly from the HEC-2 output files are also included.

ATTACHMENT 3 is the geomorphic assessment report prepared by CMG Drainage Engineering summarized in Section 4 of this report.

ATTACHMENT 4 includes assessors data, AutoCAD drawings, Microsoft Excel files, and other routines, and files that together constitute the damage model. A floppy disc with this information is also provided.

ATTACHMENT 5 is the cultural resources assessment report prepared by Cultural & Environmental Systems, Inc. Key points of that report are summarized in Section 6 of this report.

ATTACHMENT 6 is the visual resources/vegetation/wildlife habitat assessment report prepared by Wheat-Gallaher & Associates. That report is summarized in Section 7.

SECTION 2.
PREVIOUS WORK IN PROJECT AREA

The intent of this study is to rely on previous studies for background information as well as any hydrologic, hydraulic or geomorphologic data that is needed. A review of maps, reports, and computer files from past studies shows that a considerable amount of useful work has been done. This section reviews the information that is available and describes how it has been applied to the current study.

Past efforts that are applicable here include generally (1) hydrologic and hydraulic analyses by the U.S. Army Corps of Engineers (and later by FEMA) for the purpose of developing flood plain and insurance rate maps; (2) studies by several consultants and Pima County regarding the Houghton Road bridges for Tanque Verde Creek and Agua Caliente Wash; (3) joint studies by the Corps and Pima County regarding the design of a levee to protect Forty Niners Country Club Estates from flooding and erosion; and (4) analysis by Pima County in the vicinity of Tanque Verde Loop Road in response to litigation concerning removal of a bridge. An overview of information useful for this study is presented in this section, with more detailed synopses of key reports included in Appendix A. A brief discussion of drainage-related litigation in the area is also provided.

U.S. Army Corps of Engineers/FEMA. The first extensive hydrologic and hydraulic analysis of Tanque Verde Creek was published by the Corps in 1975 (Reference 1). Design discharges were developed at key locations based on gauging station data from similar watersheds, adjusted for "differences in hydrologic, meteorological, and physiographic characteristics". The resulting 100-year discharges were found to be 23,000 cfs at Houghton Road and 19,000 cfs below Canyon del Salto Creek. Water surface profiles were determined using HEC-2 with data taken from 4' contour interval aerial mapping dated 1967 and 1973. Subsequent flood insurance studies by FEMA in 1982 and 1989 (References 2 and 3 respectively) utilized the same hydrology and HEC-2 work, although cross-section designations have been changed. The FEMA floodway and flood insurance rate maps currently in effect are also based on the 1975 corps work. The HEC-2 data used for this study has been recovered from punched computer cards provided by the county, and used for the reaches upstream of Wentworth Road for which more recent or detailed data is not available. No map showing the location of the cross-sections used in that analysis has been found. It would seem that they would coincide with those shown on the current floodway, but a definite correlation has not been found. Synopses of the 1975, 1982, and 1989 studies are provided in Appendix A.

Houghton Road Bridges. Several consultants have studied Tanque Verde Creek and Agua Caliente in the vicinity of Houghton Road in conjunction with the design of bridges for those two crossings. Although the confluence of the two washes is nearly one mile downstream of Houghton

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Road, their flood plains merge well upstream of Houghton. The thinking on how to handle this both in terms of analysis and design has evolved with time.

The bridge locations and lengths were established by Dames & Moore as documented in a hydrologic and hydraulic design report dated May 1985, and a concept design report dated June 1985 (Reference 4 and 5 which have not been reviewed here). Photogrammetric mapping at 1"=200' 2' CI dated December 1984 was obtained for that project. The concepts developed included an 1,100' bridge spanning much of the effective Tanque Verde flood plain. Agua Caliente Wash would be channelized by parallel levees constructed from Tanque Verde Road to Houghton.

Detailed design analysis was provided by Hydro-Science Engineering Southwest as a subconsultant to RGA Engineering Corporation who was designing the Agua Caliente bridge. Hydro-Science produced three reports. Part I determined the effect of the proposed bridge configurations on the existing flood plains and set the low chord elevations. Part II involved a fluvial analysis to determine if long-term degradation of the channel bottom would affect the bridge, and determined local scour depths for design purposes. Part III concerned the sizing of culverts for small local drainages. These reports are documented in References 6 through 8, and synopses are included in Appendix A. Hydro-Science's work assumed that the Dames & Moore bridge configurations including the channelization of Agua Caliente Wash. The Agua Caliente levees were envisioned as being constructed during some future phase as part of the construction of a new bridge for Tanque Verde Road. The December 1984 Dames & Moore topography was used.

Cella Barr & Associates later evaluated the effects of the Houghton Road Bridges without the Agua Caliente levees. They used HEC-1 to determine the lag between the peak discharges of Agua Caliente Wash and Tanque Verde Creek to be insignificant so far as any reduction in combined peak was concerned. Cella Barr using HEC-2's split flow option determined that of the 13,000 cfs in Agua Caliente Wash, 8,000 would be diverted to Tanque Verde Wash without the parallel levees. The effects of this on the water surface profiles for both Tanque Verde Creek and Agua Caliente Wash were found to be relatively minor. The Cella Barr report is listed as Reference 9, and a synopsis is included in Appendix A.

John Wallace of Pima County Flood Control District subsequently performed a more detailed evaluation of this situation. His approach was to determine the breakout by comparing the Agua Caliente and Tanque Verde Creek water surface elevations. By adjusting these amounts until the two water surface elevations coincided, he was able to create separate but consistent HEC-2 models for each water course. An interface boundary between the flood plains was actually defined using X3 cards. No report or other documentation of this process is available. The resulting HEC-2 model has been provided and has been used for the current project.

Forty Niners Country Club Estates Levee Project. Starting in approximately 1985, the U.S. Army Corps of Engineers and Pima County jointly undertook a project to protect a portion of

Forty Niners Country Club Estates that is particularly vulnerable to flooding damage. This proposal is to construct an earthen levee faced on the river side with soil cement. Additional work behind the levee to protect from localized flows would also be included.

Three levee alignment alternatives were considered. Alternative 1 placed the levee near existing homes and would cost $1.7 million to construct. Alternative 2 would be near the existing bank and would cost $3.3 million. The "preferred" Alternative 3 locates the levee between the alternative 1 and 2 alignments and is estimated to cost $2.6 million. It is 1.7 miles in total length.

Information provided by Pima County regarding the Forty Niners project includes the following:

1. 1"=100' 1' CI mapping of the river extending from approximately Tanque Verde Loop Road to upstream of Wentworth Road. The date of this mapping is December 1986 according to Reference 6. This design quality mapping is the most detailed available throughout the study area , and is particularly important in that it covers the most sensitive reach of the project.

2. Preliminary plans showing the proposed levee alignment and profile. No typical sections or other details are included. These prints are undated and obviously reflect a preliminary stage of design.

3. HEC-2 data and output files for both the existing and proposed conditions. Because of the quality of mapping and the level of detail used for the analysis, these HEC-2 runs should be quite reliable.

4. A report documenting the sediment transport and depth of scour analysis (Reference 10). That report cites 1982 and 1984 studies by Simons Li & Associates (Reference 11 and 12 which have not been reviewed for this report) as having determined the river to be in dynamic equilibrium with its present supply of sediment. HEC-6 was used to determine that the proposed levee will have minimal effects on the state of equilibrium. The use of 24,000 cfs as a design discharge instead of 23,000 cfs is not explained.

5. Page 5 of the Engineering Division Project Update dated September 1, 1992 summarizing the alignment alternatives and their respective costs. It is that document from which the alternative levee alignment descriptions and costs cited above were obtained.

The feasibility and effects of the Forty Niners project have been investigated in detail by Pima County and design is currently under way. No attempt to re-evaluate that work has been made here. The county is confident that this project will be constructed in the near future and has directed that it be considered a "given" condition for the purposes of this study.

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Tanque Verde Loop Road. Pima County recently removed an existing bridge (constructed in the early 1930's) crossing Tanque Verde Creek at Tanque Verde Loop Road. According to discussions with Pima County personnel, that action resulted in litigation. John Wallace of Pima County Flood Control District performed a HEC-2 analysis of Tanque Verde Creek through this area to aid in defending the bridge removal. That analysis was based on the 1984 Houghton Road mapping combined with April 1986 standard 2' CI coverage. This analysis overlapped the Houghton Road bridge and Forty Niners levee analyses. No formal documentation of this word has been provided, but the HEC-2 data files are available and have been incorporated into this project.

Ongoing Litigation. In addition to the Tanque Verde Loop Road situation, other law suits have occurred involving the Houghton Road bridges. At least some of these are still in process, and the County has been understandably reluctant to provide any specific information. While a general knowledge of this situation may be adequate for the scope of the current study, a detailed understanding of the impacts and implications of all litigation in the area is needed prior to developing a final river management plan.

PART II
EXISTING CONDITIONS

SECTION 3
HYDROLOGIC AND HYDRAULIC MODELS

The intent of this study is that data from previous studies be used in lieu of performing new hydrologic and hydraulic analyses. Existing HEC-1 and HEC-2 models have been pieced together to perform the evaluations necessary for this report. A discussion of these models is presented in this section.

Hydrologic Model. The only hydrologic model provided for this study is the HEC-1 analysis performed by Cella Barr Associates in 1989 for their evaluation of the Houghton Road bridges (Reference 9). Other available hydrologic information consists of the current regulatory information originally developed by the Corps in 1975 (Reference 1), and the design discharge being used by Pima County in their design of the Forty Niners Country Club levee (reported in Reference 10). No peak discharges or other hydrologic data for storms of smaller magnitude have been provided.

As described in the previous section, some inconsistency exists between these studies. For example, the original 100-year discharge used by the Corps at Houghton Road is 23,000 cfs. Cella Barr's HEC-1 model produces 28,500 cfs for the same location, while Pima County is using 24,000 cfs for designing of the Forty Niners County Club levee. The reason for these discrepancies is not clear. For the purposes of this study, the current regulatory value of 23,000 cfs has been used for the design peak discharge. Cella Barr's HEC-1 model has been used for the limited amount of hydrograph analysis that has been needed. A map showing the assumed watershed configuration for the HEC-1 "existing conditions" model in provided in Attachment 1 as Sheet 5. A printout of the HEC-1 existing conditions analyses is provided in Attachment 2.

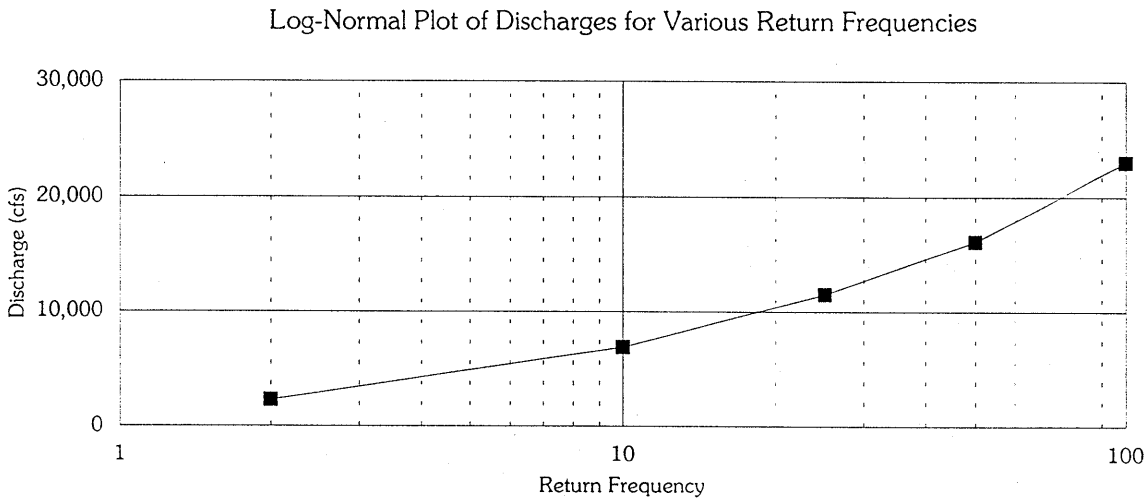
Peak discharges for lesser-magnitude storms not are not available from previous work. For the purposes of this study, estimates have been made using factors applied by Pima County with regional equations. A summary of these is presented in Figure 2 along with log-normal and log-log plots of the results. These results appear reasonable for preliminary assessments of the current study. A more detailed evaluation should be considered for any detailed planning and design work however, given the considerable amount of additional stream gauge data collected throughout the Rillito River basin since 1975. Peak discharges for more frequent storms would be a by-product of that work.

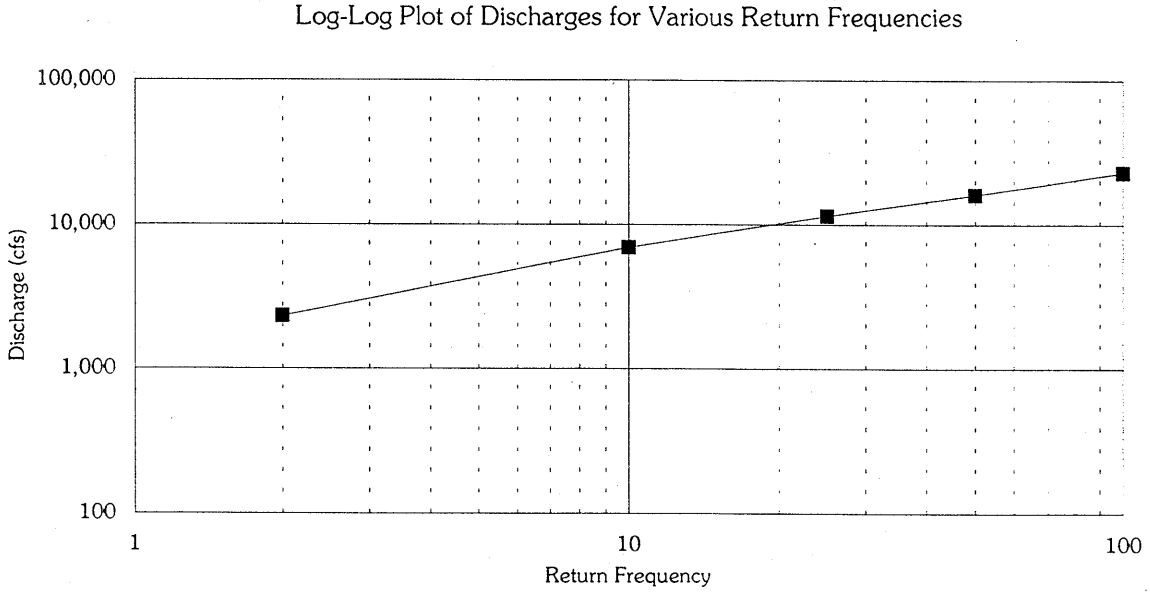
Hydraulic Model. Also discussed in the previous section are the hydraulic (HEC-2) models available for this project. The only model extending the full project length is that of the Corps in 1975 for establishing the original FEMA flood plain. That model was developed from 1"=400', 4' CI mapping performed in 1967 and 1972, and is not as detailed or current as some subsequent work.

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Figure 2. Assumed Discharges for Lesser Magnitude Storms

Return Frequency	2-year	10-year	25-year	50-yr	100-yr
Assumed multiplier	0.10	0.30	0.50	0.70	1.00
Q at Houghton Road	2,300	6,900	11,500	16,100	23,000
Q above Canyon del Salto	1,900	5,700	9,500	13,300	19,000





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For example, a variety of HEC-2 analyses have been performed by Hydro Science and later by Cella Barr in evaluating the Houghton Road bridges. That work was done using 1"=200', 2' CI mapping obtained in 1984. As described in Section 2, the primary effort of those studies was to determine the effects of the bridges on the Tanque Verde Creek and Agua Caliente flood plains, including the breakout from Agua Caliente Wash. These analyses started well downstream of Houghton Road, and extended upstream approximately 4,000', not quite reaching Tanque Verde Loop Road.

John Wallace, of Pima County, subsequently performed a more thorough evaluation of the Aqua Caliente breakout. Starting with Cella Barr's model, he varied the amount of breakout flow crossing southward to balance the Agua Caliente and Tanque Verde water surface profiles. No documentation of his effort exists, but a copy of the HEC-2 data file has been provided.

Wallace has also performed an evaluation of flood conditions in the vicinity of Tanque Verde Loop Road. That work was in response to litigation regarding removal of the Tanque Verde Loop bridge originally constructed in 1931. He supplemented the Houghton Road mapping with standard area-wide 1"=200' 2' CI mapping, also dated 1984. This work similarly has not been documented, but the HEC-2 data file has been provided.

The most detailed and reliable work to date has been performed by Pima County in conjunction with their design of the Forty Niners Country Club levee. Mapping created in 1986 at 1"=100', 1' CI was used for this analysis as well as design. Data files reflecting both the existing condition and the "preferred" levee alignment have been provided. Direct documentation of these hydraulic analyses has not been provided, though the report describing the fluvial analysis (Reference 10) and study of the input files provides sufficient background for the purposes of this study.

For developing a "project" hydraulic model, the work by Wallace at Houghton and Tanque Verde Loop Roads, and PCFCD's Forty Niners evaluation both with and without the proposed levee have been combined to make best use the information available. Beyond Wentworth Road, the original Corps run is used to round out this "composite" model. Sheet 6 of Attachment 1 shows the layout of the composite HEC-2 model. The section identifications are those used by the original models.

One difficulty with this approach is in registering the various horizontal and vertical data between the various models. It has been assumed that all are on a common vertical datum, an supposition for which there is no basis, and which Pima County considers "highly unlikely". These runs do not use the same horizontal control line making it difficult to determine the horizontal spacing. The approach used here has been to register easily identifiable features in the profile or the mapping such as the Houghton Road bridge and Tanque Verde Loop and Wentworth roads. This

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does not in all cases provide the same results as would be obtained by scaling the distance between sections along the assumed horizontal control lines, off in some cases by as much as 500'.

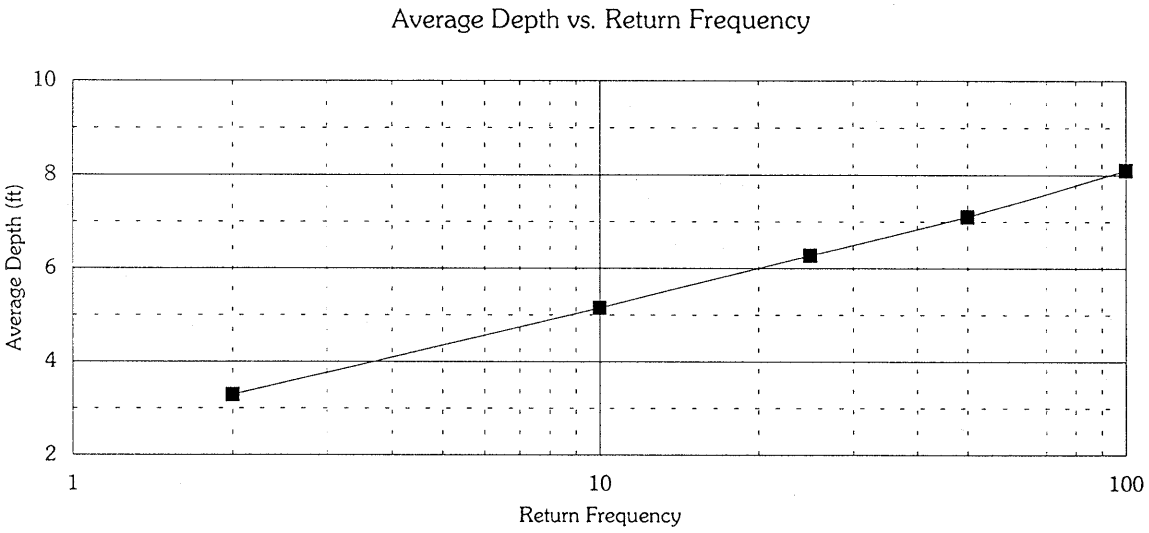
To test this approach, the results of the "existing condition" determined by the composite model have been compared to the original Corps HEC-2 run. Sheet 7 of Attachment 1 is a plot of the results of the original Corps model. Sheet 8 compares the Corps run with the equivalent (existing condition) composite model. It can be seen that while the runs are for the most part comparable, the composite model produces higher results in some areas. Particularly noticeable is that the composite results are more that two feet higher in the vicinity of Tanque Verde Loop Road. In general, however, it does not appear that the composite model differs from the original run substantially enough to invalidate it for the purposes of this study. The two foot discrepancy is too great however for detailed planning and design. An updated model will be necessary prior to undertaking any phases subsequent to this study.

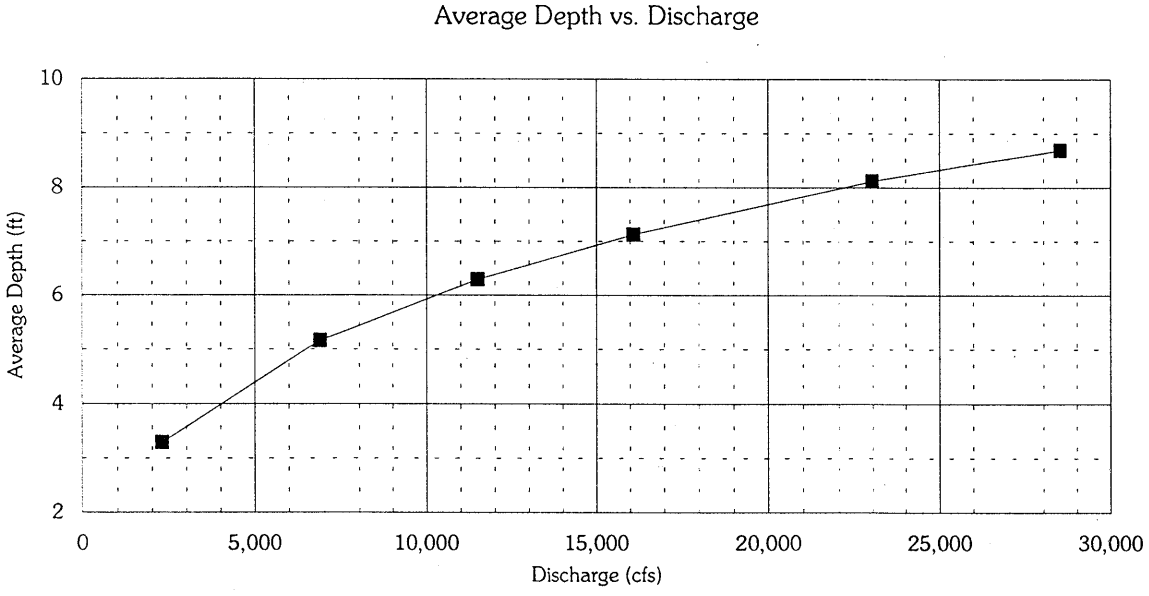
The "given condition" is used for base line comparisons for this project. It is essentially the same composite model, except that area in the vicinity of Forty Niners Country Club is modeled using the PCFCD data that reflects the levee. The given and existing conditions are compared on Sheet 9. For the most part, water surface elevations are unaffected by the levee with depth increases approaching one foot in only two locations.

HEC-2 evaluations of smaller magnitude storms have also be made. Sheet 10 presents the results of that analysis. The depth of flow in a 50-year storm, which is approximated at 70% of the 100-year discharge, averages about 1' less than that of the 100-year storm. A 25-year storm, which is 50% of the 100-year discharge, averages 2' below the 100-year depth. The lessor magnitude water surface elevations are used later for determining average annual risk of flood damage. The range of results is indicated in Figure 3 which shows the average, minimum, and maximum depths for each case. Plots of average depth as a function of return frequency, and as a function of actual discharge (at Houghton Road) are also provided. Figure 3 also shows the average depth would increase roughly 0.6' if CBA's discharge of 28,500 cfs were used.

Figure 3. Summary of HEC-2 Results for Given Condition

	2-year	10-year	25-year	50-yr	100-yr	CBA
Q:	2,300	6,900	11,500	16,100	23,000	28,500
Average Depth:	3.29	5.17	6.29	7.13	8.12	8.69
Minimum Depth:	1.08	1.99	2.66	3.17	3.83	3.95
Maximum Depth:	8.78	12.34	14.17	15.46	16.93	19.49





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SECTION 4
GEOMORPHOLOGY

The geomorphology elements of this study have been performed by CMG Drainage Engineering. CMG's report is included as Attachment 3. This section provides an overview of key points made in that report.

Character of the System. The Tanque Verde Creek watershed encompasses 100 square miles, much of which is located in mountainous terrain. The characteristics of the watershed and the water course are largely unaffected by man.

Discharge capacity of the main (low-flow) channel diminishes in the down stream direction. Low-flow channel capacity ranges from 7,000 to 8,000 cfs in the reaches above Wentworth Road. Between Wentworth and Tanque Verde Loop Road, it becomes 6,000 to 8,000 cfs, and from Tanque Verde Loop to Houghton, is only 4,000 to 6,000 cfs. This change in capacity is primarily due to reduced channel width and depth, as the longitudinal slope remains approximately uniform (about .44%) between Houghton Road and the Canyon del Salto confluence. Exceptions regarding channel width include a particularly wide section just upstream of Wentworth Road where an avulsion in 1983 widened the channel to 400', and the reach along Forty Niners Country Club where the channel narrows to less than 100'. Main stream velocity also decreases in the downstream direction.

The general decrease in channel capacity in the downstream direction corresponds to a general increase in width of the geologic flood plain. The geologic flood plain is the area over which the channel has ranged during recent geologic time. It is as narrow as 900' in the reach between Canyon del Salto and Wentworth Road, and as wide as 2,800' in the vicinity of Houghton Road. The channel tends to widen in areas where the geologic flood plain is restricted, and narrow where flow can spread into the overbank area. The geologic flood plain reflects a very long record of actual historic location of the river and is normally a conservative estimate of the area subject to erosion hazard. It is possible for a river to erode beyond that boundary however, as has recently occurred during the creation of a meander downstream of Tanque Verde Guest Ranch.

Soils in the overbank area are fluvial deposits consisting of about 50% sand and 50% silt, although previous studies have identified cohesive soils (silts and clays) along phreatophyte vegetation to be a factor in regulating the rate of bank erosion during flood events. The channel bottom consists of about 80% gravel and 20% sand with minor amount of silts and clay. The channel bed sediments have very high infiltration capacity. The U. S. Geological survey has estimated average annual recharge along this section of Tanque Verde Creek to be on the order of 1,000 acre-feet per mile per year.

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Because of the nature of the upstream watershed, discharge entering the upper reach of the project is relatively "clean" in the terms of the amount of sediment it brings with it. This, coupled with the higher capacity and velocity of the upstream reach, creates a situation of too little sediment for the available capacity in the upper reaches of the project, introducing an element of instability.

Stability of System. The overall plan form of Tanque Verde Creek is remarkably similar to that which existed in 1936, the earliest date of for which aerial photos are available. The primary exceptions to this are a 400' shift of the north bank upstream of Wentworth Road due to the 1983 avulsion, and the widening meander near Tanque Verde Guest Ranch.

The channel pattern ranges from essentially straight to meandering, approaching the point of braided in some locations. The mildly sinuous alignment seems to be primarily controlled by geologic boundaries rather than sediment transport mechanisms attempting to reduce channel slope.

The channel width has tended to narrow during periods of infrequent flows and low discharge due to sediment deposition. Large storms tend to wash out sediment and widen the channel through bank erosion and occasionally avulsions. This mechanism is more active in the reach above Wentworth Road due to the greater channel capacity and velocity coupled the lack of upstream sediment sources. Downstream of Wentworth, banks are more stable due to the ability of the river to store flow and dissipate energy in overbank areas rather than through channel widening.

Records dating back to 1931 indicate the channel bottom to be in a state of equilibrium. Other than localized conditions, such as the construction and later removal of a low-flow crossing at Houghton Road, only small cyclical changes of a foot or so have been reported. This equilibrium exists as a result of the river's tendency to dissipate energy by channel widening and overbank storage rather that changes in bottom slope.

Erosion Hazard Boundaries. Three approaches have been used for defining areas of erosion hazard. Sheet 11 of Attachment 1 shows the erosion hazard areas resulting from each.

The first is that defined by county ordinance as within 500' of the primary channel bank. The second is the geologic flood plain which reflects a very long-term historical experience, although as noted above encroachment beyond that boundary can occur.

The third is more analytical and is based on hydraulic and geologic parameter such as channel flow velocity, amplitude of existing meanders, vegetation density, historical bank erosion, and avulsion patterns, and overbank flow velocities. Using these parameters, areas of low, moderate and high erosion potential have been identified. Setbacks for areas of low, moderate, and high erosion potential are recommended as 200' to 400', 400' to 600' and 600' to 800' respectively.

SECTION 5
DAMAGE ASSESSMENT

The investigation of potential damage by Tanque Verde Creek is presented in the section. Damage is considered here as deriving from two sources--(1) "flood damage" caused by inundation of structures and contents, and (2) "erosion damage" consisting of land and structures washed away by the river.

Flood damage is dependent on depth of flooding and value of the property. It is possible to anticipate the reduction in flood damage or "benefit" for a given improvement scheme based on the amount by which the water surface elevation is reduced at each affected structures. Providing greater detention storage or a larger channel cross-section would normally yield a greater reduction of flow depth and therefor greater amount of benefit as measured by reduction of flood damage. Critical elements in the evaluation of flood damage are (1) that it can be based on a hypothetical event or series of events, and (2) it can be accomplished on a parcel-by-parcel basis. In this case the events are various storm frequencies for which the depth of flow can be determined using well-accepted procedures (HEC-2). This allows creation of a fairly rigorous flood damage model, limited by the accuracy of the input data rather than approximations inherent in the analytical approach.

Erosion damage involves loss of usable land and structures to lateral migration of the channel banks. Analytical procedures that relate lateral migration to hydraulic and geomorphic factors have been put forth, but no process widely accepted by the industry has emerged. As a result, a rigorous parcel-by-parcel model based on theoretical events cannot been created for erosion damage. A second difficulty with erosion damage is that degrees of improvement cannot be easily related to level of damage reduction. For example, it is difficult to predict the level of protection that would be provided by a low-flow channel with properly lined sides in larger storms.

Given these problems, the approach used here for dealing with erosion damage is based on historical loss of land rather than analytical procedures. Because such data is not available for each parcel likely to be affected, the analysis has been made using groups of parcels clustered along similar reaches of the river. The level of erosion protection afforded by various improvement options is considered to be all or nothing depending on the nature of the improvement.

Property Value. Both flood and erosion damage are a function of property value. For this study, the value of land and structures has been assumed to be 1.25 x full cash value as determined from assessor records. The value of contents is assumed to be 30% of the structure value. Structures in most cases are owner-occupied homes.

Flood Damage. Advances in computer technology make a rigorous but computationally intensive approach to evaluating flood damage possible. The approach used here consists of the following steps:

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1. A master AutoCAD drawing of the project area was created. This is the property map described earlier and includes among other things the following:

   a. Right-of-way and property lines of parcels in the projects area. These were determined from recorded plats, assessor maps, and the like.

   b. An AutoCAD "block" (named "pt_id") located within each parcel. Within each block is embedded the parcel's tax identification code. For parcels that are developed, the block is placed at the location of the principal structure (determined from aerial photos). Otherwise, it is placed near the center of the parcel.

   c. The HEC-2 cross-sections used for the project hydraulic model, stored as polylines. The river-mile designation for each section is embedded within the polyline as "extended entity data".

   d. The location of the geologic flood plain, the 500' regulatory erosion hazard setback, and the "engineered" erosion hazard area determined by CMG using hydraulic/geomorphic parameter (discussed in Section 4).

   f. Other incidental information such as street names, location of the main channel, FEMA 100- and 500-year flood plains, and other features of interest but not specifically used for analysis purposes.

   For detailed planning and design, the location of key cultural resources as described in Section 6, and visual resources and wildlife habitat as described in Section 7 would logically be also included as would any other features likely to influence a proposed option. Each component is placed on its own layer which is frozen or displayed depending on the task at hand. This drawing is stored under the AutoCAD drawing file name of MASTER.DWG.

2. Several sets of data have been extracted from MASTER.DWG for use in determining flood damage. This has been done using AutoLISP routines developed for specific purposes. AutoLISP is a programming language within AutoCAD which allows the creation of specialized functions for manipulating and extracting drawing information. Routines used during the determination of flood damage include the following:

   LOCATION.LSP which searches out each "pt_id" block and creates a file of coordinates associated with each parcel identifier (tax code). The resulting text file (LOCATION.TXT) has been converted to Microsoft Excel format and retained as LOCATION.XLS. This location data is used for two purposes, (1) to establish spatial relationships needed in performing various analyses such as the placement of structures with respect to HEC-2 cross-sections, and (2) to display (plot) results that are significant in terms of location (potential flood damage for example) which are best grasped visually.

   DSUS.LSP which for each parcel identifies the nearest HEC-2 cross-section downstream and upstream as well as the perpendicular distance to each. This information is used to interpolate water surface elevations at each structure from HEC-2 output. The text file output by this routine has also be converted to Excel format and retained as DSUS.XLS.

3. A text file of assessor data for the project area was obtained from Digitgraph Computer Systems Company. This file contains ownership and other information about each parcel

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including "full cash values" of land and structures This data was downloaded by Digitgraph from county records in January, 1992. This data has been converted to Excel format as ASSESSOR.XLS for extracting property values for damage assessments. Other information such as names and addresses of owner (for creating a mailing list), land use, and "date of last transfer" (usually last change in ownership) can also be extracted in this manner.

4. An Excel spread sheet entitled FLOODDMG.XLS was created to perform the actual flood damage calculation. This spread sheet constitutes the "flood damage model" used to determine the dollar value of flood damage to structure and contents for various given flow conditions. Specific components of this model include the following:

   a. Several controls that allow easy alteration of basic assumptions such as typical height of finish elevations above existing grade, whether or not to include damage to structures that will be protected by the Forty Niners levee, the assumed ratio of "market value" to the "full cash value", and the value of contents as a percentage of structure value.

   b. A table published by FEMA which relates damage of structure and content to depth of flooding (above finish floor elevation).

   c. A tabulation by parcel of the DSUS.XLS information previously described, full cash values for structures and land from ASSESSOR.XLS, finish grade elevations (estimated from available mapping), if extra building pad or stem wall height has been provided as is the case for some newer structures, whether or not the structure will be protected by the proposed Forty Niners levee, and x-y coordinates of the structure location. Finish floor elevations have been assumed to be 3' above the estimated finish grade elevation in the case of "high pads", and 1' for normal conditions.

   d. Water surface elevations at each HEC-2 cross-section for the range of return frequencies and conditions described in Section 3. The flow condition for which the amount of damage is sought is created by simply dragging the corresponding column of wse's to the proper location in the model. The HEC-2 information is taken directly from the HEC-2 output files and, after some editing to eliminate unneeded data, imported directly into FLOODDMG.XLS.

   e. Computation of the effective depth of flooding in each structure, and the resulting damage to structures and contents.

Several columns incidental to the actual analysis have also been created for exporting to AutoCAD for plotting certain information. These include finish floor elevations for comparison to existing mapping as a check of input data, and information used by a special AutoLISP routine PLOTDMG.LSP that plots circles proportional in size to the amount of damage at the point where the damage occurs. This shows visually the location and extent of problem areas, and is an example of the powerful planning tools the approaches employed for this study can produce. The results of PLOTDMG.LSP applied to "existing" and "given" conditions 100-year storm damage are provided in Attachment 1 as Sheets 12a and 12b.

Damage amounts have been determined for a range of storm magnitudes for both the existing and given conditions. Using that information, the total "average annual risk" has been determined as the area under the plot of average annual risk for various return frequencies versus annual exceedance probability (inverse of return frequency). Figure 4 shows this calculation, along with the "present worth" of average annual risk assuming an amortization period and interest rate of 50-years and 4% respectively. This effective rate is based on the difference of cost of capital and rate of inflation, assumed at 7% and 3% respectively.

Figure 4 shows the ratios of total flood damage to damage incurred in as single 100-year storm to be 1.47 and 2.15 respectively for the existing and given conditions. For the initial screening alternatives presented in this report, total benefit has been assumed to be twice the 100-year single storm value. A probability analysis similar to that of Figure 4 should, however, be made for those alternatives considered in more detail in subsequent phases.

The benefit of the various improvements considered in this report is taken to be the reduction in present worth of damage that would be avoided by the construction. Figure 4, for example, shows the monetary benefit of the levee attributable to flood damage to be about $1.2 million. This amount, however, does not include erosion losses or damage to public infrastructure. It also depended on the accuracy of data used in the model, the importance of which is discussed next. It is also important to note that this damage model consideres flooding by Tanque Verde Creek only. Damage due to tributary flooding, which could also be significant, is not considered in this study.

Accuracy of Model Data. The flood damage model has also been used to create Figure 5 to provide an indication of the sensitivity of flood damage to depth of flooding and indirectly the importance of data quality in the model. This has been done by effectively raising the 100-year given condition water surface uniformly by the amounts shown (by simply changing the assumed height of finish floors above finish ground elevation). It can be seen, for example, that a combination of error in water surface elevation and finish floor elevation that causes the average depth of flooding to increase 2' would increase from $4.6 to $6.8 million. A 1' average total error would increase damage by $1.1 million. The .57' increase from using CBA's 28,500 discharge would add nearly $0.7 million to the damage estimate. It is clear that if important decisions are to be based on the anticipated flood damage, the quality of the hydrology, HEC-2 model, and the finish floor elevations should be confirmed.

Erosion Damage. Unlike flood damage, there exists no straight-forward, widely adopted methodology for determining erosion damage potential for specific properties based on a theoretical condition. A number of proposals have been put forward (including that of CMG in Attachment 3) but none enjoy the wide acceptance as does, for example, HEC-2 for determining water surface elevation or published FEMA tables for relating flood damage to property value and depth of

Figure 4. Present Value of Average Annual Risk

Return Frequency	Annual Exceedance Probability	Existing Condition: Expected Damage for Storm	Existing Condition: Average Annual Risk	Given Condition: Expected Damage for Storm	Given Condition: Average Annual Risk
2-year	0.50	$35,885		$35,885	
			$113,716		$111,045
10-year	0.10	532,695		519,338	
			56,826		47,464
25-year	0.04	1,361,500		1,062,804	
			38,162		27,066
50-year	0.02	2,454,671		1,643,809	
			32,871		19,592
100-year	0.01	4,119,430		2,274,675	
			41,194		22,747
Larger Storms	0.00	4,119,430		2,274,675	
	Total Average Annual Risk:		$282,768		$227,914
	Present Value of Average Annual Risk for Amortization Period:		$6,074,500		$4,896,100

Based on the following--

Effective Interest Rate:	4.00%
Amortization Period:	50
Present Worth Factor:	21.48

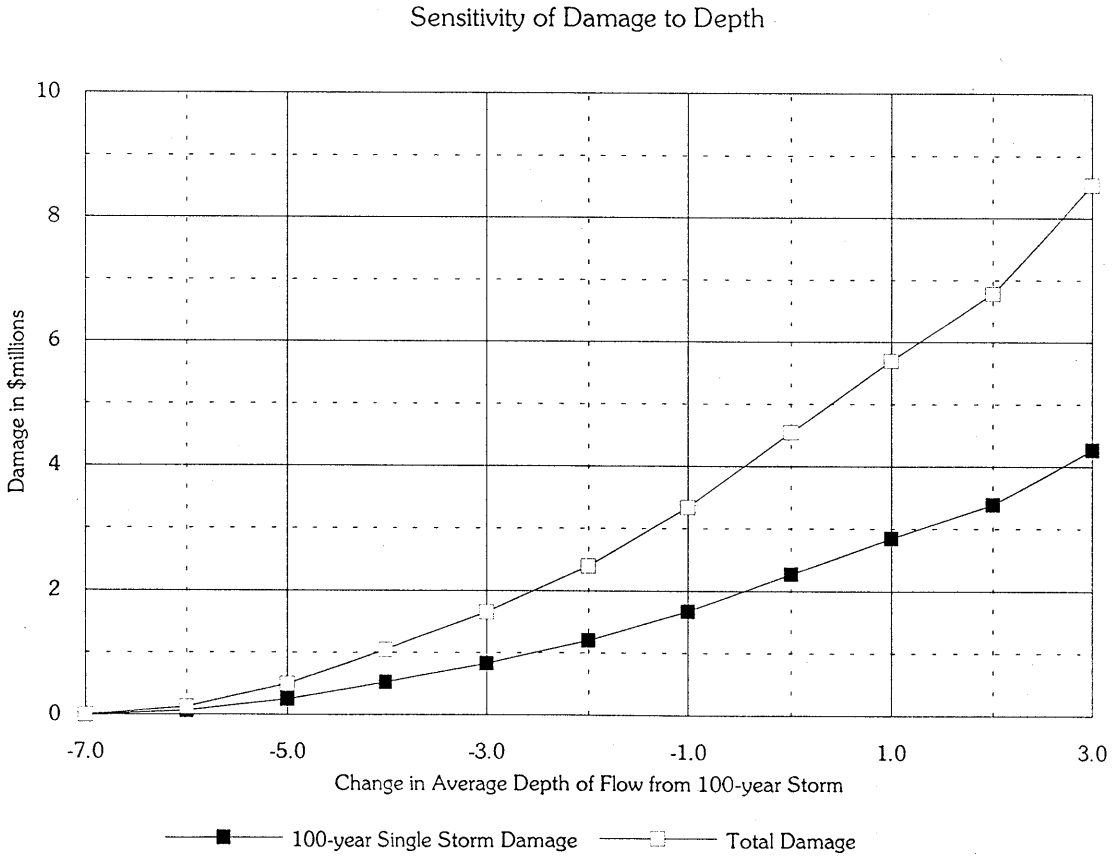
Benefit of Levee: $1,178,400 **

** Note that this considers water damage to property damage only and does not account for land or structures lost to erosion, damage to public infra-structure, cost of relief efforts, or cost of lost time of residents.

Figure 5. Sensitivity of Damage to Depth

Change in WSE	Average Depth	Damage ($millions) 100-year	Total
-7.0'	1.1'	0.00	0.00
-6.0'	2.1'	0.06	0.13
-5.0'	3.1'	0.25	0.50
-4.0'	4.1'	0.52	1.05
-3.0'	5.1'	0.83	1.65
-2.0'	6.1'	1.20	2.40
-1.0'	7.1'	1.67	3.34
0.0'	8.1'	2.27	4.55
1.0'	9.1'	2.85	5.70
2.0'	10.1'	3.39	6.78
3.0'	11.1'	4.27	8.54

Total damage assumed to be twice the 100-year single strom amount.



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flooding. This precludes the formulation of an erosion damage model that can identify specific benefits on a parcel-by-parcel for given improvement scenarios.

For this reason, a more macroscopic approach based on historical erosion losses for clusters of parcels along similar reaches has been employed. The north and south banks of Tanque Verde Creek have each been divided into eight reaches that are similar in property value as well as hydraulic and geomorphic characteristics. For each reach, the following has been determined--(1) the average loss of land over various time intervals using aerial photos, (2) the average value of property from assessor records, and (3) the annualized value and present worth of the land lost.

The 16 reaches used for this purpose are shown on Sheet 14 of Attachment 1. The "areas" shown are clusters of parcels that lie in the vicinity of the erosion hazard zone. The purpose of the clusters is to determine representative property values and don't necessarily need to be wholly contained within the erosion hazard zone. Similarly, the entire erosion hazard zone does not have to be included, although it is. The area of each cluster has been measured using AutoCAD.

Special AutoLISP routines have been used to create text file listings of the parcels located within each cluster. Those lists have subsequently been imported into an Excel spreadsheet which by combining assessor information provides the necessary property value information. The Excel file used for this purpose is EROSION.XLS. The resulting property values for each area are summarized in Figure 6a with averages shown in Figure 6b.

The amount of land lost historically within each reach has been determined by CMG using aerial photos which date to 1936. Those measurements are tabulated in Figure 7. It can be seen that a number of the areas have experienced no loss of land at all and would seemingly not benefit by improvements that address only erosion. Areas upstream of Wentworth Road have historically had the most erosion activity which is consistent with the discussion of Section 4.

Not all areas have experienced loss of land to erosion, and some areas with similar characteristics have experienced substantiality different rates. It is unreasonable to expect that parcels here-to-for unaffected by erosion will not be in the future. For that reason, assumptions have been made for each cluster based on the experience of that and other similar areas. The "experienced" and "assumed" rates are reflected in Figures 8a and 8b respectively.
The property values, and the experienced and assumed rates of land lost have been used to determine values for average annual and present worth of loss due erosion damage for each of the 16 areas. These values are also tabulated in Figure 8a and 8b. It is the present worth that the cost of improvements can be compared to determine benefit/cost feasibility. It should be noted that the assumed losses, while conservative on one hand, could be construed to over-estimate the amount of erosion-related benefit. Care should be taken in using these values to justify a particular improvement approach. The values of assumed present worth are also shown on Sheet 14 in

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Figure 6a. Property Values of Parcel Clusters for Erosion Damage Analysis

Parcel Cluster	Total Area (acres)	Number of Parcels		Total Value of Cluster Parcels			
		Total	Developed	Structures	Land	Total	Developed Parcels
South Bank--							
1	56.91	8	6	$748,669	$633,356	$1,382,025	$1,164,175
2	89.41	2	1	547,473	671,488	1,218,960	1,141,610
3	62.47	11	8	702,578	933,225	1,635,803	1,382,128
4	87.59	9	5	710,036	883,794	1,593,830	1,424,155
5	180.22	14	8	1,734,183	1,645,894	3,380,076	3,245,176
6	106.19	13	10	921,833	1,393,729	2,315,561	2,115,380
7	59.65	6	4	859,208	699,955	1,559,163	1,443,538
8	117.11	1	1	482,209	1,183,840	1,666,049	1,666,049
Total:	759.55	64	43	$6,706,186	$8,045,280	$14,751,466	$13,582,210
North Bank--							
9	89.91	8	4	$196,106	$638,913	$835,019	$356,241
10	43.26	11	7	362,910	510,916	873,826	744,033
11	57.99	25	16	646,033	925,306	1,571,339	1,507,183
12	21.21	9	2	95,220	96,375	191,595	104,095
13	38.44	7	3	142,830	16,938	159,768	157,268
14	108.34	7	6	1,554,018	1,569,175	3,123,193	2,875,693
15	89.67	8	6	1,835,915	1,664,375	3,500,290	3,039,665
16	48.52	11	5	896,929	932,500	1,829,429	1,386,304
Total:	497.34	86	49	$5,729,960	$6,354,498	$12,084,458	$10,170,480
Behind Levee--							
12x	11.21	15	15	$1,649,416	$656,250	$2,305,666	$2,305,666
13x	44.42	60	55	6,625,729	2,581,875	9,207,604	9,031,979
Total:	55.63	75	70	$8,275,145	$3,238,125	$11,513,270	$11,337,645
Total:	1,312.52	225	162	$20,711,291	$17,637,903	$38,349,194	$35,090,335

Notes--

1. Number of parcels and areas of clusters determined from AutoCAD drawing MASTER.DWG.
2. Values are computed as 1.25 x assessor full cash values.
3. Developed parcels are assumed to be those with structural values.

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Figure 6b. Average Property Values by Parcel Cluster

Parcel Cluster	Average Value of Developed Parcels	Average Value of All Property (per acre)	Average Value Land Only (per acre)
South Bank--			
1	$194,000	$24,000	$11,000
2	1,142,000	14,000	8,000
3	173,000	26,000	15,000
4	285,000	18,000	10,000
5	406,000	19,000	9,000
6	212,000	22,000	13,000
7	361,000	26,000	12,000
8	1,666,000	14,000	10,000
Average:	316,000	19,000	11,000
North Bank--			
9	89,000	9,000	7,000
10	106,000	20,000	12,000
11	94,000	27,000	16,000
12	52,000	9,000	5,000
13	52,000	4,000	400
14	479,000	29,000	14,000
15	507,000	39,000	19,000
16	277,000	38,000	19,000
Average:	208,000	24,000	13,000
Behind Levee--			
12x	154,000	206,000	59,000
13x	164,000	207,000	58,000
Average:	162,000	207,000	58,000
Total Average:	$217,000	$29,000	$13,000

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Figure 7. Loss of Land by Parcel Cluster for Erosion Damage Analysis

Parcel Cluster	1936 to 1960 Amount*	1936 to 1960 Annual Rate**	1960 to 1967 Amount	1960 to 1967 Annual Rate	1967 to 1990 Amount	1967 to 1990 Annual Rate	1990 to 1993 Amount	1990 to 1993 Annual Rate	Total Since 1936 Amount	Total Since 1936 Annual Rate
South Bank--										
1	--	--	--	--	0.6	0.05	--	--	0.6	0.01
2	--	--	--	--	--	--	--	--	--	--
3	1.8	0.08	2.3	0.33	--	--	0.3	0.10	4.4	0.08
4	--	--	1.1	0.16	--	--	--	--	1.1	0.02
5	--	--	--	--	--	--	5.0	1.67	5.0	0.09
6	10.4	0.43	--	--	6.5	0.50	0.7	0.23	17.6	0.31
7	--	--	--	--	1.4	0.11	0.6	0.20	2.0	0.04
8	--	--	--	--	3.8	0.29	1.7	0.57	5.5	0.10
Subtotal:	12.2	0.51	3.4	0.14	12.3	0.95	8.3	2.77	36.2	0.64
North Bank--										
9	--	--	--	--	0.6	0.05	--	--	0.6	0.01
10	--	--	--	--	--	--	--	--	--	--
11	1.1	0.05	--	--	--	--	2.0	0.67	3.1	0.05
12	--	--	1.1	0.16	2.2	0.17	--	--	3.3	0.06
13	2.7	0.11	--	--	1.5	0.12	--	--	4.2	0.07
14	--	--	9.5	1.36	--	--	2.2	0.73	11.7	0.21
15	--	--	12.8	1.83	4.5	0.35	1.5	0.50	18.8	0.33
16	--	--	--	--	--	--	1.0	0.33	1.0	0.02
Subtotal:	3.8	0.16	23.4	0.98	8.8	0.68	6.7	2.23	42.7	0.75
Behind Levee--										
12x	--	--	--	--	--	--	--	--	--	--
13x	--	--	--	--	--	--	--	--	--	--
Subtotal:	--	--	--	--	--	--	--	--	--	--
Total:	16.0	0.67	26.8	3.83	21.1	1.62	15.0	5.00	78.9	1.38

* Land area amounts shown in acres.

** Annual rates of land lost shown in acres per years.

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Figure 8a. Annualized Value and Present Worth of Erosion Damage Experienced

Parcel Cluster	Average Value of Land	Experienced Average Rate of Erosion (acres/year)	Annualized Rate of Loss	Present Worth of Loss
South Bank--				
1	$24,000	0.011	$ 264	$ 5.671
2	14,000	--	--	--
3	26,000	0.077	2,002	43.003
4	18,000	0.019	342	7.346
5	19,000	0.088	1,672	35.915
6	22,000	0.309	6,798	146.021
7	26,000	0.035	910	19.547
8	14,000	0.096	1,344	28.869
			Total for South Bank:	$ 286.371
North Bank (in front of levee)--				
9	$9,000	0.011	$ 99	$2.127
10	20,000	--	--	--
11	27,000	0.054	1,458	31.318
12	9,000	0.058	522	11.213
13	4,000	0.074	296	6.358
14	29,000	0.205	5,945	127.699
15	39,000	0.330	12,870	276.448
16	38,000	0.018	684	14.692
			Total for North Bank:	$ 469.854
Behind Levee--				
12x	$206,000	--	--	--
13x	207,000	--	--	--
			Total for Both Banks:	$ 756.225

Notes:

1. Present worth calculation based on the following factors--

Effective Interest Rate:	4.00%
Amortization Period:	50
Present Worth Factor:	21.48

Figure 8b. Annualized Value and Present Worth of Erosion Damage Assumed

Parcel Cluster	Average Value of Land	Assumed Average Rate of Erosion (acres/year)	Notes	Annualized Rate of Loss	Present Worth of Loss
South Bank--					
1	$24,000	0.02	(1)	$ 480	$ 10,310
2	14,000	0.02	(1)	280	6,014
3	26,000	0.08	(2)	2,080	44,678
4	18,000	0.08	(3)	1,440	30,931
5	19,000	0.10	(4)	1,900	40,812
6	22,000	0.35	(5)	7,700	165,396
7	26,000	0.35	(5)	9,100	195,468
8	14,000	0.35	(5)	4,900	105,252
				Total for South Bank:	$ 598,862
North Bank (in front of levee)--					
9	$9,000	0.01	(1)	$ 99	$2,127
10	20,000	0.01	(1)	220	4,726
11	27,000	0.08	(2)	2,160	46,397
12	9,000	0.10	(4)	900	19,332
13	4,000	0.08	(3)	320	6,874
14	29,000	0.35	(5)	10,150	218,022
15	39,000	0.35	(5)	13,650	293,202
16	38,000	0.35	(5)	13,300	285,684
				Total for North Bank:	$ 876,363
Behind Levee--					
12x	$206,000	0.00	(6)	--	--
13x	207,000	0.00	(6)	--	--
				Total for Both Banks:	$ 1,475,225

Notes:

1. Areas 1, 2, 9 and 10 assumed at .02 based on experienced rates of .011 for both areas 1 and 9.
2. Areas 3 and 11 both assumed at .08 based on Area 3's experienced value of .077
3. Areas 4 and 13 both assumed at .08 based on Area 3's experienced value of .074 (inside of bend)
4. Areas 5 and 12 assumed at .10 based on Area 5's experienced vaule of .088 (outside of bend)
5. Areas 6-8 and 14-16 assumed at .35 based on Are 15's expierence of .33
6. Assumes repairs will be made to golf course preventing progression of erosion from storm to storm.
7. Present worth calculation based on the following factors--

$1,000's, The areas of the shaded circles are proportional to these amounts, indicating visually the location and magnitude of erosion damage potential.

Areas 12x and 13x are located behind the proposed levee. They are currently buffered from the river channel by the golf course. Progressive erosion into the golf course would presumably be repaired as it occurred, so these areas have been assumed safe from erosion without the levee as well.

Figure 8b indicates the present worth of anticipated erosion damage to be $1.5 million. By means of comparison, the corresponding values for flood damage were found to be $6.1 and $4.9 for the existing and given conditions respectively. On this basis, erosion constitutes 20% to 25% of the total damage.

Analyzing potential erosion damage for discrete clusters of parcels makes it possible to evaluate feasibility on a reach by reach basis. Sheet 14 for example suggests that addressing only the reaches upstream of Wentworth would prove more feasible, at least at first glance. The potential for flood damage in this area is correspondingly lower however, potentially offsetting this benefit for any improvements that address both flood and erosion damage.

Other Damage. Other potential sources of potential storm damage include (1) damage to public infrastructure, (2) damage to utilities in the area, and (3) lost of accessibility. These costs cannot be determined from the body of data provided for this study. Each is discussed briefly here:

Public Infrastructure. CMG, in Attachment 3, has noted that public infrastructure vulnerable to damage by Tanque Verde Creek consists of the Houghton Road bridge, and of dip crossings for Tanque Verde Loop and Wentworth Roads. The bridge has been designed to withstand a 100-year storm and should therefore not contribute the anticipated damage. Repairs to the dip crossings can be expected on a relatively frequent basis, but for relatively small cost funded through annual operating budgets. The overall cost is likely to be small relatively to the other damages considered here, especially given the accuracy of the data used for the various analyses.

Utilities. CMG has also pointed out that no major utilities vulnerable to storm damage are known to exist in the area. Damage to utilities has also been ignored.

Access. The need to maintain access to the area during storms was dramatically demonstrated during the January flooding. The Tanque Verde Road bridge at Agua Caliente Wash was impassable for nearly two weeks, making it impossible for residents of Forty Niners Country Club, La Cebadilla and other neighborhoods in the area to leave or return home. The cost of relief efforts and lost productivity is unknown but likely significant in comparison to the other costs. One bright spot resulting from the flood is that a new bridge for Agua Caliente Wash will now be constructed, presumably eliminating the access problem and the associated cost.

SECTION 6
CULTURAL RESOURCES

Cultural & Environmental Systems, Inc. (C&ES) has performed a Class I archaeological survey for this project. A Class I survey consists of a records search to identify the location and nature of previously recorded sites. C&ES examined records at the Arizona State Museum, Arizona Historical Society (Tucson), and Bureau of Land Management Public Room (Phoenix). Their complete report is provided separately as Attachment 5.

Records of approximately 55 of sites were found within one-half mile of the project area. Sheet 15 of Attachment 1 shows the approximate location, condition and other information regarding each site. Also shown are locations of previous archaeological surveys and reported archaeological remains (RR--Remains Reported).

These archaeological resources represent at least three cultures--Archaic, Hohokam, and Historic. Not surprisingly, most of the reported remains are of the Hohokam culture which had highly developed social, political, and economic systems. The Hohokam took advantage of watercourses for agricultural purposes, although the extensive canal systems like those in the Gila-Salt Basin were not characteristic in the Tucson Basin.

There are few reported sites near the actual wash, even though the area was obviously quite active in prehistoric times. This could be attributed to the lack of systematic exploration in the project area, or that through alluvial action the wash has disposed of man's remnants in its own way. Perhaps the Hohokam understood the perils of developing adjacent to active washes. In any event, a more detailed Class III archaeological survey, which includes pedestrian survey, should be performed prior to any earth-disturbing structural improvements.

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SECTION 7
NATURAL RESOURCES

One of the most striking features of Tanque Verde Creek is the abundance of natural vegetation. The amount of annual runoff and relatively shallow water table supports densely forested areas along both banks which abound with wildlife and rare plants. This vegetation is an important resource that nurtures wildlife and provides a unique visual quality for the enjoyment of area residents and visitors to the area. Wheat-Gallaher & Associates (WGA) has examined this resource and identified their value in terms of wildlife habitat, visual quality and recreational opportunity. WGA's report is included separately as Attachment 6. A summary of results and recommendations is presented in Sheet 16 of Attachment 1.

Much of the vegetation along Tanque Verde Creek is classified as "Class I" habitat which is the most sensitive and rare habitat in the Tucson valley. (Classification of habitat as defined by Shaw--see reference in WGA report) The specific types of habitat found along Tanque Verde Creek include *Deciduous Riparian Woodlands*, *Mesquite Bosque*, and *Lakes, Ponds and Wetlands*--all once abundant in the Tucson valley, but becoming increasingly rare due to development and lowing ground water tables. Tanque Verde Creek and Cienega Creek are considered to have the only two significant stands of Deciduous Riparian Woodlands that now remain in Pima County. Both the woodlands and bosque habitats along Tanque Verde Creek are, however, in a state of decline due to clearing and the dropping water table.

Wildlife Habitat. Class I habitat is critical for wildlife survival and movement. The Tanque Verde Creek habitat provides shelter for nesting and breeding for a variety of birds and mammals. Probably as important however is that it also serves as a corridor for wildlife movement. Such movement is critical to interbreeding which is necessary for species to sustain genetic viability. The continuity of the Tanque Verde habitat, along with its connection to the Santa Catalina and Rincon Mountains makes it particularly vital in this regard. This function has to some extent been interrupted in some locations by clearing for agriculture, schools, and residential purposes.

Visual Quality. From the human perspective this vegetation results in outstanding visual quality and scenic view sheds which are unique in the Tucson area. It provides breath-taking foreground views, particularly looking eastward where the where the orientation of the rivers provides dramatic middle ground vistas of the Rincon Mountains. Visual quality is one of the key underlying attractions that draws residents to the area.

Recreational Opportunities. Trails for hiking and equestrian purposes are an obvious recreational opportunity in this area. Tanque Verde Creek and its associated tributaries also provide access to the Catalina and Rincon Mountains as well as important trail corridors in themselves. The *Eastern Pima County Trail System Master Plan* gives it priority status as an essential component of

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the comprehensive trail system. It is also identified as a major national forest boundary access point. Visual quality and the sense of solitude the dense vegetation provides are important elements of this recreational experience. Other current recreational uses along Tanque Verde Creek include ball fields and a golf course. Any sort of public trail system would require easements or right-of-way.

The vegetation along Tanque Verde Creek also serves a hydrologic function. It participates in the cycle of channel widening and narrowing described in Section 4 by stabilizing the banks against low flows but allowing erosion to occur in larger, less frequent storms. It also helps dissipate energy of overbank flow.

Recommendations. WGA has provided a set of recommendations for general guidance during the current planning process. Several of those which could most affect or be affected by river management alternatives is as follows:

- Give the design of any developments or improvements within the riparian or bosque habitats foremost attention to preserving the integrity and long-term viability of these environments. Class I habitat should be protected by design that avoids fragmentation or loss.
- Lakes, ponds and wetlands should be protected, particularly those which are natural aquatic ecosystems.
- The most effective way to protect habitat is to avoid it altogether. If improvements within areas of Class I habitat are necessary, they should be well integrated into the habitat. A plan should be established for restoring damaged areas affected by construction to their former value.
- Provide financial incentives for owners of private property to provide conservation easements along the river.
- Allow habitat to regenerate rather than try to protect it. It makes more sense, for example, to allow natural habitat to be lost to erosion and to regenerate, than to protect that habitat with bank protection or some other structural measure.
- Avoid or mitigate barriers to wildlife movement.

Recommendations for specific approaches and mitigation measures would be developed as part of the detailed management plan, and during the design of any improvements that might entail.

PART III
IDENTIFICATION OF ALTERNATIVES

SECTION 8
STRUCTURAL ALTERNATIVES

The purposes of this study is to develop through cursory analysis a short list of plausible strategies for subsequent study. Those that seem promising will be evaluated in detail in subsequent phases, prior to finalizing a formal management plan. The candidates considered here include both structural and non-structural approaches. Structural alternatives are considered to be large-scale permanent improvements provided on an area-wide basis by PCFCD or some other governmental entity. This contrasts to "non-structural" approaches which are considered here to be either (1) institutional measures such as purchase of flood-prone property and regulating flood plain development, or (2) spot improvements to individual parcels such as flood-proofing structures or providing "soft" bank protection. (Soft bank protection would prevent the advance of erosion in small storms, but would wash out in large storms to avoid deflecting currents in a manner that could increase damage to other property downstream.)

Traditional structural solutions typically involve major construction effort such as the proposed Forty Niners levee. Those investigated here are detention, channelization, and extending the Forty Niners levee.

Detention. Detention attenuates discharge peaks by capturing and storing incoming flow, which is then released at a lowered rate of discharge over a longer period of time. It is typically a feasible approach when large storage volumes can be provided inexpensively, and volumes of inflow are relatively small. Neither of these conditions exist in this case, and on the face of it, detention would not be expected to be a viable approach. To confirm that this is in fact the case, a more quantitative approach to this question has been taken, the results of which presented here.

CMG in Attachment 3 has identified the need to minimize the geomorphic impact of a detention system by allowing sediment to pass. This is needed to avoid a "clear water" response that would result from removing sediment from the outflow. This would have the effect of increasing the sediment deficit downstream, leading in turn to increased bed and bank erosion.

This analysis has been undertaken in two steps. The first step determined the approximate amounts of storage volume that would be needed to cause various levels of decrease in flood damage. This was done by placing a hypothetical dam of unlimited height at the upstream end of the project area. The amount of storage required, and the resultant peak discharges downstream, were then determined for a range of release discharges using the "project" hydrology (HEC-1) model.

Though the dam assumed was hypothetical, the HEC-1 model was given stage-storage characteristics based on the actual topography of the area. The dam was assumed to be located at the lower end of Subarea C as seen on Sheet 5 of Attachment 1. This is approximately one mile

upstream of Tanque Verde Guest Ranch, and is within the national forest. Storage volumes were determined using the contours shown on Sheet 5. The discharge leaving the dam was set to rates of 0, 1,000, 5,000 and 10,000 cfs. The results of this exercise are tabulated in Figure 9.

The resulting average change in water surface elevation for Tanque Verde Creek is based on linear interpolation of the information previously presented in Figure 3. The "benefit" is the decrease in flood damage from the 100-year storm (which the HEC-1 model considers to be 28,500 cfs) similarly pro-rated from Figure 5.

Because of he discrepancy between the HEC-1 model and project 100-year storm, Figure 9 provides only an approximate comparison to benefit/cost ratios for other approaches investigated later. These results do however, provide a sense of the performance that might be realized from a detention scheme. For example, reducing the average depth of flow by 1.5' would require a storage volume of 3,300 acre-feet and reduce flood damage from a 100-year storm approximately $2.9 million.

(As a point of interest, to accomplish this at this particular location would require a dam at least 300' in height, and would create a temporary lake over one mile in length. Tanque Verde Falls would be submerged.)

The second step in this investigation was to identify the specific location within the project area appearing to offer the greatest chance of feasibility. The most feasible site would be expected to take advantage of existing relief, occupy undeveloped land to the extent possible, minimize the impact to existing residences, and be located near the upstream end of the project so as to affect as much of the project length as possible. Should this approach be found conclusively unfeasible at the site most likely site to succeed, it could then be concluded that other sites would be unfeasible as well. Failure of this analysis to decisively show this approach to be unfeasible would indicate the need for a more detailed investigation.

Reviewing Sheet 1 (of Attachment 1) suggested the site most likely to succeed to be located in the vicinity of La Cebadilla Estates, using the configuration shown in Figure 10. In addition to cost and effectiveness, this configuration was formulated with other constraints in mind such as maintaining the flow of sediment , and mitigation of impacts on visual quality and wildlife.

The configuration consists of a dam constructed to appear as a continuation of existing desert ridges. Box culverts or similar structures would be placed in the main channel stream bed allowing low flows and sediment to pass unimpeded. A spillway capable of safely handling a "Maximum Probable Flood" would be necessary. Visual and wildlife impacts of the berm would be mitigated through landscaping, although the concrete spillway would be very large and quite difficult to disguise.

Figure 9. Effectiveness of Detention Over a Range of Storage Volumes

Storage Located at Upstream End of Project--

To reduce discharge entering the project to (cfs)	The volume of storage required would be (acre-ft)	Dam height would need to be	The peak Discharge at Houghton would be (cfs)	Change in Average Depth (ft) (from fig. 3)	Corresponding Flood Damage ($ million) (From fig. 5)	"Benefit" Realized ($ million)
0	3,775	358'	15,507	-1.67	2.71	1.84
1,000	3,333	320'	16,511	-1.51	2.86	1.69
5,000	2,264	229'	20,344	-.95	3.40	1.15
10,000	1,384	149'	25,082	.21	4.79	-.24
28,500	--	--	28,500	.57	5.20	-.65
		Corresponding values using project storm:	23,000	.00	4.55	--

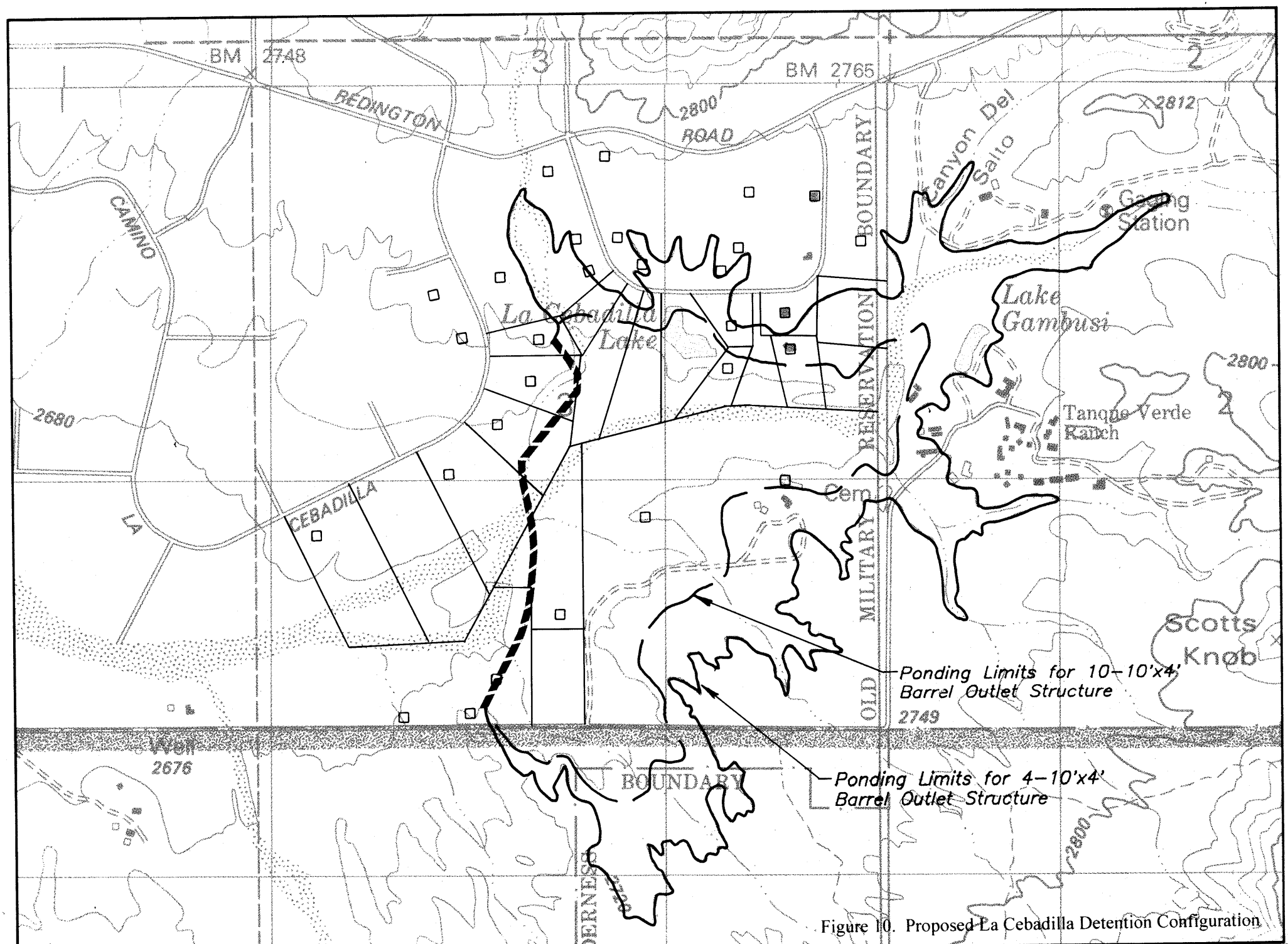


Figure 10. Proposed La Cebadilla Detention Configuration

The feasibility of this configuration was tested by assuming it to be placed at the lower end of Subarea D of the HEC-1 model. This is somewhat downstream of the actual location indicated in Figure 10 so in reality the size of the drainage basin would be somewhat smaller. Outlet structures consisting of the equivalent of 4, 6, 8, and 10 10' x 4' box culverts were tested. The extent of short term ponding in a 100-year storm for the 4 and 10 barrel configurations is shown in Figure 10.

Figure 11 summarizes approximate costs and benefits for the various outlets. Even if the berm were constructed less extravagantly and the acquired land put to a secondary use (such as a park), the benefit simply does not justify the cost. Assuming that the selected location is in fact the best available site, it can be reasonably concluded that no detention configuration will be for this project.

It has been suggested that a similar configuration within the national forest boundary could prove more feasible, presuming the cost of land purchase would be eliminated. Figure 11, which itemizes land acquisition in the cost breakdown, can be used to examine this question. If this optimal configuration could somehow be transported to within the forest boundary, such that the land costs correspondingly be come zero, the benefit cost ratios would instead of ranging from 0.11 to 0.20 would become 0.17 to 0.38--still well outside the realm of feasibility.

Channelization. The second structural approach considered here is channelization. This has traditionally been widely employed in the Tucson area because it is hydraulically effective and usually the least expensive in terms of cost and land. Channelization presents a number of drawbacks, however, which could be particularly troublesome in the case of Tanque Verde Creek. These include impacts on visual quality and wildlife habitat, reducing the rate of recharge, and altering the stability of the channel bottom. Even though channelization is often the most cost-effective approach, it can still be quite expensive particularly in cases such as Tanque Verde Creek where channel must withstand high erosive forces along its banks and bottom.

The approach to investigating the overall feasibility of channelization has been to first determine benefit/cost ratios for a range of channelization approaches strictly on the basis of construction cost and reduction of flooding. Should one or more approaches appear promising on that basis, then environmental and other impacts would be dealt with as well to ascertain overall feasibility.

CMG has identified two general responses to channelization, depending on location. As described earlier, the upper reaches (above Wentworth Road approximately) are characterized by a relatively narrow geologic flood plain and high capacity of the defined channel The resulting high sediment capacity exceeds the material brought in by the relatively clean flow from upstream. This deficit, along with the need to dissipate stream energy, leads to erosion of the side banks, something that has become an issue in the vicinity of La Cebadilla Estates. Channelization of the river in this area would not in itself have a major effect on this mechanism, presuming that the new channel

Figure 11. Feasibility of La Cebadilla Detention Proposal

Equivalent Number of 10' x 4' RCBCs	Peak Discharge from Basin (cfs)	Max Ponded Depth (ft)	Max Ponded WSE	Max Storage Volume (acre-ft)	Peak Discharge at Houghton (cfs)	Cost of Construction ($millions)	Reduction in Flood Damage (Benefit) ($millions)
10	11,189	33.3	2,713.3	2,713.3	16,567	$10.0	$1.12
8	9,273	35.3	2,715.3	2,715.3	14,670	10.1	1.45
6	7,232	37.7	2,717.7	2,717.7	12,625	10.2	1.79
4	5,960	39.7	2,719.7	2,719.7	11,337	10.3	2.02

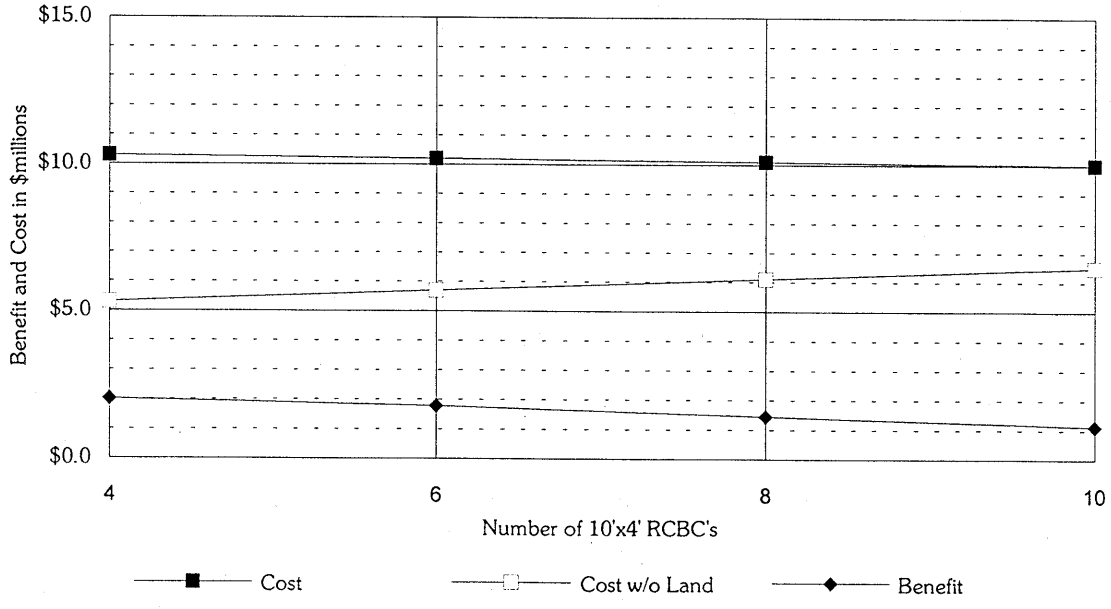
Cost Estimate--

Number of 10' x 4' RCBCs	Land	Emb	Culverts	Spillway	Landscaping	Total	Benefit/ Cost Ratio
10	$3.5	$2.0	$2.0	$2.0	$0.5	$10.0	0.11
8	4.0	2.0	1.6	2.0	0.5	10.1	0.14
6	4.5	2.0	1.2	2.0	0.5	10.2	0.18
4	5.0	2.0	0.8	2.0	0.5	10.3	0.20

Notes on Cost Estimate--

1. Land cost based on total acquisition of affected parcels if primary structure is included, pro-rated share of land covered if not. Acquisition cost assumed to be 1.5 x full cash value. Determination made for cases of 10 and 4 RCBC's with land cost pro-rated for others.
2. Culverts assumed to consist of array of 2 10'x4'x350' RCBC's with structural concrete cost of $350 per CY.
3. Assumed top width of dam is 100' with 3:1 sideslopes, average height of 35', effective length of 4000', and that fill can be placed for $2.00/C.Y. Approximately the same volume of earthwork will be required regardless of approach. This volume could be reduced by a factor of two by narrowing the "desert ridge".
4. A concrete spillway capable of conveying a Maximum Probable Flood with the culverts clogged. Preliminary calculations indicate that such a structure could easily be 15' deep and 600' wide, costing from $2 to $3 million.

Benefit/Cost of Various Configurations--



width were not substantially changed from that of the existing. Such an approach would be of little benefit however, without lining the sides--an action that would force the river to dissipate energy and respond to the sediment deficit through bottom degradation instead. Grade control structures would need to be a part of this scheme.

The second response applies generally to the lower reaches where the geologic flood plain is much wider and the defined channel smaller. Larger flows quickly exceed the channel capacity and spread out over the flood plain. This lowers the overall velocity and diffuses the energy of the river. The notable lack of bottom or side erosion indicates that sediment movement is in equilibrium. Channelization through this area, depending on the extent to which it would concentrate the flow, would introduce the sort of condition that exists upstream. Both side and bottom stabilization would likely be necessary. The goal of channelization would be to reduce flooding in the overbank area. The greater the extent to which this is successful, the more would be the impact on sediment equilibrium. Consequently, channelization in this area would likely require both side and bottom erosion protection as well.

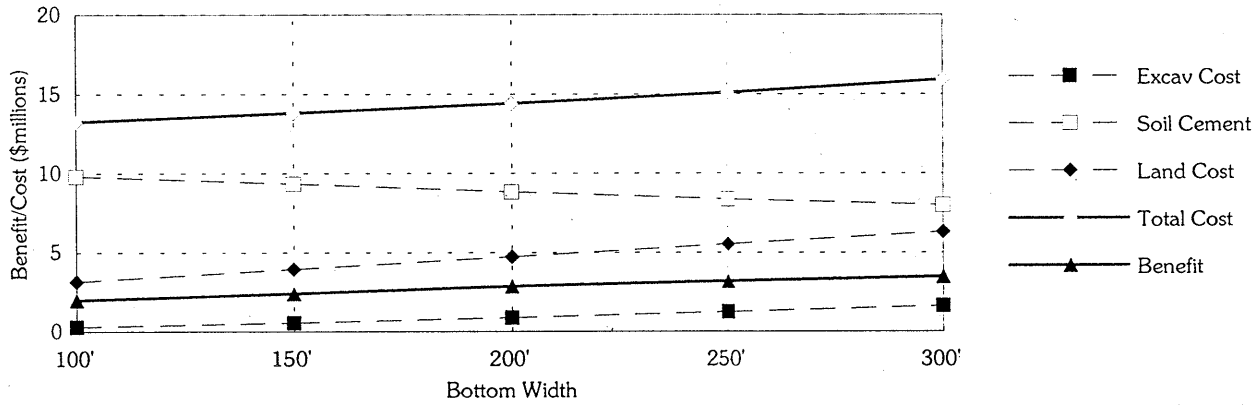
Fifteen channelization approaches have been evaluated for cost and effectiveness. These configuration include channel cross-sections of 100', 150', 200', 250' and 300' bottom widths, each considered with the bottom elevation placed at existing flow line, at 3' below existing flow line, and at 6' below existing flow line. The hydraulic effectiveness was evaluated using the "given" condition project HEC-2 model modified with CHIMP cards. HEC-2 was used to determine average depth of flow as well as the quantity of excavation for each configuration. Cross-sections have been plotted for two configuration, a 200' bottom width at 3' below existing flow line and a 300' bottom width at 6' below existing flow line, to provide an understanding of the impact that a middle and extreme channelization proposal would have on the adjacent area. These are included in Attachment 1 as Sheets 15a through 15c, and 16a through 16c respectively.

Given the anticipated geomorphic impacts, soil cement bank protection with bottom stabilization structures has been included. The cost of soil cement bank lining at total depth of 2.5 time the average depth of flow has been incorporated in the cost analysis. Also included is the acquisition of right-of-way at a width equal to the channel bottom width plus 100'. The benefit of each configuration has been approximated based on the change in average depth from the 100-year storm (Q = 23,000 cfs) and the data of Figure 5.

For this analysis, complete elimination of erosion damage has been assumed, even for low-flow configurations. Presumably, low-flow bank protection would remain in place even during high flows, directing concentrated flows away from overflow areas. Should such an approach initially appear cost-effective, a more careful consideration of these assumptions would need to be made. The results of this analysis are presented in Figures 12a through 12c which show various cost and benefit results for the various configurations. Figure 13 summarizes the benefit/cost ratios which

Figure 12a. Evaluation of Channelization Options - - Channel Bottom Set at Existing Channel Invert

	"Given" Condition	Channel Bottom Width 100'	150'	200'	250'	300'
Average Depth of Flow	8.12	7.70	7.34	6.93	6.57	6.29
Average Change in CWSEL		-0.42	-0.78	-1.19	-1.55	-1.83
Volume of Excavation		301,500	539,460	870,530	1,235,840	1,618,970
Effective Height of Soil Cement (ft)		19.3	18.4	17.3	16.4	15.7
Volume of Soil Cement (CY)		391,548	373,332	352,563	334,212	319,925
Area of Land to be Acquired (acres)		315.2	393.9	472.7	551.5	630.3
Excavation Cost		$0.30	$0.54	$0.87	$1.24	$1.62
Soil Cement Cost		9.79	9.33	8.81	8.36	8.00
Land Cost		3.15	3.94	4.73	5.52	6.30
Total Cost		$13.24	$13.81	$14.41	$15.11	$15.92
Flood Damage Benefit		$0.51	$0.94	$1.39	$1.72	$1.99
Erosion Damage Benefit		1.48	1.48	1.48	1.48	1.48
Total Benefit		$1.99	$2.42	$2.87	$3.20	$3.47
Benefit/Cost Ratio		0.15	0.18	0.20	0.21	0.22

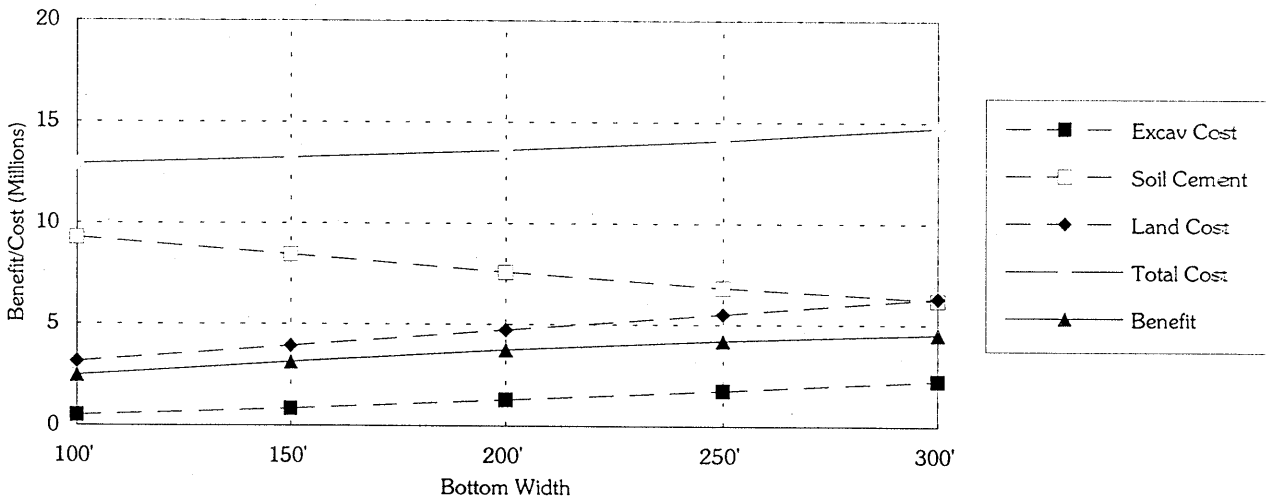


Notes:

1. Effective channel length assumed to be 6.5 miles (includes deduction for 49er's levee).
2. Effective height of soil cement assumed to be 2.5 times the average depth of flow. This includes allowance for stabilizers.
3. Volume of soil cement assumed to be (height of soil cement) x 8' x (2 x effective channel length)
4. Area of land (right-of-way) to be acquired assumed to be (channel bottom width + 100') x (2 x effective channel length)
5. Unit cost of excavation assumed to be $1.00 per CY.
6. Unit cost of soild cement assumed to be $25.00 per CY.
7. Unit cost of right of way acquisition assumed to be $10,000 per acre.
8. Benefit assumed to be the reduction in flood damage as determined from Figure 5.

Figure 12b. Evaluation of Channelization Options - - Channel Bottom Set at 3' Below Existing Channel Invert

	"Given" Condition	Channel Bottom Width 100'	150'	200'	250'	300'
Average Depth of Flow	8.12	7.29	6.64	5.97	5.36	4.88
Average Change in CWSEL		-0.83	-1.48	-2.15	-2.76	-3.24
Volume of Excavation		507,420	845,960	1,280,810	1,743,060	2,224,070
Effective Height of Soil Cement (ft)		18.2	16.6	14.9	13.4	12.2
Volume of Soil Cement (CY)		370,512	337,746	303,526	272,680	248,172
Area of Land to be Acquired (acres)		315.2	393.9	472.7	551.5	630.3
Excavation Cost		$0.51	$0.85	$1.28	$1.74	$2.22
Soil Cement Cost		9.26	8.44	7.59	6.82	6.20
Land Cost		3.15	3.94	4.73	5.52	6.30
Total Cost		$12.92	$13.23	$13.60	$14.08	$14.73
Flood Damage Benefit		$1.00	$1.66	$2.26	$2.72	$3.04
Erosion Damage Benefit		1.48	1.48	1.48	1.48	1.48
Total Benefit		$2.48	$3.14	$3.74	$4.20	$4.52
Benefit/Cost Ratio		0.19	0.24	0.28	0.30	0.31

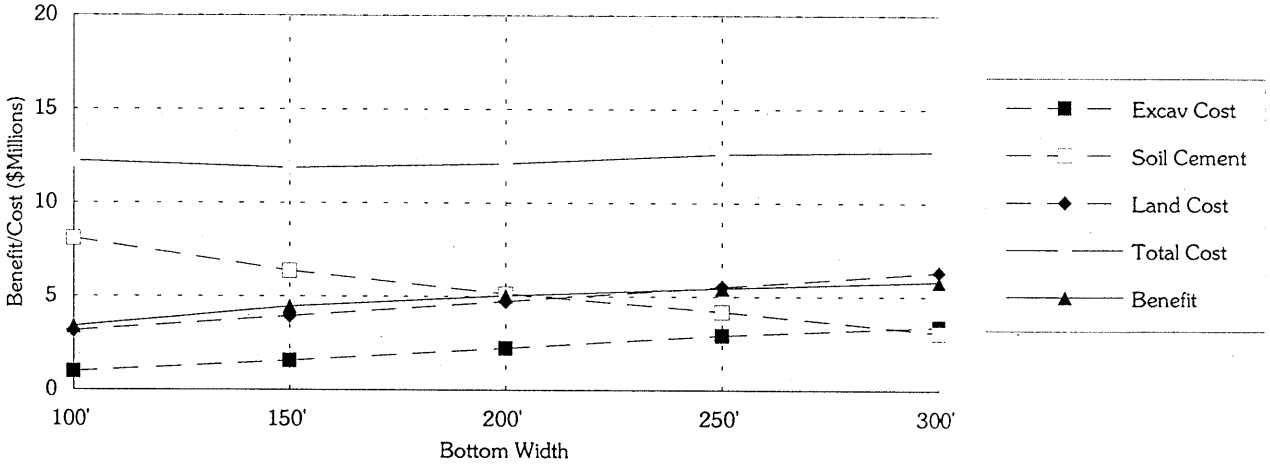


Notes:

1. Effective channel length assumed to be . miles (includes deduction for 49er's levee).
2. Effective height of soil cement assumed to be . times the average depth of flow. This includes allowance for stabilizers.
3. Volume of soil cement assumed to be (height of soil cement) x 8' x (2 x effective channel length)
4. Area of land (right-of-way) to be acquired assumed to be (channel bottom width + 100') x (2 x effective channel length)
5. Unit cost of excavation assumed to be $1.00 per CY.
6. Unit cost of soil cement assumed to be $25.00 per CY.
7. Unit cost of right of way acquisition assumed to be $ per acre.
8. Benefit assumed to be the reduction in flood damage as determined from Figure 5.

Figure 12c. Evaluation of Channelization Options - - Channel Bottom Set at 6' Below Existing Channel Inver

	"Given" Condition	Channel Bottom Width 100'	150'	200'	250'	300'
Average Depth of Flow	8.12	6.36	5.00	4.04	3.28	2.40
Average Change in CWSEL		-1.76	-3.12	-4.08	-4.84	-5.72
Volume of Excavation		992,480	1,561,480	2,228,770	2,908,120	3,381,780
Effective Height of Soil Cement (ft)		15.9	12.5	10.1	8.2	6.0
Volume of Soil Cement (CY)		323,535	254,402	205,566	166,857	122,000
Area of Land to be Acquired (acres)		315.2	393.9	472.7	551.5	630.3
Excavation Cost		$0.99	$1.56	$2.23	$2.91	$3.38
Soil Cement Cost		8.09	6.36	5.14	4.17	3.05
Land Cost		3.15	3.94	4.73	5.52	6.30
Total Cost		$12.23	$11.86	$12.10	$12.59	$12.73
Flood Damage Benefit		$1.92	$2.97	$3.55	$3.97	$4.32
Erosion Damage Benefit		1.48	1.48	1.48	1.48	1.48
Total Benefit		$3.40	$4.45	$5.03	$5.45	$5.80
Benefit/Cost Ratio		0.28	0.38	0.42	0.43	0.46

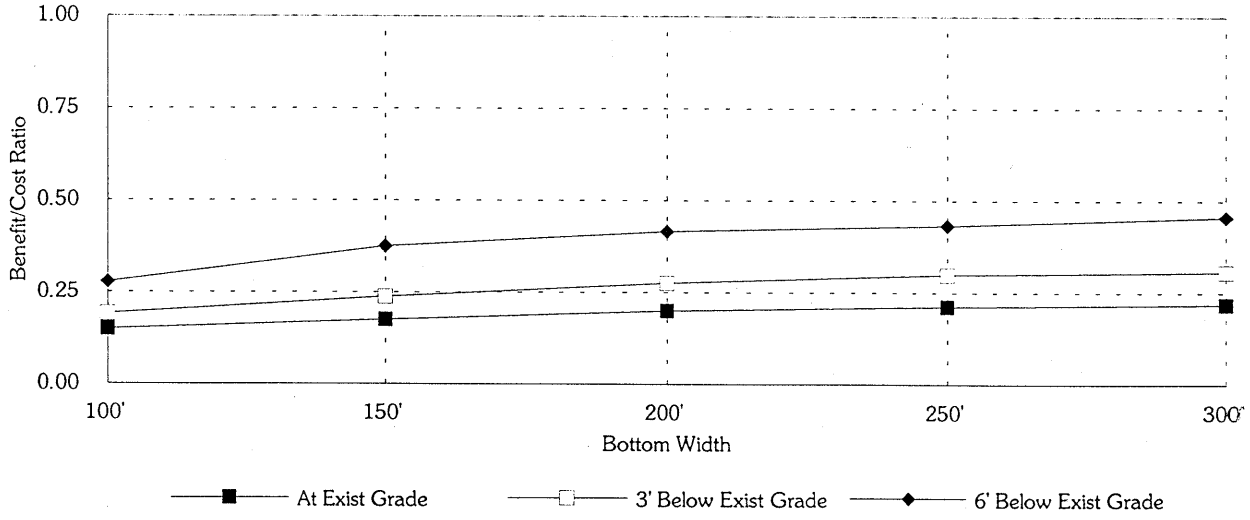


Notes:

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2. Effective height of soil cement assumed to be . times the average depth of flow. This includes allowance for stabilizers.
3. Volume of soil cement assumed to be (height of soil cement) x 8' x (2 x effective channel length)
4. Area of land (right-of-way) to be acquired assumed to be (channel bottom width + 100') x (2 x effective channel length)
5. Unit cost of excavation assumed to be $1.00 per CY.
6. Unit cost of soil cement assumed to be $25.00 per CY.
7. Unit cost of right of way acquisition assumed to be $ per acre.
8. Benefit assumed to be the reduction in flood damage as determined from Figure 5.

Figure 13. Benefit/Cost Ratios of Channelization Options

Bottom Width:	100'	150'	200'	250'	300'
At Exist Grade	0.15	0.18	0.20	0.21	0.22
3' Below Exist Grade	0.19	0.24	0.28	0.30	0.31
6' Below Exist Grade	0.28	0.38	0.42	0.43	0.46



range from less that 0.15 to about 0.5. It is doubtful that further refinement of approximations used in this analysis would sufficiently alter this outcome to suggest that further consideration should be given to any of these options.

Extend Forty Niners Levee. Sheets 13a and 13b show that the proposed 10,000' long Forty Niners levee will nicely resolve one of two major clusters of anticipated flood damage that currently exist. This suggests the possibility of extending the proposed levee approximately 6,600' further downstream to alleviate the second clustering.

Sheet 19 of Attachment 1 shows a proposed configuration for such an extension. Evaluating the effect of this configuration using the project hydraulic model (HEC-2 for 100-year Given Condition) indicates little effect on the depth of flooding as the summary of results presented in Figure 14 indicates.

No geomorphic evaluation of this proposal has been made. Based on the findings of the HEC-6 analysis of the Forty Niners levee, it is likely that the bottom slope would remain at approximately its current equilibrium slope. The concern for this approach would be the extent to which overbank storage would be removed, and what would become of the energy now dissipated in that process. The possibility that erosion of the opposite bank would be induced should be investigated if this approach is considered further.

The cost of constructing this levee has been estimated by pro-rating the estimate for the Forty Niners levee on the basis of length. The estimated cost of the Forty Niners levee is $2.6 million (see Section 1). That cost presumably includes improvements behind the levee to handle local drainage, work that is likely to be needed for the extended levee as well. This calculation results in an estimated cost of $1.7 million for the proposed levee extension.

The benefit has been determined as the anticipated flood damage to those homes that would be protected by the levee. The erosion damage determined for Areas 9 and 10, which are not protected by a golf course or any other sort of development likely to be continuously repaired, could conceivably be added, but is so small it is ignored here. Using the procedures explained in Section 5, the given condition 100-year storm damage to structures and contents that would now be protected from flooding is $1.8 million. The calculations of Figure 4 show the present worth of flood damage to be approximately twice the 100-year storm value. Assuming that ratio to hold for just this area as well indicates a benefit of $3.6 million. The benefit/cost ratio based on these figures would be in excess of 2.0, suggesting this construction would be cost-effective. A more detailed evaluation of this approach is certainly warranted.

Tributary Drainage. As noted earlier, damage caused by tributary drainage has not been considered in this study, and the cost of correcting for tributary flooding is not included in the benefit/cost analysis for any of the alternatives. If tributary drainage improvements were included, the cost for each alternative would increase. Because flood damage also occurs due to runoff from

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Figure 14. Effects of Extended Levee on Water Surface Elevation

Section Number	Corresponding River-Mile	Given Condition 100-year WSE	100-year WSE with Levee Extention in Place	Change in 100-year WSE
113		2,586.12	2,586.12	0.00
114		2,587.99	2,587.79	0.20
1		2,592.81	2,592.98	-0.17
2		2,594.52	2,594.99	-0.47
3		2,596.45	2,597.10	-0.65
4		2,599.67	2,598.38	1.29
5		2,600.42	2,600.00	0.42
6		2,602.44	2,601.71	0.73
20.195		2,604.28	2,603.52	0.76
20.361		2,605.52	2,605.45	0.07
20.442		2,607.53	2,607.72	-0.19
20.520		2,609.65	2,610.18	-0.53
20.604		2,610.83	2,611.48	-0.65
20.660		2,611.76	2,612.19	-0.43
20.722		2,612.96	2,613.04	-0.08
			Average:	0.02

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these tributaries at times when the Tanque Verde is not flooding, the amount of benefit would also increase. To determine if the overall benefit/cost ratio would increase or decrease would require a similar sort of flood damage model and analysis for each tributary. Incorporating tributary drainage in the river management plan would expand the scope of the studies and preliminary designs.

SECTION 9
NON-STRUCTURAL ALTERNATIVES

"Non-structural" approaches are considered here as falling into two categories--(1) institutional measures such purchasing property and regulating construction in flood prone areas, and (2) small-scale improvements that can be accomplished by a single or small number of property owners such as flood-proofing individual structures or providing "soft" bank protection. In this section, these sorts of measures are explored. A viable management plan could easily contain a mixture of structural and non-structural strategies.

Purchase of Land Subject to Storm Damage. An alternative to providing costly drainage improvements is to purchase property vulnerable to storm damage. Several land purchase scenarios have been investigated to determine the sort of cost effectiveness that can be expected for various concepts. In each case, the cost is the cost of purchasing the property, relocating the occupants, and demolishing the structures. That has been assumed as 1.5 times fair market values determined in Section 5. The benefit is the present worth of the flood and erosion damage anticipated for the purchased parcels. Costs and benefits have been determined using the procedures outlined previously for flood and erosion damage. A summary of costs and benefits for several approaches is presented in Figure 15.

The first two cases consider purchasing all property within the FEMA 100-year flood plain for both the current "existing" condition, and the "given" condition assuming the Forty Niners levee to be complete. Although sizable damage amount are associated with both cases, the cost of acquiring the entire flood plain is much greater. Benefit/cost ratios are well below 0.5 for both cases, even with full credit for erosion damage is applied.

The third case is provided in anticipation of a strategy that combines land purchase with structural improvements--in this case extending the Forty Niners levee. As might be expected, the magnitudes of cost and benefit are much lower that when considering the entire flood plain. The benefit/cost ratio, however, does not increase.

The last case considers relatively low-cost floodway land. The damage potential, although low in magnitude, is relatively high when considered in terms of cost. The benefit/cost ratio approaches 1.0, suggesting that in special cases involving a single or small number of parcels, outright purchase should be examined. For structures located within the floodway, non-structural options are limited to purchase of property or doing nothing.

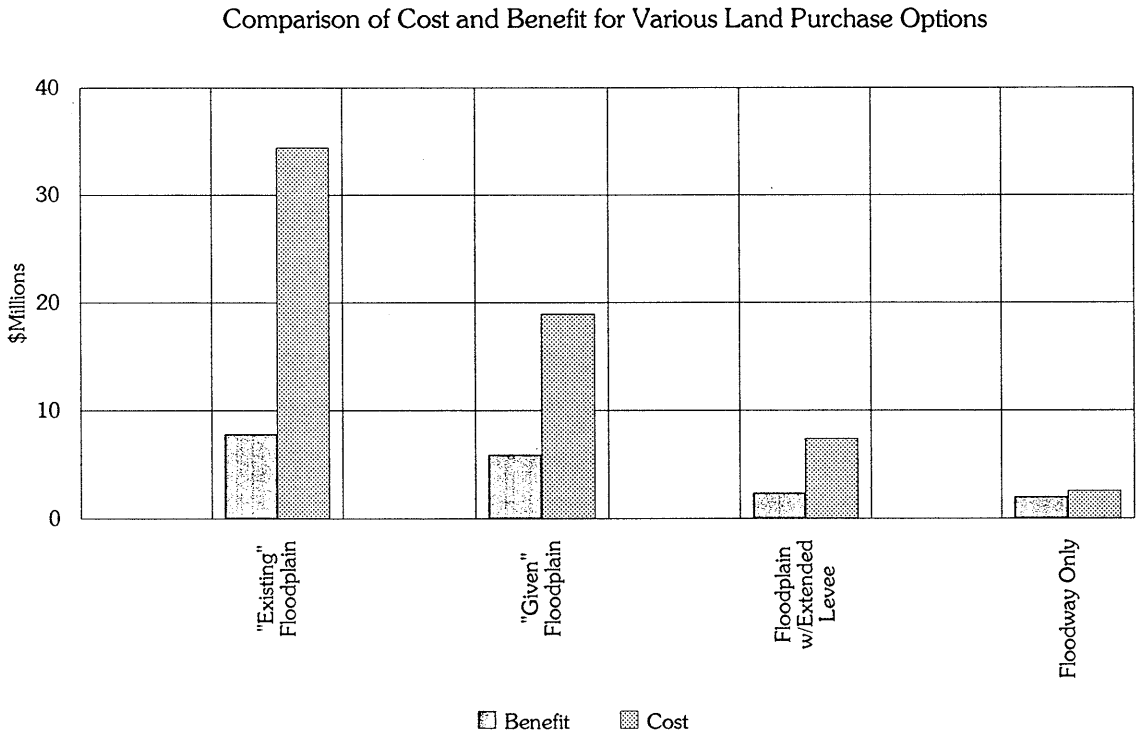
Regulation of Construction in Hazardous Areas. CMG in Attachment 3 has reviewed the current state of flood plain regulation in Pima County. The current Pima County Flood plain Ordinance provides adequate control regarding new development in flood and erosion-prone areas. CMG suggests that an "engineered" erosion hazard setback be adopted in lieu of the blanket 500'

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Figure 15. Cost and Benefit of Property Acquisition for Various Land Purchase Options

To Acquire	Land Area (acres)	Number of Strucs	Cost of Acquiring Property	100-year Flood Damage	Approx. Present Worth	Erosion Damage	Total Present Worth	Benefit/ Cost Ratio
"Existing" Floodplain (without 49ers levee)	1,325	208	34.39	2.93	6.30	1.48	7.78	0.23
"Given" Floodplain (49ers levee in place)	1,219	108	18.95	2.05	4.41	1.48	5.89	0.31
"Given" Floodplain with extended levee in place	850	26	7.38	0.41	0.88	1.48	2.36	0.32
Floodway Only (49ers levee in place)	600	32	2.56	0.23	0.49	1.48	1.97	0.77

All costs shown are in $1,000,000s



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setback that currently exists. CMG's cursory analysis indicates the 500' to be inadequate in some cases, and overly conservative in others.

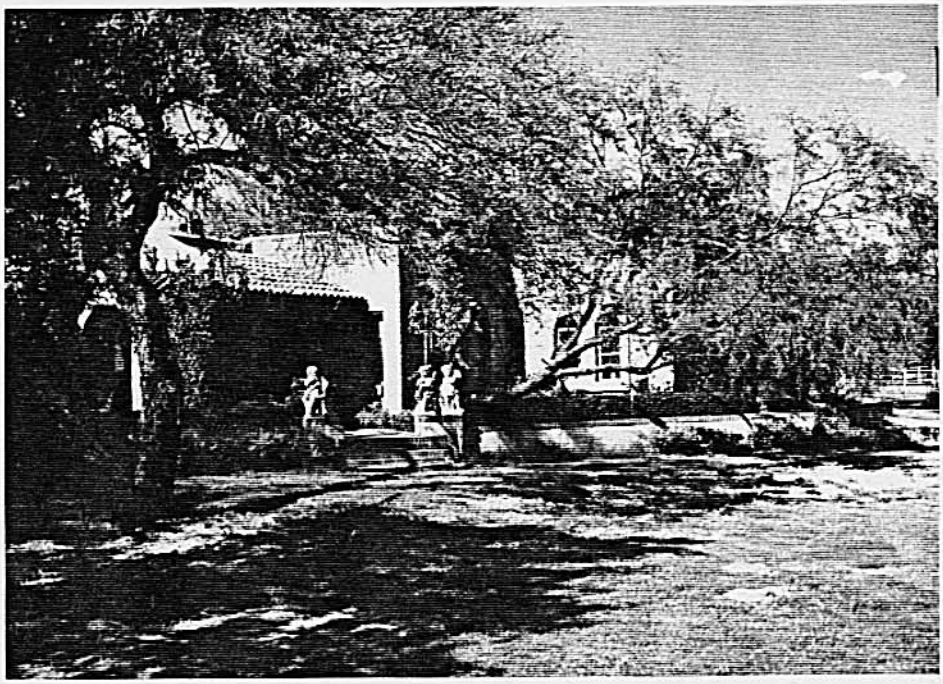
County ordinances do not (and probably cannot) protect the riparian habitat and resultant visual quality from the gradual deterioration due to clearing and lowering of the ground water table. Just how serious this problem is, and what sort of measures might be taken, should be considered in more detail.

Flood Proofing Existing Structures. While flood plain regulation can be effective in controlling future development, that is of little benefit to existing homes in the area that are susceptible to either flood or erosion damage. Flood-proofing can be an effective means of protecting structures and contents against damage due to flooding. Two approaches to flood proofing have be examined here.

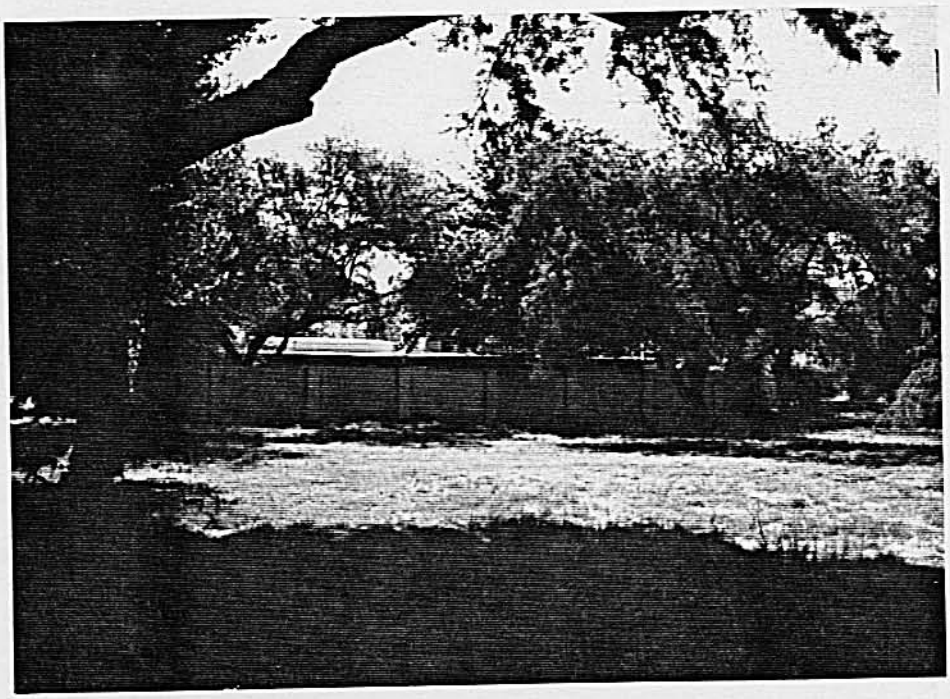
The first is to water proof the structure itself by providing water-tight doors and windows if applicable. Exterior walls may also need to be sealed in some fashion. This approach may be practical for relatively shallow flooding depths (say up to a foot or so). Greater depths could present structural problems would depend on the type and soundness of construction. This sort of effort could be provided by the county or, more likely, performed by individual or groups of homeowners. Guidance could be furnished to homeowners both generally in the form of brochures outlining workable procedures, and individually by providing the depth of 100-year storm above finish floor elevation for specific structures. Costs could vary from several hundred to thousands of dollars, depending on individual circumstances. Benefits likewise could vary widely.

The second approach for flood-proofing is to provide levees or flood walls around individual or small groups of structures. The levee can consist of a berm which ideally would be worked unobtrusively in to the surrounding landscaping. Flood walls would consist of masonry structures such as planters or patio walls for shallow depths. Reinforced concrete wall may be required for greater depths where space is limited. The photographs included as Figure 16 show how this might be done for various conditions. Sheet 20 is a concept plan prepared by Wheat-Gallaher showing alternative concepts for providing 3' and 6' of protection.

Providing for vehicular and pedestrian access over or through the structure could prove challenging, particularly in situations where space is limited. Ideally, permanent access would cross over the barrier. One of the installations shown in the photographs includes a flood gate, requiring that someone anticipate or be present in a major storm. Again, the costs of these approaches would vary significantly depending on the depth flooding, length, and degree of landscaping that is incorporated. Shallower flooding depths would be more easily accommodated, both in terms of cost and in making the installation visually acceptable. Many of the jeopardized homes in the project areas are on large lots which would lend themselves to a combination of berms and planters such as that suggested by the photographs and the Wheat-Gallaher concepts.



Short planters with stairway provides 3' of protection. A similar treatment extends around the rear of the home to protect the swimming pool.



This wall surrounds a residence near the river. It would provide 5' to 6' of protection if the structure and foundation were of adequate strength.

Figure 16. Photographs of Existing Individual Flood Proofing Installations

Construction of "Soft" Bank Protection. CMG in Attachment 3 has also explored the concept of soft bank protection as an option for individual owners wishing to protect their property from erosion. This bank protection could, for example, consist of dumped rock of specified size and gradation. It would be designed to withstand low flows but to wash out in larger storms to preclude reflective scour that would not otherwise occur. This bank protection would not exceed the current top-of-bank height to avoid interfering with overbank flow.

Pima County has already taken a step in this direction. On May 11, 1993, the Board of Supervisors voted to interpret non-structural measures to include "low flow" bank protection. This action (1) defined low flow bank protection as extending only as high as the existing top of bank; (2) considers the use of low flow bank protection to be appropriate in cases where private development, riparian habitat, or public infrastructure are threatened; and (3) requires that an evaluation be made in each case to determine the effects on short/long term bottom stability, protection of riparian habitat, and changes in flood peak. The effect on reflective scour is not specifically mentioned, however, nor is provision for programmed failure to avoid causing problems downstream..

Both concepts are technically problematic. No well-established (and therefore legally defensible) procedures exist for predicting specific conditions of reflective scour, or for insuring that a particular bank protection installation will wash out in time to avoid causing downstream damage that would not otherwise occur. Since a policy is already in place, this approach must be given more consideration in the next study phase. It is likely that protection placed in isolated locations will not be found feasible, given the potential for liability to be incurred, and that this sort of process would need to utilized along larger reaches.

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SECTION 10
DO NOTHING ALTERNATIVE

The do nothing alternative traditionally serves as a base line against which the relative benefits of various options are weighed. In many cases it proves to be the most viable approach as well.

The effects of doing nothing have been determined as a by-product of the various analyses throughout this study, though not always specifically identified as such. This section gathers this information in more coherent format, providing a summary of the quantitative and qualitative costs and benefits of no action.

Cost. The cost of doing nothing in terms of benefit/cost analysis is nothing. A price is paid however, that being the amount of storm damage that will accumulate in the future. Values for anticipated storm damage have been developed in Section 5. These costs have been cast as the present worth of various elements of anticipated storm damage. Flood damage, that defined as being caused by inundation of structures and contents, was found to be $4.9 million assuming the Forty Niners levee to be constructed. That amount would be $6.1 million without the Forty Niners levee. The accuracy of these values is dependent on the quality of data used in flood damage model, some of which is questionable. Although these numbers must be used with some caution, they do provide an indication of the damage potential that exists in terms of today's dollars.

Erosion damage due to loss of land and structures was found to $1.5 million based on assumptions regarding the vulnerability of areas that have not experienced actual damage in recent times. Based solely on losses since 1936, erosion damage is about $0.7 million. Both flood damage and erosion damage have been determined for private property only.

Damage to public infrastructure and utilities has not been included as information to make such an assessment is not available. It is thought to be small in comparison to flood and erosion damage, particularly when accuracy of the data used to develop those amounts is considered. Ignoring the cost of damage to infrastructure and utilities as unlikely to influence the outcome of the current effort.

Similarly, no information for assessing damage attributed to loss of access during major storms is available. This amount is probably not negligible when the cost of relief efforts and lost productivity are considered. The January 1993 storm demonstrated amply the disruption that loss of access can cause. The impending construction of a new bridge for Tanque Verde Road at Agua Caliente Wash should result in all-weather access for most of the area however, eliminating this as a source of damage for future consideration.

Visual Quality and Wildlife Habitat. Doing nothing would perpetuate current conditions. While this area is considered good in terms of both visual quality and wildlife habitat, clearing of land

and a lowering water table have taken their toll in the past. Continued gradual deterioration of these conditions can be expected.

Recreational Opportunity. The river bed will continue to offer excellent opportunity for equestrian and hiking activity for those who live in the area. Lacking development of formal amenities such as trails and parking lots, will continue to discourage use by the public at large, however, and fail to realize the full potential for useful connections to Coronado National Forest and Saguaro National Monument.

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PART IV

EVALUATION AND RANKING OF ALTERNATIVES

SECTION 11
SUMMARY OF EVALUATION RESULTS

The purpose of this section is to summarize the information developed throughout the report in a format that provides a broader view than the often detailed results of the various analyses. This has been attempted via the table presented as Figure 17, which is the sum total of this section. Both quantitative and qualitative results are shown. Comments are included in some cases to provide a more thorough understanding of a particular result. The intent of Figure 17 is to layout the study results in a manner that allows the reader to easily compare the features of the various options.

Figure 17. Summary of Study Results

Alternative	Benefit ($millions)	Cost ($millions)	Benefit Cost Ratio	Damage Potential Remaining ($millions)	Impact on Visual Quality and Wildlife Habitat	Impact on Recreational Value	General Comments
	COST CONSIDERATIONS				NON-COST CONSIDERATIONS		
Do Nothing	--	--	n/a	6.4	Continued slow deterioration due to gradual clearing of vegetation and lowering of groundwater table	Informal hiking and equestrian opportunities available to nearby residents. Lack of formal facilities discourages use by general public	The improvement in access anticipated with construction of the Tanque Verde Road/Agua Caliente bridge will solve one of the major concerns with doing nothing. The more subtle problem of potential for significant flood damage, will continue to persist under this option. Do nothing makes sense as an option only if a cost-effective, environmentally non-disruptive solution can not be found.
Detention Least cost-effective:	1.1	11.5	0.1	5.3	Detrimental to visual quality, and to integrity of wildlife habitat. Landscaping and other similar measures would only partially mitigate these impacts.	Same as "Do Nothing"	Not at all cost-effective and probably very unacceptable to the public. The net effect on erosion is not known. This analysis dismisses a traditional approach that is often viable from further consideration in this case.
Most cost-effective:	2.0	8.8	0.2	4.4			
Channelization Least cost-effective:	2.0	13.2	0.2	4.4	Construction likely to destroy a considerable portion of existing vegetation. Stabilized banks would inhibit natural re-establishment. Landscaping could mitigate this effect, at least in part. Loss of overbank flooding could impact vegetation.	Linear parks could be established in conjunction with the channel construction.	Not a cost effective approach, and likely to be very disruptive visually and environmentally. Another traditional approach that does not fit this situation.
Most cost-effective:	4.3	12.7	0.3	2.1			
Extend Levee	3.6	1.7	2.1	2.8	Again, construction would destroy existing vegetation. By placing the levee well away from the channel, the natural re-establishment process could continue, supplement initially with landscaping. Loss of overbank flooding could impact vegetation.	Same as Do Nothing". Does not naturally lend itself to establishment of recreational facilities as does, say, acquisition of floodway property or channelization.	The most promising structural approach. As with each alternative, the effect of tributary drainage on benfit/cost is unknown. Less visually and environmentally disruptive than other structural approaches--also more suited to mitigation. Could serve in combination with non-structural elements as part of a viable river management plan. Clearly worth further study. Effect on lateral stability of channel banks needs to be investigated to determine effects of loss of overbank flow as an energy dissipation mechanism.
	Note that all benefit/cost figures are based on Tanque Verde Creek flooding only. Considering tributary drainage is likely to increase both cost and benefit, with the overall effect on benefit/cost unknown. Considering tributary drainage would extend the scope of the river management plan.						
Floodplain Regulation	--	--	n/a	6.4	Same as "Do Nothing" unless further measures to control clearing and pumping of groundwater are enacted.	Same as "Do Nothing" unless formal trails, access points, parking, and so forth are developed.	Existing measures are effective at protecting future development, but cannot solve problems that existed prior to their implementation.
Purchase Floodway Property	2.0	2.6	0.8	4.4	Same as "Floodplain Regulation" County ownership of floodway enhances ability to control clearing, however.	Same as "Floodplain Regulation" except that county ownership of narrow strip of land along river conducive to development of linear park or trail system.	May be cost-effective in specific instances. Could work well for parcels not encompassed by a structural scheme (such as extending the levee), and which cannot be flood proofed because they are located within the floodway
Purchase Floodplain Property ("Given" Condition)	5.9	19.0	0.3	0.5	Same as "Purchase Floodway Property" except that county ownership of greater area of land provides greater control over clearing of vegetation.	Same as "Purchase Floodway Property" except that county ownership of greater area of land allows development of larger range of park facilities for passive or active recreation.	Not cost-effective. Acceptability to public unknown but doubtful. This alternative included to demonstrate one extreme option.
Flood Proof Structures	Cost-effectiveness needs to be evaluated on a case-by-case basis for those parcels found to be particularly vulnerable to flooding.				Same as "Do Nothing"	Same as "Do Nothing"	Special design and construction would be undertaken for specific parcels, probably by the property owners with design support from PCFCD (such as depth of flooding for particular structures and how-to brochures) This option could used in conjunction with a structural option, such as extending the levee, for parcels that remain in the floodplain (but not in the floodway).
Soft Bank Protection	Same as "Flood Proof Structures"				Same as "Do Nothing"	Same as "Do Nothing"	Possibly an option for property owners to restore land lost to erosion to some pre-defined line (such as the bank that existed prior to the 1993 storms). The restored land would be protected in small storms by "soft" bank protection--probably dumped rock--designed to wash out in larger storms. The engineering and liability aspects of this approach both need to be examined further, as does the rational of protecting land against small but not large storms.

Sep 23, 1993 9:21 am

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PART V
RECOMMENDATIONS

SECTION 12
RECOMMENDATIONS

Tanque Verde Creek presents a classical problem in river management. Potentially serious flooding and erosion problems clearly exist, and are readily identifiable to engineers and the public alike. Recent storms have both heightened concerns that previously existed among area residents, and extended awareness of this situation to the community at large.

The low density of population and development of this area makes finding cost-effective flood protection measures difficult. Traditional approaches such as channelization and particularly detention are clearly unsuitable. The proposed Forty Niners levee will protect one of two areas of particularly high risk to flooding. Extending this levee downstream to protect the second area is the only structural alternative that offers the possibility of cost-effectiveness.

As compelling as it is to protect people and property from flood damage is, other sometimes conflicting community values must be considered as well. Preservation of riparian habitat, cultural resources, recreational opportunities, and visual quality are among these. These impacts on environmental and other community values can be thought of as "non-cost" considerations that must be considered as well in determining the viability of a particular approach.

A plan that is technically sound in terms of level of protection, cost considerations, and non-cost considerations, must also be politically stable to be effective over the long term. For example, a plan that fails to strike a reasonable balance between the rights of property owners and concerns for environmental issues will be under constant pressure for change. Deep-rooted public understanding and support is necessary for the plan's ultimate success, making public acceptance a critical aspect as well technical and financial elements.

The recommendations presented here outline a process for completing and implementing a comprehensive and workable river management plan. Specifically, they (1) identify those alternatives that warrant further consideration based on preliminary analysis, (2) outline an approach for further evaluating these alternatives and developing them into a comprehensive management strategy, (3) present a public involvement program designed for two-way exchange of ideas and information, and (4) preparing a formal document to serve as the adopted plan.

Alternatives for Further Consideration. No one particular approach jumps out as a single solution to the flooding and erosion damage potential created by Tanque Verde Creek. The following appear promising for various situations, however, and should be evaluated in more detail.

Extend Forty Niners Levee. This is the one structural approach that appears cost effective. The impacts on visual quality and wildlife habitat, while not insignificant, can perhaps be largely mitigated through careful design and intensive revegetation. Initial analysis indicates that such an approach would have little effect on water surface elevation. The geomorphic aspects, particularly

with respect to the effect on lateral migration caused by the elimination of overbank flow, needs to be carefully examined. Some sort of protection may be needed along the south bank as well.

Flood Proof Structures. This approach may be viable, for example, for those structures not protected by a levee, and that lie within the flood plain but not the floodway. Cost-effective and attractive ways may be found to work flood protection into a landscaping scheme for individual or small groups of homes. Because the design height is so important to the cost and appearance of such installation, detailed analysis of flooding depths at affected structures would be an important part of this approach.

Purchase Floodway Property. Construction of flood protection improvements for homes located within the floodway is not permissible. Without a structural approach such as channelization, the options that remain available are to purchase and remove such structures, or to simply do nothing. The overall cost and benefit of both approaches should be looked at in more detail. It can be seen how a sound management plan is likely to include a combination of these approaches, as well as others that might surface during the detailed analysis and development.

Further Analysis. One outcome of this the preliminary analysis has been an understanding of how important the accuracy of flow depth is to cost, and to visual aspects of various improvement alternatives. The information currently available is a composite of data obtained over a span of twenty years, at differing levels of accuracy and quite possibly different location and elevation data. Judicious use of this information would entail application of substantial safety factors to design depths. The preliminary analyses have shown cost and benefit to be quite sensitive to depth of flow. Similarly, the visual impact and cost of construction of various improvement schemes varies with cost. It is recommended that the analyses be updated with consistent and current data. Specifically, the following is proposed:

Hydrology. Review the hydrology of Tanque Verde Creek. The original Corps evaluation in 1975 did not specifically study the Tanque Verde basin in detail, and considerably more stream gauge data is now available. This would resolve the conflicting information that now exists, and provide more definitive and defensible results on which to base important decisions.

A HEC-1 model calibrated to the results of the stream-gauge analysis should also be developed. It should be adequately detailed that the effects of proposed changes in land use can be easily and reliably determined, and that it can be used to study phenomena such as the effects of overbank storage on highly vegetated reaches.

Mapping. The project area should be remapped to provide updated topography at a consistent level of detail and accuracy. This would reflect the changes due the recent large flows. Questions regarding the age and accuracy of mapping, and of consistency of the components of the current composite HEC-2 model would be resolved. As construction of major projects such as the Forty Niners levee and the Agua Caliente Wash bridge for Tanque Verde Road is completed, the

mapping should be updated either photogrammetrically, or using as-built plans and spot checks in the field.

Finish floor elevations of structures subject to flooding should be accurately measured to eliminate that element of uncertainty from the damage model. This step in itself is likely to eliminate several of the larger incidents of damage predicted by the current damage model. (These would be newer structures near the river, but on raised pads or with flood walls.)

Hydraulics. The project HEC-2 model should be updated to reflect the new mapping, new peak discharges, and the effects of overbank storage. Careful consideration should be given to the location of cross-sections extensions across overbank areas. A monitoring system for calibrating "n" values in bosque areas could be created as a part of the plan.

Damage Model. The damage model should be updated with the more accurate HEC-2 results and finish floor elevations. These actions would eliminate the two weakest links of the model and improve its reliability immensely. Improving the accuracy of the model will provide more confidence the cost-benefit analyses. More importantly, is would provide accurate depths of flooding and projected damage for use by owners of specific parcels for their consideration of undertaking individual improvements, or in supporting a larger effort.

Legal and Financial Elements. Input from outside the engineering profession will be required concerning the legal and financial aspects of the river management plan. Key financial questions, regarding for example the use of flood control district funds to flood-proof individual structure or purchase flood-prone property, are policy issues and must be addressed though the political process.

Public Involvement. Just as the technical, financial, and legal aspects are critical to the success of the river management plan, so is public acceptance. Deep-seeded fundamental support is necessary to ensure initial approval as well as long-term viability. This sort of support cannot be developed by simply holding a series of CAC meetings or public open houses (although those are important). Neither can this support be developed quickly.

An intensive and lengthy process is proposed here which openly includes the public in the planning process. It is similar to the approach applied successfully to the initially very controversial Campbell Avenue/Grant Road Grade Separation, and consists of four elements:

Citizen Advisory Committee (CAC). This committee would consists of interested property owners, residents, and business owners in the area. It would be the formal body providing input into the process, and would meet periodically to review results.

Public Meetings. Public meetings would also be held. These meetings would be proceeded by detailed informational mailers and questionnaires, designed to familiarize interested persons with the issues and to solicit knowledgeable and thoughtful responses to specific questions.

Key Groups and Individuals. Informal individual meetings would be held with elected officials, home-owner associations, wildlife associations, and other groups and individuals with specific interests in the area. These groups and individuals are likely to be more knowledgeable that the general public, making their input particularly valuable. They are also likely to be most influential at the political level making their support important as well.

Other Interested Individuals. This group includes those who are interested in the project, but who are not included in the CAC or key groups. Telephone conversations or short meetings with these individuals, coupled with the word-of-mouth communication these encounters can start, will go a long way in allaying the fears and mistrust inherent to projects of this nature, and in building broad-based support.

Two keys to a successful public involvement programt are (1) insuring that the public has a good understanding of project, and (2) responding to public input in good faith. Considerable time and resources should to be devoted to the public involement task.

REFERENCES

REFERENCES

1. *Tanque Verde Creek and Tributaries Vicinity of Tucson, Arizona*; Corps of Engineers, U.S. Army Los Angeles District; August 1975

2. *Flood Insurance Study Pima County, Arizona Unincorporated Areas*; Federal Emergency Management Agency; December 15, 1982

3. *Flood Insurance Study Pima County, Arizona Unincorporated Areas Volumes 1 of 3 and 3 of 3*; Federal Emergency Management Agency; Revised September 6, 1989

4. *Final Report - Hydrologic and Hydraulic Analyses for Proposed Improvements on Houghton Road at Tanque Verde and Agua Caliente Washes for Ruiz Engineering Corporation*; Dames & Moore; May 1985.

5. *Concept Design Report - Bridge Site Selection Study Tanque Verde Wash and Agua Caliente Wash at Houghton Road*; Ruiz Engineering Corporation in association with Harland Bartholomew and Associates, Inc., Dames & Moore; June 1985.

6. *Part I. Final River Hydraulic Analysis for the Houghton Road Bridges over the Tanque Verde Creek and Agua Caliente Wash*; Hydro-Science Engineering Southwest, Inc.; Revised March 1988.

7. *Part II. Final River Dynamics Analysis for the Houghton Road Bridges over the Tanque Verde Creek and Agua Caliente Wash*; Hydro-Science Engineering Southwest, Inc.; Revised March 1988.

8. *Part III. Final Local Drainage Analysis of the Houghton Road Improvements between Tanque Verde Road and Speedway Boulevard*; Hydro-Science Engineering Southwest, Inc.; May 1987

9. *Hydrologic/Hydraulic Assessments for Houghton Road Bridge (Revised)*; Cella Barr Associates; April 12, 1989.

10. *Fluvial Analysis for Tanque Verde Creek Bank Protection Near Fortyniner's Country Club Estates (W.O. 4FFNCC)*; Pima County Department of Transportation and Flood Control District; October, 1991.

APPENDIX A
SYNOPSES OF PREVIOUS STUDIES

APPENDIX A
SYNOPSES OF PREVIOUS STUDIES

U.S. Army Corps of Engineers/Federal Emergency Management Agency

Flood Plain Information
Tanque Verde Creek and Tributaries Vicinity of Tucson, Arizona
Corps of Engineers, U.S. Army Los Angeles District
August 1975

Flood Insurance Study
Pima County, Arizona Unincorporated Area
Federal Emergency Management Agency
December 15, 1982

Flood Insurance Study
Pima County, Arizona Unincorporated Areas
Volumes 1 of 3 and 3 of 3
Federal Emergency Management Agency
Revised September 6, 1989

Houghton Road Bridges

Part I. Final River Hydraulic Analysis for the Houghton Road Bridges over the Tanque Verde Creek and Agua Caliente Wash
Hydro-Science Engineering Southwest, Inc.
Revised March 1988

Part II. Final River Dynamics Analysis for the Houghton Road Bridges over the Tanque Verde Creek and Agua Caliente Wash
Hydro-Science Engineering Southwest, Inc.
Revised March 1988

Part III. Final Local Drainage Analysis of the Houghton Road Improvements between Tanque Verde Road and Speedway Boulevard
Hydro-Science Engineering Southwest, Inc.
May 1987

Hydrologic/Hydraulic Assessments for Houghton Road Bridge (Revised)
Cella Barr Associates
April 12, 1989

Forty Niners Country Club Estates Flood Protection

Fluvial Analysis for Tanque Verde Creek Bank Protection Near Fortyniner's Country Club Estates (W.O. 4FFNCC)
Pima County Department of Transportation and Flood Control District
October, 1991

Flood Plain Information
Tanque Verde Creek and Tributaries
Vicinity of Tucson, Arizona
Corps of Engineers, U.S. Army
Los Angeles District
August 1975

This report documents a study of Tanque Verde Creek by the Corps of Engineers beginning at Pantano Road. Sabino Creek and Agua Caliente Wash, both major tributaries which enter Tanque Verde Creek below the current study limits were also included. The current study comprises about 25% of the total river length studied by the corps.

Peak discharges were determined using records from two stream gages--(1) Rillito River at the First Avenue bridge which has been in service since 1908 (though apparently moved from the Old Oracle Highway bridge at some point), and (2) Sabino Creek 1/2 mile north of the Coronado National Forest boundary which was maintained from 1932 to 1981. Other gages exist on Bear Canyon Creek, Tanque Verde Creek, Rincon Creek, and Pantano Wash. Only Tanque Verde Creek was in the Corps' (and our) study area, and all were apparently considered too recent to provide meaningful data. (Note however, that these have since accumulated 16 years additional data.) Since adequate records for Tanque Verde Creek did not exist, study discharges were based on the analysis of records from similar basins but adjusted for "differences in hydrologic, meteorological, and physiographic characteristics". No actual calculations or specific procedures are provided in the report. Peak discharges were determined for the "Intermediate Regional Flood" (100-year storm) and "Standard Project Flood" (based on the August 19th, 1954 storm on Queen Creek drainage basin west of Phoenix). Discharges determined for applicable locations along Tanque Verde Creek are as follows:

Location	Distance Upstream (River Miles)	Watershed Area (Sq Mi.)	Intermediate Regional Flood (cfs)	Standard Project Flood (cfs)
Above confluence with Agua Caliente Wash	7.04	98	23,000	64,000
Below confluence with Canyon del Salto Creek	12.62	51	19,000	43,000
Above confluence with Canyon del Salto Creek	12.70	43	16,000	36,000

Flow analysis was performed using HEC-2. Flood limits for both the Intermediate Regional and Standard Project Floods were determined and plotted on 14 1"=500' scale plates. Four-foot contour interval mapping dated August 1967 and December 1973 was used for this study. According to the transmittal letter from Steve Dolan, the current FEMA FIRMs are based on this study. Data for those runs have been provided by the County in the form of punched computer cards. Pima County has also provided 1"=400' blue prints showing cross-section locations superimposed on the FEMA mapping.

Flood Insurance Study
Pima County, Arizona Unincorporated Areas
Federal Emergency Management Agency
December 15, 1982

The provided portions of this report include (1) tabulations of drainage areas and peak discharges for 10-, 50-, and 100-years storms, (2) tabulations of floodway and flood plain data, and (3) plots of water surface profiles. The data used to compile this information was obtained from the 1975 Corps study, but is of value to the current study in that it provides detail not published in the 1975 report. Flood insurance zones are also established.

Flood Insurance Study
Pima County, Arizona Unincorporated Areas
Volumes 1 of 3 and 3 of 3
Federal Emergency Management Agency
Revised September 6, 1989

The provided portions of this report reiterated the data provided in the 1982 report except that a two-mile reach below Houghton Road was dropped having been annexed by the city of Tucson. The revised Flood Boundary and Floodway Map and Flood Insurance Rate Map currently in effect were adopted with this study.

Part I. Final River Hydraulic Analysis for the Houghton Road Bridges over the Tanque Verde Creek and Agua Caliente Wash
Hydro-Science Engineering Southwest, Inc.
Revised March 1988

This report was prepared on behalf of RGA Engineering Corporation in conjunction with their design of the Houghton Road bridges. The bridge locations and lengths had been previously established in a study by Dames & Moore dated May 1985. That report apparently set the bridge lengths of 1,100' at Tanque Verde Creek as and 300' at Agua Caliente Wash,. The purpose of the Hydro-Science report was to (1) establish the low chord elevations of the bridges, and (2) determine the effects the roadway construction would have on the flow of Agua Caliente Wash and Tanque Verde Creek. Because the Agua Caliente crossing would present a contraction, the FEMA requirement of 4' of freeboard above the 100-year water surface elevation was observed. Because no levees or channelization were envisioned for Tanque Verde Creek, the increase in 100-year water surface elevation was to be less than one foot.

The Hydro-Science report states that it was stipulated that there was to be no channelization for Tanque Verde Creek, and that all of the flow in Agua Caliente Wash would be channelized between Tanque Verde Road and Houghton Road using parallel levees (apparently based on the Dames and Moore work). The bridge height and channel design parameters were determined using 1984 topography. The flood plain effects were determined using 1986 topography provided by Pima County subsequent to the design parameters having been established.

HEC-2 was used to perform this work. Peak discharge quantities of 23,000 cfs and 13,000 cfs were used for Agua Caliente and Tanque Verde Creek respectively. "Baseline" (existing condition) water surface elevations of 2575.9 and 2588.2 were used. It was assumed that the flow in Tanque Verde Creek would be unaffected by Agua Caliente Wash due to planned levees.

Hydro-Science found that the 2,100'-wide Tanque Verde Creek flood plain would be increased less that one foot in elevation by the constriction of the 1,100 bridge opening. It was in fact determined that the low chord of the bridge could be placed below the 100-year water surface prior to the one-foot criteria being violated. The possibility of reducing the bridge length was considered but rejected by Pima County. The design low chord elevation was recommend to be 2578.9, 2.5' above the design condition water surface elevation of 2576.4.

The Agua Caliente Wash flood plain was found to be 2,300' in width between Tanque Verde Road and Houghton Road. Containing all this flow between parallel levees, resulting in a water surface elevation of 2591.1 at the planned bridge location. The FEMA four-foot criteria resulted in a recommended low chord elevation of 2595.1. The geometric configuration of the levees is not explicitly provided. Viewing Figure 5 suggests the levees assumed to be approximately 300' apart.

Reference of construction phasing are made, but what the phasing is to be is not explained. It seems as though Phase 1 is the construction of Houghton Road including the two bridges, and that the Agua Caliente levees would be constructed in the future along with a bridge over Agua Caliente Wash at Tanque Verde Road.

Hydro-Science noted the difficulty in setting Manning's Roughness Coefficients (n's) for overbank areas of the flood plain. This problem was approach through a sensitivity analysis that showed less than one foot of change in water surface elevation associated with increasing n through what was considered to be the possible range of .050 to .090. An average value of .070 was used, deemed acceptable as providing an error of less than .5'.

Hydro-Science also noted a condition of aggregation behind the temporary-flow Houghton Road crossing. Figure 9 indicates the bottom elevation having been raised approximately 3'. They correctly disregarded this for their analyses. This may however explain variations in bottom elevation found in different topographic maps, and difference in results of various studies.

Part II. Final River Dynamics Analysis for the Houghton Road Bridges over the Tanque Verde Creek and Agua Caliente Wash
Hydro-Science Engineering Southwest, Inc.
Revised March 1988

This report was prepared subsequently to *Part I* to evaluate the dynamics of the river beds in the context of designing the bridge piers, abutments, and embankment protection. The effects of long-term degradation as well as local scour were considered. Hydro-Science's conclusions regarding long-term degradation are of particular interest to this study.

Hydro-Science performed qualitative, quantitative, and modeling analyses. Qualitatively, they noticed very little change in bed elevation and slope since 1931, the date of the earliest information available. Approximately 2' of aggregation took place downstream of Houghton between 1967 and 1979, but by 1986 the original profile had been restored.

Historically, the slope upstream of Houghton has varied between .39% to .43%--essentially constant indicating the river is essentially in equilibrium at that location.

Quantitative assessment of long-term stability of existing slope/width relationships was investigated using analysis using a sediment transport regression equation. This analysis showed that the reaches downstream of Houghton, and between Houghton and Tanque Verde Loop Road to be very close to equilibrium. The equilibrium slope found for the reach between Houghton and Tanque Verde Loop Roads was .41%.

A sediment routing analysis was performed using the mathematical model FLUVIAL 12. Both the then-existing and proposed design conditions were examined. The results of this analysis showed long-term degradation of 2.7' at Houghton which was explained as re-establishment of the profile that existed prior to the temporary Houghton crossing. The equilibrium predicted by FLUVIAL 12 between Houghton and Tanque Verde Loop was .44%, essentially identical to that found by the regression analysis as well as that which exists today.

The key result of *Part II* as it relates to the current study is that at least this reach of the river is in equilibrium. That is not unexpected given that neither the watershed nor the river itself have been dramatically altered from their natural condition.

This report also explains the project evolution more clearly. Dames & Moore in association with Ruiz Engineering did in fact recommend the Houghton Road bridge locations and lengths in 1985. Pima County adopted those results and contracted with Cannon & Associates to design the Tanque Verde Creek bridge, and RGA the Agua Caliente Wash bridge. The Agua Caliente would be channelized by means of parallel levees, but no channelization of the Tanque Verde would occur, save removal of the sediment deposited upstream of the temporary crossing. Hydro-Science determined the depth of scour to be used in the design of both.

Part III. Final Local Drainage Analysis of the Houghton Road Improvements between Tanque Verde Road and Speedway Boulevard
Hydro-Science Engineering Southwest, Inc.
May 1987

This report documented the smaller "localized" drainages affecting the proposed roadway construction, and recommended culverts or other conventional means for dealing with them. The "Local Drainage Map" (Sheet 1 of 3) shows the proposed alignment of the Agua Caliente Wash parallel levees.

Hydrologic/Hydraulic Assessments for
Houghton road Bridge (Revised)
By Cella Barr Associates
April 12, 1989

This letter report documents a re-evaluation of the effects of the then-proposed Houghton Road bridges crossing Agua Caliente and Tanque Verde Creeks given without assuming the parallel levees along Agua Caliente Wash in place. The significant difference in this scenario is that substantial breakout from Agua Caliente could occur and flow southward to Tanque Verde Wash upstream of Houghton Road.

The narrative indicates awareness of that overflow from Agua Caliente would cross over to the Tanque Verde in the condition that then existed, but no evaluation of quantity or other effects of that breakout is included in the report. A detailed analysis of the breakout that would occur after construction of Houghton was made however, and the resulting impact on water surface elevation along Tanque Verde Creek and Agua Caliente Wash determined.

To consider the time differential between the Agua Caliente and Tanque Verde Creek hydrographs, a HEC-1 evaluation of the entire watershed was made. The result of that analysis was that Agua Caliente peaked at approximately 3 hours and Tanque Verde Creek at 3.5 hours. The half-hour differential was not considered significant, and it was conservatively assumed that no reduction in peak discharge due to the time-wise offset of the hydrographs would occur. (That is, discharges could be directly added and subtracted between the two watersheds.)

A second point of interest regarding the HEC-1 analysis is that the discharge for Tanque Verde Creek provided by the model was 28,500 cfs, somewhat higher than the adopted value of 23,000. This suggests two possibilities--(1) that the HEC-1 model, having served the intended purpose, was not given the level of detail and calibration to the effort that might be used in a design situation, and/or (2) the adopted value, developed by the U.S. Army Corps of Engineers prior to 1975 using largely undocumented processes, is not entirely realistic.

The key finding of the Cella Barr effort involves the quantity of flow breaking over from Agua Caliente Wash to Tanque Verde Creek. Using HEC-2's split-flow option, it was found that of the 13,000 cfs reaching Houghton Road in a 100-year storm 8,000 cfs would break over to Tanque Verde Creek upstream of Houghton. Because the times to peak are considered the same, this effectively raises the Tanque Verde design discharge from 23,000 cfs to 31,000 cfs, and drops the Agua Caliente peak discharge to 5,000 cfs. Cella Barr went on to recompute water surface profiles for Tanque Verde Creek and Agua Caliente Wash using the new discharges, finding changes rarely exceeding one foot.

Cella Barr also compared water surface profiles obtained using the 1967 FEMA mapping to those using the more recent mapping used in the Hydro-Science studies. It was found that

the more recent mapping produced elevations that were lower downstream and higher upstream. The list of possible explanations offered for this did not include the agradation occurring upstream of the temporary Houghton crossing noticed by Hydro-Science.

Fluvial Analysis for
Tanque Verde Creek Bank Protection
Near Fortyniner's Country Club Estates
Pima County Department of Transportation and Flood Control District
October, 1991

This study was performed by Pima County in conjunction with the design of a levee to protect Forty Niners Country Club Estates. The levee will consist of an earthen berm located along the north bank of Tanque Verde Creek. It will be 1.7 miles in length, extending from downstream of Conestoga Avenue to Wentworth Road. It will consist of an earthen berm, armored on the river side by soil cement. Improvements behind the levee to deal with localized flooding are also planned. This project is to be financed jointly by Pima County and the U.S. Army Corps of Engineers. Surveys, analysis and design is being performed by Pima County as part of its "in-kind" contribution.

The intent of this particular report was to (1) determine the short- and long-term effects of the levee on the stability of the river, and (2) establish the depth of bank protection needed to protect the levee from scour.

This report noted results from the 1982 and 1984 Simons & Li studies that the existing channel bed is generally in equilibrium as far as long-term aggradation and degradation are concerned. No additional analysis of the existing condition was performed however.

Analysis was performed assuming construction of a levee along the "preferred" Alternative 3 alignment. Both single-storm and long-term responses were considered. HEC-6 was used to model the sediment transport mechanism. Analysis of a single 100-year flow (Q=24,000 cfs) showed that at peak flow the depth of degradation of about 4' would occur at one section, but by the end of the storm the channel bed will have generally returned to its pre-storm profile. Long-term response was determined using the "probability-weighted" average of the response to 30 cycles of 2-year and 5-years storms. The average was used since it is not clear which frequency storm is dominant. Generally it was found that through the reach where the levee is to be constructed, the bottom will remain stable. A general increase in bottom elevation of 2.5' to 3.5' was found upstream of Wentworth Road however.

Attention was also given to lateral stability as well. A review of historical photographs dating to 1958 showed no significant changes until a storm in December 1965 (12,200 cfs) caused a shift of approximately 400' northward in the vicinity of Wentworth Road. Since then there has been a slight increase in channel width, but the channel overall has remained relatively stable. A storm in December 1978 similar in magnitude to the 1965 storm (12,700 cfs) caused no significant change in channel pattern. The October 1983 flood (estimated at 20,000 cfs) also caused no major shifts.

OUTPUT FILES FROM HEC-1 AND HEC-2 ANALYSES

1. HEC1.OUT--CBA's Houghton Road bridges hydrology model.
2. H2_ORIG.OUT--U. S. Army Corps of Engineers original analysis (1975)
3. H2_EXIST.OUT--Composite model without proposed levee.
4. H2_GIVEN.OUT--Composite model with proposed levee (given condition. 100-year storm).
5. H2_MULTI.OUT--Baseline model for multiple return frequencies.

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*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*           SEPTEMBER 1990              *
*            VERSION 4.0                *
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*  RUN DATE  08/24/1993  TIME  10:00:07 *
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*                                       *
*   U.S. ARMY CORPS OF ENGINEERS        *
*   HYDROLOGIC ENGINEERING CENTER       *
*        609 SECOND STREET              *
*      DAVIS, CALIFORNIA 95616          *
*          (916) 756-1104               *
*                                       *
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  1       ID       HOUGHTON ROAD BRIDGE STUDY
  2       ID       TANQUE VERDE HEC-1 FILE TVHEC1
  3       ID       CBA 308 NO. 05524-01-30    DECEMBER 13, 1988
  4       IT      5 15JUN88   1200     100
  5       IO      3
  6       IN      5 15JUN88    1200

  7       KK   SUB A
  8       KM       RUNOFF FROM SUBBASIN A - TANQUE VERDE
  9       BA    7.2
 10       PB   3.79
 11       PC    0.0    0.11    0.36    0.56    0.67    0.73    0.79    0.84    0.89    0.93
 12       PC   0.96    0.99     1.0
 13       LS             84
 14       UD   0.51

 15       KK      A ROUTE HYDROGRAPH A THROUGH REACH 2
 16       RS       1    FLOW      -1
 17       RC  0.055   0.047   0.055   24200  0.0194
 18       RX    160     180     380     400     450     470     580     600
 19       RY   3830    3820    3815    3810    3810    3815    3820    3830

 20       KK   SUB B
 21       KM       RUNOFF FROM SUBBASIN B - TANQUE VERDE
 22       BA   25.2
 23       PB   3.56
 24       PC    0.0    0.11    0.36    0.56    0.67    0.73    0.79    0.84    0.89    0.93
 25       PC   0.96    0.99     1.0
 26       LS             77
 27       UD   1.18

 28       KK      3 COMBINE A WITH B
 29       KM       ADD TWO HYDROGRAPHS
 30       HC      2

 31       KK      3 ROUTE HYDROGRAPHS A & B THROUGH REACH 3
 32       RS       1    FLOW      -1
 33       RC  0.055   0.047   0.055   14850  0.0471
 34       RX    220     230     240     250     300     310     350     360
 35       RY   3340    3330    3325    3320    3320    3325    3330    3340

 36       KK   SUB C
 37       KM       RUNOFF FROM SUBBASIN C - TANQUE VERDE
 38       BA   7.37
 39       PB   3.79
 40       PC    0.0    0.11    0.36    0.56    0.67    0.73    0.79    0.84    0.89    0.93
 41       PC   0.96    0.99     1.0
 42       LS             85
 43       UD   0.80
```

085

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  44      KK       4 COMBINE A & B WITH C
  45      KM        ADD TWO HYDROGRAPHS
  46      HC       2

  47      KK       4 ROUTE HYDROGRAPHS A-C THROUGH REACH 4
  48      RS       1    2695      -1
  49      RC   0.055   0.047   0.055   16500  0.0076
  50      RX       0     300     550     900    1000    1050    1200   1700
  51      RY    2720    2710    2700    2695    2695    2700    2700   2720

  52      KK   SUB D
  53      KM        RUNOFF FORM SUBBASIN D - TANQUE VERDE
  54      BA    33.3
  55      PB    3.51
  56      PC     0.0    0.11    0.36    0.56    0.67    0.73    0.79    0.84    0.89    0.93
  57      PC    0.96    0.99     1.0
  58      LS              81
  59      UD    1.93

  60      KK       5 COMBINE A-C WITH D
  61      KM         ADD TWO HYDROGRAPHS
  62      HC       2

  63      KK       5 ROUTE HYDROGRAPHS A-D THROUGH REACH 5
  64      RS       1    2616      -1
  65      RC   0.055   0.047   0.055   21450   0.004
  66      RX       0     460     550     580     740     770     950    1070
  67      RY    2624    2622    2620    2616    2616    2618    2620   2624

  68      KK   SUB E
  69      KM        RUNOFF FROM SUBBASIN E - TANQUE VERDE
  70      BA    21.4
  71      PB    3.58
  72      PC     0.0    0.11    0.36    0.56    0.67    0.73    0.79    0.84    0.89    0.93
  73      PC    0.96    0.99     1.0
  74      LS              81
  75      UD    3.33

  76      KK       6 COMBINE HYDROGRAPHS A-D WITH E
  77      KM        ADD TWO HYDROGRAPHS
  78      KO              2
  79      HC       2
  80      ZZ
```

```
*****************************************          *****************************************
*                                       *          *                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *          *    U.S. ARMY CORPS OF ENGINEERS       *
*           SEPTEMBER 1990              *          *    HYDROLOGIC ENGINEERING CENTER      *
*            VERSION 4.0                *          *         609 SECOND STREET             *
*                                       *          *       DAVIS, CALIFORNIA 95616         *
*  RUN DATE  08/24/1993  TIME  10:00:07 *          *          (916) 756-1104               *
*                                       *          *                                       *
*****************************************          *****************************************
```

HOUGHTON ROAD BRIDGE STUDY
TANQUE VERDE HEC-1 FILE TVHEC1
COA JOB NO. 05524-01-30 DECEMBER 13, 1988

```
5 IO        OUTPUT CONTROL VARIABLES
                 IPRNT          3  PRINT CONTROL
                 IPLOT          0  PLOT CONTROL
                 QSCAL          0.  HYDROGRAPH PLOT SCALE

  IT        HYDROGRAPH TIME DATA
                 NMIN           5  MINUTES IN COMPUTATION INTERVAL
                 IDATE      15JUN88  STARTING DATE
                 ITIME         1200  STARTING TIME
                    NQ          100  NUMBER OF HYDROGRAPH ORDINATES
                 NQDATE     15JUN88  ENDING DATE
                 NQTIME         2015  ENDING TIME
                 ICENT           19  CENTURY MARK

            COMPUTATION INTERVAL      .08 HOURS
                TOTAL TIME BASE    8.25 HOURS

      ENGLISH UNITS
          DRAINAGE AREA         SQUARE MILES
          PRECIPITATION DEPTH   INCHES
          LENGTH, ELEVATION     FEET
          FLOW                  CUBIC FEET PER SECOND
          STORAGE VOLUME        ACRE-FEET
          SURFACE AREA          ACRES
          TEMPERATURE           DEGREES FAHRENHEIT


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
7 KK      *    SUB A    *
          *             *
          ***************
                        RUNOFF FROM SUBBASIN A - TANQUE VERDE

6 IN        TIME DATA FOR INPUT TIME SERIES
                 JXMIN          5  TIME INTERVAL IN MINUTES
                 JXDATE     15JUN88  STARTING DATE
                 JXTIME        1200  STARTING TIME

          SUBBASIN RUNOFF DATA

9 BA        SUBBASIN CHARACTERISTICS
                 TAREA       7.20  SUBBASIN AREA
```

PRECIPITATION DATA

10 PB STORM 3.79 BASIN TOTAL PRECIPITATION

11 PI INCREMENTAL PRECIPITATION PATTERN
.11 .25 .20 .11 .06 .06 .05 .05 .04 .03
.03 .01

13 LS SCS LOSS RATE
STRTL .38 INITIAL ABSTRACTION
CRVNBR 84.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

14 UD SCS DIMENSIONLESS UNITGRAPH
TLAG .51 LAG

***

UNIT HYDROGRAPH
33 END-OF-PERIOD ORDINATES

414.	1213.	2490.	4202.	5551.	6243.	6266.	5824.	5120.	4206.
3141.	2410.	1879.	1501.	1180.	905.	715.	562.	437.	337.
265.	209.	164.	128.	99.	78.	63.	52.	41.	30.
20.	10.	1.							

*** *** *** *** ***

HYDROGRAPH AT STATION SUB A

TOTAL RAINFALL = 3.79, TOTAL LOSS = 1.60, TOTAL EXCESS = 2.19

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	8.25-HR
10093.	.92	(CFS)	1694.	1232.	1232.	1232.
		(INCHES)	2.187	2.187	2.187	2.187
		(AC-FT)	840.	840.	840.	840.

CUMULATIVE AREA = 7.20 SQ MI

** ***

15 KK
****
* *
* A *
* *
****

ROUTE HYDROGRAPH A THROUGH REACH 2

HYDROGRAPH ROUTING DATA

16 RS STORAGE ROUTING
NSTPS 1 NUMBER OF SUBREACHES
ITYP FLOW TYPE OF INITIAL CONDITION
RSVRIC -1.00 INITIAL CONDITION
X .00 WORKING R AND D COEFFICIENT

17 RC NORMAL DEPTH CHANNEL
ANL .055 LEFT OVERBANK N-VALUE
ANCH .047 MAIN CHANNEL N-VALUE
ANR .055 RIGHT OVERBANK N-VALUE
RLNTH 24200. REACH LENGTH
[illegible] ENERGY SLOPE

088

ELMAX .0 MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

CROSS-SECTION DATA

--- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---

19 RY	ELEVATION	3830.00	3820.00	3815.00	3810.00	3810.00	3815.00	3820.00	3830.00
18 RX	DISTANCE	160.00	180.00	380.00	400.00	450.00	470.00	580.00	600.00

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	31.71	68.34	109.89	156.37	208.83	290.11	409.57	567.20	763.00
OUTFLOW	.00	247.36	811.43	1652.03	2767.26	4227.09	6310.39	9104.16	12803.74	17575.81
ELEVATION	3810.00	3811.05	3812.11	3813.16	3814.21	3815.26	3816.32	3817.37	3818.42	3819.47
STORAGE	992.50	1228.90	1467.77	1709.10	1952.90	2199.15	2447.87	2699.06	2952.70	3208.81
OUTFLOW	23913.70	31809.78	40821.84	50883.16	61943.55	73963.52	86911.05	100759.50	115486.60	131074.50
ELEVATION	3820.53	3821.58	3822.63	3823.69	3824.74	3825.79	3826.84	3827.90	3828.95	3830.00

*** *** *** *** ***

HYDROGRAPH AT STATION A

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	8.25-HR
7000.	1.25	(CFS)	1679.	1229.	1229.	1229.
		(INCHES)	2.169	2.182	2.182	2.182
		(AC-FT)	833.	838.	838.	838.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	8.25-HR
320.	1.25	93.	69.	69.	69.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	8.25-HR
3816.58	1.25	3812.36	3811.75	3811.75	3811.75

CUMULATIVE AREA = 7.20 SQ MI

** ***

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**************
*            *
20 KK  *   SUB B   *
*            *
**************
```

RUNOFF FROM SUBBASIN B - TANQUE VERDE

6 IN TIME DATA FOR INPUT TIME SERIES

JXMIN	5	TIME INTERVAL IN MINUTES
JXDATE	15JUN80	STARTING DATE
JXTIME	1200	STARTING TIME

SUBBASIN RUNOFF DATA

22 BA SUBBASIN CHARACTERISTICS

TAREA	25.20	SUBBASIN AREA

PRECIPITATION DATA

23 PB STORM 3.54 BASIN TOTAL PRECIPITATION

089

```
 24 PI            INCREMENTAL PRECIPITATION PATTERN
                    .11      .25      .20      .11      .06      .06      .05      .05      .04      .03
                    .03      .01

 26 LS          SCS LOSS RATE
                     STRTL      .68  INITIAL ABSTRACTION
                    CRVNBR    77.00  CURVE NUMBER
                     RTIMP      .00  PERCENT IMPERVIOUS AREA

 27 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG     1.18  LAG

                                                    ***

                                                UNIT HYDROGRAPH
                                            73 END-OF-PERIOD ORDINATES
          204.     553.    1038.    1650.    2384.    3237.    4324.    5549.    6798.    7806.
         8723.    9378.    9786.    9920.    9941.    9874.    9589.    9073.    8597.    8057.
         7449.    6768.    5952.    5210.    4547.    4071.    3637.    3239.    2899.    2621.
         2373.    2125.    1910.    1706.    1502.    1354.    1218.    1082.     976.     874.
          772.     696.     621.     547.     496.     445.     395.     358.     321.     285.
          258.     230.     205.     184.     164.     145.     132.     118.     107.      99.
           90.      82.      74.      66.      58.      58.      43.      36.      29.      22.
           16.       9.       2.

    ***           ***           ***           ***           ***

                  HYDROGRAPH AT STATION    SUB B

   TOTAL RAINFALL =    3.56, TOTAL LOSS =    2.08, TOTAL EXCESS =    1.48

PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
  (CFS)       (HR)                  6-HR       24-HR       72-HR     8.25-HR
 13692.       1.67       (CFS)     3997.       2908.       2908.       2908.
                        (INCHES)   1.475       1.475       1.475       1.475
                        (AC-FT)    1982.       1983.       1983.       1983.

                  CUMULATIVE AREA =   25.20 SQ MI


** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
 28 KK    *         3   *      COMBINE A WITH B
          *             *
          ***************
                          ADD TWO HYDROGRAPHS

 30 HC          HYDROGRAPH COMBINATION
                     ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                    ***

    ***           ***           ***           ***           ***

                  HYDROGRAPH AT STATION       3

PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
  (CFS)       (HR)                  6-HR       24-HR       72-HR     8.25-HR
 19921.       1.50       (CFS)     5675.       4137.       4137.       4137.
                        (INCHES)   1.629       1.632       1.632       1.632
```

090

	(AC-FT)	2814.	2821.	2821.	2821.

CUMULATIVE AREA = 32.40 SQ MI

*** ***

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          ***************
          *             *
 31 KK    *       3     *      ROUTE HYDROGRAPHS A & B THROUGH REACH 3
          *             *
          ***************
```

HYDROGRAPH ROUTING DATA

```
 32 RS    STORAGE ROUTING
               NSTPS          1  NUMBER OF SUBREACHES
                ITYP       FLOW  TYPE OF INITIAL CONDITION
               RSVRIC      -1.00  INITIAL CONDITION
                   X        .00 WORKING R AND D COEFFICIENT

 33 RC    NORMAL DEPTH CHANNEL
                 ANL       .055  LEFT OVERBANK N-VALUE
                ANCH       .047  MAIN CHANNEL N-VALUE
                 ANR       .055  RIGHT OVERBANK N-VALUE
               RLNTH      14850.  REACH LENGTH
                 SEL      .0471  ENERGY SLOPE
               ELMAX         .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION
```

CROSS-SECTION DATA

		--- LEFT OVERBANK ---		+ ------ MAIN CHANNEL -------			+ --- RIGHT OVERBANK ---		
35 RY	ELEVATION	3340.00	3330.00	3325.00	3320.00	3320.00	3325.00	3330.00	3340.00
34 RX	DISTANCE	220.00	230.00	240.00	250.00	300.00	310.00	350.00	360.00

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	18.70	38.91	60.63	83.87	108.68	136.64	168.38	203.89	243.18
OUTFLOW	.00	378.07	1213.55	2415.70	3956.67	5884.64	8362.14	11272.85	14650.76	18525.48
ELEVATION	3320.00	3321.05	3322.11	3323.16	3324.21	3325.26	3326.32	3327.37	3328.42	3329.47
STORAGE	285.87	329.70	374.27	419.61	465.70	512.54	560.14	608.50	657.61	707.48
OUTFLOW	22989.34	28021.80	33527.01	39486.76	45887.36	52718.14	59970.57	67637.78	75714.11	84195.71
ELEVATION	3330.53	3331.58	3332.63	3333.69	3334.74	3335.79	3336.84	3337.90	3338.95	3340.00

*** *** *** *** ***

HYDROGRAPH AT STATION 3

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	8.25-HR
19534.	1.67	(CFS)	5661.	4135.	4135.	4135.
		(INCHES)	1.624	1.631	1.631	1.631
		(AC-FT)	2807.	2819.	2819.	2819.

AK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	8.25-HR
253.	1.67	91.	67.	67.	67.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	8.25-HR

3329.71 1.67 3324.07 3323.01 3323.01 3323.01

CUMULATIVE AREA = 32.40 SQ MI

*** ***

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          ***************
          *             *
36 KK     *     SUB C   *
          *             *
          ***************
```

RUNOFF FROM SUBBASIN C - TANQUE VERDE

6 IN TIME DATA FOR INPUT TIME SERIES

JXMIN	5	TIME INTERVAL IN MINUTES
JXDATE	15JUN88	STARTING DATE
JXTIME	1200	STARTING TIME

SUBBASIN RUNOFF DATA

38 BA SUBBASIN CHARACTERISTICS

TAREA	7.37	SUBBASIN AREA

PRECIPITATION DATA

39 PB

STORM	3.79	BASIN TOTAL PRECIPITATION

40 PI INCREMENTAL PRECIPITATION PATTERN

.11	.25	.20	.11	.06	.06	.05	.05	.04	.03
.03	.01								

42 LS SCS LOSS RATE

STRTL	.35	INITIAL ABSTRACTION
CRVNBR	85.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

43 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.80	LAG

***

UNIT HYDROGRAPH
50 END-OF-PERIOD ORDINATES

126.	417.	792.	1291.	1955.	2744.	3422.	3897.	4165.	4226.
4193.	3964.	3676.	3346.	2939.	2449.	2017.	1703.	1444.	1226.
1062.	909.	778.	652.	558.	474.	406.	343.	293.	246.
211.	179.	154.	131.	112.	95.	81.	68.	58.	50.
44.	38.	33.	28.	23.	19.	15.	10.	6.	2.

*** *** *** *** ***

HYDROGRAPH AT STATION SUB C

TOTAL RAINFALL = 3.79, TOTAL LOSS = 1.52, TOTAL EXCESS = 2.27

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
(CFS)	(HR)		6-HR	24-HR	72-HR	8.25-HR
8255.	1.25	(CFS)	1800.	1309.	1309.	1309.
		(INCHES)	2.271	2.271	2.271	2.271
		(AC-FT)	893.	893.	893.	893.

CUMULATIVE AREA = 7.37 SQ MI

*** ***

```
          ***************
          *             *
 44 KK    *         4   *      COMBINE A & B WITH C
          *             *
          ***************
                          ADD TWO HYDROGRAPHS

 46 HC          HYDROGRAPH COMBINATION
                     ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                        ***

      ***             ***             ***             ***             ***

                       HYDROGRAPH AT STATION        4

  PEAK FLOW     TIME                            MAXIMUM AVERAGE FLOW
    (CFS)       (HR)                   6-HR       24-HR       72-HR      8.25-HR
    26169.      1.50        (CFS)      7455.       5444.       5444.       5444.
                          (INCHES)     1.743       1.750       1.750       1.750
                           (AC-FT)     3697.       3712.       3712.       3712.

                       CUMULATIVE AREA =   39.77 SQ MI
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*** ***

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          ***************
          *             *
 47 KK    *         4   *      ROUTE HYDROGRAPHS A-C THROUGH REACH 4
          *             *
          ***************

             HYDROGRAPH ROUTING DATA

 48 RS          STORAGE ROUTING
                     NSTPS           1  NUMBER OF SUBREACHES
                      ITYP        2695  TYPE OF INITIAL CONDITION
                     RSVRIC      -1.00  INITIAL CONDITION
                          X        .00 WORKING R AND D COEFFICIENT

 49 RC          NORMAL DEPTH CHANNEL
                       ANL        .055  LEFT OVERBANK N-VALUE
                      ANCH        .047  MAIN CHANNEL N-VALUE
                       ANR        .055  RIGHT OVERBANK N-VALUE
                     RLNTH      16500.  REACH LENGTH
                       SEL       .0076  ENERGY SLOPE
                     ELMAX          .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                    CROSS-SECTION DATA
                          --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
 51 RY       ELEVATION   2720.00   2710.00   2700.00   2695.00   2695.00   2700.00   2700.00  27200.00
 50 RX       DISTANCE        .00    300.00    550.00    900.00   1000.00   1050.00   1200.00  17000.00
```

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

```
          STORAGE       .00 783959.10 1978137.00 3578655.00 5585513.00 7998710.00**********************************************
          OUTFLOW       .00**********************************************************************************************
        ELEVATION   2695.00  3984.74  5274.47  6564.21  7853.95  9143.68 10433.42 11723.16 13012.89 14302.63

          STORAGE **********************************************************************************************************
          OUTFLOW **********************************************************************************************************
        ELEVATION  15592.37 16882.10 18171.84 19461.57 20751.31 22041.05 23330.78 24620.52 25910.26 27199.99


*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN       0. TO *********
               THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
               THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

    ***           ***           ***           ***           ***

                    HYDROGRAPH AT STATION       4

 PEAK FLOW    TIME                          MAXIMUM AVERAGE FLOW
   (CFS)      (HR)                6-HR       24-HR       72-HR      8.25-HR
  26159.      1.50       (CFS)    7455.       5444.       5444.       5444.
                        (INCHES)   1.743       1.750       1.750       1.750
                        (AC-FT)    3697.       3712.       3712.       3712.

PEAK STORAGE  TIME                          MAXIMUM AVERAGE STORAGE
   (AC-FT)    (HR)                6-HR       24-HR       72-HR      8.25-HR
     41.      1.50                 12.         8.          8.          8.

 PEAK STAGE   TIME                          MAXIMUM AVERAGE STAGE
   (FEET)     (HR)                6-HR       24-HR       72-HR      8.25-HR
 2695.07      1.50              2695.02     2695.01     2695.01     2695.01

                    CUMULATIVE AREA =   39.77 SQ MI


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
 52 KK    *     SUB D   *
          *             *
          ***************
                          RUNOFF FORM SUBBASIN D - TANQUE VERDE

  6 IN          TIME DATA FOR INPUT TIME SERIES
                     JXMIN          5  TIME INTERVAL IN MINUTES
                    JXDATE     15JUN88  STARTING DATE
                    JXTIME        1200  STARTING TIME

              SUBBASIN RUNOFF DATA

 54 BA          SUBBASIN CHARACTERISTICS
                     TAREA       33.30  SUBBASIN AREA

                PRECIPITATION DATA

 55 PB                STORM        3.51  BASIN TOTAL PRECIPITATION

 56 PI            INCREMENTAL PRECIPITATION PATTERN
                    .11       .25       .20       .11       .06       .06       .05       .05       .04       .03
                    .03       .01
```

094

58 LS SCS LOSS RATE

STRTL	.47	INITIAL ABSTRACTION
CRVNBR	81.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

59 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	1.93	LAG

***

UNIT HYDROGRAPH
118 END-OF-PERIOD ORDINATES

103.	207.	398.	639.	899.	1209.	1520.	1923.	2337.	2825.
3376.	3946.	4601.	5256.	5828.	6380.	6856.	7235.	7602.	7809.
8016.	8101.	8136.	8147.	8112.	8078.	7875.	7668.	7440.	7199.
6949.	6674.	6398.	6061.	5717.	5337.	4923.	4519.	4174.	3829.
3565.	3324.	3097.	2898.	2684.	2512.	2340.	2199.	2073.	1947.
1821.	1695.	1591.	1487.	1384.	1280.	1184.	1115.	1046.	977.
909.	848.	796.	744.	693.	641.	600.	562.	524.	486.
448.	422.	396.	371.	345.	321.	302.	283.	264.	245.
229.	215.	201.	188.	174.	163.	152.	142.	132.	122.
115.	108.	101.	94.	88.	84.	80.	76.	72.	68.
63.	59.	55.	51.	47.	43.	39.	36.	32.	29.
25.	22.	18.	15.	11.	8.	4.	1.		

*** *** *** *** ***

HYDROGRAPH AT STATION SUB D

TOTAL RAINFALL = 3.51, TOTAL LOSS = 1.79, TOTAL EXCESS = 1.72

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	8.25-HR
13673.	2.33	(CFS)	6007.	4453.	4453.	4453.
		(INCHES)	1.677	1.710	1.710	1.710
		(AC-FT)	2979.	3036.	3036.	3036.

CUMULATIVE AREA = 33.30 SQ MI

*** ***

60 KK
****
* *
* 5 * COMBINE A-C WITH D
* *
****

ADD TWO HYDROGRAPHS

62 HC HYDROGRAPH COMBINATION

ICOMP	2	NUMBER OF HYDROGRAPHS TO COMBINE

***

*** *** *** *** ***

HYDROGRAPH AT STATION 5

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	8.25-HR
35647.	1.67	(CFS)	13451.	9897.	9897.	9897.
		(INCHES)	1.711	1.732	1.732	1.732
		(AC-FT)	6678	6748	6748	6748

095

CUMULATIVE AREA = 73.07 SQ MI

*** ***

****
* 5 *
****

63 KK ROUTE HYDROGRAPHS A-D THROUGH REACH 5

HYDROGRAPH ROUTING DATA

64 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	2616	TYPE OF INITIAL CONDITION
RSVRIC	-1.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

65 RC NORMAL DEPTH CHANNEL

ANL	.055	LEFT OVERBANK N-VALUE
ANCH	.047	MAIN CHANNEL N-VALUE
ANR	.055	RIGHT OVERBANK N-VALUE
RLNTH	21450.	REACH LENGTH
SEL	.0040	ENERGY SLOPE
ELMAX	.0	MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

CROSS-SECTION DATA

		--- LEFT OVERBANK ---		+ ------ MAIN CHANNEL -------			+ --- RIGHT OVERBANK ---		
67 RY	ELEVATION	2624.00	2622.00	2620.00	2616.00	2616.00	2618.00	2620.00	2624.00
66 RX	DISTANCE	.00	460.00	550.00	580.00	740.00	770.00	950.00	1070.00

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	34.16	70.29	108.39	148.44	190.67	239.58	297.01	362.95	437.40
OUTFLOW	.00	76.68	246.10	489.27	799.73	1180.05	1648.62	2202.49	2851.32	3603.49
ELEVATION	2616.00	2616.42	2616.84	2617.26	2617.68	2618.11	2618.53	2618.95	2619.37	2619.79
STORAGE	520.12	609.64	705.70	808.32	917.49	1037.78	1180.30	1345.52	1533.45	1744.08
OUTFLOW	4499.21	5545.28	6714.11	8009.61	9435.68	10959.85	12674.17	14604.28	16770.99	19197.76
ELEVATION	2620.21	2620.63	2621.05	2621.47	2621.90	2622.32	2622.74	2623.16	2623.58	2624.00

WARNING --- ROUTED OUTFLOW (19360.) IS GREATER THAN MAXIMUM OUTFLOW (19198.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (20533.) IS GREATER THAN MAXIMUM OUTFLOW (19198.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (21553.) IS GREATER THAN MAXIMUM OUTFLOW (19198.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (22414.) IS GREATER THAN MAXIMUM OUTFLOW (19198.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (23114.) IS GREATER THAN MAXIMUM OUTFLOW (19198.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (23657.) IS GREATER THAN MAXIMUM OUTFLOW (19198.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (24051.) IS GREATER THAN MAXIMUM OUTFLOW (19198.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (24306.) IS GREATER THAN MAXIMUM OUTFLOW (19198.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (24430.) IS GREATER THAN MAXIMUM OUTFLOW (19198.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (24435.) IS GREATER THAN MAXIMUM OUTFLOW (19198.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (24334.) IS GREATER THAN MAXIMUM OUTFLOW (19198.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (24137.) IS GREATER THAN MAXIMUM OUTFLOW (19198.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (23857.) IS GREATER THAN MAXIMUM OUTFLOW (19198.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (23503.) IS GREATER THAN MAXIMUM OUTFLOW (19198.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (23086.) IS GREATER THAN MAXIMUM OUTFLOW (19198.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (22614.) IS GREATER THAN MAXIMUM OUTFLOW (19198.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (22095.) IS GREATER THAN MAXIMUM OUTFLOW (19198.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (21531.) IS GREATER THAN MAXIMUM OUTFLOW (19198.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (20931.) IS GREATER THAN MAXIMUM OUTFLOW (19198.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (20302.) IS GREATER THAN MAXIMUM OUTFLOW (19198.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (19647.) IS GREATER THAN MAXIMUM OUTFLOW (19198.) IN STORAGE-OUTFLOW TABLE

*** *** *** *** ***

HYDROGRAPH AT STATION 5

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	8.25-HR
24435.	2.58	(CFS)	12846.	9640.	9640.	9640.
		(INCHES)	1.635	1.687	1.687	1.687
		(AC-FT)	6370.	6573.	6573.	6573.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	8.25-HR
2199.	2.58	1211.	926.	926.	926.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	8.25-HR
2624.91	2.58	2622.36	2621.10	2621.10	2621.10

CUMULATIVE AREA = 73.07 SQ MI

*** *** *** *

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                    TAREA       21.40  SUBBASIN AREA

               PRECIPITATION DATA

71 PB                STORM       3.58  BASIN TOTAL PRECIPITATION

72 PI             INCREMENTAL PRECIPITATION PATTERN
                     .11       .25       .20       .11       .06       .06       .05       .05       .04       .03
                     .03       .01

74 LS             SCS LOSS RATE
                     STRTL        .47  INITIAL ABSTRACTION
                    CRVNBR      81.00  CURVE NUMBER
                     RTIMP        .00  PERCENT IMPERVIOUS AREA

75 UD             SCS DIMENSIONLESS UNITGRAPH
                     TLAG       3.33  LAG

                                                    ***

                                                UNIT HYDROGRAPH
                                              202 END-OF-PERIOD ORDINATES
                23.       45.       68.       91.      143.      196.      249.      302.      369.      437.
               505.      573.      661.      752.      843.      934.     1049.     1171.     1292.     1413.
              1552.     1696.     1840.     1984.     2111.     2233.     2354.     2475.     2571.     2654.
              2738.     2821.     2880.     2926.     2971.     3017.     3040.     3048.     3055.     3063.
              3062.     3055.     3047.     3039.     3013.     2968.     2922.     2877.     2828.     2775.
              2722.     2669.     2613.     2552.     2491.     2431.     2365.     2289.     2213.     2137.
              2057.     1966.     1875.     1784.     1697.     1621.     1545.     1470.     1399.     1346.
              1293.     1240.     1188.     1143.     1097.     1052.     1007.      969.      931.      893.
               856.      829.      801.      773.      746.      718.      690.      663.      635.      612.
               590.      567.      544.      521.      499.      476.      453.      437.      422.      407.
               392.      377.      361.      346.      331.      319.      308.      296.      285.      273.
               262.      251.      239.      230.      222.      213.      205.      197.      188.      180.
               172.      165.      159.      154.      148.      142.      137.      131.      125.      120.
               116.      112.      108.      104.      100.       95.       91.       88.       85.       82.
                79.       75.       72.       69.       66.       64.       61.       59.       57.       55.
                52.       50.       48.       46.       44.       43.       41.       40.       38.       37.
                35.       34.       33.       32.       31.       30.       29.       28.       27.       26.
                25.       24.       24.       23.       22.       21.       20.       19.       18.       17.
                16.       15.       15.       14.       13.       12.       12.       11.       10.        9.
                 9.        8.        7.        6.        6.        5.        4.        3.        3.        2.
                 1.        0.

   ***          ***          ***          ***          ***

                    HYDROGRAPH AT STATION    SUB E

  TOTAL RAINFALL =    3.58, TOTAL LOSS =    1.81, TOTAL EXCESS =    1.77

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
    (CFS)       (HR)                6-HR        24-HR       72-HR      8.25-HR
    5397.       3.75      (CFS)     3539.       2746.       2746.       2746.
                          (INCHES)  1.538       1.640       1.640       1.640
                          (AC-FT)   1755.       1872.       1872.       1872.

                    CUMULATIVE AREA =   21.40 SQ MI


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

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76 KK     *         6  *      COMBINE HYDROGRAPHS A-D WITH E
          *            *
          ***************
                             ADD TWO HYDROGRAPHS

78 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          3  PRINT CONTROL
                    IPLOT          2  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE

79 HC          HYDROGRAPH COMBINATION
                    ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                          ***

     ***            ***            ***            ***            ***

                       HYDROGRAPH AT STATION       6

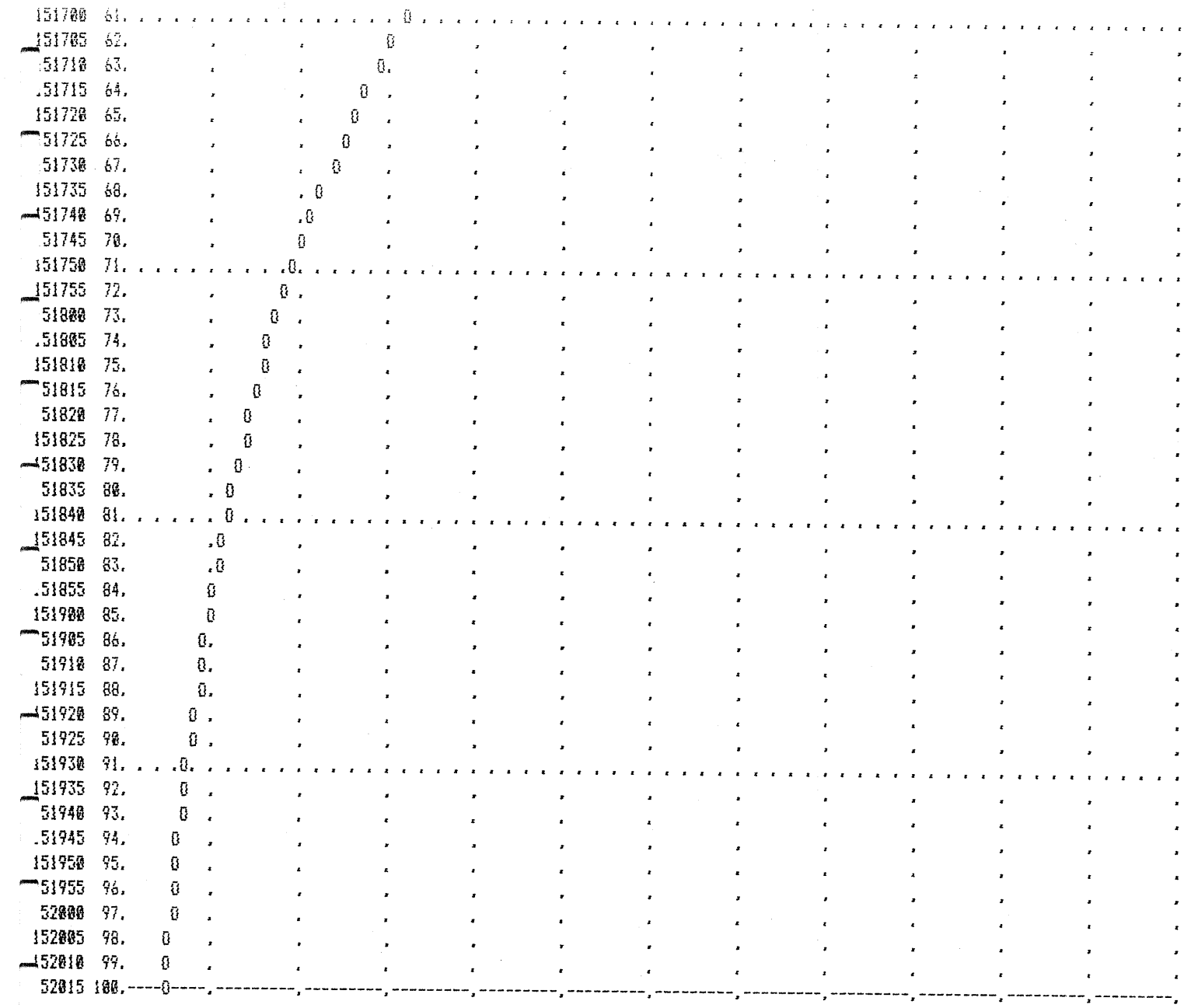
 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
   (CFS)       (HR)                 6-HR       24-HR       72-HR      8.25-HR
   28567.      2.67       (CFS)    16334.      12386.      12386.      12386.
                         (INCHES)    1.688       1.676       1.676       1.676
                         (AC-FT)    8100.       8445.       8445.       8445.

                       CUMULATIVE AREA =   94.47 SQ MI
```

STATION 6

(0) OUTFLOW

	0.	4000.	8000.	12000.	16000.	20000.	24000.	28000.	32000.	0.	0.	0.	0.
DAHRMN	PER												
151200	10												
151205	20												
151210	30												
151215	40												
151220	50												
151225	60												
151230	70												
151235	8.0												
151240	9.0												
151245	10.	0											
151250	11.		0										
151255	12.			0									
151300	13.				0.								
151305	14.					0							
151310	15.						0						
151315	16.							0					
151320	17.								0				
151325	18.									0			
151330	19.										0		
151335	20.											0	
151340	21.												0
151345	22.												0
151350	23.												0
151355	24.												0
151400	25.												0
151405	26.												0
151410	27.												0
151415	28.												0
151420	29.												0.
151425	30.												0
151430	31.												.0.
151435	32.												.0
151440	33.												.0
151445	34.												.0
151450	35.												.0
151455	36.												.0
151500	37.												0
151505	38.												0.
151510	39.												0
151515	40.												0
151520	41.											.0.	
151525	42.											0	
151530	43.											0	
151535	44.											.0	
151540	45.										0.		
151545	46.										0		
151550	47.										0		
151555	48.										0		
151600	49.										0		
151605	50.										0		
151610	51.									.0.			
151615	52.								0				
151620	53.								0				
151625	54.								0				
151630	55.								.0				
151635	56.								0				
151640	57.								0				
151645	58.								0				
151650	59.								0				
151655	60								0				


151700 61.
151705 62.
51710 63.
51715 64.
151720 65.
51725 66.
51730 67.
151735 68.
51740 69.
51745 70.
151750 71.
151755 72.
51800 73.
51805 74.
151810 75.
51815 76.
51820 77.
151825 78.
51830 79.
51835 80.
151840 81.
151845 82.
51850 83.
51855 84.
151900 85.
51905 86.
51910 87.
151915 88.
51920 89.
51925 90.
151930 91.
151935 92.
51940 93.
51945 94.
151950 95.
51955 96.
52000 97.
152005 98.
52010 99.
52015 100.

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	SUB A	10093.	.92	1694.	1232.	1232.	7.20		
ROUTED TO	A	7000.	1.25	1679.	1229.	1229.	7.20	3816.58	1.25
HYDROGRAPH AT	SUB B	13692.	1.67	3997.	2908.	2908.	25.20		
2 COMBINED AT	3	19921.	1.50	5675.	4137.	4137.	32.40		
ROUTED TO	3	19534.	1.67	5661.	4135.	4135.	32.40	3329.71	1.67
HYDROGRAPH AT	SUB C	8255.	1.25	1800.	1309.	1309.	7.37		
2 COMBINED AT	4	26169.	1.50	7455.	5444.	5444.	39.77		
ROUTED TO	4	26159.	1.50	7455.	5444.	5444.	39.77	2695.07	1.50
HYDROGRAPH AT	SUB D	13673.	2.33	6007.	4453.	4453.	33.30		
2 COMBINED AT	5	35647.	1.67	13451.	9897.	9897.	73.07		
ROUTED TO	5	24435.	2.58	12846.	9640.	9640.	73.07	2624.91	2.58
HYDROGRAPH AT	SUB E	5397.	3.75	3539.	2746.	2746.	21.40		
2 COMBINED AT	6	28567.	2.67	16334.	12386.	12386.	94.47		

*** NORMAL END OF HEC-1 ***

```
*********************************************
*  HEC-2 WATER SURFACE PROFILES             *
*                                           *
*  Version   4.6.2;  May 1991               *
*                                           *
*  RUN DATE    07DEC92    TIME    11:40:13  *
*********************************************
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**************************************
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*  609 SECOND STREET, SUITE D        *
*  DAVIS, CALIFORNIA 95616-4687      *
*          (916) 756-1104            *
**************************************
```


```
X     X  XXXXXXXX   XXXXX              XXXXX
X     X  X         X     X           X     X
X     X  X         X                 X
XXXXXXX  XXXX      X       XXXXX     XXXXX
X     X  X         X                 X
X     X  X         X     X           X
X     X  XXXXXXXX   XXXXX             XXXXXXX
```

THIS RUN EXECUTED 07DEC92 11:40:13

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**************************************
 HEC-2 WATER SURFACE PROFILES

 Version  4.6.2;  May 1991
**************************************


T1  TANQUE VERDE CK. AND TRIBUTARIES, VICINITY OF TUCSON, PIMA CO. ARIZ.
T2    X-SEC  STATIONING  IS FROM LEFT TO RIGHT LOOKING DOWNSTREAM
T3    FILE:H2_ORIG.DAT (D.DAT+C.DAT) COMBINED CORP. RUN

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     0         WSEL      FQ

      0         2                                               -1            2551.21

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     -1                  -1                                    -1

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38        39        42        43         1        23        24        26        55        56
      3

J5  LPRNT     NUMSEC                    *********REQUESTED SECTION NUMBERS*********

    -10       -10

NC     .065      .060      .030       0.1       0.3
QT       1     31000
           ALL X-SEC   IDENTIFICATION NUMBERS SHOULD BE MULTIPLIED BY
                 0.0010  IN ORDER TO DETERMINE CORRECT MILE STATIONING
           100 YR. MULTIPLE DISCHARGE VALUES FOR TANQUE VERDE WASH
X1     5740        15       420       865
X3       10
GR     2560         0      2556       145      2552       295      2551       350      2552       405
GR   2552.3       420      2552       435      2548       440      2545       460      2545       865
GR     2548       975    2548.9      1170    2548.6      2185      2552      2670      2556      2820

X1     5800        13       600       990       435       340       430
GR     2564         0      2560       200      2556       360      2552       600      2548       620
GR     2546       710      2546       960      2548       990    2551.8      1300      2552      1550
GR     2556      2490      2560      2570      2564      2600

NC     .065      .065      .035       0.1       0.3
X1     5800        19      1045      1430       465       400       430
GR     2572         0      2568        50      2564        80      2560       230      2560       370
GR     2558       450      2560       540      2556       575      2553       900      2552      1045
GR   2548.5      1245    2548.5      1280      2552      1430      2555      2035      2556      2325
GR     2557      2390      2560      2815      2564      2925      2568      3030
```

X1	5960	22	1050	1275	420	440	420			
GR	2572	0	2560	75	2564	115	2560	330	2556.5	620
GR	2556	780	2552	955	2556	1035	2556.2	1050	2556	1065
GR	2552	1090	2550.3	1130	2552	1205	2552	1260	2556	1275
GR	2556	1460	2553	1510	2556	1550	2558.9	1905	2560	2085
GR	2564	2390	2560	2750						
DT	1	23000								
X1	6040	15	1030	1280	540	415	425			
X3	10					1605				
GR	2572	0	2560	265	2564	380	2560	550	2556	985
GR	2557	965	2556	1030	2552.2	1090	2552.2	1215	2556	1280
GR	2559.5	1605	2558.5	1910	2560	2095	2564	2380	2560	2735
X1	6140	20	765	925	530	410	320			
X3	10					1600				
GR	2576	0	2572	100	2573	140	2582	190	2560	335
GR	2564	430	2560	490	2560	550	2561	635	2560	710
GR	2556	765	2554.5	790	2554.5	890	2556	925	2556.5	1145
GR	2559	1345	2560	1600	2564	1925	2564	2370	2568	2400
X1	6220	18	910	1100	405	315	420			
X3	10					1910				
GR	2580	0	2570	115	2572	325	2560	415	2567	535
GR	2564	675	2560	780	2557	910	2556.5	920	2556.5	1080
GR	2557	1100	2558.5	1195	2560	1625	2564	1910	2565	2160
GR	2568	2520	2568	2690	2572	3160				
X1	6300	21	910	1050	410	310	415			
X3	10					2100				
GR	2580	0	2576	100	2572	260	2568	385	2564	515
GR	2560	745	2559	775	2560	805	2561	855	2560	910
GR	2559	945	2559	1060	2559.2	1080	2559.8	1200	2560	1310
GR	2564	1645	2565	2100	2568	2415	2568	2610	2568.1	2760
GR	2572	3085								
WC	.065	.065	.030	.1	.3					
X1	6380	22	905	1080	480	340	420			
X3	10					1985				
GR	2580	0	2576	145	2572	420	2572	580	2560	555
GR	2568	660	2564	800	2560	905	2559.5	930	2560	960
GR	2560	1015	2559.5	1050	2560	1080	2562	1280	2564	1630
GR	2565	1840	2565.5	1985	2568	2400	2569	2525	2570	2650
GR	2572	3060	2573.5	3300						
X1	6460	25	580	760	375	460	425			
X3	10					1470				
GR	2580	0	2582	70	2580	135	2576	240	2572	355
GR	2568	425	2564	470	2563	515	2564	580	2560	615
GR	2559.8	710	2560	735	2564	760	2565	805	2564	855
GR	2564	1025	2563	1135	2564	1250	2565	1470	2568	1840
GR	2572	2285	2572	2500	2573	2780	2594	2985	2576	3130

X1	6540	17	545	670	460	375	420			
X3	10					1965				
GR	2580	0	2576	160	2572	235	2568	345	2568	485
GR	2564	545	2561	565	2561	650	2564	670	2566	800
GR	2564.3	1115	2567.5	1525	2568	1640	2572	1965	2573	2225
GR	2573.5	2320	2576	2900						
X1	6620	18	595	670	445	390	425			
X3	10					2215				
GR	2584	0	2580	145	2568	430	2564	595	2562.5	625
GR	2564	670	2568	830	2568.5	985	2568	1115	2567	1275
GR	2568	1420	2570	1730	2572	2115	2571	2170	2572	2215
GR	2576	2650	2576	2855	2580	3225				
X1	6710	20	755	1020	520	390	460			
X3	10					2455				
GR	2588	0	2572	485	2568	690	2567	700	2568	715
GR	2569	755	2568	810	2564.5	855	2564.5	900	2568	955
GR	2569	1020	2568	1080	2567.9	1100	2568	1125	2570	1305
GR	2568.5	1545	2572	2065	2572.2	2455	2576	2840	2580	3380
X1	6800	25	1080	1250	520	330	480			
X3	10					2490				
GR	2592	0	2588	50	2584	140	2583	170	2584	200
GR	2580	290	2576	420	2572	610	2568	725	2571.8	770
GR	2571	880	2572	1000	2572.5	1045	2572	1080	2568	1095
GR	2567	1100	2567	1225	2568	1230	2572	1250	2573	1375
GR	2572	1515	2572	1900	2575.8	2490	2576	3060	2581.5	3235
X1	6880	17	1210	1340	420	400	420			
X3	10					2600				
GR	2592	0	2588	325	2576	430	2572	570	2570	655
GR	2572	715	2573	1000	2572	1210	2568	1235	2568	1335
GR	2572	1340	2574	1685	2574	2000	2576	2320	2576.5	2600
GR	2576	2970	2580	3450						
X1	6960	24	1085	1260	340	500	420			
X3	10					2660				
GR	2592	0	2588	170	2580	225	2576	295	2572	430
GR	2572	495	2573.7	630	2575	770	2576	890	2576.3	975
GR	2576	1070	2572	1085	2569.3	1125	2569.3	1215	2572	1260
GR	2576	1270	2576.2	1340	2576	1420	2576	1600	2577	1855
GR	2579	2340	2580	2660	2581.2	3030	2584	3670		
NC	.065	.065	.040	.1	.3					
X1	7040	13	1105	1210	265	455	410			
X3	10					3550				
GR	2592	0	2588	295	2576	375	2574	545	2576	770
GR	2576	1105	2572	1135	2571.3	1180	2572	1210	2576	1435
GR	2578.1	1680	2580	2100	2584	3550				

X1	7120	13	1170	1405	620	325	425			
X3	10					3620				
GR	2592	0	2580	220	2576	580	2577	1005	2576	1170
GR	2573	1215	2573	1295	2576	1405	2577	1520	2576	1660
GR	2580	1965	2581.5	2600	2584	3620				
NC	.065	.065	.040	.1	.3					
QT	1	23000								
X1	7200	14	1240	1510	422	422	422			
GR	2596	0	2584	215	2580	435	2578.5	855	2576	1240
GR	2575	1270	2575	1300	2576	1340	2578	1510	2580	1680
GR	2581	2035	2581.5	2605	2584	3380	2588	4050		
NC	.060	.065	.035	.1	.3					
X1	7280	15	1250	1395	510	250	420			
GR	2596	0	2584	215	2580	530	2578.9	660	2580	760
GR	2581	1085	2580	1250	2576	1280	2576	1320	2579.5	1395
GR	2580	1485	2581.5	1865	2582	2420	2584	3040	2588	3800
QT	1	23000								
X1	7360	15	1400	1700	350	500	420			
GR	2596	0	2588	135	2584	230	2582	540	2583	1225
GR	2580	1400	2578.5	1425	2580	1440	2581	1550	2580	1650
GR	2578.5	1675	2580	1700	2584	2500	2588	3650	2592	4300
X1	7440	19	1890	2030	460	360	430			
X3	10									
GR	2604	0	2600	70	2596	190	2584	610	2583.8	850
GR	2584	1100	2584.5	1440	2584	1740	2584	1780	2584.2	1835
GR	2584	1890	2580.6	1960	2583	2030	2584	2210	2586.1	2780
GR	2584	3100	2588	3740	2591	4090	2592	4460		
NC	.060	.060	.030	.1	.3					
X1	7520	14	1590	1710	390	440	450			
GR	2600	0	2604	70	2600	180	2588	485	2587	1250
GR	2584	1590	2582	1630	2585	1670	2584	1710	2587.9	2620
GR	2587.8	2790	2588	3165	2591.3	3550	2592	4060		
X1	7600	14	1230	1395	360	420	410			
GR	2608	0	2604	25	2600	130	2592	485	2588	805
GR	2588	1230	2584	1250	2584	1325	2587.8	1395	2587.8	1720
GR	2588	2360	2592	3040	2592	3170	2596	4100		
X1	7680	15	1150	1305	440	410	450			
GR	2612	0	2600	340	2596	415	2592	575	2591	645
GR	2591.3	770	2592	1070	2588	1150	2585.8	1180	2585.8	1240
GR	2588	1305	2587.5	1720	2589.7	2520	2592	2875	2596	3570

X1	7770	18	1350	1455	570	405	500			
GR	2616	0	2612	285	2600	365	2604	410	2600	500
GR	2596	690	2593.5	920	2592	1190	2588	1350	2587.3	1375
GR	2587.3	1435	2588	1455	2592	1600	2592	1770	2592.5	2040
GR	2592	2450	2593	2930	2596	3470				
X1	7840	16	1170	1295	290	450	360			
GR	2616	0	2612	90	2600	275	2604	370	2600	590
GR	2596	750	2592	1140	2589.2	1170	2589.2	1215	2592	1295
GR	2593.7	1530	2592.1	1860	2594	1980	2595.3	2530	2596	3165
GR	2600	3475								
X1	7890	16	1040	1180	195	265	300			
GR	2616	0	2612	110	2600	315	2604	420	2600	580
GR	2596	710	2595.5	850	2596	1000	2592	1040	2598.2	1060
GR	2598.2	1130	2592	1180	2596	2420	2596.7	2660	2596.7	3000
GR	2600	3240								
X1	7935	16	1120	1215	200	240	240			
GR	2616	0	2612	195	2600	565	2596.8	720	2596.2	965
GR	2596	1110	2592	1120	2591.3	1130	2591.3	1200	2592	1215
GR	2596	1335	2595.8	1550	2596	2280	2598.6	2825	2600	3210
GR	2604	3570								
NC	.865	.860	.830	.1	.3					
X1	7945	14	1040	1155	60	70	50			
X3	10							2597.2	2597.2	
GR	2616	0	2600	475	2597.9	750	2596	1030	2591.4	1040
GR	2591.4	1155	2596	1170	2596.1	1350	2596	1450	2594.5	1650
GR	2596	2160	2598.7	2700	2600	3100	2604	3425		
SB	1.05	1.28	2.6	0	114	20	535	0	2592.1	2591.4
X1	7950	15	1001	1115	20	20	20			
X2			1	2597.2	2594.5					
X3	10							2600	2596	
BT	15	0	2612	0	500	2600	0	745	2597.9	0
BT	1000	2599	0	1001	2599.5	0	1115	2599.5	0	1160
BT	2596	0	1315	2596.1	0	1410	2596	0	1620	2594.5
BT	0	1810	2596	0	2120	2596	0	2520	2599	0
BT	3050	2600		3375	2604					
GR	2612	0	2600	500	2597.9	745	2596	1000	2591.5	1001
GR	2591.5	1115	2596	1160	2596.1	1315	2596	1410	2594.5	1620
GR	2596	1810	2596	2120	2599	2520	2600	3050	2604	3375
X1	7960	13	995	1110	60	35	50			
GR	2616	0	3600	240	2600	520	2596	995	2592.1	1020
GR	2592.1	1110	2596	1210	2596	1400	2596	1790	2596	2100
GR	2599	2520	2600	3050	2604	3380				

X1	8000	17	1030	1180	260	140	210			
GR	2616	0	2612	240	2600	435	2600	655	2597.5	830
GR	2596	1030	2592.6	1040	2592.6	1165	2596	1180	2576	1300
GR	2596.2	1420	2596	1560	2597	2045	2599	2535	2600	2890
GR	2600	3000	2604	3435						
X1	8000	14	910	1045	450	425	420			
X3	10									
GR	2616	0	2608	280	2604	470	2600	710	2596	910
GR	2594.6	925	2594.6	1030	2596	1045	2596	1360	2595.5	1430
GR	2596	1470	2598.6	2025	2600	2565	2604	3265		
NC	.060	.065	.030	.1	.3					
X1	8160	14	970	1460	470	430	430			
GR	2620	0	2616	220	2612	340	2609	550	2604	730
GR	2600	970	2596.5	1460	2599.3	1580	2600	1760	2603.2	2420
GR	2604	3160	2608	3770	2612	3930	2616	4000		
X1	8240	23	870	1000	370	415	430			
X3	10									
GR	2620	0	2616	155	2612	255	2608	415	2604	645
GR	2600	735	2599	800	2600	870	2597	905	2597	980
GR	2600	1000	2602	1150	2600	1330	2599.8	1390	2600	1450
GR	2603.5	1675	2603.5	2025	2604	2630	2606.6	2965	2607	3225
GR	2608	3475	2612	3600	2616	3840				
X1	8320	20	740	815	640	250	440			
X3	10									
GR	2620	0	2616	100	2612	320	2608	465	2604	650
GR	2600	740	2597.5	750	2597.5	795	2600	800	2604	815
GR	2605	830	2604	850	2601	1075	2603	1390	2604	1665
GR	2605	2470	2606	2840	2608	3180	2612	3370	2616	3600
X1	8400	20	1060	1190	520	270	420			
GR	2620	0	2616	195	2612	585	2608	680	2606	865
GR	2604	1060	2600	1090	2598.8	1095	2598.8	1155	2600	1160
GR	2604	1190	2606	1300	2604	1665	2603	1760	2604	1850
GR	2605.5	2130	2606.8	2735	2608	3220	2612	3400	2616	3670
X1	8480	20	1160	1195	285	510	425			
X3	10									
GR	2620	0	2616	190	2612	320	2609.7	585	2608	645
GR	2604	1100	2600	1125	2599.9	1130	2599.9	1165	2600	1170
GR	2604	1195	2608	1220	2608.2	1235	2608	1245	2604	1515
GR	2604	1560	2608	2250	2609.5	2445	2612	3025	2616	3165
X1	8540	19	1130	1230	230	370	320			
GR	2620	0	2616	150	2612	415	2608	690	2608.2	770
GR	2608	825	2607.8	910	2608	1005	2608.1	1070	2608	1130
GR	2604	1160	2604	1200	2608	1230	2610.7	1410	2608	1640
GR	2606.5	1790	2608	1995	2612	2740	2616	3020		

X1	8600	16	1280	1420	220	420	310			
GR	2624	0	2620	155	2616	190	2612	635	2608	1280
GR	2606	1305	2606	1410	2608	1420	2612	1600	2612.1	1650
GR	2612	1730	2610	1950	2612	2240	2612	2650	2616	3100
GR	2624	3135								
X1	8660	17	1350	1435	250	400	320			
GR	2628	0	2624	145	2620	295	2616	390	2612	895
GR	2608	1350	2607.1	1370	2607.1	1430	2608	1435	2611.2	1600
GR	2612	1770	2614	1925	2612	2125	2612	2330	2614.3	3015
GR	2616	3145	2620	3265						
X1	8720	22	1240	1485	270	390	320			
GR	2628	0	2624	180	2620	360	2616	410	2616	530
GR	2617	620	2616	705	2612	960	2610	1240	2607.9	1290
GR	2607.9	1380	2610	1465	2612	1700	2612	1820	2612.6	1870
GR	2630	1870.1	2636	1980	2613.8	1980.1	2614.2	2040	2615.4	2630
GR	2616	2990	2620	3175						
X1	8780	25	1275	1420	310	480	320			
GR	2628	0	2624	220	2620	370	2620	820	2616	965
GR	2612	1275	2610.5	1300	2610.5	1370	2612	1420	2616	1670
GR	2616.5	1750	2630	1750.1	2630	1900	2616.3	1900.1	2616	1925
GR	2615.9	1975	2630	1975.1	2630	2300	2615.7	2300.1	2613	2375
GR	2616	2570	2630	2570.1	2630	2920	2616.2	2920.1	2620	3050
X1	8860	23	1325	1450	340	470	425			
GR	2632	0	2628	170	2624	330	2620	630	2616	1060
GR	2612	1325	2612	1410	2616	1450	2619.4	1690	2635	1690.1
GR	2635	1900	2618	1900.1	2617.5	1970	2635	1970.1	2635	2215
GR	2616	2215.1	2615.8	2290	2616	2365	2617	2475	2635	2475.1
GR	2635	2760	2620	2760.1	2624	3080				
X1	8940	23	1350	1510	330	530	425			
GR	2636	0	2632	185	2628	325	2624	465	2616	1350
GR	2613.4	1395	2613.4	1475	2616	1510	2620	1695	2621	1750
GR	2635	1750.1	2635	1880	2621.8	1880.1	2620	1975	2619.5	2295
GR	2616	2385	2616	2435	2620	2520	2635	2520.1	2635	2870
GR	2625	2870.1	2628	3035	2632	3230				
X1	9000	30	1235	1325	260	350	320			
GR	2636	0	2632	150	2628	360	2626	450	2640	450.1
GR	2640	630	2623	630.1	2620.2	935	2620	1095	2616	1235
GR	2614.1	1245	2614.1	1300	2616	1325	2620	1590	2621.5	1685
GR	2620	1770	2617	1825	2620	1875	2620	1960	2640	1960.1
GR	2640	2200	2620	2200.1	2620	2300	2618	2380	2620	2425
GR	2624	2475	2627	2730	2628	2840	2632	2980	2636	3250

X1	9000	29	1070	1165	350	430	420			
GR	2636	0	2632	285	2628	330	2624	520	2621.8	690
GR	2620	915	2616	1070	2615.4	1085	2615.4	1145	2616	1165
GR	2617.7	1430	2620	1530	2640	1530.1	2640	1625	2624.5	1625.1
GR	2623	1740	2640	1740.1	2640	1860	2623	1860.1	2624	2240
GR	2624.2	2335	2624	2430	2624	2500	2626	2590	2625.3	2640
GR	2640	2640.1	2640	2890	2634	2890.1	2636	3000		
X1	9140	25	825	950	360	345	320			
GR	2640	0	2636	85	2632	260	2624	610	2620	825
GR	2616.5	855	2616.5	930	2620	950	2620.5	1120	2620	1290
GR	2619	1350	2620	1400	2624	1465	2625	1640	2626	1915
GR	2626.5	2070	2645	2070.1	2645	2210	2627	2210	2625	2535
GR	2645	2535.1	2645	2690	2630	2690.1	2632	2835	2636	2980
X1	9200	22	665	750	360	135	340			
GR	2640	0	2624	605	2620	665	2618.9	680	2618.9	730
GR	2620	750	2620	1180	2624	1340	2645	1340.1	2645	1470
GR	2626	1470.1	2627	1560	2645	1560.1	2645	1725	2627	1725.1
GR	2624.3	2385	2628.1	2520	2645	2520.1	2645	2690	2633	2690.1
GR	2636	2980	2638	3135						
X1	9280	26	650	950	460	320	450			
GR	2644	0	2640	130	2636	185	2632	410	2624	650
GR	2621.5	725	2621.5	835	2623.9	950	2624	1275	2627	1350
GR	2645	1350.1	2645	1475	2628	1475.1	2628.1	1560	2645	1560.1
GR	2645	1720	2628	1720.1	2627.9	1775	2627.8	2000	2645	2000.1
GR	2645	2100	2627	2100	2627.9	2395	2636	2780	2636	2915
GR	2640	3180								
X1	9340	27	810	950	350	320	325			
GR	2644	0	2632	420	2628	640	2624	810	2622.5	855
GR	2622.5	930	2624	950	2628	1375	2645	1375.1	2645	1560
GR	2628.5	1560.1	2628.5	1635	2645	1635.1	2645	1820	2628.5	1820.1
GR	2627.8	1860	2628	1910	2628.7	1990	2645	1990.1	2645	2175
GR	2628	2175.1	2628	2330	2626.5	2435	2628	2485	2632	2605
GR	2636	2775	2640	3085						
X1	9420	27	990	1115	450	350	420			
GR	2644	0	2636	415	2632	725	2628	920	2626	990
GR	2624	1030	2624	1060	2626	1115	2628	1285	2628	1285
GR	2627.8	1360	2628	1460	2628.7	1600	2645	1600.1	2645	1730
GR	2628.7	1730.1	2628.8	1810	2645	1810.1	2645	1980	2628.7	1980.1
GR	2632	2240	2632	2330	2628	2350	2628	2490	2632	2620
GR	2636	2840	2640	3080						
NC	.06	.04	.035							
X1	9500	17	1070	1150	420	420	430			
X3						1800				
X4	1	2635	1800							
GR	2640	0	2640	455	2636	620	2628	1070	2626	1085
GR	2626	1125	2628	1150	2632	1700	2632	1850	2632.9	2080
GR	2633	2410	2632	2500	2632	2595	2636	2775	2640	3960

GR	2644	3150	2648	3500						
X1	9580	15	915	1090	500	365	450			
X3						1700				
X4	2	2633.5	1650	2636.8	1700					
GR	2648	0	2644	60	2640	370	2636	500	2632	765
GR	2629	915	2628	960	2628	1000	2629	1090	2632	1215
GR	2633.7	2080	2636	2450	2640	2765	2644	3070	2648	3290
X1	9660	14	1000	1130	465	365	430			
X3						1790				
X4	2	2635.2	1740	2638.1	1790					
GR	2652	0	2648	25	2644	60	2640	170	2630	270
GR	2632	1000	2629.4	1035	2629.5	1085	2632	1130	2635	2170
GR	2636	2490	2640	2720	2644	3015	2648	3175		
X1	9740	28	990	1240	570	360	450			
X3						1820				
GR	2660	0	2652	20	2648	65	2640	325	2636	465
GR	2635	690	2636	840	2636.5	905	2636	940	2632	990
GR	2630.7	1055	2630.7	1140	2632	1240	2636	1540	2637.2	1725
GR	2636	1815	2640	1820	2640	1845	2636	2150	2636	2325
GR	2636.5	2350	2636	2370	2636.5	2410	2636	2435	2640	2625
GR	2644	2825	2648	3060	2652	3255				
X1	9800	20	770	1015	325	300	330			
X3						1400				
X4	1	2640.5	1400							
GR	2652	0	2644	200	2640	570	2636	770	2632	870
GR	2632	905	2636	1015	2640	1350	2636	1450	2640	1475
GR	2640	1505	2636	2035	2635.7	2050	2636	2080	2640	2325
GR	2644	2450	2645.7	2540	2648	2605	2652	2800	2656	3050
X1	9860	20	1010	1245	250	250	325			
X3						1550				
X4	1	2643	1550							
GR	2656	0	2648	300	2644	500	2640	825	2636	1010
GR	2634	1110	2634	1140	2636	1245	2640	1290	2640.3	1470
GR	2640	1585	2640.5	1630	2640	1650	2636	2100	2635.8	2185
GR	2636	2200	2640	2380	2644	2530	2648	2670	2656	3030
X1	9920	19	1275	1465	200	400	320			
X3						1900				
X4	2	2640.5	1940	2643.5	1980					
GR	2660	0	2656	125	2652	395	2648	525	2644	1070
GR	2640	1275	2636	1435	2636	1465	2640	1655	2640.5	1825
GR	2640.1	2030	2640	2460	2630	2600	2640	2720	2644	2820
GR	2648	3000	2652	3190	2656	3460	2660	3600		

X1	9980	18	1425	1470	220	570	320			
X3						2300				
X4	2	2642	2250	2645	2300					
GR	2660	0	2652	550	2648	685	2644	1290	2642	1350
GR	2640	1425	2639.8	1430	2639.8	1460	2640	1470	2641	1790
GR	2643	2540	2644	2700	2644	2900	2648	3465	2652	3580
GR	2653.3	3665	2656	3945	2660	4030				
X1	10060	21	1575	1850	300	435	440			
X3						2625				
X4	2	2644.1	2560	2647	2625					
GR	2664	0	2660	450	2656	550	2652	900	2648	1300
GR	2644	1535	2642	1575	2641	1590	2641	1750	2642	1850
GR	2644	2080	2645	2100	2644	2120	2644	2150	2645	2235
GR	2644	2310	2644.1	2690	2645	3270	2640	3460	2652	3745
GR	2660	4100								
X1	10140	16	1370	1570	585	425	420			
X3	10									
GR	2668	0	2664	260	2660	665	2652	1150	2648	1300
GR	2644	1370	2642.3	1430	2643.3	1510	2644	1570	2643	1760
GR	2644	1900	2648	2270	2648	2500	2652	3250	2656	3400
GR	2660	3570								
NC	.065	.065	.035		.1	.3				
X1	10210	16	1230	1520	350	210	400			
X3	10									
GR	2668	0	2664	350	2660	675	2652	1180	2649	1230
GR	2644.1	1300	2644.1	1365	2645.3	1520	2644	1650	2644	1720
GR	2648	1900	2650.6	2300	2652	2980	2656	3200	2660	3340
GR	2664	3390								
X1	10280	15	1330	1825	450	260	390			
GR	2668	0	2664	360	2660	595	2656	960	2652	1245
GR	2648	1330	2646	1480	2646	1475	2648	1825	2651.2	2285
GR	2651.2	2710	2652	2830	2656	3100	2660	3250	2664	3300
X1	10360	18	1260	1485	390	380	420			
X3	10									
GR	2668	0	2660	560	2656	940	2652	1180	2648	1260
GR	2647.8	1285	2648	1310	2648.5	1485	2649	1660	2648	1800
GR	2647.9	1830	2648	1875	2652	1930	2656	2500	2656	2710
GR	2660	3030	2664	3175	2668	3285				
X1	10420	13	1350	1685	260	360	320			
GR	2668	0	2668	125	2664	220	2660	640	2656	1070
GR	2652	1350	2650.4	1525	2650.4	1685	2652	2020	2656	2425
GR	2660	2880	2664	3165	2668	3400				

X1	10500	13	1500	1975	460	400	430			
GR	2672	0	2668	130	2664	340	2660	785	2656	1135
GR	2653	1500	2652	1695	2652	1725	2656	1975	2660	2875
GR	2664	3015	2668	3315	2672	3540				
X1	10500	15	1975	2200	435	390	415			
GR	2675	0	2672	150	2672	485	2668	670	2664	985
GR	2660	1245	2656	1975	2653.5	2030	2653.5	2200	2653.6	2420
GR	2656	2585	2657.6	2930	2660	3125	2664	3395	2672	3870
X1	10640	15	1875	2100	230	435	320			
GR	2676	0	2672	265	2668	615	2665	815	2664	925
GR	2660	1185	2657	1545	2656	1875	2655	1925	2655	2100
GR	2656	2415	2660	2700	2664	3110	2668	3300	2676	3525
X1	10700	15	1800	2060	290	445	330			
GR	2676	0	2672	340	2668	630	2664	980	2660.5	1190
GR	2660	1270	2656	1800	2655.9	1930	2656	2060	2657	2230
GR	2656	2390	2660	2530	2668	2960	2672	3290	2676	3470
X1	10780	19	1600	1775	360	510	425			
GR	2680	0	2676	250	2672	490	2672	530	2673	570
GR	2672	590	2669	750	2668	890	2664.5	1045	2664	1260
GR	2661	1480	2660	1600	2656	1640	2658	1775	2658.6	1940
GR	2660	2300	2660	2420	2664	2700	2668	2890		
X1	10860	14	1410	1480	320	400	420			
GR	2680	0	2676	100	2672	210	2673	350	2672	500
GR	2672	730	2668	900	2664	1060	2660	1410	2660	1480
GR	2664	2410	2668	2735	2676	3150	2680	3600		
X1	10940	12	1230	1450	465	380	430			
GR	2684	0	2672	295	2668	430	2668	535	2664	1020
GR	2662	1230	2662	1450	2664	1570	2664.5	2085	2668	2540
GR	2676	3120	2680	3480						
X1	11020	18	1240	1450	470	380	425			
X3	10									
GR	2682	0	2681	160	2680	320	2676	490	2672	560
GR	2668	940	2664	1040	2664	1115	2668	1185	2668	1220
GR	2664	1240	2664	1450	2666.4	1740	2668	2540	2672	2630
GR	2676	2850	2680	3225	2684	3350				
X1	11100	19	950	1990	460	270	420			
X3	10									
GR	2684	0	2676	210	2672	515	2671.7	615	2668.5	750
GR	2668	875	2669	940	2668	950	2667.3	1670	2668	1990
GR	2667.6	2110	2668	2220	2672	2390	2676	2610	2680	2830
GR	2681	2940	2680	3070	2684	3150	2680	3470		

X1	11160	24	815	1260	245	300	315			
GR	2684	0	2680	55	2676	170	2672	600	2672	700
GR	2668	740	2668.2	770	2668	815	2667	950	2668	1100
GR	2668	1170	2668.3	1260	2668	1310	2668	1350	2668.3	1420
GR	2669	1650	2672	1930	2672	2072	2670.2	2460	2676	2680
GR	2680	2980	2684	3140	2684	3340	2688	3560		
X1	11240	24	760	1075	680	200	425			
X3	10									
GR	2692	0	2688	40	2684	125	2680	150	2676	170
GR	2673.5	315	2672	350	2671.8	375	2672	400	2672	760
GR	2670	890	2670	1040	2672	1075	2672.5	1095	2672	1135
GR	2672	1370	2676	1545	2675.8	1620	2675	1740	2672	1845
GR	2676	2190	2680	2520	2684	2720	2688	3150		
X1	11320	21	1175	1395	445	310	425			
X3	10									
GR	2692	0	2688	30	2684	90	2680	155	2676	305
GR	2675.8	515	2672	685	2671.5	965	2672	1175	2672	1360
GR	2676	1395	2679	1590	2678	1895	2678	2200	2680	2380
GR	2681	2435	2680	2470	2679	2590	2680	2700	2684	2940
GR	2688	3440								
MC	.065	.065	.040	.1	.3					
X1	11400	24	1185	1735	390	415	435			
X3	10									
GR	2696	0	2692	30	2688	50	2684	125	2680	450
GR	2679.1	600	2676	860	2675	930	2676	1010	2676.5	1060
GR	2676	1185	2674	1285	2674	1390	2676	1520	2674.5	1540
GR	2676	1570	2674	1590	2674	1650	2676	1735	2680	1970
GR	2681	2220	2684	2480	2688	2740	2692	3050		
X1	11480	26	1485	1800	335	480	425			
GR	2700	0	2696	15	2692	50	2688	245	2684	575
GR	2680	910	2677	1050	2676	1280	2675.5	1325	2676	1370
GR	2676	1420	2675.8	1450	2676	1485	2676	1715	2675.5	1725
GR	2675.5	1760	2676	1800	2680	1850	2684	2200	2684.5	2290
GR	2684	2355	2682	2440	2684	2520	2688	2670	2692	2900
GR	2696	3325								
X1	11560	28	400	1165	615	305	420			
X3	10									
GR	2700	0	2696	25	2692	45	2688	60	2692	85
GR	2695	150	2692	225	2688	270	2684	365	2680	400
GR	2678.5	440	2678.5	490	2680	510	2680.4	545	2680	740
GR	2679.2	810	2680	900	2679.8	920	2680	940	2680.5	1000
GR	2676.5	1050	2676.5	1090	2680	1165	2684	1440	2686	1620
GR	2688	1930	2692	2150	2696	2290				

X1	11640	27	860	1380	710	440	420			
X3	10									
GR	2700	0	2696	120	2692	230	2691.5	255	2692	275
GR	2696	310	2697	380	2696	445	2692	475	2688	510
GR	2684	530	2682.6	680	2684	860	2681.5	940	2684	1050
GR	2684	1160	2680	1300	2680	1335	2678.6	1340	2678.6	1370
GR	2680	1380	2683	1425	2684	1480	2686	1755	2688	2050
GR	2692	2250	2696	2400						
NC	.065	.065	.035	.1	.3					
X1	11700	20	840	1120	315	300	315			
GR	2700	0	2696	50	2696	100	2692	175	2692	240
GR	2694	310	2692	350	2688	400	2684	450	2684	665
GR	2685	740	2684	840	2684	910	2680	950	2684	1120
GR	2685	1290	2688	1440	2692	1790	2696	1970	2700	2235
X1	11760	15	820	1000	215	255	315			
GR	2700	0	2697	110	2696	190	2692	255	2688	290
GR	2687.5	385	2685.5	670	2684	820	2682.5	830	2682.5	990
GR	2684	1000	2688	1170	2692	1430	2696	1620	2700	1750
X1	11840	24	1170	1330	345	340	420			
X3	10									
GR	2704	0	2700	40	2696	210	2692	470	2691	725
GR	2688	770	2687.8	850	2688	935	2688.3	975	2688	1020
GR	2688	1075	2688.5	1135	2688	1170	2685.5	1195	2685.5	1295
GR	2688	1330	2688.2	1380	2688	1485	2688.5	1535	2688	1575
GR	2688	1690	2692	1710	2696	1740	2700	1945		
X1	11900	18	1390	1510	315	320	330			
GR	2704	0	2700	60	2700	180	2696	410	2696	545
GR	2698.5	670	2696	775	2692	920	2690	1210	2688	1390
GR	2687	1400	2687	1470	2686	1510	2692	1730	2696	1930
GR	2696	1980	2700	1990	2704	2010				
X1	11960	21	970	1080	200	470	320			
GR	2704	0	2700	200	2696	390	2692	530	2691	745
GR	2692	910	2687.5	970	2687.5	1010	2689	1030	2688.1	1080
GR	2692	1110	2694	1140	2692	1160	2692	1200	2691	1235
GR	2692	1255	2692	1380	2693	1665	2694	1870	2700	1930
GR	2708	2040								
X1	12020	16	910	995	270	315	310			
GR	2705	0	2700	250	2696	450	2692	700	2691.5	740
GR	2692	775	2693	850	2692	910	2689.0	925	2689.0	995
GR	2692	1060	2692.5	1085	2692	1120	2692	1165	2694	1645
GR	2712	1880								

X1	12100	15	1050	1170	360	440	430			
GR	2709	0	2700	80	2704	300	2700	530	2700	680
GR	2696	790	2690.6	1050	2690.6	1170	2691.5	1250	2696	1375
GR	2696	1540	2700	1550	2700	1580	2700	1775	2700	1810
X1	12180	12	1020	1110	210	195	200			
GR	2720	0	2716	150	2700	650	2696	725	2694	910
GR	2692.2	1020	2692.2	1110	2696	1260	2704	1550	2702	1690
GR	2716	1770	2720	1825						
X1	12250	19	850	927	365	340	370			
GR	2716	0	2700	140	2700	280	2704	390	2700	435
GR	2697.0	520	2700	625	2701	695	2700	760	2696	820
GR	2692.7	850	2692.7	927	2696	940	2700	965	2699.5	1095
GR	2700	1165	2704	1300	2700	1415	2720	1670		
X1	12300	20	530	685	360	265	270			
GR	2720	0	2716	70	2712	180	2704	210	2701.5	380
GR	2700	480	2692.7	530	2692.8	560	2704.5	630	2696	665
GR	2692.8	675	2696	685	2700	700	2701	760	2700	820
GR	2699.5	910	2700	975	2700	1240	2712	1345	2716	1410
X1	12380	17	420	590	640	190	425			
GR	2720	0	2716	50	2712	100	2712	160	2700	240
GR	2704	390	2700	400	2696	420	2694.6	435	2694.6	460
GR	2696	490	2700	590	2701.5	720	2700	830	2700	900
GR	2704	1040	2700	1190						
X1	12460	15	360	430	515	350	425			
GR	2720	0	2715	50	2712	70	2700	120	2706	320
GR	2706	330	2704	340	2700	350	2698	360	2698	430
GR	2700	450	2704	480	2704	595	2700	840	2712	1025
X1	12540	19	510	560	410	350	410			
GR	2720	0	2712	60	2700	425	2709	450	2700	480
GR	2704	490	2701	510	2701	560	2704	585	2700	610
GR	2712	625	2714	710	2716	775	2714	810	2716	880
GR	2718	945	2716	1050	2716	1140	2720	1290		
GT	1	19000								
X1	12620	14	575	620	190	570	425			
GR	2720	0	2716	30	2712	60	2710	290	2712	415
GR	2708	480	2703	575	2708	620	2708	675	2704	725
GR	2708	735	2712	740	2716	790	2720	840		
GT	1	16000								
X1	12700	18	695	790	285	585	425			
GR	2720	0	2724	100	2700	230	2700	300	2720	345
GR	2716	390	2712	530	2711.5	590	2712	635	2712	685
GR	2707	695	2705	700	2705	775	2707	790	2712	800
GR	2716	820	2720	845	2720	1010				

X1	12780	10	90	170	415	480	435			
GR	2728	0	2724	45	2720	70	2712	90	2707.5	100
GR	2707.5	170	2712	220	2716	250	2720	300	2732	450
X1	12840	12	150	185	270	280	335			
GR	2732	0	2728	45	2720	85	2716	100	2712	130
GR	2709	150	2709	185	2712	220	2716	295	2720	320
GR	2732	420	2736	440						
X1	12900	10	295	310	320	245	340			
GR	2732	0	2724	50	2720	150	2716	200	2712	295
GR	2711.9	300	2712	310	2716	335	2720	345	2736	440
X1	12980	11	300	330	410	430	425			
GR	2740	0	2732	40	2728	130	2724	210	2720	300
GR	2720	330	2724	370	2724	415	2728	460	2732	495
GR	2736	530								
X1	13060	14	315	350	360	490	430			
GR	2744	0	2740	75	2736	170	2732	270	2728	300
GR	2722	315	2722	350	2728	375	2728	415	2732	450
GR	2732	480	2732	515	2736	535	2740	600		
X1	13140	15	200	230	370	470	420			
GR	2752	0	2748	40	2744	75	2740	140	2736	175
GR	2732	200	2731	210	2732	230	2736	265	2738	310
GR	2736	340	2736	370	2740	420	2744	485	2752	585
X1	13200	13	280	325	295	320	313			
GR	2760	0	2756	70	2744	160	2740	280	2738	300
GR	2740	310	2744	325	2746	385	2744	445	2748	500
GR	2752	585	2756	620	2760	685				
X1	13280	15	185	250	400	350	425			
GR	2768	0	2764	60	2756	160	2752	185	2748	200
GR	2746	220	2748	250	2752	370	2755	430	2752	495
GR	2748	575	2744	600	2752	640	2760	665	2776	745
X1	13360	18	80	120	440	300	415			
GR	2776	0	2760	75	2756	80	2754	95	2756	120
GR	2757	190	2756	250	2757	290	2756	310	2752	370
GR	2752	395	2756	420	2757	460	2756	490	2755	535
GR	2755	575	2760	580	2772	620				
X1	13440	11	130	190	460	450	430			
GR	2784	0	2776	30	2768	110	2764	130	2760	150
GR	2757	190	2760	260	2764	400	2768	465	2776	555
GR	2780	610								

XI	13520	11	125	150	460	285	420			
GR	2760	0	2776	40	2772	80	2760	125	2756	135
GR	2760	150	2764	230	2768	310	2776	365	2780	395
GR	2780	460								
XI	13600	7	60	80	450	350	420			
GR	2780	0	2764	60	2760	80	2774	160	2776	200
GR	2780	210	2792	265						

THIS RUN EXECUTED 07DEC92 11:48:28

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

ILE:H2_ORIG.DAT (0.DAT+C

SUMMARY PRINTOUT

	SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
	5740.000	.00	2545.00	31000.00	2551.21	2552.30	2545.00	8.24	.00	2.34	2551.97
*	5800.000	430.00	2546.00	31000.00	2552.46	2552.00	2548.00	12.10	.64	3.06	2554.53
	5880.000	430.00	2548.50	31000.00	2555.72	2552.00	2552.00	11.03	3.27	3.07	2557.20
	5960.000	420.00	2550.30	31000.00	2558.64	2556.20	2556.00	12.48	4.61	3.63	2560.18
*	6040.000	425.00	2552.20	23000.00	2561.31	2556.00	2556.00	7.73	2.47	2.39	2561.97
	6140.000	320.00	2554.50	23000.00	2562.21	2556.00	2556.00	9.17	2.42	3.61	2562.93
	6220.000	420.00	2556.50	23000.00	2563.47	2557.00	2557.00	8.59	3.34	3.24	2564.12
	6300.000	415.00	2559.00	23000.00	2564.87	2560.00	2559.20	9.16	3.76	3.71	2565.51
	6380.000	420.00	2559.50	23000.00	2566.27	2560.00	2560.00	10.68	3.38	3.36	2567.28
	6460.000	425.00	2559.80	23000.00	2567.79	2564.00	2564.00	10.18	3.13	3.05	2568.78
	6540.000	420.00	2561.00	23000.00	2569.04	2564.00	2564.00	12.17	2.31	3.32	2570.27
	6620.000	425.00	2562.50	23000.00	2571.05	2564.00	2564.00	12.94	4.18	3.35	2572.04
*	6710.000	460.00	2564.50	23000.00	2572.98	2569.00	2569.00	7.65	2.47	2.32	2573.42
*	6800.000	480.00	2567.00	23000.00	2574.24	2572.00	2572.00	12.01	3.41	2.37	2575.61
*	6880.000	420.00	2568.00	23000.00	2576.40	2572.00	2572.00	9.28	2.77	2.06	2577.01
*	6960.000	420.00	2569.30	23000.00	2577.16	2572.00	2572.00	11.93	3.27	1.52	2578.65
	7040.000	410.00	2571.30	23000.00	2579.68	2576.00	2572.00	7.59	3.20	3.11	2580.03

	SECND	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EB
	7128.000	425.00	2573.00	23000.00	2580.68	2576.00	2576.00	5.79	2.45	2.22	2581.14
*	7200.000	422.00	2575.00	23000.00	2581.84	2576.00	2578.00	7.14	3.38	1.93	2582.28
	7280.000	420.00	2576.00	23000.00	2583.44	2580.00	2579.50	8.76	3.21	2.35	2583.93
	7360.000	420.00	2578.50	23000.00	2584.98	2580.00	2580.00	6.53	2.49	2.44	2585.31
	7440.000	430.00	2580.60	23000.00	2586.59	2584.00	2583.00	8.72	3.38	2.54	2586.99
	7520.000	450.00	2582.00	23000.00	2588.75	2584.00	2584.00	10.65	3.04	3.25	2589.36
	7600.000	410.00	2584.00	23000.00	2590.60	2588.00	2587.80	10.32	2.89	3.00	2591.36
*	7680.000	450.00	2585.80	23000.00	2592.35	2588.00	2588.00	7.55	1.37	2.81	2592.69
*	7770.000	500.00	2587.30	23000.00	2593.90	2588.00	2588.00	12.42	3.60	3.25	2594.89
*	7840.000	360.00	2589.20	23000.00	2596.06	2589.20	2592.00	12.15	3.45	3.33	2597.06
*	7890.000	300.00	2590.20	23000.00	2597.56	2592.00	2592.00	8.76	1.95	2.62	2598.06
*	7935.000	240.00	2591.30	23000.00	2598.58	2592.00	2592.00	12.24	2.78	3.14	2599.52
	7945.000	50.00	2591.40	23000.00	2599.11	2591.40	2591.40	9.84	1.90	2.76	2599.75
*	7950.000	20.00	2591.50	23000.00	2598.67	2591.50	2591.50	12.93	.00	3.51	2599.96
	7960.000	50.00	2592.10	23000.00	2599.65	2596.00	2592.10	9.35	1.74	2.89	2600.19
	8000.000	210.00	2592.60	23000.00	2600.06	2596.00	2596.00	8.87	2.16	2.58	2600.63
	8080.000	420.00	2594.60	23000.00	2601.22	2596.00	2596.00	7.49	2.08	2.69	2601.54
*	8160.000	430.00	2596.50	23000.00	2601.99	2600.00	2596.50	9.93	2.05	3.46	2603.23
	8240.000	430.00	2597.00	23000.00	2604.47	2600.00	2600.00	11.56	4.22	2.88	2605.49
	8320.000	440.00	2597.50	23000.00	2606.24	2600.00	2604.00	12.42	3.68	3.01	2607.08
*	8400.000	420.00	2598.80	23000.00	2607.58	2604.00	2604.00	11.92	2.68	2.71	2608.69
	8480.000	425.00	2599.90	23000.00	2609.47	2604.00	2604.00	10.32	2.82	2.63	2610.14
*	8540.000	320.00	2604.00	23000.00	2610.83	2608.00	2608.00	13.54	4.00	3.55	2611.92
*	8600.000	310.00	2606.00	23000.00	2613.01	2608.00	2608.00	11.80	3.38	2.35	2614.13
	8660.000	320.00	2607.10	23000.00	2614.78	2608.00	2608.00	9.53	3.16	2.26	2615.24
	8720.000	320.00	2607.90	23000.00	2615.37	2610.00	2610.00	8.44	2.81	2.30	2616.09

	SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
*	8780.000	320.00	2610.50	23000.00	2617.35	2612.00	2612.00	13.03	4.12	3.48	2618.85
	8860.000	425.00	2612.00	23000.00	2619.84	2612.00	2616.00	10.70	3.83	2.73	2620.69
	8940.000	425.00	2613.40	23000.00	2621.11	2616.00	2616.00	11.63	2.96	2.90	2622.37
	9000.000	320.00	2614.10	23000.00	2622.65	2616.00	2616.00	12.04	3.16	3.26	2623.61
	9080.000	420.00	2615.40	23000.00	2624.16	2616.00	2616.00	9.48	3.00	3.37	2624.74
*	9140.000	320.00	2616.50	23000.00	2624.54	2620.00	2620.00	13.03	3.19	4.20	2626.04
	9200.000	340.00	2618.90	23000.00	2626.39	2620.00	2620.00	10.46	3.11	3.79	2627.82
	9280.000	450.00	2621.50	23000.00	2627.38	2624.00	2623.90	11.47	2.74	3.85	2629.00
*	9340.000	325.00	2622.50	23000.00	2629.59	2624.00	2624.00	12.81	3.94	3.30	2631.02
	9420.000	420.00	2624.00	23000.00	2631.87	2626.00	2626.00	11.20	3.32	3.16	2632.80
	9500.000	430.00	2626.00	23000.00	2633.71	2628.00	2628.00	11.39	3.59	6.31	2634.66
	9580.000	450.00	2628.00	23000.00	2635.60	2629.00	2629.00	8.49	3.12	4.60	2636.27
*	9660.000	430.00	2629.40	23000.00	2636.89	2632.00	2632.00	5.26	2.79	2.86	2637.87
*	9740.000	450.00	2630.70	23000.00	2637.30	2632.00	2632.00	9.53	2.53	4.91	2638.31
*	9800.000	330.00	2632.00	23000.00	2640.14	2636.00	2636.00	11.52	3.22	4.84	2641.83
	9860.000	325.00	2634.00	23000.00	2642.17	2636.00	2636.00	9.94	3.52	4.28	2643.36
	9920.000	320.00	2636.00	23000.00	2643.88	2640.00	2636.00	8.04	2.16	5.77	2644.58
	9980.000	320.00	2639.00	23000.00	2645.61	2640.00	2640.00	7.19	2.66	5.31	2646.85
	10060.000	440.00	2641.00	23000.00	2646.79	2642.00	2642.00	7.90	2.52	4.56	2647.44
	10140.000	420.00	2642.30	23000.00	2648.36	2644.00	2644.00	7.92	2.69	5.56	2649.01
	10210.000	400.00	2644.10	23000.00	2649.53	2649.00	2645.30	10.29	.85	5.14	2650.67
	10280.000	390.00	2646.00	23000.00	2651.82	2648.00	2648.00	8.03	2.28	2.18	2652.69
	10360.000	420.00	2647.80	23000.00	2653.73	2648.00	2648.50	8.98	3.17	4.29	2654.48
	10420.000	320.00	2650.40	23000.00	2655.36	2652.00	2650.40	9.19	2.55	4.85	2656.26
	10500.000	430.00	2652.00	23000.00	2657.94	2653.00	2656.00	8.89	3.77	1.71	2658.85
*	10580.000	415.00	2653.50	23000.00	2659.97	2656.00	2653.50	6.86	1.73	3.00	2660.34

	SECND	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
	10640.000	320.00	2655.00	23000.00	2660.83	2656.00	2655.00	6.94	2.69	3.13	2661.18
	10700.000	330.00	2655.90	23000.00	2661.72	2656.00	2656.00	6.75	2.60	3.16	2662.11
*	10780.000	425.00	2658.00	23000.00	2663.10	2660.00	2658.00	10.11	3.86	4.51	2663.88
	10860.000	420.00	2660.00	23000.00	2665.77	2660.00	2660.00	9.64	3.80	3.82	2666.20
	10940.000	430.00	2662.00	23000.00	2667.48	2662.00	2662.00	8.08	3.02	2.95	2667.99
	11020.000	425.00	2664.00	23000.00	2669.17	2664.00	2664.00	9.16	3.83	3.23	2669.84
	11100.000	420.00	2667.30	23000.00	2671.83	2668.00	2668.00	5.41	2.30	2.59	2671.42
	11160.000	315.00	2667.00	23000.00	2671.98	2668.00	2668.30	7.86	3.66	3.03	2672.66
*	11240.000	425.00	2670.00	23000.00	2674.51	2672.00	2672.00	10.93	4.21	3.63	2675.72
*	11320.000	425.00	2671.50	23000.00	2677.59	2672.00	2676.00	7.22	3.74	1.10	2678.82
	11400.000	435.00	2674.00	23000.00	2679.11	2676.00	2676.00	7.31	3.28	2.25	2679.78
	11480.000	425.00	2675.50	23000.00	2681.14	2676.00	2676.00	7.30	4.05	2.62	2681.69
	11560.000	420.00	2676.50	23000.00	2683.32	2680.00	2680.00	7.30	2.51	2.52	2684.11
	11640.000	420.00	2678.60	23000.00	2686.32	2684.00	2680.00	7.86	3.96	3.52	2687.07
	11700.000	315.00	2680.00	23000.00	2688.02	2684.00	2684.00	9.25	3.80	3.25	2688.93
	11760.000	315.00	2682.50	23000.00	2689.18	2684.00	2684.00	12.09	4.06	3.80	2690.69
	11840.000	420.00	2685.50	23000.00	2692.13	2688.00	2688.00	9.97	3.77	4.00	2692.92
	11900.000	330.00	2686.00	23000.00	2693.66	2688.00	2686.00	12.54	4.43	5.07	2694.93
*	11960.000	320.00	2687.50	23000.00	2695.88	2687.50	2688.10	9.09	3.31	2.87	2696.41
	12020.000	310.00	2689.00	23000.00	2696.84	2692.00	2689.00	10.21	3.47	3.76	2697.45
	12100.000	430.00	2690.60	23000.00	2698.31	2690.60	2690.60	11.09	4.33	4.39	2699.33
	12180.000	200.00	2692.20	23000.00	2699.18	2692.20	2692.20	14.02	5.87	5.47	2700.66
*	12250.000	370.00	2692.70	23000.00	2702.94	2692.70	2692.70	14.23	4.46	3.80	2704.61
	12300.000	270.00	2692.70	23000.00	2705.10	2692.70	2696.00	9.38	3.80	3.57	2705.88
	12380.000	425.00	2694.60	23000.00	2706.08	2696.00	2700.00	9.14	3.24	3.24	2706.95
*	12460.000	425.00	2698.00	23000.00	2709.86	2698.00	2698.00	15.46	3.92	4.76	2711.15

	SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
*	12540.000	410.00	2701.00	23000.00	2713.56	2701.00	2701.00	16.76	4.63	6.60	2715.79
*	12620.000	425.00	2703.00	19000.00	2716.54	2703.00	2708.00	7.63	3.07	3.50	2716.85
	12700.000	425.00	2700.00	16000.00	2716.93	2707.00	2707.00	5.71	2.64	1.69	2717.20
*	12780.000	435.00	2707.50	16000.00	2717.10	2712.00	2707.50	16.90	3.68	7.02	2720.75
	12840.000	335.00	2709.00	16000.00	2720.84	2709.00	2709.00	16.25	6.62	6.57	2722.96
	12900.000	340.00	2711.90	16000.00	2722.91	2712.00	2712.00	20.67	8.44	8.40	2725.19
*	12980.000	425.00	2720.00	16000.00	2728.89	2720.00	2720.00	18.91	7.50	7.14	2731.22
*	13060.000	430.00	2722.00	16000.00	2735.02	2722.00	2722.00	18.14	5.33	5.96	2737.91
*	13140.000	420.00	2731.00	16000.00	2742.18	2732.00	2732.00	18.81	6.67	6.66	2744.68
*	13280.000	313.00	2738.00	16000.00	2747.55	2740.00	2744.00	17.20	7.36	6.03	2749.68
*	13280.000	425.00	2744.00	16000.00	2753.94	2752.00	2748.00	16.28	2.53	7.16	2756.10
	13360.000	415.00	2752.00	16000.00	2759.57	2756.00	2756.00	13.99	3.43	7.29	2760.75
*	13440.000	430.00	2757.00	16000.00	2765.98	2764.00	2757.00	17.31	2.69	8.47	2768.54
*	13520.000	420.00	2758.00	16000.00	2770.59	2760.00	2760.00	20.74	6.53	8.00	2773.69
*	13600.000	420.00	2760.00	16000.00	2776.74	2764.00	2760.00	22.35	6.81	8.64	2780.56

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 5800.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 5800.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 6040.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 6710.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 6800.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 6800.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 6880.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 6960.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 6960.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 7200.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 7680.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 7770.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 7770.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 7840.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 7840.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 7890.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 7935.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 7935.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 7950.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 7950.000 PROFILE= 1 WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO= 7950.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 8160.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 8400.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 8400.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 8540.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 8540.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 8600.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 8600.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 8780.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 8780.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 9140.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 9340.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

CAUTION SECNO= 9340.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 9660.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 9740.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 9800.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 9800.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 10560.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 10780.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 11240.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 11240.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 11320.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 11960.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 12250.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12250.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 12460.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12460.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 12540.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12540.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 12620.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 12780.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12780.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 12980.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12980.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 13060.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13060.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 13140.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13140.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 13200.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13200.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 13280.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13280.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

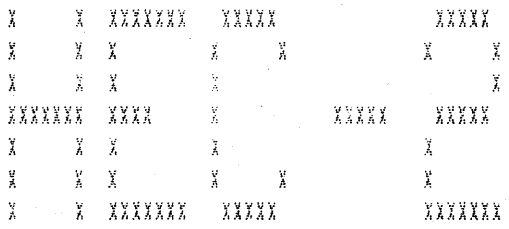
CAUTION SECNO= 13440.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13440.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 13520.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13520.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 13600.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13600.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

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**********************************************
*  HEC-2 WATER SURFACE PROFILES              *
*                                            *
*  Version   4.6.2;  May 1991                *
*                                            *
*  RUN DATE    09DEC92     TIME    09:30:33  *
**********************************************
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**********************************
*  U.S. ARMY CORPS OF ENGINEERS  *
*  HYDROLOGIC ENGINEERING CENTER *
*  609 SECOND STREET, SUITE D    *
*  DAVIS, CALIFORNIA 95616-4687  *
*         (916) 756-1104         *
**********************************
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THIS RUN EXECUTED 09DEC92 09:30:33

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**************************************
 HEC-2 WATER SURFACE PROFILES

 Version  4.6.2;  May 1991
**************************************


T1      FILENAME: H2_EXIST.DAT (OLD 304)PROJ.DAT)
T2      TANQUE VERDE CREEK MODEL        WITH 8K FLOW ON ACW
T2      COMBINED HEC2 RUNS, EXIST. CONDITION - REACH 1 THRU REACH 4
T2      REACH 1 (MILE 5.898 TO MILE 7.468)
T3      TANQUE VERDE CREEK

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC    HVINS     Q         WSEL      FQ

       0        2                          .004                                2555.6

J2  NPROF     IPLOT    PRFVS    XSECV    ASECH    FN        ALLDC     IBW       CHNIM     ITRACE

       1               -1                                                              0


J3  VARIABLE CODES FOR SUMMARY PRINTOUT

      36        39        42        43         1        23        24        26        55        56
       3

J5  LPRNT    NUMSEC                  *********REQUESTED SECTION NUMBERS*********

    -10       -10

NC      .06       .06       .03       .1        .3
QT         1     23000
NH         4       .06      1010      .085      1235       .03      1470       .06      2790
X1         1        25      1235      1470
GR    2556.0       580    2554.0       600    2554.0       610    2556.0       630    2554.0       660
GR    2552.0      1010    2552.0      1110    2550.0      1165    2550.2      1200    2550.0      1235
GR    2548.7      1240    2548.7      1460    2550.0      1470    2554.0      1480    2554.0      1730
GR    2552.0      1900    2552.0      1930    2554.0      1970    2552.0      2020    2552.0      2160
GR    2554.0      2200    2552.0      2220    2552.0      2420    2556.0      2720    2560.0      2790

NH         4      .060      1300      .085      1615       .03      1895       .06      2215
X1       101        10      1615      1695       650      1050       650
GR      2562      1000      2558      1165      2556      1300      2554      1615      2552      1635
GR      2552      1710      2554      1895      2556      1960      2558      2150    2558.9      2215

NH         4      .060      1220      .085      1390       .03      1580       .06      2480
X1       102        13      1390      1580      1100       800       950
GR      2568      1000      2566      1080      2564      1150      2562      1220      2560      1315
GR      2558      1370      2556      1390      2556      1530      2558      1580    2558.5      1780
GR      2560      2040      2562      2260    2563.2      2480
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NH	5	.060	1205	.085	1440	.03	1630	.045	2320	.06
NH	2570									
X1	103	15	1440	1650	600	550	575			
GR	2568	1000	2566	1080	2564	1205	2562	1370	2560	1440
GR	2558	1490	2558	1630	2560	1650	2562	1670	2562	1720
GR	2560	1840	2562	2120	2563	2320	2564	2470	2564.6	2570
NH	7	.060	370	.085	560	.03	750	.045	1200	.06
NH	1400	.085	1520	.06	1740					
X1	104	16	560	750	780	760	770			
GR	2582	0	2570	370	2566	400	2564	560	2562	575
GR	2562	620	2560	670	2560	740	2564	750	2565	800
GR	2564	900	2564	980	2564	1200	2563	1400	2566	1520
GR	2567.2	1740								
NH	5	.060	340	.085	460	.03	640	.06	1100	.085
NH	1570									
X1	105	12	460	640	530	400	500			
GR	2580.0	0	2572.0	275	2570.0	340	2568.0	460	2566.0	485
GR	2564.0	500	2563.0	540	2564.0	600	2566.0	640	2567.3	760
GR	2566.0	1100	2567.9	1570						
NH	5	.06	320	.085	510	.03	720	.06	1170	.085
NH	1590									
X1	106	16	510	720	450	390	430			
GR	2582	0	2574	250	2572	320	2570	390	2568	510
GR	2564.4	550	2565.2	700	2568	720	2570	850	2570.2	930
GR	2570	990	2568	1170	2568	1320	2570	1480	2570.2	1570
GR	2570.3	1590								
NH	0	.085	220	.06	380	.085	690	.03	865	.06
NH	1425	.085	1550							
X1	107	15	690	865	530	430	500			
GR	2580.0	0	2574.0	220	2570.0	380	2571.0	620	2570.0	690
GR	2568.0	700	2566.0	720	2566.5	790	2566.5	840	2568.0	850
GR	2570.0	865	2571.5	1045	2570.0	1170	2570.0	1425	2570.7	1550

HOUGHTON ROAD X-SECTION

NC	.085	.060	.030	.3	.5					
X1	100	11	1030	1130	450	450	450			
GR	2575.0	600	2574.5	640	2574.0	860	2572.0	1030	2571.0	1040
GR	2570.0	1045	2570.0	1100	2571.0	1110	2572.0	1130	2573.0	1430
GR	2573.7	1700								
X1	100.1	52	1030	1130	5	5	5			
BT	-6	600	2582.5	2577.1	1030	2585.6	2580.2	1090	2586	2580.6
BT		1100	2586.2	2580.8	1275	2586	2580.6	1700	2584	2578.6
GR	2575.0	600	2574.5	640	2574.4	698	2577.9	698	2577.9	702
GR	2574.4	702	2574.1	798	2578.6	798	2578.6	802	2574.1	802
GR	2574.0	860	2573.5	898	2579.4	898	2579.4	902	2573.5	902
GR	2572.4	993	2580.2	998	2580.2	1002	2572.4	1002	2572.0	1030
GR	2571.0	1040	2570.0	1045	2570.0	1098	2580.0	1098	2580.6	1102
GR	2570.0	1102	2571.0	1110	2572.0	1130	2572.1	1150	2572.2	1198

GR	2580.8	1190	2580.0	1202	2572.2	1202	2572.5	1275	2572.6	1296
GR	2580.4	1298	2580.4	1302	2572.6	1302	2572.9	1398	2580.1	1398
GR	2580.1	1402	2572.9	1402	2573.0	1430	2573.2	1498	2579.6	1498
GR	2579.6	1502	2573.2	1502	2573.5	1598	2579.2	1598	2579.2	1602
GR	2573.5	1602	2573.7	1700						
XI	100.2				40	40	40			
X2							1			
XI	100.3	11	1030	1130	5	5	5			
GR	2575.0	600	2574.5	640	2574.0	860	2572.0	1030	2571.0	1040
GR	2570.0	1045	2570.0	1100	2571.0	1110	2572.0	1130	2573.0	1430
GR	2573.7	1700								
NC				.1	.3					
NH	8	.06	290	.085	1035	.03	1230	.06	1480	.085
NH	1815	.06	2040	.085	2810	.06	3200			
XI	109	18	1035	1230	390	450	410			
X3						1300				
GR	2688.0	0	2682.0	290	2575.3	290	2574.0	340	2574.0	560
GR	2576.0	1035	2574.0	1060	2572.2	1080	2572.0	1165	2572.0	1220
GR	2574.0	1230	2575.0	1350	2575.0	1400	2575.0	1815	2576.0	2040
GR	2578.0	2540	2578.0	2810	2580.0	3200				
NH	10	.06	320	.085	910	.03	1100	.06	1350	.035
NH	1460	.06	1710	.085	2200	.06	2570	.085	3100	.06
NH	3400									
XI	110	25	910	1100	630	600	730			
X3						2360				
GR	2578	200	2576	320	2575.8	350	2576	510	2576	740
GR	2578.8	910	2574	950	2574	1040	2574.2	1080	2576.5	1100
GR	2575.8	1220	2576.0	1300	2576	1350	2574	1390	2574	1450
GR	2577	1460	2577.6	1600	2577.9	1710	2577	2000	2577.5	2200
GR	2578	2420	2579	2570	2580	2800	2581	3100	2582.8	3400
NH	7	.085	920	.03	1140	.06	1545	.085	2370	.06
NH	2530	.085	2950	.06	3260					
XI	111	19	920	1140	850	410	530			
X3						2340				
GR	2590.0	0	2580.0	280	2580.0	920	2576.0	940	2576.0	1050
GR	2578.0	1070	2579.0	1140	2580.0	1345	2578	1470	2578	1495
GR	2580	1545	2579.0	1885	2580.0	2110	2580	2370	2580.0	2430
GR	2581	2530	2582.0	2640	2583.0	2950	2584.0	3260		
NH	7	.085	1250	.035	1330	.06	1380	.03	1520	.085
NH	2200	.06	2550	.085	3280					
XI	112	28	1380	1520	480	470	590			
X3						2550				
GR	2594	0	2584	220	2582	300	2580	580	2580	720
GR	2582	820	2582.5	930	2582	980	2580.8	1100	2582	1170
GR	2581	1250	2579	1270	2579	1320	2580	1330	2580	1380
GR	2578	1400	2578.5	1500	2581	1520	2582	1570	2583	1670
GR	2582	1780	2581.8	1900	2582	2200	2581.8	2280	2582	2340
GR	2583	2550	2584	2760	2586.0	3280				

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NH      8       .06     520     .085    1265    .035    1340    .06     1490    .03
NH      1600    .085    2240    .06     2520    .085    3470
X1      113     21      1490    1600    440     510     540
X3                                              2320
GR      2586    0       2584    50      2582    150     2582    220     2582.3  520
GR      2582    940     2582    970     2584    1160    2584    1265    2581.5  1280
GR      2581.5  1330    2583    1340    2584    1490    2580    1510    2580.2  1580
GR      2583.3  1600    2583.5  1790    2584    2240    2586    2520    2588    3050
GR      2590    3470

NH      6       .06     2250    .085    2390    .03     2500    .085    3200    .06
NH      3550    .085    4410
X1      114     20      2390    2500    440     510     520
X3                                              2440
GR      2590    900     2584    1070    2584.2  1270    2583.8  1410    2584.3  1540
GR      2584    1600    2585.2  2050    2586    2250    2586.4  2310    2586    2340
GR      2586    2390    2582    2415    2582    2470    2584    3500    2586    2810
GR      2587.5  3000    2587.7  3200    2588    3550    2590    4000    2592    4410
        I **** FINAL RUN FOR REVISED MODEL WITH DIP CROSSING ****
        I **** DATA USED FOR JANUARY 31, 1991 MEMO TO COUNTY ATTY ****
        I FILENAME TVLR26.HZI:  THIS FILE SAME AS TVLR24.HZI EXCEPT:
        ***** REACH #2 *****

NC      .060    .085    .027    .1      .3
X1      1       16      700     800     1056    1056    1056    0       0       0
X3                                              800     2590
GR      2594    0       2590    155     2590    700     2585.5  730     2585.5  800
GR      2588    830     2590    880     2590    990     2588    1010    2586    1030
GR      2588    1040    2590    1080    2590    1140    2590    1900    2592    2110
GR      2593.2  2400

X1      2       19      700     840     180     184     180     0       0       0
X3                                              910     2592
GR      2594    0       2592    60      2592    700     2586.4  730     2586.4  810
GR      2590    840     2592    910     2592    960     2590    1090    2588.4  1130
GR      2590    1170    2592    1240    2591.5  1540    2592    1720    2592    1910
GR      2590    1930    2590    1980    2592    2120    2594    2300

X1      3       15      830     1000    360     525     517     0       0       0
X3                                              1100    2594
GR      2600    0       2594    270     2592    830     2589    840     2589    910
GR      2592    1000    2594    1100    2590    1370    2589    1400    2590    1420
GR      2594    2000    2594    2240    2592    2520    2594    2840    2596    3000

X1      4       20      790     930     500     381     484     0       0       0
X3                                              930     2598
GR      2610    0       2600    330     2596    460     2594    790     2590.4  810
GR      2590.4  900     2598    930     2596    950     2594    1180    2592    1200
GR      2591    1215    2592    1235    2594    1250    2596    1530    2594    1630
GR      2592.5  1660    2594    1690    2594    2940    2596    3200    2598    3470
        TANQUE VERDE LOOP ROAD
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X1	5	28	737	878	200	250	200	0	0	0
X3				737	2598	878	2596.4			
GR	2609	0	2600	250	2598	340	2596	490	2596	620
GR	2598	670	2599	730	2591	737	2590.9	766	2590.8	795
GR	2590.8	823	2591	841	2591.2	865	2591.5	870	2599	895
GR	2598	920	2596	1190	2594	1225	2592	1245	2592	1265
GR	2594	1270	2596	1290	2597	1330	2596	1530	2596	1630
GR	2596	2210	2598	2445	2600	2635				
X1	6	18	670	830	319	64	234	0	0	0
X3						850	2601			
GR	2610	0	2606	65	2606	160	2602	250	2600	340
GR	2598	670	2591.4	710	2591.4	790	2594	830	2601	850
GR	2598	890	2596	990	2594	1230	2594	1260	2596	1290
GR	2596	1600	2598	1920	2600	3420				

***** REACH #3 *****
DATA TAKEN FROM HEC-2 RUN BY PIMA COUNTY FLOODPLAIN
TANQUE VERDE CREEK IN FRONT OF 49ERS' COUNTRY CLUB

NC				.1	.3					
NH	3	.056	9925.	.03	10082.	.056	12493.			
X1	20.195	66.	9925.	10082.	675	675	675			
GR	2620.0	8948.0	2619.0	8962.0	2618.0	8974.0	2617.0	8993.0	2616.0	9024.0
GR	2615.0	9058.0	2614.0	9089.0	2613.0	9131.0	2612.0	9171.0	2611.0	9231.0
GR	2610.0	9296.0	2609.0	9323.0	2608.0	9360.0	2607.0	9413.0	2606.0	9475.0
GR	2605.0	9518.0	2604.0	9574.0	2603.0	9617.0	2602.0	9663.0	2601.0	9704.0
GR	2600.0	9776.0	2599.0	9845.0	2598.0	9925.0	2597.0	9945.0	2596.0	9960.0
GR	2595.0	9963.0	2594.0	9964.0	2593.0	10001.0	2594.0	10038.0	2595.0	10040.0
GR	2596.0	10050.0	2597.0	10063.0	2598.0	10072.0	2599.0	10074.0	2600.0	10078.0
GR	2601.0	10079.0	2602.0	10082.0	2602.0	10094.0	2601.0	10196.0	2600.0	10259.0
GR	2599.0	10307.0	2598.0	10358.0	2597.0	10365.0	2596.0	10372.0	2596.0	10440.0
GR	2597.0	10456.0	2598.0	10472.0	2599.0	10493.0	2600.0	10513.0	2600.0	10607.0
GR	2600.0	11065.0	2601.0	11224.0	2602.0	11349.0	2601.0	11515.0	2602.0	11654.0
GR	2602.0	11718.0	2601.0	11852.0	2602.0	11948.0	2603.0	12113.0	2604.0	12216.0
GR	2605.0	12273.0	2606.0	12315.0	2607.0	12354.0	2608.0	12400.0	2609.0	12444.0
GR	2610.0	12493.0	.0	.0	.0	.0	.0	.0	.0	.0
NH	3	.056	9837.	.03	10155.	.056	12577.			
X1	20.361	61.	9837.	10121.	835.	855.	850.			
GR	2620.0	9285.0	2619.0	9252.0	2618.0	9300.0	2617.0	9338.0	2616.0	9376.0
GR	2615.0	9407.0	2614.0	9441.0	2613.0	9488.0	2612.0	9550.0	2611.0	9593.0
GR	2610.0	9637.0	2609.0	9684.0	2608.0	9731.0	2607.0	9764.0	2606.0	9791.0
GR	2605.0	9811.0	2604.0	9823.0	2603.0	9830.0	2602.0	9837.0	2601.0	9875.0
GR	2600.0	9911.0	2600.0	9974.0	2601.0	9974.0	2602.0	9979.0	2602.0	9994.0
GR	2601.0	9998.0	2600.0	10004.0	2599.0	10010.0	2598.0	10014.0	2597.0	10020.0
GR	2596.0	10025.0	2595.	10030.0	2595.	10038.0	2595.0	10045.0	2596.0	10050.0
GR	2597.0	10052.0	2598.0	10055.0	2599.0	10056.0	2600.0	10061.0	2601.0	10071.0
GR	2602.0	10082.0	2603.0	10089.0	2604.0	10094.0	2605.0	10097.0	2606.0	10099.0
GR	2606.0	10121.0	2605.0	10136.0	2604.0	10155.0	2604.0	10387.0	2603.0	10420.0
GR	2602.0	10465.0	2602.0	10771.0	2603.0	10798.0	2604.0	10825.0	2605.0	11455.0
GR	2606.0	11627.0	2606.0	11948.0	2607.0	12226.0	2608.0	12462.0	2609.0	12513.0
GR	2610.0	12577.0	.0	.0	.0	.0	.0	.0	.0	.0

NH	3	.056	9939.	.03	10111.	.056	12440.			
XI	20.442	60.	9910.	10069.	500.	390.	410.			
GR	2620.0	9401.0	2619.0	9408.0	2618.0	9416.0	2617.0	9440.0	2616.0	9470.0
GR	2617.0	9491.0	2618.0	9498.0	2618.0	9520.0	2617.0	9524.0	2616.0	9529.0
GR	2615.0	9542.0	2614.0	9553.0	2613.0	9585.0	2612.0	9609.0	2612.0	9700.0
GR	2611.0	9755.0	2610.0	9823.0	2609.0	9854.0	2608.0	9891.0	2607.0	9901.0
GR	2606.0	9910.0	2605.0	9917.0	2604.0	9925.0	2603.0	9932.0	2602.0	9939.0
GR	2601.0	9947.0	2600.0	9955.0	2599.0	9962.0	2598.0	9968.0	2598.0	10037.0
GR	2599.0	10041.0	2600.0	10046.0	2601.0	10049.0	2602.0	10052.0	2603.0	10055.0
GR	2604.0	10060.0	2605.0	10063.0	2606.0	10069.0	2606.0	10111.0	2606.0	10210.0
GR	2605.0	10284.0	2604.0	10372.0	2604.0	10418.0	2605.0	10511.0	2606.0	10612.0
GR	2606.0	10656.0	2605.0	10698.0	2604.0	10713.0	2603.0	10723.0	2602.0	10740.0
GR	2602.0	10801.0	2603.0	10808.0	2604.0	10815.0	2605.0	10821.0	2606.0	10827.0
GR	2606.0	11382.0	2607.0	12109.0	2608.0	12324.0	2609.0	12368.0	2610.0	12440.0
NH	3	.056	9900.	.03	10102.	.056	12129.			
XI	20.520	49.	9836.	10102.	420.	470.	450.			
GR	2620.0	8998.0	2619.0	9050.0	2618.0	9106.0	2617.0	9175.0	2616.0	9255.0
GR	2615.0	9323.0	2614.0	9389.0	2613.0	9424.0	2613.0	9517.0	2612.0	9558.0
GR	2611.0	9596.0	2610.0	9645.0	2609.0	9660.0	2608.0	9676.0	2607.0	9749.0
GR	2606.0	9836.0	2605.0	9867.0	2604.0	9900.0	2603.0	9997.0	2604.0	10085.0
GR	2605.0	10089.0	2606.0	10093.0	2607.0	10095.0	2608.0	10096.0	2609.0	10099.0
GR	2610.0	10102.0	2610.0	10205.0	2609.0	10209.0	2608.0	10212.0	2608.0	10310.0
GR	2607.0	10422.0	2606.0	10555.0	2605.0	10561.0	2604.0	10567.0	2603.0	10573.0
GR	2602.0	10581.0	2602.0	10633.0	2603.0	10643.0	2604.0	10651.0	2605.0	10693.0
GR	2606.0	10744.0	2607.0	10872.0	2608.0	10985.0	2608.0	11039.0	2607.0	11155.0
GR	2608.0	11473.0	2608.0	11966.0	2609.0	12035.0	2610.0	12129.0	.0	.0
NH	3	.056	9905.	.03	10098.	.056	11230.			
XI	20.604	40.	9905.	10106.	415.	440.	470.			
GR	2620.0	8917.0	2619.0	8953.0	2618.0	8996.0	2617.0	9044.0	2616.0	9081.0
GR	2615.0	9115.0	2614.0	9148.0	2613.0	9205.0	2612.0	9254.0	2611.0	9328.0
GR	2610.0	9428.0	2609.0	9495.0	2608.0	9561.0	2607.0	9653.0	2608.0	9868.0
GR	2608.0	9905.0	2607.0	9912.0	2606.0	9916.0	2606.0	10090.0	2607.0	10091.0
GR	2608.0	10098.0	2609.0	10108.0	2610.0	10305.0	2610.0	10324.0	2609.0	10331.0
GR	2608.0	10334.0	2607.0	10337.0	2606.0	10340.0	2605.0	10347.0	2604.0	10353.0
GR	2604.0	10400.0	2605.0	10422.0	2606.0	10458.0	2607.0	10549.0	2608.0	10643.0
GR	2608.0	11025.0	2609.0	11083.0	2610.0	11129.0	2610.0	11180.0	2612.	11230.
NH	3	.056	9914.	.03	10102.	.056	11840.			
XI	20.660	41.	9914.	10112.	275.	320.	300.			
GR	2620.0	9011.0	2619.0	9048.0	2618.0	9068.0	2617.0	9078.0	2616.0	9088.0
GR	2615.0	9110.0	2614.0	9132.0	2613.0	9152.0	2612.0	9180.0	2611.0	9322.0
GR	2610.0	9459.0	2609.0	9485.0	2608.0	9507.0	2608.0	9732.0	2609.0	9818.0
GR	2610.0	9893.0	2610.0	9914.0	2609.0	9920.0	2608.0	9924.0	2607.0	9934.0
GR	2606.0	9944.0	2606.0	10091.0	2607.0	10097.0	2608.0	10102.0	2609.0	10107.0
GR	2610.0	10112.0	2610.5	10190.	2611.0	10233.0	2610.0	10441.0	2609.0	10474.0
GR	2608.0	10497.	2607.0	10653.0	2608.0	10788.0	2609.0	10816.0	2610.0	10847.0
GR	2611.0	10921.	2612.0	11401.0	2613.0	11536.0	2614.0	11677.0	2615.0	11771.0
GR	2616.0	11840.	0							

NH	3	.056	9923.	.03	10149.	.056	11736.			
X1	20.722	53.	9923.	10099.	300.	350.	320.			
GR	2630.0	8472.0	2629.0	8528.0	2628.0	8559.0	2627.0	8586.0	2626.0	8617.0
GR	2625.0	8647.0	2624.0	8691.0	2623.0	8738.0	2622.0	8785.0	2621.0	8802.0
GR	2620.0	8823.0	2619.0	8849.0	2618.0	8888.0	2617.0	8951.0	2616.0	9008.0
GR	2615.0	9074.0	2614.0	9140.0	2613.0	9209.0	2612.0	9266.0	2611.0	9421.0
GR	2610.0	9440.0	2609.0	9456.0	2609.0	9573.0	2610.0	9806.0	2612.0	9923.0
GR	2609.0	9926.0	2608.0	9930.0	2607.0	9985.0	2607.0	10092.0	2608.0	10095.0
GR	2609.0	10099.0	2609.0	10149.0	2610.0	10160.0	2611.0	10168.0	2611.	10175.
GR	2612.0	10206.	2612.0	10304.0	2612.0	10405.0	2611.0	10454.0	2610.0	10531.0
GR	2609.0	10546.	2609.0	10650.0	2608.0	10712.0	2608.0	10735.0	2609.0	10744.0
GR	2610.0	10753.	2611.0	10778.0	2612.0	10817.0	2613.0	10896.0	2613.0	11282.0
GR	2614.0	11456.	2615.	11706.	2616.	11736.				
NH	4	.056	9895.	.03	10080.	.056	10651.	.10	11702.	
X1	20.780	57.	9895.	10080.	295.	330.	315.			
GR	2630.0	8477.0	2629.0	8527.0	2628.0	8597.0	2627.0	8606.0	2626.0	8630.0
GR	2625.0	8687.0	2624.0	8737.0	2623.0	8779.0	2622.0	8800.0	2621.0	8835.0
GR	2620.0	8863.0	2619.0	8904.0	2618.0	8937.0	2617.0	8953.0	2616.0	8960.0
GR	2615.0	9089.0	2614.0	9382.0	2613.0	9519.0	2612.0	9524.0	2611.0	9529.0
GR	2611.0	9690.0	2612.0	9845.0	2612.0	9895.0	2611.0	9899.0	2610.0	9903.0
GR	2609.0	9907.0	2608.0	10045.0	2608.0	10074.0	2607.0	10076.0	2610.0	10078.0
GR	2611.0	10080.0	2611.0	10145.0	2611.	10150.	2610.0	10181.0	2610.0	10245.0
GR	2611.0	10254.	2612.0	10267.0	2613.0	10334.0	2614.0	10396.0	2614.0	10426.0
GR	2613.0	10503.	2613.0	10631.0	2612.0	10651.0	2611.0	10660.0	2611.0	10753.0
GR	2610.0	10770.	2609.0	10786.0	2609.0	10823.0	2610.0	10834.0	2611.0	10853.0
GR	2612.0	10866.	2613.0	10877.0	2614.0	10992.0	2614.	11182.	2615.	11602.
GR	2616.	11677.	2617.	11702.						
NH	5	.056	9912.	.03	10088.	.05	10230.	.035	10346.	.150
NH	11604.									
X1	20.840	58.	9912.	10141.	310.	325.	315.			
GR	2630.0	8524.0	2629.0	8572.0	2628.0	8626.0	2627.0	8672.0	2626.0	8715.0
GR	2625.0	8746.0	2624.0	8855.0	2623.0	8882.0	2622.0	8891.0	2622.0	8920.0
GR	2621.0	8934.0	2620.0	8976.0	2619.0	8993.0	2618.0	9005.0	2617.0	9025.0
GR	2616.0	9233.0	2616.0	9338.0	2615.0	9544.0	2614.0	9549.0	2613.0	9555.0
GR	2612.0	9561.0	2612.0	9776.0	2613.0	9865.0	2613.0	9912.0	2612.0	9915.0
GR	2611.0	9917.0	2610.0	9918.0	2609.0	10015.0	2609.0	10043.0	2610.0	10083.0
GR	2611.0	10088.0	2612.0	10141.0	2612.	10155.	2612.0	10172.0	2611.0	10230.0
GR	2611.0	10286.	2612.0	10314.0	2613.0	10346.0	2613.0	10431.0	2614.0	10446.0
GR	2615.0	10468.	2616.0	10507.0	2616.0	10778.0	2615.0	10796.0	2614.0	10809.0
GR	2613.0	10843.	2612.0	10853.0	2611.0	10860.0	2611.0	10901.0	2612.0	10906.0
GR	2613.0	10912.	2613.0	10984.0	2614.0	10997.0	2615.0	11014.0	2616.	11334.
GR	2616.	11414.	2617.	11584.	2618.	11604.				
NH	5	.056	9925.	.03	10080	.07	10247.	.05	10503.	.15
NH	11486.									
X1	20.902	59.	9925.	10088.	320.	345.	325.			
GR	2625.0	8856.0	2624.0	8910.0	2623.0	8942.0	2622.0	8978.0	2622.0	9112.0
GR	2621.0	9123.0	2620.0	9138.0	2620.0	9314.0	2621.0	9319.0	2622.0	9326.0
GR	2623.0	9349.0	2623.0	9377.0	2622.0	9388.0	2621.0	9392.0	2620.0	9398.0
GR	2619.0	9404.0	2618.0	9409.0	2618.0	9422.0	2619.0	9430.0	2620.0	9433.0
GR	2621.0	9438.0	2622.0	9443.0	2623.0	9447.0	2623.0	9464.0	2622.0	9467.0

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GR   2621.0    9470.0    2620.0    9475.0    2619.0    9479.0    2618.0    9568.0    2617.0    9604.0
GR   2616.0    9606.0    2615.0    9621.0    2614.0    9696.0    2614.0    9925.0    2613.0    9930.0
GR   2612.0    9934.0    2611.0    9958.0    2611.0   10073.0    2612.0   10070.0    2613.0   10083.0
GR   2614.0   10088.0    2614.     10210.    2614.0   10224.0    2615.0   10233.0    2616.0   10239.0
GR   2617.0   10247.     2617.0   10503.0    2616.0   10641.0    2615.0   10836.0    2614.     10981.
GR   2613.    10991.     2613.    11016.     2614.    11021.     2615.    11026.     2616.     11031.
GR   2617.    11081.     2618.    11176.     2618.    11426.     2619.    11486.

NH      5      .056      9921.       .03     10093.       .07     10176.      .035     10313.       .15
NH   11770.
X1   20.983      40.     9921.    10112.      405.      440.      425.
GR   2625.0    8970.0    2624.0    9060.0    2623.0    9073.0    2622.0    9191.0    2622.0    9214.0
GR   2623.0    9220.0    2623.0    9240.0    2622.0    9256.0    2621.0    9271.0    2620.0    9291.0
GR   2619.0    9652.0    2619.0    9691.0    2618.0    9695.0    2617.0    9700.0    2616.0    9750.0
GR   2616.0    9921.0    2615.0    9925.0    2614.0    9929.0    2613.0    9932.0    2613.0   10081.0
GR   2614.0   10088.0    2615.0   10093.0    2616.0   10097.0    2617.0   10103.0    2618.0   10106.0
GR   2619.0   10112.0    2620.0   10176.0    2621.0   10190.0    2621.     10200.     2621.0   10239.0
GR   2620.0   10250.     2619.0   10313.0    2619.0   10710.0    2618.0   10865.0    2617.0   10899.0
GR   2616.0   10923.     2615.0   10938.0    2615.0   10977.0    2616.0   10988.0    2617.0   11000.0
GR   2618.0   11012.     2619.0   11133.0    2620.0   11400.0    2621.    11440.     2622.     11495.
GR   2623.    11620.     2624.    11690.     2625.    11770.

NH      5      .056      9936.       .03     10100.       .07     10136.      .035     10327.       .15
NH   11434.
X1   21.066      40.     9835.    10198.      415.      460.      440.
GR   2625.0    9118.0    2624.0    9179.0    2623.0    9224.0    2622.0    9380.0    2621.0    9393.0
GR   2620.0    9748.0    2620.0    9835.0    2619.0    9844.0    2618.0    9852.0    2617.0    9907.0
GR   2616.0    9916.0    2615.0    9936.0    2614.0    9974.0    2614.0   10100.0    2615.0   10101.0
GR   2616.0   10103.0    2617.0   10136.0    2618.0   10157.0    2619.0   10180.0    2620.0   10191.0
GR   2621.0   10198.0    2621.     10215.    2621.0   10255.0    2622.0   10281.0    2622.0   10303.0
GR   2621.0   10327.     2621.0   10520.0    2620.0   10933.0    2619.0   10949.0    2618.0   10965.0
GR   2617.0   10985.     2617.0   11014.0    2618.0   11020.0    2619.0   11028.0    2620.0   11039.0
GR   2621.    11061.     2622.    11154.     2623.    11214.     2624.    11379.     2625.    11434.

NH      5      .056      9897.       .03     10096.       .05     10276.      .035     10341.        .1
NH   11373.
X1   21.125      40.     9857.    10096.      305.      325.      315.
GR   2625.0    9305.0    2624.0    9315.0    2623.0    9325.0    2623.0    9334.0    2623.0    9415.0
GR   2622.0    9694.0    2622.0    9782.0    2621.0    9857.0    2620.0    9871.0    2619.0    9889.0
GR   2618.0    9897.0    2617.0    9903.0    2616.0    9907.0    2615.0    9913.0    2615.0    9918.0
GR   2616.0   10077.0    2617.0   10086.0    2618.0   10096.0    2618.     10150.     2618.0   10276.0
GR   2619.0   10296.     2620.0   10311.0    2621.0   10325.0    2622.0   10341.0    2622.0   10503.0
GR   2621.0   10510.     2620.0   10521.0    2620.0   10622.0    2621.0   10640.0    2621.0   10728.0
GR   2622.0   10914.     2622.0   10954.0    2621.0   11054.0    2620.0   11063.0    2620.0   11190.0
GR   2621.0   11200.     2622.0   11208.0    2623.0   11222.0    2624.0   11259.0    2625.0   11373.0

NH      4      .056      9891.       .03     10118.       .05     10360.        .1    11644.
X1   21.207      36.     9891.    10118.      420.      425.      425.
GR   2626.0    9544.     2625.     9554.      2625     9644.     2624.0    9719.0    2623.0    9891.0
GR   2622.0    9893.0    2621.0    9894.0    2620.0    9897.0    2619.0    9898.0    2616.0    9900.0
GR   2617.0    9902.0    2617.0   10016.     2618.0   10082.0    2619.0   10095.0    2620.0   10118.0
GR   2620.    10250.     2620.0   10360.     2619.0   10384.     2619.0   10469.0    2620.0   10486.0
GR   2621.0   10502.     2622.0   10524.     2623.0   10530.     2624.0   10835.0    2623.0   11126.0
GR   2622.0   11145.     2621.0   11157.     2621.0   11197.     2622.0   11202.0    2622.0   11244.0
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GR  2623.0   11260.   2623.0   11463.   2624.0   11517.   2625.0   11579.0  2626.0   11609.
GR  2627.0   11644.      .0       .0       .0       .0

NH       5     .07     9900.     .03    10067.     .03    10297.     .035   10525.     .1
NW  12156.
X1  21.325      54.     9900.   10067.     630.     610.     615.
GR  2640.0   9281.0   2639.0   9238.0   2638.0   9267.0   2637.0   9305.0   2636.0   9377.0
GR  2635.0   9409.0   2634.0   9445.0   2633.0   9490.0   2632.0   9544.0   2631.0   9572.0
GR  2630.0   9595.0   2629.0   9632.0   2628.0   9663.0   2628.0   9790.0   2627.0   9807.0
GR  2626.0   9825.0   2625.0   9843.0   2624.0   9858.0   2623.0   9900.0   2622.0   9985.0
GR  2621.0   9989.0   2620.0   9914.0   2619.0   9917.0   2619.0   9922.0   2620.0   10059.0
GR  2621.0   10061.0  2622.0   10064.0  2623.0   10067.0  2623.0   10200.0   2622.    10290.
GR  2622.0   10297.   2622.0   10525.0  2623.0   10543.0  2624.0   10557.0  2625.0   10571.0
GR  2626.0   10586.   2627.0   11441.0  2627.0   11512.0  2627.0   11512.0  2626.0   11514.0
GR  2625.0   11519.   2624.0   11521.0  2624.0   11532.0  2625.0   11543.0  2626.0   11550.0
GR  2627.0   11624.   2628.0   11698.0  2629.0   11749.0  2630.0   11782.0  2631.0   11845.0
GR  2632.0   11931.   2633.0   12000.0  2634.0   12063.0  2635.0   12156.0     .0       .0

NW       5     .07     9914.     .03    10033.     .07    10207.     .035   10466.     .12
NW  11904.
X1  21.468      47.     9885.   10041.     780.     720.     755.
GR  2640.0   9244.0   2639.0   9279.0   2638.0   9314.0   2637.0   9343.0   2636.0   9377.0
GR  2635.0   9428.0   2634.0   9504.0   2633.0   9579.0   2632.0   9676.0   2631.0   9713.0
GR  2630.0   9763.0   2630.0   9791.0   2629.0   9817.0   2628.0   9833.0   2627.0   9861.0
GR  2626.0   9885.0   2625.0   9893.0   2624.0   9901.0   2623.0   9914.0   2623.0   10033.0
GR  2624.0   10036.0  2625.0   10039.0  2626.0   10041.0  2626.0   10153.0  2625.0   10196.0
GR  2625.0   10207.0  2625.2   10240.   2626.0   10354.0  2627.0   10402.0  2628.0   10415.0
GR  2629.0   10466.   2630.0   10606.0  2630.0   11326.0  2630.0   11381.0  2629.0   11393.0
GR  2628.0   11403.   2628.0   11471.0  2627.0   11478.0  2627.0   11516.0  2628.0   11521.0
GR  2629.0   11525.   2630.0   11571.0  2631.0   11673.0  2632.0   11738.0  2633.0   11798.0
GR  2634.0   11833.   2635.0   11904.0     .0       .0       .0       .0       .0       .0

NW       5     .07     9917.     .03    10041.     .07    10229.     .035   10512.     .15
NW  11737.
X1  21.544      54.     9903.   10051.     400.     390.     390.
GR  2640.0   9239.0   2639.0   9278.0   2638.0   9338.0   2637.0   9371.0   2636.0   9417.0
GR  2635.0   9440.0   2634.0   9445.0   2634.0   9456.0   2635.0   9463.0   2636.0   9472.0
GR  2636.0   9493.0   2635.0   9535.0   2634.0   9681.0   2633.0   9778.0   2632.0   9807.0
GR  2632.0   9868.0   2631.0   9880.0   2630.0   9891.0   2629.0   9896.0   2628.0   9903.0
GR  2627.0   9917.0   2626.0   9920.0   2625.0   9924.0   2624.0   9927.0   2624.0   10032.0
GR  2625.0   10034.0  2626.0   10036.0  2627.0   10041.0  2628.0   10051.0  2628.0   10150.0
GR  2629.0   10175.0  2629.0   10206.0  2628.0   10229.0   2628.    10230.   2628.0   10384.0
GR  2629.0   10413.   2630.0   10442.0  2631.0   10512.0  2631.0   10939.0  2631.0   11248.0
GR  2630.0   11279.   2630.0   11323.0  2629.0   11391.0  2628.0   11413.0  2627.0   11448.0
GR  2627.0   11456.   2628.0   11481.0  2629.0   11494.0  2630.0   11510.0  2631.0   11525.0
GR  2632.0   11585.   2633.0   11627.0  2634.0   11692.0  2635.0   11737.0     .0       .0

NW       5     .07     9970.     .03    10054.     .07    10292.     .035   10605.     .1
NW  11944.
X1  21.628      52.     9970.   10150.     430.     450.     440.
GR  2640.0   9452.0   2639.0   9491.0   2638.0   9542.0   2637.0   9586.0   2636.0   9692.0
GR  2635.0   9761.0   2634.0   9797.0   2633.0   9964.0   2632.0   9970.0   2631.0   9973.0
GR  2630.0   9976.0   2629.0   9978.0   2628.0   9980.0   2627.0   9983.0   2626.0   9984.0
GR  2626.0   10035.0  2627.0   10054.0  2628.0   10058.0  2629.0   10090.0  2630.0   10112.0
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GR	2631.0	10150.0	2631.	10270.	2631.0	10292.0	2631.0	10562.0	2632.0	10573.0
GR	2633.0	10580.	2634.0	10605.0	2634.0	10733.0	2633.0	10750.0	2632.0	10764.0
GR	2632.0	10807.	2633.0	10836.0	2633.0	11168.0	2632.0	11251.0	2632.0	11398.0
GR	2632.0	11410.	2631.0	11416.0	2630.0	11423.0	2629.0	11430.0	2629.0	11462.0
GR	2630.0	11497.	2631.0	11504.0	2632.0	11509.0	2633.0	11515.0	2634.0	11516.0
GR	2634.0	11586.	2635.0	11671.0	2636.0	11727.0	2637.0	11800.0	2638.0	11835.0
GR	2639.0	11896.	2640.0	11944.0	.0	.0	.0	.0	.0	.0
NH	5	.065	9975.	.03	10046.	.07	10307.	.035	10611.	.1
NH	11853.									
XI	21.707	65.	9834.	10090.	420.	405.	410.			
GR	2641.0	9279.	2640.	9314.	2639.0	9345.0	2639.0	9439.0	2638.0	9569.0
GR	2637.0	9598.0	2637.0	9626.0	2636.0	9689.0	2635.0	9716.0	2634.0	9834.0
GR	2633.0	9849.0	2632.0	9861.0	2631.0	9871.0	2630.0	9927.0	2629.0	9971.0
GR	2628.0	9975.0	2628.0	10039.0	2629.0	10043.0	2630.0	10046.0	2631.0	10051.0
GR	2632.0	10071.	2633.0	10090.0	2633.0	10101.0	2632.0	10116.0	2631.0	10132.0
GR	2630.0	10185.	2631.0	10205.0	2632.0	10264.0	2633.0	10275.0	2634.0	10307.0
GR	2634.	10310.	2634.0	10416.	2635.0	10436.0	2636.0	10444.0	2637.0	10453.0
GR	2637.0	10532.	2636.0	10540.	2635.0	10552.0	2635.0	10597.0	2636.0	10611.0
GR	2636.0	10708.	2635.0	10719.	2634.0	10733.0	2634.0	10830.0	2635.0	10853.0
GR	2635.0	10992.	2634.0	11020.	2634.0	11224.0	2633.0	11289.0	2633.0	11324.0
GR	2631.0	11332.	2630.0	11339.	2630.0	11354.0	2631.0	11362.0	2632.0	11366.0
GR	2633.0	11376.	2634.0	11397.	2634.0	11432.0	2635.0	11465.0	2636.0	11509.0
GR	2637.0	11613.	2638.0	11658.	2639.0	11705.0	2640.0	11783.0	2641.	11853.
NH	5	.065	9947.	.03	10050.	.07	10258.	.035	10593.	.15
NH	11770.									
XI	21.790	63.	9922.	10116.	435.	430.	430.			
GR	2642.	8998.	2641.	9028.	2640.	9078.	2639.0	9178.0	2638.0	9287.0
GR	2637.0	9228.0	2636.0	9294.0	2636.0	9857.0	2635.0	9860.0	2634.0	9866.0
GR	2633.0	9872.0	2632.0	9878.0	2632.0	9903.0	2633.0	9907.0	2634.0	9912.0
GR	2634.0	9922.0	2633.0	9930.0	2632.0	9937.0	2631.0	9941.0	2630.0	9947.0
GR	2630.0	10050.	2631.0	10053.	2632.0	10070.0	2633.0	10092.0	2634.0	10101.0
GR	2635.0	10116.	2634.0	10129.	2633.0	10137.0	2633.0	10155.0	2634.0	10161.0
GR	2635.0	10171.	2635.0	10187.	2635.0	10258.0	2635.	10320.	2635.0	10469.0
GR	2636.0	10569.	2637.0	10593.	2638.0	10635.	2638.0	10699.0	2637.0	10711.0
GR	2636.0	10724.	2636.0	11059.	2635.0	11074.	2634.0	11081.0	2634.0	11132.0
GR	2635.0	11272.	2634.0	11319.	2633.0	11324.	2632.0	11328.0	2631.0	11332.0
GR	2630.0	11335.	2630.0	11357.	2631.0	11359.	2632.0	11364.0	2633.0	11367.0
GR	2634.0	11369.	2635.0	11373.	2636.0	11378.	2637.0	11408.0	2638.0	11546.0
GR	2639.0	11621.	2640.0	11695.	2641.0	11770.				
NH	5	.065	9862.	.03	10046.	.05	10160.	.035	10455.	.15
NH	11690.									
XI	21.880	58.	9854.	10055.	520.	440.	470.			
GR	2645.0	8983.0	2644.0	9013.0	2643.0	9045.0	2642.0	9058.0	2641.0	9102.0
GR	2640.0	9126.0	2639.0	9150.0	2638.0	9177.0	2637.0	9330.0	2637.0	9496.0
GR	2638.0	9717.0	2638.0	9765.0	2637.0	9774.0	2636.0	9780.0	2635.0	9787.0
GR	2635.0	9808.0	2636.0	9820.0	2636.0	9854.0	2635.0	9862.0	2634.0	9865.0
GR	2633.0	9870.0	2633.0	9910.0	2632.0	9919.0	2632.0	9942.0	2631.0	10026.0
GR	2632.0	10032.0	2633.0	10036.0	2634.0	10040.0	2635.0	10046.0	2636.0	10055.0
GR	2637.0	10160.0	2638.0	10225.0	2638.0	10355.0	2637.0	10442.0	2638.0	10449.0
GR	2639.0	10455.0	2639.0	10637.0	2638.0	10645.0	2637.0	10661.0	2636.0	11162.0
GR	2635.0	11193.0	2634.0	11198.0	2633.0	11201.0	2632.0	11204.0	2632.0	11232.0

SR	2633.0	11235.0	2634.0	11237.0	2635.0	11241.0	2636.0	11245.0	2637.0	11249.0
SR	2638.0	11278.0	2639.0	11301.0	2640.0	11352.0	2641.0	11487.0	2642.0	11495.0
SR	2643.0	11531.0	2644.0	11627.0	2645.0	11690.0	.0	.0	.0	.0
NH	5	.065	9939.	.03	10092.	.05	10194.	.035	10411.	.15
NH	11587.									
XI	21.925	69.	9939.	10134.	285.	235.	240.			
GR	2645.0	9296.0	2644.0	9335.0	2643.0	9375.0	2642.0	9397.0	2642.0	9424.0
SR	2643.0	9447.0	2643.0	9670.0	2642.0	9692.0	2641.0	9701.0	2640.0	9711.0
GR	2639.0	9721.0	2639.0	9760.0	2640.0	9782.0	2640.0	9786.0	2639.0	9790.0
SR	2638.0	9794.0	2637.0	9797.0	2636.0	9802.0	2636.0	9844.0	2637.0	9855.0
GR	2638.0	9867.0	2638.0	9939.0	2637.0	9942.0	2636.0	9944.0	2635.0	9946.0
SR	2634.0	9949.0	2633.0	9952.0	2633.0	10067.0	2634.0	10072.0	2635.0	10078.0
GR	2636.0	10081.0	2637.0	10092.0	2638.0	10134.0	2638.	10175.	2638.0	10194.0
GR	2639.0	10208.	2639.0	10311.0	2640.0	10411.0	2641.0	10466.0	2641.0	10510.0
GR	2640.0	10555.	2640.0	10592.0	2639.0	10639.0	2639.0	10723.0	2638.0	10930.0
GR	2638.0	11153.	2637.0	11158.0	2636.0	11162.0	2635.0	11166.0	2634.0	11168.0
GR	2633.0	11172.	2632.0	11194.0	2632.0	11197.0	2633.0	11199.0	2634.0	11201.0
GR	2635.0	11203.	2636.0	11205.0	2637.0	11208.0	2638.0	11210.0	2639.0	11214.0
GR	2639.0	11260.	2640.0	11298.0	2640.0	11333.0	2641.0	11384.0	2642.0	11423.0
SR	2642.0	11468.	2643.0	11513.0	2644.0	11561.0	2645.0	11587.0	.0	.0
NH	4	.065	9902.	.03	10085.	.05	10353.	.15	11430.	
XI	21.972	58.	9870.	10133.	235.	250.	245.			
GR	2645.0	9330.0	2644.0	9360.0	2643.0	9387.0	2642.0	9421.0	2641.0	9456.0
SR	2641.0	9700.0	2642.0	9706.0	2642.0	9711.0	2641.0	9722.0	2640.0	9739.0
GR	2639.0	9751.0	2638.0	9759.0	2637.0	9768.0	2637.0	9778.0	2638.0	9787.0
SR	2639.0	9840.0	2639.0	9870.0	2638.0	9892.0	2637.0	9895.0	2636.0	9898.0
GR	2635.0	9902.0	2634.0	9920.0	2634.0	9972.0	2635.0	9984.0	2635.0	10020.0
SR	2635.0	10077.0	2636.0	10080.0	2637.0	10082.0	2638.0	10085.0	2639.0	10133.0
GR	2639.5	10160.	2640.0	10211.0	2641.0	10288.0	2642.0	10353.0	2642.0	10448.0
SR	2641.0	10525.	2640.0	10619.0	2640.0	10878.0	2639.0	10912.0	2639.0	11061.0
SR	2638.0	11072.	2637.0	11075.0	2636.0	11078.0	2635.0	11081.0	2634.0	11091.0
GR	2634.0	11107.	2635.0	11110.0	2636.0	11113.0	2637.0	11116.0	2638.0	11120.0
GR	2639.0	11121.	2640.0	11131.0	2640.0	11231.0	2641.0	11288.0	2642.0	11308.0
SR	2643.0	11388.	2644.0	11405.0	2645.0	11430.0	.0	.0	.0	.0
NH	5	.065	9862.	.03	10141.	.05	10283.	.035	10470.	.07
NH	11432.									
XI	22.047	56.	9778.	10165.	295.	430.	395.			
GR	2645.0	9432.0	2644.0	9487.0	2644.0	9634.0	2643.0	9703.0	2642.0	9778.0
GR	2641.0	9791.0	2640.0	9840.0	2639.0	9854.0	2638.0	9862.0	2637.0	9865.0
GR	2636.0	9868.0	2636.0	9921.0	2637.0	10050.0	2637.0	10066.0	2636.0	10099.0
GR	2636.0	10115.0	2637.0	10121.0	2638.0	10128.0	2639.0	10133.0	2640.0	10138.0
GR	2641.0	10141.0	2642.0	10165.0	2642.	10200.	2642.0	10251.0	2643.0	10283.0
GR	2644.0	10291.	2645.0	10300.0	2645.0	10383.0	2644.0	10389.0	2643.0	10396.0
GR	2643.0	10426.	2643.0	10490.0	2642.0	10698.0	2642.0	10895.0	2641.0	10942.0
SR	2640.0	11062.	2639.0	11071.0	2638.0	11092.0	2637.0	11110.0	2636.0	11133.0
GR	2636.0	11146.	2637.0	11156.0	2638.0	11168.0	2639.0	11185.0	2640.0	11200.0
GR	2641.0	11229.	2641.0	11259.0	2640.0	11268.0	2639.0	11279.0	2639.0	11313.0
GR	2640.0	11316.	2641.0	11319.0	2642.0	11325.0	2643.0	11346.0	2644.0	11390.0
SR	2645.0	11432.	0							

NH	5	.065	9830.	.03	10169.	.05	10592.	.035	11306.	.07
NH	11879.									
X1	22.125	64.	9769.	10183.	330.	490.	410.			
GR	2650.0	9128.0	2649.0	9152.0	2646.0	9200.0	2647.0	9276.0	2646.0	9324.0
GR	2645.0	9418.0	2644.0	9519.0	2645.0	9623.0	2645.0	9696.0	2644.0	9745.0
GR	2643.0	9756.0	2642.0	9769.0	2641.0	9824.0	2640.0	9830.0	2639.0	9835.0
GR	2638.0	9839.0	2638.0	9957.0	2639.0	9960.0	2640.0	9966.0	2641.0	9969.0
GR	2642.0	10008.0	2642.0	10040.0	2641.0	10082.0	2640.0	10091.0	2639.0	10098.0
GR	2638.0	10108.0	2638.0	10158.0	2639.0	10164.0	2640.0	10169.0	2641.0	10176.0
GR	2642.0	10183.0	2642.0	10245.0	2641.0	10255.0	2640.0	10259.0	2639.0	10267.0
GR	2639.0	10276.0	2640.0	10281.0	2641.0	10285.0	2641.0	10327.0	2640.5	10350.
GR	2640.0	10367.	2641.0	10377.0	2642.0	10452.0	2643.0	10470.0	2644.0	10485.0
GR	2645.0	10504.	2645.0	10520.0	2644.0	10536.0	2643.0	10548.0	2643.0	10582.0
GR	2644.0	10592.	2644.0	10871.0	2643.0	10905.0	2643.0	10970.0	2644.0	11003.0
GR	2645.0	11077.	2644.0	11306.0	2644.0	11330.0	2645.0	11562.0	2646.0	11775.0
GR	2647.0	11828.	2648.0	11850.0	2649.0	11859.0	2650.0	11879.0	.0	.0
NH	3	.065	9807.	.036	10192.	.065	11916.			
X1	22.195	66.	9807.	10238.	340.	380.	365.			
GR	2650.0	9345.0	2649.0	9411.0	2648.0	9518.0	2647.0	9605.0	2646.0	9621.0
GR	2645.0	9632.0	2645.0	9701.0	2646.0	9729.0	2647.0	9752.0	2648.0	9776.0
GR	2649.0	9799.0	2649.0	9807.0	2648.0	9809.0	2647.0	9811.0	2646.0	9813.0
GR	2645.0	9815.0	2644.0	9817.0	2643.0	9818.0	2642.0	9819.0	2641.0	9822.0
GR	2640.0	9825.0	2639.0	9841.0	2639.0	9860.0	2640.0	9910.0	2640.0	9937.0
GR	2641.0	9943.0	2642.0	9952.0	2643.0	9958.0	2644.0	9976.0	2644.0	9992.0
GR	2643.0	10008.0	2642.0	10014.0	2641.0	10024.0	2641.0	10184.0	2642.0	10192.0
GR	2643.0	10225.0	2644.0	10233.0	2645.0	10238.0	2644.0	10343.0	2644.0	10397.0
GR	2645.0	10442.0	2646.0	10465.0	2647.0	10474.0	2647.0	10508.0	2646.0	10515.0
GR	2645.0	10522.0	2644.0	10529.0	2643.0	10534.0	2642.0	10541.0	2641.0	10547.0
GR	2641.0	10590.0	2642.0	10593.0	2643.0	10596.0	2644.0	10599.0	2644.	10600.
GR	2645.0	10603.	2646.0	10716.0	2646.0	10820.0	2645.0	10879.0	2645.0	11006.0
GR	2646.0	11091.	2646.0	11452.0	2647.0	11661.0	2648.0	11776.0	2649.0	11834.0
GR	2650.0	11916.	0							
NH	3	.065	9767.	.036	10247.	.065	11950.			
X1	22.275	69.	9767.	10247.	425.	240.	370.			
GR	2652.0	9530.0	2651.0	9565.0	2650.0	9588.0	2649.0	9651.0	2649.0	9728.0
GR	2648.0	9749.0	2647.0	9755.0	2646.0	9761.0	2645.0	9767.0	2644.0	9773.0
GR	2643.0	9778.0	2642.0	9784.0	2641.0	9891.0	2641.0	9901.0	2642.0	9903.0
GR	2643.0	9907.0	2644.0	9910.0	2645.0	9913.0	2645.0	10043.0	2644.0	10057.0
GR	2643.0	10081.0	2642.0	10158.0	2642.0	10194.0	2643.0	10202.0	2643.0	10239.0
GR	2644.0	10243.0	2645.0	10247.0	2645.0	10325.0	2646.0	10338.0	2647.0	10394.0
GR	2648.0	10469.0	2649.0	10474.0	2650.0	10479.0	2651.0	10484.0	2652.0	10487.0
GR	2653.0	10491.0	2654.0	10495.0	2655.0	10499.0	2654.0	10501.0	2653.0	10504.0
GR	2652.0	10507.0	2652.0	10671.0	2653.0	10674.0	2654.0	10677.0	2654.0	10683.0
GR	2653.0	10687.0	2652.0	10691.0	2651.0	10693.0	2650.0	10696.0	2649.0	10735.0
GR	2648.0	10739.0	2647.0	10742.0	2646.0	10745.0	2645.0	10749.0	2644.0	10752.0
GR	2643.0	10755.0	2642.0	10758.0	2642.0	10794.0	2643.0	10796.0	2644.0	10799.0
GR	2645.0	10803.0	2646.0	10809.0	2647.0	10913.0	2647.0	11367.0	2647.0	11665.0
GR	2648.0	11800.0	2648.0	11860.0	2649.0	11900.0	2650.0	11950.0		

WENTWORTH ROAD

NH	3	.065	9754.	.036	10330.	.065	12260.			
XI	22.338	37.	9700.	10390.	400.	230.	395.			
GR	2655.0	9393.0	2654.0	9434.0	2653.0	9586.0	2652.0	9560.0	2651.0	9612.0
GR	2650.0	9640.0	2649.0	9656.0	2648.0	9689.0	2647.0	9700.0	2646.0	9754.0
GR	2645.0	9782.0	2644.0	9809.0	2643.0	9835.0	2643.0	9891.0	2644.0	9916.0
GR	2645.0	9946.0	2646.0	10005.0	2645.	10020.	2644.	10130.	2644.	10230.
GR	2646.	10330.	2647.	10390.	2647.	10690.	2647.	10765.	2647.	10995.
GR	2647.6	11050.	2647.	11110.	2648.	11182.	2648.	11735.	2649.	11850.
GR	2649.	11935.	2650.	12005.	2651.	12040.	2652.	12115.	2653.	12170.
GR	2654.	12230.	2655.	12280.	.0	.0	.0	.0	.0	.0

NH	3	.065	9837.	.036	10304.	.065	11319.			
XI	22.373	35.	9823.	10338.	200.	350.	200.			
GR	2655.	9292.	2654.	9481.	2653.	9590.	2652.	9634.	2651.	9673.
GR	2651.	9787.	2651.	9823.	2650.	9825.	2649.	9826.	2648.	9828.
GR	2647.	9831.	2646.	9834.	2645.	9837.	2644.	9898.	2644.	9954.
GR	2645.	9957.	2646.	9959.	2647.	9961.	2648.	9966.	2648.	10010.
GR	2647.	10051.	2646.	10061.	2646.	10248.	2647.	10304.	2648.	10316.
GR	2649.	10327.	2650.	10338.	2650.	10457.	2651.	10605.	2651.	10719.
GR	2650.	10941.	2649.	11044.	2649.	11139.	2650.	11283.	2651.	11319.

NH	3	.065	9825.	.036	10167.	.065	11651.			
XI	22.454	50.	9770.	10366.	170.	230.	170.			
GR	2660.0	8996.0	2659.0	9102.0	2658.0	9161.0	2658.0	9286.0	2657.0	9219.0
GR	2656.0	9337.0	2655.0	9396.0	2654.0	9555.0	2653.0	9578.0	2652.0	9668.0
GR	2651.0	9770.0	2650.0	9784.0	2649.0	9793.0	2648.0	9885.0	2647.0	9815.0
GR	2646.0	9825.0	2645.0	9850.0	2645.0	9975.0	2646.0	9978.0	2647.0	9979.0
GR	2648.0	9980.0	2648.0	9986.0	2647.0	10020.0	2647.0	10167.0	2648.0	10199.0
GR	2648.0	10336.0	2649.0	10345.0	2650.0	10355.0	2651.0	10366.0	2651.0	10435.0
GR	2652.0	10536.0	2651.0	10655.0	2650.0	10700.0	2650.0	10711.0	2651.0	10723.0
GR	2652.0	10739.0	2653.0	10756.0	2653.0	10912.0	2652.0	10920.0	2651.0	10951.0
GR	2651.0	11126.0	2652.0	11182.0	2653.0	11235.0	2654.0	11310.0	2655.0	11343.0
GR	2656.0	11377.0	2657.0	11448.0	2658.0	11490.0	2659.0	11575.0	2660.0	11651.0

NH	3	.065	9825.	.03	10137.	.065	11239.			
XI	22.511	30.	9790.	10359.	300.	300.	300.			
GR	2660.0	9177.0	2659.0	9290.0	2658.0	9321.0	2657.0	9377.0	2656.0	9456.0
GR	2655.0	9522.0	2654.0	9667.0	2653.0	9723.0	2652.0	9790.0	2651.0	9801.0
GR	2650.0	9818.0	2649.0	9825.0	2648.0	9842.0	2647.0	9917.0	2647.0	10092.0
GR	2648.0	10096.0	2648.0	10137.0	2649.0	10153.0	2650.0	10183.0	2650.0	10481.0
GR	2651.0	10511.0	2652.0	10559.0	2652.0	10754.0	2653.0	10962.0	2654.0	11036.0
GR	2654.0	11064.0	2655.0	11115.0	2656.0	11175.0	2657.0	11205.0	2658.0	11239.0

NH	3	.065	9606.	.036	10239.	.065	11137.			
XI	22.591	55.	9456.	10279.	420.	345.	420.			
GR	2660.0	8946.0	2659.0	9082.0	2658.0	9124.0	2657.0	9215.0	2656.0	9337.0
GR	2656.0	9456.0	2655.0	9470.0	2654.0	9517.0	2653.0	9589.0	2652.0	9594.0
GR	2651.0	9597.0	2650.0	9601.0	2649.0	9603.0	2648.0	9606.0	2648.0	9618.0
GR	2649.0	9653.0	2650.0	9657.0	2651.0	9660.0	2652.0	9662.0	2653.0	9665.0
GR	2654.0	9670.0	2654.0	9751.0	2653.0	9770.0	2652.0	9777.0	2651.0	9783.0
GR	2650.0	9788.0	2649.0	9793.0	2649.0	9877.0	2648.0	9964.0	2648.0	9970.0
GR	2649.0	9971.0	2650.0	9973.0	2651.0	9976.0	2651.0	10027.0	2650.0	10042.0
GR	2649.0	10057.0	2649.0	10080.0	2650.0	10140.0	2651.0	10239.0	2652.0	10248.0

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GR   2653.0   10279.0   2653.0   10317.0   2652.0   10407.0   2652.0   10438.0   2653.0   10446.0
GR   2654.0   10478.0   2654.0   10537.0   2653.0   10609.0   2654.0   10696.0   2655.0   10774.0
GR   2656.0   10870.0   2657.0   10937.0   2658.0   10990.0   2659.0   11004.0   2660.0   11137.0

NH       3      .065     9803.      .036   10272.      .065   10937.
X1   22.670      35.     9746.   10280.     420.      380.     420.
GR   2660.0   8924.0   2659.0   8952.0   2658.0   9050.0   2657.0   9147.0   2656.0   9407.0
GR   2655.0   9536.0   2655.0   9656.0   2655.0   9746.0   2654.0   9760.0   2653.0   9790.0
GR   2652.0   9798.0   2651.0   9803.0   2650.0   9810.0   2650.0   9817.0   2651.0   9850.0
GR   2652.0   9887.0   2653.0   9905.0   2654.0   9934.0   2654.0   10023.0   2654.0   10078.0
GR   2653.0   10111.0   2652.0   10173.0   2652.0   10272.0   2653.0   10276.0   2654.0   10278.0
GR   2655.0   10280.0   2655.0   10572.0   2654.0   10592.0   2654.0   10598.0   2655.0   10612.0
GR   2656.     10667.     2657.     10722.     2658.     10797.     2659.     10857.     2660.     10937.
        ***** REACH #4 *****
        TAKEN FROM DATA BY ARMY CORPS OF ENGINEERS, 1975

NC     .065      .065      .040       .1        .3
X1   10580        15      1975     2200       544       544       544
GR    2675         0      2672      150      2672       485      2660       690      2664       985
GR    2660      1245      2656     1975    2653.5      2030    2653.5      2200    2653.6      2420
GR    2656      2585    2657.6     2930      2660      3125      2664      3395      2672      3870

X1   10640        15      1875     2100       230       435       320
GR    2676         0      2672      265      2660       615      2665       815      2664       925
GR    2660      1165      2657     1545      2656      1875      2655      1925      2655      2100
GR    2656      2415      2660     2700      2664      3110      2660      3300      2676      3525

X1   10700        15      1800     2060       290       445       330
GR    2676         0      2672      340      2660       630      2664       980    2660.5      1190
GR    2660      1270      2656     1800    2655.9      1930      2656      2060      2657      2230
GR    2656      2390      2660     2530      2660      2960      2672      3290      2676      3470

X1   10780        19      1600     1775       360       510       425
GR    2680         0      2676      250      2672       490      2672       530      2673       570
GR    2672       590      2669      750      2660       690    2664.5      1045      2664      1280
GR    2661      1480      2660     1600      2658      1640      2658      1775    2658.6      1940
GR    2660      2300      2660     2420      2664      2700      2668      2890

X1   10860        14      1410     1480       320       400       420
GR    2680         0      2676      100      2672       210      2673       350      2672       500
GR    2672       730      2668      900      2664      1060      2660      1410      2660      1480
GR    2664      2410      2668     2735      2676      3150      2680      3600

X1   10940        12      1230     1450       465       380       430
GR    2684         0      2672      295      2660       430      2668       535      2664      1020
GR    2662      1230      2662     1450      2664      1570    2664.5      2085      2668      2540
GR    2676      3120      2680     3480

X1   11020        18      1240     1450       470       380       425
X3      10
GR    2682         0      2681      160      2680       320      2676       490      2672       560
GR    2660       940      2664     1040      2664      1115      2668      1185      2668      1220
GR    2664      1240      2664     1450    2666.4      1740      2668      2540      2672      2630
GR    2676      2850      2680     3225      2684      3350
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X1	11100	19	950	1990	460	270	420			
X3	10									
GR	2684	0	2676	210	2672	515	2671.7	615	2668.5	750
GR	2668	875	2669	940	2668	950	2667.3	1670	2668	1990
GR	2667.6	2110	2668	2220	2672	2390	2676	2610	2680	2830
GR	2681	2940	2680	3070	2684	3150	2688	3470		
X1	11160	24	815	1260	245	300	315			
GR	2684	0	2680	55	2676	170	2672	600	2672	700
GR	2668	740	2668.2	770	2668	815	2667	950	2668	1100
GR	2668	1170	2668.3	1260	2668	1310	2668	1350	2668.3	1420
GR	2669	1650	2672	1930	2672	2072	2670.2	2460	2676	2680
GR	2680	2980	2684	3140	2684	3340	2686	3560		
X1	11240	24	760	1075	680	260	425			
X3	10									
GR	2692	0	2688	40	2684	125	2680	150	2676	170
GR	2673.5	315	2672	350	2671.8	375	2672	400	2672	760
GR	2670	890	2670	1040	2672	1075	2672.5	1095	2672	1135
GR	2672	1370	2676	1545	2675.8	1620	2675	1740	2672	1845
GR	2676	2190	2680	2520	2684	2720	2688	3150		
X1	11320	21	1175	1395	445	310	425			
X3	10									
GR	2692	0	2688	30	2684	90	2680	155	2676	305
GR	2675.8	515	2672	685	2671.5	965	2672	1175	2672	1360
GR	2676	1395	2679	1590	2678	1895	2678	2200	2680	2380
GR	2681	2435	2680	2470	2679	2590	2680	2700	2684	2940
GR	2688	3440								
NC	.065	.065	.040	.1	.3					
X1	11400	24	1185	1735	390	415	435			
X3	10									
GR	2696	0	2692	30	2688	50	2684	125	2680	450
GR	2679.1	600	2676	860	2675	930	2676	1010	2676.5	1060
GR	2676	1185	2674	1285	2674	1390	2676	1520	2674.5	1540
GR	2676	1570	2674	1590	2674	1650	2676	1735	2680	1970
GR	2681	2220	2684	2480	2688	2740	2692	3050		
X1	11480	26	1485	1800	335	480	425			
GR	2700	0	2696	15	2692	50	2688	245	2684	575
GR	2680	910	2677	1050	2676	1280	2675.5	1325	2676	1370
GR	2676	1420	2675.8	1450	2676	1485	2676	1715	2675.5	1725
GR	2675.5	1760	2676	1800	2680	1850	2684	2200	2684.5	2290
GR	2684	2355	2682	2440	2684	2520	2688	2670	2692	2900
GR	2696	3325								
X1	11560	28	400	1165	615	305	420			
X3	10									
GR	2700	0	2696	25	2692	45	2688	60	2692	85
GR	2695	150	2692	225	2688	270	2684	365	2680	400
GR	2678.5	440	2678.5	490	2680	510	2680.4	545	2680	740
GR	2679.2	810	2680	900	2679.8	920	2680	940	2680.5	1000

GR	2676.5	1050	2676.5	1090	2680	1165	2684	1440	2686	1620
GR	2688	1930	2692	2150	2696	2290				
X1	11640	27	860	1380	710	440	420			
X3	10									
GR	2700	0	2696	120	2692	230	2691.5	255	2692	275
GR	2696	310	2697	380	2696	445	2692	475	2688	510
GR	2684	530	2682.6	680	2684	860	2681.5	940	2684	1050
GR	2684	1160	2680	1300	2680	1335	2678.6	1340	2678.6	1370
GR	2680	1380	2683	1425	2684	1480	2686	1755	2688	2050
GR	2692	2250	2696	2400						
NC	.065	.065	.035	.1	.3					
X1	11700	20	840	1120	315	300	315			
GR	2700	0	2696	50	2696	100	2692	175	2692	240
GR	2694	310	2692	350	2688	400	2684	450	2684	665
GR	2685	740	2684	840	2684	910	2680	950	2684	1120
GR	2685	1290	2688	1440	2692	1790	2696	1970	2700	2235
X1	11760	15	820	1000	215	255	315			
GR	2700	0	2697	110	2696	190	2692	255	2688	290
GR	2687.5	385	2685.5	670	2684	820	2682.5	830	2682.5	990
GR	2684	1000	2688	1170	2692	1430	2696	1620	2700	1750
X1	11840	24	1170	1330	345	340	420			
X3	10									
GR	2704	0	2700	40	2696	210	2692	470	2691	725
GR	2688	770	2687.8	850	2688	935	2688.3	975	2688	1020
GR	2688	1075	2688.5	1135	2688	1170	2685.5	1195	2685.5	1295
GR	2688	1330	2688.2	1380	2688	1485	2688.5	1535	2688	1575
GR	2688	1690	2692	1710	2696	1740	2700	1945		
X1	11900	18	1390	1510	315	320	330			
GR	2704	0	2700	60	2700	180	2696	410	2696	545
GR	2698.5	670	2696	775	2692	920	2690	1210	2688	1390
GR	2687	1400	2687	1490	2686	1510	2692	1730	2696	1930
GR	2696	1980	2700	1990	2704	2010				
X1	11960	21	970	1080	200	470	320			
GR	2704	0	2700	200	2696	390	2692	530	2691	745
GR	2692	910	2687.5	970	2687.5	1010	2689	1030	2688.1	1080
GR	2692	1110	2694	1140	2692	1160	2692	1200	2691	1235
GR	2692	1255	2692	1380	2693	1665	2694	1870	2700	1930
GR	2700	2040								
X1	12020	16	910	995	270	315	310			
GR	2705	0	2700	250	2696	450	2692	700	2691.5	740
GR	2692	775	2693	850	2692	910	2689.0	925	2689.0	995
GR	2692	1060	2692.5	1085	2692	1120	2692	1165	2694	1645
GR	2712	1880								

XI	12100	15	1050	1170	380	440	430			
GR	2709	0	2700	80	2704	300	2700	530	2700	660
GR	2696	790	2690.6	1050	2690.6	1170	2691.5	1250	2696	1375
GR	2696	1540	2700	1550	2700	1580	2700	1775	2700	1810
XI	12130	12	1020	1110	210	195	200			
GR	2720	0	2716	190	2700	650	2696	725	2694	910
GR	2692.2	1020	2692.2	1110	2696	1260	2704	1550	2702	1690
GR	2716	1770	2720	1825						
XI	12250	19	850	927	365	340	370			
GR	2716	0	2708	140	2708	280	2704	390	2700	435
GR	2697.0	520	2700	625	2701	695	2700	760	2696	820
GR	2692.7	850	2692.7	927	2696	940	2700	965	2699.5	1095
GR	2700	1165	2704	1300	2708	1415	2720	1670		
XI	12300	20	530	685	360	265	270			
GR	2720	0	2716	70	2712	100	2704	210	2701.5	380
GR	2700	480	2692.7	530	2692.8	560	2704.5	630	2696	665
GR	2692.8	675	2696	685	2700	700	2701	760	2700	820
GR	2699.5	910	2700	975	2708	1240	2712	1345	2716	1410
XI	12380	17	420	590	640	190	425			
GR	2720	0	2716	50	2712	100	2712	160	2708	240
GR	2704	390	2700	400	2696	420	2694.6	435	2694.6	460
GR	2696	490	2700	590	2701.5	720	2700	830	2700	900
GR	2704	1040	2708	1190						
XI	12460	15	360	430	515	350	425			
GR	2720	0	2715	50	2712	70	2708	120	2706	320
GR	2706	330	2704	340	2700	350	2698	360	2698	430
GR	2700	450	2704	480	2704	575	2708	840	2712	1025
XI	12540	19	510	560	410	350	410			
GR	2720	0	2712	60	2708	425	2709	450	2708	480
GR	2704	490	2701	510	2701	560	2704	585	2708	610
GR	2712	625	2714	710	2716	775	2714	810	2716	880
GR	2718	945	2716	1050	2716	1140	2720	1290		
QT	1	19000								
XI	12620	14	575	620	190	570	425			
GR	2720	0	2716	30	2712	60	2710	290	2712	415
GR	2708	480	2703	575	2708	620	2708	675	2704	725
GR	2708	735	2712	740	2716	790	2720	840		
QT	1	16000								
XI	12700	18	695	790	285	585	425			
GR	2720	0	2724	100	2700	230	2700	300	2720	345
GR	2716	390	2712	530	2711.5	590	2712	635	2712	685
GR	2707	695	2705	700	2705	775	2707	790	2712	800
GR	2716	820	2720	845	2720	1010				

X1	12780	10	90	170	415	480	435			
GR	2728	0	2724	45	2720	70	2712	90	2707.5	160
GR	2707.5	170	2712	220	2716	250	2720	300	2732	450
X1	12840	12	150	185	270	280	335			
GR	2732	0	2728	45	2720	85	2716	100	2712	130
GR	2709	150	2709	185	2712	220	2716	295	2720	320
GR	2732	420	2736	440						
X1	12900	10	295	310	320	245	340			
GR	2732	0	2724	50	2720	150	2716	200	2712	295
GR	2711.9	300	2712	310	2716	335	2720	345	2736	440
X1	12980	11	300	330	410	430	425			
GR	2740	0	2732	40	2728	130	2724	210	2720	300
GR	2720	330	2724	370	2724	415	2728	460	2732	495
GR	2736	530								
X1	13060	14	315	350	360	490	430			
GR	2744	0	2740	75	2736	170	2732	270	2728	300
GR	2722	315	2722	350	2728	375	2728	415	2732	450
GR	2732	480	2732	515	2736	535	2740	600		
X1	13140	15	200	230	370	470	420			
GR	2752	0	2748	40	2744	75	2740	140	2736	175
GR	2732	200	2731	210	2732	230	2736	265	2738	310
GR	2736	340	2736	370	2740	420	2744	485	2752	585
X1	13200	13	280	325	295	320	313			
GR	2760	0	2756	70	2744	160	2740	280	2738	300
GR	2740	310	2744	325	2746	385	2744	445	2740	500
GR	2752	585	2756	620	2760	685				
X1	13280	15	185	250	400	350	425			
GR	2768	0	2764	60	2756	160	2752	185	2748	200
GR	2746	220	2748	250	2752	370	2755	430	2752	495
GR	2748	575	2744	600	2752	640	2760	665	2776	745
X1	13360	18	80	120	440	300	415			
GR	2776	0	2760	75	2756	80	2754	95	2756	120
GR	2757	190	2756	250	2757	290	2756	310	2752	370
GR	2752	395	2756	420	2757	460	2756	490	2755	535
GR	2755	575	2760	580	2772	620				
X1	13440	11	130	190	460	450	430			
GR	2784	0	2776	30	2768	110	2764	130	2760	150
GR	2757	190	2760	260	2764	400	2768	465	2776	555
GR	2780	610								

XI	13520	11	125	150	460	285	420			
GR	2780	0	2776	40	2772	80	2760	125	2758	135
GR	2760	150	2764	230	2768	310	2776	365	2780	395
GR	2783	460								
XI	13600	7	60	80	450	350	420			
GR	2780	0	2764	60	2760	80	2774	160	2776	200
GR	2780	210	2792	265						

THIS RUN EXECUTED 09DEC92 09:30:51

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

TANQUE VERDE CREEK

SUMMARY PRINTOUT

	SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
	1.000	.00	2548.70	23000.00	2554.67	2550.00	2550.00	10.25	2.43	2.58	2555.72
	101.000	850.00	2552.00	23000.00	2558.25	2554.00	2554.00	11.81	2.82	3.10	2559.99
	102.000	950.00	2556.00	23000.00	2563.07	2556.00	2558.00	10.20	2.34	3.30	2564.07
	103.000	575.00	2558.00	23000.00	2564.99	2560.00	2560.00	8.84	1.73	3.63	2565.73
	104.000	770.00	2560.00	23000.00	2567.25	2564.00	2564.00	11.40	2.06	4.00	2568.50
	105.000	500.00	2563.00	23000.00	2569.77	2568.00	2566.00	12.65	1.35	3.80	2571.19
	106.000	430.00	2564.40	23000.00	2572.02	2568.00	2568.00	10.85	2.05	2.66	2573.28
	107.000	500.00	2566.00	23000.00	2574.02	2570.00	2570.00	9.95	2.18	3.00	2574.91
*	108.000	450.00	2570.00	23000.00	2576.44	2572.00	2572.00	14.00	3.16	5.29	2577.96
*	108.100	5.00	2570.00	23000.00	2577.18	2572.00	2572.00	12.23	2.91	4.78	2578.16
	108.200	40.00	2570.00	23000.00	2577.64	2572.00	2572.00	10.98	2.60	4.39	2578.42
	108.300	5.00	2570.00	23000.00	2577.76	2572.00	2572.00	10.48	2.51	4.03	2578.46
	109.000	410.00	2572.00	23000.00	2578.99	2576.00	2574.00	10.22	2.78	4.00	2579.95
*	110.000	730.00	2574.00	23000.00	2581.04	2578.00	2576.50	5.62	1.60	2.25	2581.23
*	111.000	530.00	2576.00	23000.00	2581.92	2580.00	2579.00	11.07	2.08	2.92	2582.96
*	112.000	590.00	2578.00	23000.00	2584.64	2580.00	2581.00	8.56	2.66	1.91	2585.86
	113.000	540.00	2580.00	23000.00	2586.12	2584.00	2583.30	8.36	2.90	1.79	2586.44

	SECNO	XLCH	ELMIN	Q	CWSEL	XLSEL	RSEL	VCH	VLOB	VROB	EG
*	114.000	520.00	2582.00	23000.00	2587.99	2586.00	100000.00	10.86	4.46	.00	2588.47
	1.000	1056.00	2585.50	23000.00	2592.81	2590.00	2590.00	10.75	2.90	2.05	2593.73
*	2.000	160.00	2586.40	23000.00	2594.52	2592.00	2590.00	11.82	2.63	1.80	2595.68
	3.000	517.00	2589.00	23000.00	2596.45	2592.00	2592.00	9.19	2.61	1.52	2597.07
*	4.000	484.00	2590.40	23000.00	2599.67	2594.00	2598.00	10.79	3.16	1.19	2600.68
	5.000	200.00	2590.00	23000.00	2600.42	2591.00	2596.40	9.03	1.58	1.54	2601.10
*	6.000	234.00	2591.40	23000.00	2602.44	2598.00	2594.00	10.46	2.23	.95	2603.68
*	20.195	675.00	2593.00	23000.00	2604.28	2598.00	2602.00	5.43	1.83	1.74	2604.46
*	20.361	850.00	2595.00	23000.00	2605.52	2602.00	2606.00	10.51	2.91	3.21	2606.69
*	20.442	410.00	2598.00	23000.00	2607.53	2606.00	2606.00	11.17	1.50	2.76	2608.67
	20.520	450.00	2602.00	23000.00	2609.65	2606.00	2610.00	6.79	2.42	2.61	2610.03
	20.604	470.00	2604.00	23000.00	2610.83	2608.00	2609.00	7.99	3.19	3.68	2611.27
	20.660	300.00	2606.00	23000.00	2611.76	2610.00	2610.00	9.29	3.42	3.39	2612.44
	20.722	320.00	2607.00	23000.00	2612.96	2610.00	2609.00	9.43	3.42	3.75	2613.64
*	20.780	315.00	2608.00	23000.00	2614.14	2612.00	2611.00	11.89	3.86	3.25	2615.48
*	20.840	315.00	2609.00	23000.00	2616.09	2613.00	2612.00	8.39	3.24	2.84	2616.72
*	20.902	325.00	2611.00	23000.00	2617.81	2614.00	2614.00	12.51	4.54	2.03	2619.29
*	20.983	425.00	2613.00	23000.00	2620.31	2616.00	2619.00	11.51	4.33	1.33	2621.71
*	21.066	440.00	2614.00	23000.00	2622.60	2620.00	2621.00	7.79	2.20	1.06	2623.37
	21.125	315.00	2615.00	23000.00	2623.37	2621.00	2618.00	8.60	1.41	2.48	2624.13
	21.207	425.00	2617.00	23000.00	2624.31	2623.00	2620.00	9.93	1.29	2.62	2625.35
	21.325	615.00	2619.00	23000.00	2626.39	2623.00	2623.00	10.58	2.35	5.12	2627.47
	21.468	755.00	2623.00	23000.00	2630.00	2626.00	2626.00	10.24	3.24	5.78	2631.02
*	21.544	390.00	2624.00	23000.00	2631.91	2628.00	2628.00	12.45	2.57	3.26	2633.35
	21.628	440.00	2626.00	23000.00	2634.74	2632.00	2631.00	8.75	1.54	3.28	2635.37
	21.707	410.00	2628.00	23000.00	2636.46	2634.00	2633.00	7.79	2.20	2.85	2637.03

	SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
	21.790	430.00	2630.00	23000.00	2638.03	2634.00	2635.00	8.27	2.36	2.33	2638.56
*	21.880	470.00	2631.00	23000.00	2639.18	2636.00	2636.00	11.13	2.41	1.96	2640.46
*	21.925	240.00	2632.00	23000.00	2640.94	2638.00	2636.00	11.96	3.57	2.05	2642.44
	21.972	245.00	2634.00	23000.00	2642.39	2639.00	2639.00	9.60	2.52	1.45	2643.44
	22.047	395.00	2636.00	23000.00	2643.64	2642.00	2642.00	7.10	1.06	2.14	2644.43
	22.125	410.00	2638.00	23000.00	2644.74	2642.00	2642.00	8.31	1.24	3.42	2645.58
	22.195	365.00	2639.00	23000.00	2646.24	2649.00	2645.00	9.13	1.87	2.83	2647.34
	22.275	378.00	2641.00	23000.00	2648.28	2645.00	2645.00	7.36	2.17	2.24	2648.96
	22.338	395.00	2643.00	23000.00	2649.64	2647.00	2647.00	5.26	1.39	1.73	2649.98
*	22.373	200.00	2644.00	23000.00	2650.36	2651.00	2650.00	10.22	.00	2.24	2651.92
*	22.454	170.00	2645.00	23000.00	2652.34	2651.00	2651.00	6.92	1.22	1.63	2653.05
	22.511	300.00	2647.00	23000.00	2653.47	2652.00	2652.00	6.47	1.19	1.48	2654.18
	22.591	420.00	2648.00	23000.00	2654.91	2656.00	2653.00	6.65	.00	2.13	2655.55
	22.670	420.00	2650.00	23000.00	2656.91	2655.00	2655.00	8.41	2.63	3.04	2657.84
*	10580.000	544.00	2653.50	23000.00	2659.88	2656.00	2653.50	6.46	1.86	3.31	2660.22
	10640.000	320.00	2655.00	23000.00	2660.88	2656.00	2655.00	6.30	2.00	3.25	2661.19
	10700.000	330.00	2655.90	23000.00	2661.83	2656.00	2656.00	6.00	2.69	3.26	2662.15
*	10780.000	425.00	2658.00	23000.00	2663.35	2660.00	2658.00	8.66	3.04	4.42	2663.93
	10860.000	428.00	2660.00	23000.00	2665.78	2660.00	2660.00	8.58	3.86	3.89	2666.16
	10940.000	430.00	2662.00	23000.00	2667.59	2662.00	2662.00	7.23	3.09	3.03	2667.99
	11020.000	425.00	2664.00	23000.00	2669.33	2664.00	2664.00	8.02	3.82	3.28	2669.83
	11100.000	428.00	2667.30	23000.00	2671.13	2668.00	2668.00	5.12	2.50	2.80	2671.48
	11160.000	315.00	2667.00	23000.00	2672.26	2668.00	2668.30	6.85	3.46	2.99	2672.76
*	11240.000	425.00	2670.00	23000.00	2674.70	2672.00	2672.00	9.62	4.30	3.69	2675.60
*	11320.000	425.00	2671.50	23000.00	2677.59	2672.00	2676.00	6.63	3.92	1.15	2677.97
	11400.000	435.00	2674.00	23000.00	2679.15	2676.00	2676.00	7.22	3.25	2.23	2679.80

	SECNO	XLCH	ELMIN	Q	CWSEL	XLSEL	RSEL	VCH	VLOB	VROB	ES
	11480.000	425.00	2675.50	23000.00	2681.13	2676.00	2676.00	7.31	4.06	2.62	2681.68
	11560.000	420.00	2676.50	23000.00	2683.31	2680.00	2680.00	7.29	2.51	2.52	2684.11
	11640.000	420.00	2678.60	23000.00	2686.31	2684.00	2680.00	7.87	3.97	3.52	2687.06
	11700.000	315.00	2680.00	23000.00	2688.02	2684.00	2684.00	9.24	3.80	3.23	2688.93
	11760.000	315.00	2682.50	23000.00	2689.18	2684.00	2684.00	12.09	4.06	3.80	2690.69
	11840.000	420.00	2685.50	23000.00	2692.13	2688.00	2688.00	9.97	3.77	4.00	2692.92
	11900.000	330.00	2686.00	23000.00	2693.66	2688.00	2686.00	12.54	4.43	5.07	2694.92
*	11960.000	320.00	2687.50	23000.00	2695.88	2687.50	2688.10	9.89	3.31	2.87	2696.41
	12020.000	310.00	2689.00	23000.00	2696.84	2692.00	2689.00	10.21	3.47	3.76	2697.45
	12100.000	430.00	2690.60	23000.00	2698.31	2690.60	2690.60	11.89	4.33	4.39	2699.33
	12180.000	200.00	2692.20	23000.00	2699.18	2692.20	2692.20	14.82	5.87	5.47	2700.66
*	12250.000	370.00	2692.70	23000.00	2702.94	2692.70	2692.70	14.23	4.46	3.80	2704.61
	12300.000	270.00	2692.70	23000.00	2705.10	2692.70	2696.00	9.38	3.80	3.57	2705.88
	12380.000	425.00	2694.60	23000.00	2706.88	2696.00	2700.00	9.14	3.24	3.24	2706.95
*	12460.000	425.00	2698.00	23000.00	2709.06	2698.00	2696.00	15.46	3.92	4.76	2711.15
*	12540.000	410.00	2701.00	23000.00	2713.56	2701.00	2701.00	16.76	4.63	6.60	2715.79
*	12620.000	425.00	2703.00	19000.00	2716.54	2703.00	2708.00	7.63	3.07	3.50	2716.85
	12700.000	425.00	2700.00	16000.00	2716.93	2707.00	2707.00	5.71	2.64	1.69	2717.20
*	12780.000	435.00	2707.50	16000.00	2717.10	2712.00	2707.50	16.90	3.68	7.02	2720.75
	12840.000	335.00	2709.00	16000.00	2720.84	2709.00	2709.00	16.25	6.62	6.57	2722.96
	12900.000	340.00	2711.90	16000.00	2722.91	2712.00	2712.00	20.67	8.44	8.48	2725.19
*	12980.000	425.00	2720.00	16000.00	2728.89	2720.00	2720.00	18.91	7.50	7.14	2731.22
*	13060.000	430.00	2722.00	16000.00	2735.02	2722.00	2722.00	18.14	5.33	5.96	2737.91
*	13140.000	420.00	2731.00	16000.00	2742.18	2732.00	2732.00	18.81	6.67	6.66	2744.68
*	13200.000	313.00	2738.00	16000.00	2747.55	2740.00	2744.00	17.20	7.36	6.83	2749.68
*	13280.000	425.00	2744.00	16000.00	2753.94	2752.00	2748.00	16.28	2.53	7.16	2756.10

	SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EB
	13360.000	415.00	2752.00	16000.00	2759.57	2756.00	2756.00	13.99	3.43	7.29	2760.75
*	13440.000	430.00	2757.00	16000.00	2765.98	2764.00	2757.00	17.31	2.69	8.47	2768.54
*	13520.000	420.00	2758.00	16000.00	2770.59	2760.00	2760.00	20.74	6.53	8.00	2773.69
*	13600.000	420.00	2760.00	16000.00	2776.74	2764.00	2760.00	22.35	6.81	8.64	2780.56

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 100.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 100.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 100.100 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 110.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 111.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 111.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 111.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 112.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 114.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 2.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 2.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 2.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 4.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 4.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 4.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 6.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 6.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 6.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 20.195 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 20.361 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 20.361 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 20.361 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 20.442 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 20.442 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 20.780 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 20.780 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 20.840 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 20.902 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 20.902 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 20.902 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 20.983 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 20.983 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 21.066 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 21.544 PROFILE= 1 CRITICAL DEPTH ASSUMED

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CAUTION SECNO=     21.544  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     21.880  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     21.880  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     21.925  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     21.925  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     21.925  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=     22.373  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     22.373  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     22.373  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=     22.454  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=  10500.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=  10780.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=  11240.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=  11320.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=  11960.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=  12250.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=  12250.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=  12250.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=  12460.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=  12460.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=  12460.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=  12540.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=  12540.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=  12540.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=  12620.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=  12780.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=  12780.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=  12780.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=  12980.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=  12980.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=  13060.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=  13060.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=  13060.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=  13140.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=  13140.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=  13140.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
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CAUTION SECNO=  13280.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=  13280.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=  13280.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=  13280.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=  13280.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=  13440.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=  13440.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=  13520.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=  13520.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=  13600.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=  13600.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=  13600.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
```

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**********************************************
*  HEC-2 WATER SURFACE PROFILES              *
*                                            *
*  Version   4.6.2;  May 1991                *
*                                            *
*  RUN DATE    09DEC92    TIME    10:01:02   *
**********************************************
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**************************************
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*  609 SECOND STREET, SUITE D        *
*  DAVIS, CALIFORNIA 95616-4687      *
*           (916) 756-1104           *
**************************************
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X     X  XXXXXXXX   XXXXX              XXXXX
X     X  X         X     X            X     X
X     X  X         X                        X
XXXXXXXX  XXXX     X          XXXXX     XXXXX
X     X  X         X                    X
X     X  X         X     X              X
X     X  XXXXXXXX   XXXXX              XXXXXXX
```

THIS RUN EXECUTED 09DEC92 10:01:02

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**************************************
 HEC-2 WATER SURFACE PROFILES

 Version  4.6.2;  May 1991
**************************************


T1      FILENAME: H2_GIVEN.DAT (OLD N3041H2.DAT)
T2      TANQUE VERDE CREEK MODEL        WITH 8K FLOW ON ACW
T2      COMBINED HEC2 RUNS, NEW CONDITION REACH 1 THRU REACH 4
T2      REACH 1 (MILE 5.898 TO MILE 7.488)  PATCHWORK MODEL W/ BERM
T3      TANQUE VERDE CREEK

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

        0         2                           .004                            2555.6

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

        1               -1                                                            0


J3  VARIABLE CODES FOR SUMMARY PRINTOUT

      38        39        42        43         1        23        24        26        55        56
       3

J5  LPRNT     NUMSEC                    *********REQUESTED SECTION NUMBERS*********

     -10       -10

NC      .06       .06       .03        .1        .3
QT         1     23000
NH         4       .06      1010      .085      1235       .03      1470       .06      2790
X1         1        25      1235      1470
GR    2556.0       500    2554.0       600    2554.0       610    2556.0       630    2554.0       660
GR    2552.0      1010    2552.0      1110    2550.0      1165    2550.2      1200    2550.0      1235
GR    2548.7      1240    2548.7      1460    2550.0      1470    2554.0      1480    2554.0      1730
GR    2552.0      1800    2552.0      1930    2554.0      1970    2552.0      2020    2552.0      2160
GR    2554.0      2200    2552.0      2220    2552.0      2420    2556.0      2720    2560.0      2790

NH         4       .060      1300      .085      1615       .03      1895       .06      2215
X1       101         10      1615      1895       650      1050       850
GR      2562       1000      2558      1165      2556      1300      2554      1615      2552      1635
GR      2552       1710      2554      1895      2556      1960      2558      2150    2558.9      2215

NH         4       .060      1220      .085      1390       .03      1580       .06      2480
X1       102         13      1390      1580      1100       800       950
GR      2568       1000      2566      1080      2564      1150      2562      1220      2560      1315
GR      2558       1370      2556      1390      2556      1530      2558      1580    2558.5      1780
GR      2560       2040      2562      2260    2563.2      2480
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NH	5	.060	1205	.085	1440	.03	1650	.045	2320	.06
NH	2570									
X1	103	15	1440	1650	600	550	575			
GR	2560	1000	2566	1080	2564	1205	2562	1370	2560	1440
GR	2558	1490	2558	1630	2560	1650	2562	1670	2562	1720
GR	2560	1840	2562	2120	2563	2320	2564	2470	2564.6	2570
NH	7	.060	370	.085	560	.03	750	.045	1200	.06
NH	1400	.085	1520	.06	1740					
X1	104	16	560	750	780	760	770			
GR	2582	0	2570	370	2566	400	2564	560	2562	575
GR	2562	620	2560	690	2560	740	2564	750	2565	800
GR	2564	900	2564	900	2564	1200	2565	1400	2566	1520
GR	2567.2	1740								
NH	5	.060	340	.085	460	.03	640	.06	1100	.085
NH	1570									
X1	105	12	460	640	530	400	500			
GR	2580.0	0	2572.0	275	2570.0	340	2568.0	460	2566.0	485
GR	2564.0	500	2563.0	540	2564.0	600	2566.0	640	2567.0	760
GR	2566.0	1100	2567.9	1570						
NH	5	.06	320	.085	510	.03	720	.06	1170	.085
NH	1590									
X1	106	16	510	720	450	390	430			
GR	2582	0	2574	250	2572	320	2570	390	2568	510
GR	2564.4	550	2565.2	700	2568	720	2570	850	2570.2	930
GR	2570	990	2568	1170	2568	1320	2570	1400	2570.2	1570
GR	2570.3	1590								
NH	6	.085	220	.06	380	.085	690	.03	865	.06
NH	1425	.085	1550							
X1	107	15	690	865	530	430	500			
GR	2580.0	0	2574.0	220	2570.0	380	2571.0	620	2570.0	690
GR	2568.0	700	2566.0	720	2566.5	790	2566.5	840	2568.0	850
GR	2570.0	865	2571.5	1045	2570.0	1170	2570.0	1425	2570.7	1550

HOUGHTON ROAD X-SECTION

NC	.085	.060	.030	.3	.5					
X1	108	11	1030	1130	450	450	450			
GR	2575.0	600	2574.5	640	2574.0	860	2572.0	1030	2571.0	1040
GR	2570.0	1045	2570.0	1100	2571.0	1110	2572.0	1130	2573.0	1430
GR	2573.7	1700								
X1	108.1	52	1030	1130	5	5	5			
BT	-6	600	2582.5	2577.1	1030	2585.6	2580.2	1098	2586	2580.6
BT		1180	2586.2	2580.8	1275	2586	2580.6	1700	2584	2578.6
GR	2575.0	600	2574.5	640	2574.4	698	2577.9	698	2577.9	782
GR	2574.4	782	2574.1	798	2578.6	798	2578.6	882	2574.1	882
GR	2574.0	860	2573.5	898	2579.4	898	2579.4	982	2573.5	982
GR	2572.4	998	2580.2	998	2580.2	1002	2572.4	1002	2572.0	1030
GR	2571.0	1040	2570.0	1045	2570.0	1098	2580.0	1098	2580.8	1102
GR	2570.0	1102	2571.0	1110	2572.0	1130	2572.1	1180	2572.2	1198

GR	2580.8	1198	2580.8	1202	2572.2	1202	2572.5	1275	2573.6	1298
GR	2580.4	1298	2580.4	1302	2572.6	1302	2572.9	1398	2580.1	1398
GR	2580.1	1402	2572.9	1402	2573.0	1438	2573.2	1498	2579.6	1498
GR	2579.6	1502	2573.2	1502	2573.5	1598	2579.2	1598	2579.2	1602
GR	2573.5	1602	2573.7	1700						
X1	100.2				40	40	40			
X2							1			
X1	100.3	11	1030	1130	5	5	5			
GR	2575.0	600	2574.5	640	2574.0	860	2572.0	1030	2571.8	1040
GR	2570.0	1045	2570.0	1100	2571.0	1110	2572.0	1130	2573.0	1430
GR	2573.7	1700								
NC				.1	.3					
NH	0	.06	290	.005	1035	.03	1230	.06	1480	.005
NH	1815	.06	2040	.005	2810	.06	3200			
X1	109	18	1035	1230	390	450	410			
X3						1300				
GR	2688.0	0	2682.0	290	2575.3	290	2574.0	340	2574.0	560
GR	2576.0	1035	2574.0	1040	2572.2	1080	2572.0	1165	2572.0	1220
GR	2574.0	1230	2575.0	1350	2575.0	1480	2575.0	1815	2576.0	2040
GR	2578.0	2540	2578.0	2810	2580.0	3200				
NH	10	.06	320	.005	910	.03	1100	.06	1350	.035
NH	1460	.06	1710	.005	2200	.06	2570	.005	3100	.06
NH	3400									
X1	110	25	910	1100	630	600	730			
X3						2360				
GR	2578	200	2576	320	2575.8	350	2576	510	2578	740
GR	2576.8	910	2574	950	2574	1040	2574.2	1080	2576.5	1100
GR	2575.8	1220	2576.0	1300	2576	1350	2574	1390	2574	1450
GR	2577	1460	2577.6	1600	2577.9	1710	2577	2000	2577.5	2200
GR	2578	2420	2579	2570	2580	2800	2581	3100	2582.0	3400
NH	7	.005	920	.03	1140	.06	1545	.005	2370	.06
NH	2530	.005	2950	.06	3260					
X1	111	19	920	1140	850	410	530			
X3						2340				
GR	2590.0	0	2580.0	280	2580.0	920	2576.0	940	2576.0	1050
GR	2578.0	1070	2579.0	1140	2580.0	1345	2578	1470	2578	1495
GR	2580	1545	2579.0	1805	2580.0	2110	2580	2370	2580.0	2430
GR	2581	2530	2582.0	2640	2583.0	2950	2584.0	3260		
NH	7	.005	1250	.035	1330	.06	1380	.03	1520	.005
NH	2200	.06	2550	.005	3280					
X1	112	28	1380	1520	480	470	590			
X3						2550				
GR	2594	0	2584	220	2582	300	2580	580	2580	720
GR	2582	820	2582.5	930	2582	980	2580.8	1100	2582	1170
GR	2581	1250	2579	1270	2579	1320	2580	1330	2580	1380
GR	2578	1400	2578.5	1500	2581	1520	2582	1570	2583	1670
GR	2582	1700	2581.8	1900	2582	2200	2581.8	2280	2582	2340
GR	2583	2550	2584	2760	2586.0	3280				

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 NH      8       .06      520      .085     1265      .035     1340      .06      1490      .03
 NH   1600       .085     2240      .06     2520      .085     3470
 X1    113        21      1490     1600      440       510      540
 X3                                                    2320
 GR   2586         0      2584       50     2582       150     2582       220     2582.3     520
 GR   2582       940      2582      970     2584      1160     2584      1265     2581.5    1280
 GR  2581.5     1330      2583     1340     2584      1490     2580      1510     2580.2    1580
 GR  2583.3     1600    2583.5     1790     2584      2240     2586      2520      2588     3050
 GR   2590      3470

 NH      6       .06      2250     .085     2390      .03      2500      .085     3200      .06
 NH   3550       .085     4410
 X1    114        20      2390     2500      440       510      520
 X3                                                    2440
 GR   2590       900      2584     1090     2584.2    1270     2583.8    1410     2584.3    1540
 GR   2584      1680    2585.2     2050     2586      2250     2586.4    2310      2586     2340
 GR   2586      2390      2582     2415     2582      2470     2584      2500      2586     2810
 GR  2587.5     3000    2587.7     3200     2588      3550     2590      4000      2592     4410
        **** FINAL RUN FOR REVISED MODEL WITH DIP CROSSING ****
        **** DATA USED FOR JANUARY 31, 1991 MEMO TO COUNTY ATTY ****
         FILENAME TVLR26.H2I:  THIS FILE SAME AS TVLR24.H2I EXCEPT:
        ***** REACH #2 *****

 NC    .060       .085      .027      .1       .3
 X1       1        16       700      880     1056      1056      1056       0         0         0
 X3                                                     880      2590
 GR   2594         0       2590      155     2590       700     2585.5     730      2585.5     800
 GR   2588       830       2590      880     2590       990     2588      1010      2586      1030
 GR   2588      1040       2590     1080     2590      1140     2590      1980      2592      2110
 GR  2593.2     2400

 X1       2        19       700      840      180       184      188       0         0         0
 X3                                                     910      2592
 GR   2594         0       2592       60     2592       700     2586.4     730      2586.4    810
 GR   2590       840       2592      910     2592       960     2590      1090      2588.4    1130
 GR   2590      1170       2592     1240     2591.5    1540     2592      1720      2592      1910
 GR   2590      1930       2590     1980     2592      2120     2594      2300

 X1       3        15       830     1000      360       525      517       0         0         0
 X3                                                    1100      2594
 GR   2600         0       2594      270     2592       830     2589       840      2589      910
 GR   2592      1000       2594     1100     2590      1370     2589      1400      2590      1420
 GR   2594      2000       2594     2240     2592      2520     2594      2840      2596      3000

 X1       4        20       790      930      500       301      484       0         0         0
 X3                                                     930      2598
 GR   2610         0       2600      330     2596       460     2594       790     2590.4     810
 GR  2590.4      900       2598      930     2596       950     2594      1180      2592      1200
 GR   2591      1215       2592     1235     2594      1250     2596      1530      2594      1630
 GR  2592.5     1660       2594     1690     2594      2940     2596      3200      2598      3470
        TANQUE VERDE LOOP ROAD
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X1       5        20       737       878       200       250       200         0         0         0
X3                                    737      2598       878    2596.4
GR    2609         0      2600       250      2598       340      2596       490      2596       620
GR    2598       670      2595       730      2591       737    2590.9       766    2590.8       795
GR  2590.8       823      2591       841    2591.2       865    2591.5       878      2599       895
GR    2598       920      2596      1190      2594      1225      2592      1245      2592      1265
GR    2594      1270      2596      1290      2597      1330      2596      1530      2596      1630
GR    2596      2210      2598      2445      2600      2635

X1       6        18       670       830       319        64       234         0         0         0
X3                                                      850      2601
GR    2610         0      2600        65      2606       160      2602       250      2600       340
GR    2598       670    2591.4       710    2591.4       790      2594       830      2601       850
GR    2598       890      2596       990      2594      1230      2594      1260      2596      1290
GR    2596      1600      2598      1920      2600      3420
     ***REACH 3****
  HEC2 DATA FROM PIMA CO. PLANNING DEPT 10/8/92
  20.780  BEGIN X3 ENCROACHMENT
  22.195  END X3 ENCROACHMNET
  TANQUE VERDE CREEK 49ER ESTATE REACH: IMPROVED        FILE = FIN1_100.DAT
  Q100 = 24,000 CFS, TOPOS ARE 1988 1"=100' AND 1" = 200'       DL 7-27-92
       FIN1_100 7-29-92
  J1          2                  .0039                              2603
  J2   -1             -1       5      20
  J3   38      43      13      14      15       1      55      26      56
  J3   28              38       1      53      54      42       8      25
  J3   50
  QT    1   24000

NC                                    .1        .3
NH       3      .056      9925.       .03     10082.      .056     12493.
X1   20.195        66.     9925.    10082.       675        675       675
GR   2620.0    8948.0    2619.0    8962.0    2618.0    8974.0    2617.0    8998.0    2616.0    9024.0
GR   2615.0    9058.0    2614.0    9089.0    2613.0    9131.0    2612.0    9171.0    2611.0    9231.0
GR   2610.0    9296.0    2609.0    9323.0    2608.0    9360.0    2607.0    9413.0    2606.0    9475.0
GR   2605.0    9518.0    2604.0    9574.0    2603.0    9617.0    2602.0    9663.0    2601.0    9704.0
GR   2600.0    9776.0    2599.0    9845.0    2598.0    9925.0    2597.0    9945.0    2596.0    9960.0
GR   2595.0    9963.0    2594.0    9964.0    2593.0   10001.0    2594.0   10030.0    2595.0   10040.0
GR   2596.0   10050.0    2597.0   10063.0    2598.0   10072.0    2599.0   10074.0    2600.0   10078.0
GR   2601.0   10079.0    2602.0   10082.0    2602.0   10094.0    2601.0   10196.0    2600.0   10259.0
GR   2599.0   10307.0    2598.0   10350.0    2597.0   10365.0    2596.0   10372.0    2596.0   10440.0
GR   2597.0   10456.0    2598.0   10472.0    2599.0   10493.0    2600.0   10513.0    2600.0   10687.0
GR   2600.0   11065.0    2601.0   11224.0    2602.0   11349.0    2601.0   11515.0    2602.0   11654.0
GR   2602.0   11718.0    2601.0   11852.0    2602.0   11948.0    2603.0   12113.0    2604.0   12216.0
GR   2605.0   12273.0    2606.0   12315.0    2607.0   12354.0    2608.0   12400.0    2609.0   12444.0
GR   2610.0   12493.0        .0        .0        .0        .0        .0        .0        .0        .0

NH       3      .056      9837.       .03     10155.      .056     12650
X1   20.361        62.     9837.    10121.       835.      855.      850.
GR   2620.0    9205.0    2619.0    9252.0    2618.0    9300.0    2617.0    9338.0    2616.0    9376.0
GR   2615.0    9407.0    2614.0    9441.0    2613.0    9488.0    2612.0    9550.0    2611.0    9593.0
GR   2610.0    9637.0    2609.0    9684.0    2608.0    9731.0    2607.0    9764.0    2606.0    9791.0
GR   2605.0    9811.0    2604.0    9823.0    2603.0    9830.0    2602.0    9837.0    2601.0    9875.0
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3F	2600.0	9911.0	2600.0	9974.0	2601.0	9974.0	2602.0	9979.0	2602.0	9994.0
4F	2601.0	9998.0	2600.0	10004.0	2599.0	10010.0	2598.0	10014.0	2597.0	10020.0
5F	2596.0	10025.0	2595.	10030.0	2595.	10038.0	2595.0	10045.0	2596.0	10050.0
6F	2597.0	10052.0	2596.0	10055.0	2599.0	10056.0	2600.0	10061.0	2601.0	10071.0
7F	2602.0	10080.0	2603.0	10089.0	2604.0	10094.0	2605.0	10097.0	2606.0	10099.0
8F	2606.0	10121.0	2605.0	10136.0	2604.0	10155.0	2604.0	10387.0	2603.0	10420.0
9F	2602.0	10465.0	2602.0	10771.0	2603.0	10798.0	2604.0	10825.0	2605.0	11455.0
10F	2606.0	11627.0	2606.0	11948.0	2607.0	12226.0	2608.0	12462.0	2606.0	12513.0
11F	2610.0	12577.0	2612	12650	.0	.0	.0	.0	.0	.0
NH	3	.056	9939.	.03	10111.	.056	12900			
X1	20.442	61.	9910.	10069.	500.	390.	410.			
1R	2610.0	9401.0	2619.0	9408.0	2618.0	9416.0	2617.0	9440.0	2616.0	9470.0
2R	2617.0	9491.0	2618.0	9498.0	2618.0	9520.0	2617.0	9524.0	2616.0	9529.0
3R	2615.0	9542.0	2614.0	9553.0	2613.0	9585.0	2612.0	9609.0	2612.0	9700.0
4R	2611.0	9735.0	2610.0	9823.0	2609.0	9854.0	2608.0	9891.0	2607.0	9901.0
5R	2606.0	9910.0	2605.0	9917.0	2604.0	9925.0	2603.0	9932.0	2602.0	9939.0
6R	2601.0	9947.0	2600.0	9955.0	2599.0	9962.0	2598.0	9968.0	2596.0	10037.0
7R	2599.0	10041.0	2600.0	10046.0	2601.0	10049.0	2602.0	10052.0	2603.0	10055.0
8R	2604.0	10060.0	2605.0	10063.0	2606.0	10069.0	2606.0	10111.0	2606.0	10210.0
9R	2605.0	10284.0	2604.0	10372.0	2604.0	10410.0	2605.0	10511.0	2606.0	10612.0
10R	2606.0	10656.0	2605.0	10698.0	2604.0	10713.0	2603.0	10723.0	2602.0	10748.0
11R	2602.0	10801.0	2603.0	10808.0	2604.0	10815.0	2605.0	10821.0	2606.0	10827.0
12R	2606.0	11382.0	2607.0	12109.0	2608.0	12324.0	2609.0	12368.0	2610.0	12440.0
13R	2615	12900								
NH	3	.056	9900.	.03	10102.	.056	12529			
X1	20.520	51.	9836.	10102.	420.	470.	450.			
1R	2620.0	8998.0	2619.0	9050.0	2618.0	9106.0	2617.0	9175.0	2616.0	9255.0
2R	2615.0	9323.0	2614.0	9389.0	2613.0	9424.0	2613.0	9517.0	2612.0	9558.0
3R	2611.0	9576.0	2610.0	9645.0	2609.0	9660.0	2608.0	9676.0	2607.0	9749.0
4R	2606.0	9836.0	2605.0	9867.0	2604.0	9900.0	2603.0	9997.0	2604.0	10085.0
5R	2605.0	10089.0	2606.0	10093.0	2607.0	10095.0	2608.0	10096.0	2609.0	10099.0
6R	2610.0	10102.0	2610.0	10205.0	2609.0	10209.0	2608.0	10212.0	2608.0	10310.0
7R	2607.0	10422.0	2606.0	10555.0	2605.0	10561.0	2604.0	10567.0	2603.0	10573.0
8R	2602.0	10581.0	2602.0	10633.0	2603.0	10643.0	2604.0	10651.0	2605.0	10693.0
9R	2606.0	10744.0	2607.0	10872.0	2608.0	10985.0	2608.0	11039.0	2607.0	11155.0
10R	2608.0	11473.0	2608.0	11966.0	2609.0	12035.0	2610.0	12129.0	2612.	12229.
11R	2615	12529								
NH	3	.056	9985.	.03	10098.	.056	11500			
X1	20.604	43.	9905.	10108	415.	440.	470.			
1R	2620.0	8917.0	2619.0	8953.0	2618.0	8996.0	2617.0	9044.0	2616.0	9081.0
2R	2615.0	9115.0	2614.0	9148.0	2613.0	9205.0	2612.0	9254.0	2611.0	9328.0
3R	2610.0	9420.0	2609.0	9495.0	2608.0	9561.0	2607.0	9653.0	2606.0	9868.0
4R	2608.0	9905.0	2607.0	9912.0	2606.0	9916.0	2606.0	10090.0	2607.0	10091.0
5R	2608.0	10098.0	2609.0	10108.0	2610.0	10305.0	2610.0	10324.0	2609.0	10331.0
6R	2608.0	10334.0	2607.0	10337.0	2606.0	10340.0	2605.0	10347.0	2604.0	10353.0
7R	2604.0	10400.0	2605.0	10422.0	2606.0	10458.0	2607.0	10549.0	2608.3	10643.0
8R	2608.0	11025.0	2609.0	11083.0	2610.0	11129.0	2610.0	11180.0	2612.	11230.
9R	2612.	11440.	2614.	11490.	2616.	11560				

NH	3	.056	9914.	.03	10102.	.056	12000			
X1	20.660	42.	9914.	10112.	275.	320.	300.			
X3										
GR	2620.0	9011.0	2619.0	9048.0	2618.0	9068.0	2617.0	9078.0	2616.0	9068.0
GR	2615.0	9110.0	2614.0	9132.0	2613.0	9152.0	2612.0	9180.0	2611.0	9322.0
GR	2610.0	9459.0	2609.0	9485.0	2608.0	9507.0	2608.0	9732.0	2609.0	9818.0
GR	2610.0	9893.0	2610.0	9914.0	2609.0	9920.0	2608.0	9924.0	2607.0	9934.0
GR	2606.0	9944.0	2606.0	10091.0	2607.0	10097.0	2608.0	10102.0	2609.0	10107.0
GR	2610.0	10112.0	2610.5	10190.	2611.0	10233.0	2610.0	10441.0	2609.0	10474.0
GR	2608.0	10497.	2607.0	10653.0	2608.0	10788.0	2609.0	10816.0	2610.0	10847.0
GR	2611.0	10921.	2612.0	11401.0	2613.0	11536.0	2614.0	11677.0	2615.0	11771.0
GR	2616.0	11840.	2618	12000						
NH	3	.056	9923.	.03	10149.	.056	11756			
X1	20.722	54.	9923.	10099.	300.	350.	320.			
GR	2630.0	8472.0	2629.0	8528.0	2628.0	8559.0	2627.0	8586.0	2626.0	8617.0
GR	2625.0	8647.0	2624.0	8691.0	2623.0	8738.0	2622.0	8785.0	2621.0	8802.0
GR	2620.0	8823.0	2619.0	8849.0	2618.0	8888.0	2617.0	8951.0	2616.0	9080.0
GR	2615.0	9074.0	2614.0	9140.0	2613.0	9209.0	2612.0	9266.0	2611.0	9421.0
GR	2610.0	9440.0	2609.0	9456.0	2609.0	9573.0	2610.0	9806.0	2610.0	9923.0
GR	2609.0	9926.0	2608.0	9930.0	2607.0	9985.0	2607.0	10072.0	2608.0	10095.0
GR	2609.0	10099.0	2609.0	10149.0	2610.0	10160.0	2611.0	10168.0	2611.	10175.
GR	2612.0	10206.	2612.0	10304.0	2612.0	10405.0	2611.0	10454.0	2610.0	10531.0
GR	2609.0	10546.	2609.0	10658.0	2608.0	10712.0	2608.0	10735.0	2609.0	10744.0
GR	2610.0	10753.	2611.0	10778.0	2612.0	10817.0	2613.0	10896.0	2613.0	11282.0
GR	2614.0	11456.	2615.	11706.	2616.	11736.	2620	11756.		
NH	4	.056	9895.	.03	10080.	.056	10651.	.10	11860	
X1	20.780	58.	9895.	10080.	295.	330.	315.			
X3						10550	2622.			
GR	2630.0	8477.0	2629.0	8527.0	2628.0	8597.0	2627.0	8606.0	2626.0	8630.0
GR	2625.0	8687.0	2624.0	8737.0	2623.0	8779.0	2622.0	8800.0	2621.0	8835.0
GR	2620.0	8863.0	2619.0	8904.0	2618.0	8937.0	2617.0	8953.0	2616.0	8960.0
GR	2615.0	9089.0	2614.0	9332.0	2613.0	9519.0	2612.0	9524.0	2611.0	9529.0
GR	2611.0	9698.0	2612.0	9845.0	2612.0	9895.0	2611.0	9899.0	2610.0	9903.0
GR	2609.0	9907.0	2608.0	10043.0	2608.0	10074.0	2609.0	10076.0	2610.0	10078.0
GR	2611.0	10080.0	2611.0	10145.0	2611.	10150.	2610.0	10181.0	2610.0	10245.0
GR	2611.0	10254.	2612.0	10267.0	2613.0	10334.0	2614.0	10396.0	2614.0	10426.0
GR	2613.0	10503.	2613.0	10631.0	2612.0	10651.0	2611.0	10660.0	2611.0	10753.0
GR	2610.0	10770.	2609.0	10786.0	2609.0	10823.0	2610.0	10834.0	2611.0	10853.0
GR	2612.0	10866.	2613.0	10877.0	2614.0	10992.0	2614.	11182.	2615.	11602.
GR	2616.	11677.	2617.	11702.	2620	11860				
NH	5	.056	9912.	.03	10088.	.05	10230.	.035	10346.	.150
NH	11980									
X1	20.840	59.	9912.	10141.	310.	325.	315.			
X3						10370	2622			
GR	2630.0	8524.0	2629.0	8572.0	2628.0	8626.0	2627.0	8672.0	2626.0	8715.0
GR	2625.0	8746.0	2624.0	8855.0	2623.0	8882.0	2622.0	8891.0	2622.0	8920.0
GR	2621.0	8934.0	2620.0	8976.0	2619.0	8993.0	2618.0	9005.0	2617.0	9025.0
GR	2616.0	9233.0	2616.0	9338.0	2615.0	9544.0	2614.0	9549.0	2613.0	9555.0
GR	2612.0	9561.0	2612.0	9776.0	2613.0	9865.0	2613.0	9912.0	2612.0	9915.0
GR	2611.0	9917.0	2610.0	9918.0	2609.0	10015.0	2609.0	10043.0	2610.0	10083.0

GR	2611.0	10088.0	2612.0	10141.0	2612.	10155.	2612.0	10172.0	2611.0	10230.0
GR	2611.0	10286.	2612.0	10314.0	2613.0	10346.0	2613.0	10431.0	2614.0	10446.0
GR	2615.0	10468.	2616.0	10507.0	2616.0	10770.0	2615.0	10796.0	2614.0	10809.0
GR	2613.0	10843.	2612.0	10853.0	2611.0	10860.0	2611.0	10901.0	2612.0	10986.0
GR	2613.0	10912.	2613.0	10984.0	2614.0	10997.0	2615.0	11014.0	2616.	11334.
GR	2616.	11414.	2617.	11584.	2618.	11604.	2622	11980		
NH	5	.056	9925.	.03	10088	.07	10247	.05	10503.	.15
NW	11486.									
X1	20.982	59.	9925.	10088.	328.	345.	325.			
X3						10330	2625.			
GR	2625.0	8856.0	2624.0	8910.0	2623.0	8942.0	2622.0	8978.0	2622.0	9112.0
GR	2621.0	9123.0	2620.0	9138.0	2620.0	9314.0	2621.0	9319.0	2622.0	9326.0
GR	2623.0	9349.0	2623.0	9377.0	2622.0	9388.0	2621.0	9392.0	2620.0	9398.0
GR	2619.0	9404.0	2618.0	9409.0	2618.0	9422.0	2619.0	9430.0	2620.0	9433.0
GR	2621.0	9438.0	2622.0	9443.0	2623.0	9447.0	2623.0	9464.0	2622.0	9467.0
GR	2621.0	9470.0	2620.0	9475.0	2619.0	9479.0	2618.0	9568.0	2617.0	9604.0
GR	2616.0	9608.0	2615.0	9621.0	2614.0	9696.0	2614.0	9925.0	2613.0	9930.0
GR	2612.0	9934.0	2611.0	9958.0	2611.0	10073.0	2612.0	10078.0	2613.0	10083.0
GR	2614.0	10088.0	2614.	10210.	2614.0	10224.0	2615.0	10233.0	2616.0	10239.0
GR	2617.0	10247.	2617.0	10503.0	2616.0	10641.0	2615.0	10836.0	2614.	10981.
GR	2613.	10991.	2613.	11016.	2614.	11021.	2615.	11026.	2616.	11031.
GR	2617.	11081.	2618.	11176.	2618.	11426.	2619.	11486.		
NH	5	.056	9921.	.03	10093.	.07	10176.	.035	10313.	.15
NW	11770.									
X1	20.983	49.	9921.	10112.	405.	440.	425.			
X3						10270	2627.			
GR	2630	8740	2625.0	8970.0	2624.0	9068.0	2623.0	9073.0	2622.0	9191.0
GR	2622.0	9214.0	2623.0	9220.0	2623.0	9240.0	2622.0	9256.0	2621.0	9271.0
GR	2620.0	9291.0	2619.0	9652.0	2619.0	9691.0	2618.0	9695.0	2617.0	9700.0
GR	2616.0	9750.0	2616.0	9921.0	2615.0	9925.0	2614.0	9929.0	2613.0	9932.0
GR	2613.0	10081.0	2614.0	10088.0	2615.0	10093.0	2616.0	10097.0	2617.0	10103.0
GR	2618.0	10106.0	2619.0	10112.0	2620.0	10176.0	2621.0	10190.0	2621.	10200.
GR	2621.0	10239.0	2620.0	10250.	2619.0	10313.0	2619.0	10710.0	2618.0	10865.0
GR	2617.0	10899.0	2616.0	10923.	2615.0	10938.0	2615.0	10977.0	2616.0	10988.0
GR	2617.0	11000.0	2618.0	11012.	2619.0	11133.0	2620.0	11400.0	2621.	11440.
GR	2622.	11495.	2623.	11620.	2624.	11690.	2625.	11770.		
NH	5	.056	9936.	.03	10100.	.07	10136.	.035	10327.	.15
NW	11434.									
X1	21.066	42.	9835.	10198.	415.	460.	440.			
X3						10280	2630.			
GR	2630.	8868.	2627.	9018.	2625.0	9118.0	2624.0	9179.0	2623.0	9224.0
GR	2622.0	9380.0	2621.0	9393.0	2620.0	9748.0	2620.0	9835.0	2619.0	9844.0
GR	2618.0	9852.0	2617.0	9907.0	2616.0	9916.0	2615.0	9936.0	2614.0	9974.0
GR	2614.0	10100.0	2615.0	10101.0	2616.0	10103.0	2617.0	10136.0	2618.0	10157.0
GR	2619.0	10180.0	2620.0	10191.0	2621.0	10198.0	2621.	10215.	2621.0	10255.0
GR	2622.0	10281.0	2622.0	10303.0	2621.0	10327.	2621.0	10520.0	2620.0	10933.0
GR	2619.0	10949.0	2618.0	10965.0	2617.0	10985.	2617.0	11014.0	2618.0	11020.0
GR	2619.0	11028.0	2620.0	11039.0	2621.	11061.	2622.	11154.	2623.	11214.
GR	2624.	11379.	2625.	11434.						

NH	5	.056	9897.	.03	10096.	.05	10276.	.035	10341.	.1
NH	11373.									
X1	21.125	45.	9857.	10096.	305.	325.	315.			
X3						10280	2635.			
GR	2630.	9835.	2629.	9895.	2628.	9135.	2627.	9155.	2626.	9215.
GR	2625.0	9305.0	2624.0	9315.0	2623.0	9325.0	2623.0	9334.0	2623.0	9415.0
GR	2622.0	9694.0	2622.0	9782.0	2621.0	9857.0	2620.0	9871.0	2619.0	9889.0
GR	2618.0	9897.0	2617.0	9903.0	2616.0	9907.0	2615.0	9913.0	2615.0	9918.0
GR	2616.0	10077.0	2617.0	10086.0	2618.0	10096.0	2618.	10150.	2618.0	10276.0
GR	2619.0	10296.	2620.0	10311.0	2621.0	10325.0	2622.0	10341.0	2623.0	10503.0
GR	2621.0	10510.	2620.0	10521.0	2620.0	10622.0	2621.0	10640.0	2621.0	10728.0
GR	2622.0	10914.	2622.0	10954.0	2621.0	11054.0	2620.0	11063.0	2620.0	11190.0
GR	2621.0	11200.	2622.0	11208.0	2623.0	11222.0	2624.0	11259.0	2625.0	11373.0
NH	4	.056	9891.	.03	10118.	.05	10360.	.1	11644	
X1	21.207	38.	9891.	10118.	420.	425.	425.			
X3						10465	2635.			
GR	2630.	9350.	2628.	9450.	2626.0	9544.	2625.	9554.	2625.	9644.
GR	2624.0	9719.0	2623.0	9891.0	2622.0	9893.0	2621.0	9894.0	2620.0	9897.0
GR	2619.0	9898.0	2618.0	9900.0	2617.0	9902.0	2617.0	10016.	2618.0	10082.0
GR	2619.0	10095.0	2620.0	10118.0	2620.	10280.	2620.0	10360.	2619.0	10384.
GR	2619.0	10469.0	2620.0	10486.0	2621.0	10502.	2622.0	10524.	2623.0	10530.
GR	2624.0	10635.0	2623.0	11126.0	2622.0	11145.	2621.0	11157.	2621.0	11197.
GR	2622.0	11202.0	2622.0	11244.0	2623.0	11260.	2623.0	11463.	2624.0	11517.
GR	2625.0	11579.0	2626.0	11609.	2627.0	11644.	.0	.0	.0	.0
NH	5	.07	9900.	.03	10067.	.05	10297.	.035	10441.	.1
NH	12156.									
X1	21.325	55	9900.	10067.	630.	610.	615.			
X3						10450	2635.			
GR	2640.0	9201.0	2639.0	9230.0	2638.0	9267.0	2637.0	9305.0	2636.0	9377.0
GR	2635.0	9409.0	2634.0	9445.0	2633.0	9490.0	2632.0	9544.0	2631.0	9572.0
GR	2630.0	9595.0	2629.0	9632.0	2628.0	9663.0	2628.0	9790.0	2627.0	9807.0
GR	2626.0	9825.0	2625.0	9843.0	2624.0	9858.0	2623.0	9900.0	2621.0	9905.0
GR	2621.0	9909.0	2620.0	9914.0	2619.0	9917.0	2619.0	9922.0	2620.0	10059.0
GR	2621.0	10061.0	2622.0	10064.0	2623.0	10067.0	2623.0	10200.0	2622.	10290.
GR	2622.0	10297.	2622	10441	2622.0	10525.0	2623.0	10543.0	2624.0	10557.0
GR	2625.0	10571.0	2626.0	10586.	2627.0	11441.0	2627.0	11512.0	2627.0	11512.0
GR	2626.0	11514.0	2625.0	11519.	2624.0	11521.0	2624.0	11532.0	2625.0	11543.0
GR	2626.0	11558.0	2627.0	11624.	2628.0	11698.0	2629.0	11749.0	2630.0	11782.0
GR	2631.0	11845.0	2632.0	11931.	2633.0	12008.0	2634.0	12063.0	2635.0	12156.0
NH	5	.07	9914.	.03	10033.	.07	10207.	.035	10466.	.12
NH	11984.									
X1	21.468	47.	9885.	10041.	780.	720.	755.			
X3						10430	2640.			
GR	2640.0	9244.0	2639.0	9279.0	2638.0	9314.0	2637.0	9343.0	2636.0	9377.0
GR	2635.0	9428.0	2634.0	9504.0	2633.0	9579.0	2632.0	9676.0	2631.0	9713.0
GR	2630.0	9763.0	2630.0	9791.0	2629.0	9817.0	2628.0	9833.0	2627.0	9861.0
GR	2626.0	9885.0	2625.0	9893.0	2624.0	9901.0	2623.0	9914.0	2623.0	10033.0
GR	2624.0	10036.0	2625.0	10039.0	2626.0	10041.0	2626.0	10153.0	2625.0	10196.0
GR	2625.0	10207.0	2625.2	10240.	2626.0	10354.0	2627.0	10402.0	2628.0	10415.0
GR	2629.0	10466.	2630.0	10606.0	2630.0	11326.0	2630.0	11381.0	2629.0	11393.0

GR	2628.0	11403.	2628.0	11471.0	2627.0	11478.0	2627.0	11516.0	2628.0	11521.0
GR	2629.0	11525.	2630.0	11571.0	2631.0	11673.0	2632.0	11736.0	2633.0	11798.0
GR	2634.0	11833.	2635.0	11904.0	.0	.0	.0	.0	.0	.0
NH	5	.07	9917.	.03	10041.	.07	10229.	.035	10512.	.15
NH	11737.									
X1	21.544	54.	9903.	10051.	400.	390.	390.			
X3						10430	2645.			
GR	2640.0	9239.0	2639.0	9278.0	2638.0	9338.0	2637.0	9371.0	2636.0	9417.0
GR	2635.0	9440.0	2634.0	9445.0	2634.0	9456.0	2635.0	9463.0	2636.0	9472.0
GR	2636.0	9493.0	2635.0	9555.0	2634.0	9681.0	2633.0	9770.0	2632.0	9807.0
GR	2632.0	9868.0	2631.0	9880.0	2630.0	9891.0	2629.0	9896.0	2628.0	9903.0
GR	2627.0	9917.0	2626.0	9920.0	2625.0	9924.0	2624.0	9927.0	2624.0	10032.0
GR	2625.0	10034.0	2626.0	10036.0	2627.0	10041.0	2628.0	10051.0	2628.0	10150.0
GR	2629.0	10175.0	2629.0	10206.0	2628.0	10229.0	2628.	10230.	2628.0	10384.0
GR	2629.0	10413.	2630.0	10442.0	2631.0	10512.0	2631.0	10939.0	2631.0	11248.0
GR	2630.0	11279.	2630.0	11323.0	2629.0	11391.0	2628.0	11413.0	2627.0	11448.0
GR	2627.0	11456.	2628.0	11481.0	2629.0	11494.0	2630.0	11510.0	2631.0	11525.0
GR	2632.0	11585.	2633.0	11627.0	2634.0	11692.0	2635.0	11737.0	.0	.0
NH	5	.07	9970.	.03	10054.	.07	10292.	.035	10605.	.1
NH	11944.									
X1	21.628	53	9970.	10150.	430.	450.	440.			
X3						10490	2645.			
GR	2645	9200	2640.0	9452.0	2639.0	9491.0	2638.0	9542.0	2637.0	9586.0
GR	2636.0	9692.0	2635.0	9761.0	2634.0	9797.0	2633.0	9964.0	2632.0	9970.0
GR	2631.0	9973.0	2630.0	9976.0	2629.0	9978.0	2628.0	9980.0	2627.0	9983.0
GR	2626.0	9984.0	2626.0	10035.0	2627.0	10054.0	2628.0	10058.0	2629.0	10090.0
GR	2630.0	10112.0	2631.0	10150.0	2631.	10270.	2631.0	10292.0	2631.0	10562.0
GR	2632.0	10573.0	2633.0	10580.	2634.0	10605.0	2634.0	10733.0	2633.0	10750.0
GR	2632.0	10764.0	2632.0	10807.	2633.0	10836.0	2633.0	11168.0	2632.0	11251.0
GR	2632.0	11398.0	2632.0	11410.	2631.0	11416.0	2630.0	11423.0	2629.0	11430.0
GR	2629.0	11462.0	2630.0	11497.	2631.0	11504.0	2632.0	11509.0	2633.0	11515.0
GR	2634.0	11516.0	2634.0	11586.	2635.0	11671.0	2636.0	11727.0	2637.0	11800.0
GR	2638.0	11835.0	2639.0	11896.	2640.0	11944.0	.0	.0	.0	.0
NH	5	.065	9975.	.03	10046.	.07	10307.	.035	10611.	.1
NH	11853									
X1	21.707	65.	9834.	10090.	420.	405.	410.			
X3						10550	2645.			
GR	2641.0	9279.	2640.	9314.	2639.0	9345.0	2639.0	9439.0	2636.0	9569.0
GR	2637.0	9590.0	2637.0	9628.0	2636.0	9689.0	2635.0	9716.0	2634.0	9834.0
GR	2633.0	9849.0	2632.0	9861.0	2631.0	9871.0	2630.0	9927.0	2629.0	9971.0
GR	2628.0	9975.0	2628.0	10039.0	2629.0	10043.0	2630.0	10046.0	2631.0	10051.0
GR	2632.0	10071.	2633.0	10090.0	2633.0	10101.0	2632.0	10116.0	2634.	10130.
GR	2631.0	10132.	2630.0	10185.	2631.0	10205.0	2632.0	10264.0	2633.0	10275.0
GR	2634.0	10307.	2634.0	10416.	2635.0	10436.0	2636.0	10444.0	2637.0	10453.0
GR	2637.0	10532.	2636.0	10540.	2635.0	10552.0	2635.0	10597.0	2636.0	10611.0
GR	2636.0	10708.	2635.0	10719.	2634.0	10733.0	2634.0	10830.0	2635.0	10853.0
GR	2635.0	10992.	2634.0	11020.	2634.0	11224.0	2633.0	11289.0	2632.0	11324.0
GR	2631.0	11332.	2630.0	11339.	2630.0	11354.0	2631.0	11362.0	2632.0	11366.0
GR	2633.0	11376.	2634.0	11397.	2634.0	11432.0	2635.0	11465.0	2636.0	11509.0
GR	2637.0	11613.	2638.0	11658.	2639.0	11705.0	2640.0	11783.0	2641.	11853.

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NH      5      .065     9947.      .03     10050.      .07     10256.      .035     10593.      .15
NH   11770
X1  21.790        64     9922.   10116.       435.      430.       430.
X3                                                    10340      2650.
GR    2645     8978.     2642.     8998.     2641.     9028.      2640.     9078.     2639.0     9178.0
GR  2638.0     9207.0    2637.0    9228.0    2636.0    9294.0     2636.0    9857.0    2635.0     9860.0
GR  2634.0     9866.0    2633.0    9872.0    2632.0    9878.0     2632.0    9903.0    2633.0     9907.0
GR  2634.0     9912.0    2634.0    9922.0    2633.0    9930.0     2632.0    9937.0    2631.0     9941.0
GR  2630.0     9947.0    2630.0    10050.    2631.0    10053.     2632.0    10070.0   2633.0     10092.0
GR  2634.0     10101.0   2635.0    10116.    2634.0    10129.     2633.0    10137.0   2633.0     10155.0
GR  2634.0     10161.0   2635.0    10171.    2635.0    10187.     2635.0    10258.0   2635.      10320.
GR  2635.0     10469.0   2636.0    10569.    2637.0    10593.     2638.0    10635.    2630.0     10699.0
GR  2637.0     10711.0   2636.0    10724.    2636.0    11059.     2635.0    11074.    2634.0     11081.0
GR  2634.0     11132.0   2635.0    11272.    2634.0    11319.     2633.0    11324.    2633.0     11328.0
GR  2631.0     11332.0   2630.0    11335.    2630.0    11357.     2631.0    11359.    2632.0     11364.0
GR  2633.0     11367.0   2634.0    11369.    2635.0    11373.     2636.0    11378.    2637.0     11408.0
GR  2638.0     11546.0   2639.0    11621.    2640.0    11695.     2641.0    11770.

NH      5      .065     9862.      .03     10046.      .05     10160.      .035     10455.      .15
NH   11690.
X1  21.880        58.    9854.   10055.       520.      440.       470.
X3                                                    10390      2650.
GR  2645.0     8983.0    2644.0    9013.0    2643.0    9045.0     2642.0    9058.0    2641.0     9102.0
GR  2640.0     9126.0    2639.0    9150.0    2638.0    9177.0     2637.0    9330.0    2637.0     9496.0
GR  2638.0     9717.0    2638.0    9765.0    2637.0    9774.0     2636.0    9780.0    2635.0     9787.0
GR  2635.0     9808.0    2636.0    9820.0    2636.0    9854.0     2635.0    9862.0    2634.0     9865.0
GR  2633.0     9870.0    2633.0    9910.0    2632.0    9919.0     2632.0    9942.0    2631.0     10026.0
GR  2632.0     10032.0   2633.0    10036.0   2634.0    10040.0    2635.0    10046.0   2636.0     10055.0
GR  2637.0     10160.0   2638.0    10225.0   2638.0    10355.0    2637.0    10442.0   2638.0     10449.0
GR  2639.0     10455.0   2639.0    10637.0   2638.0    10645.0    2637.0    10861.0   2636.0     11182.0
GR  2635.0     11193.0   2634.0    11198.0   2633.0    11201.0    2632.0    11204.0   2632.0     11232.0
GR  2633.0     11235.0   2634.0    11237.0   2635.0    11241.0    2636.0    11245.0   2637.0     11249.0
GR  2638.0     11278.0   2639.0    11301.0   2640.0    11352.0    2641.0    11487.0   2642.0     11495.0
GR  2643.0     11531.0   2644.0    11627.0   2645.0    11690.0      .0        .0        .0         .0

NH      5      .065     9939.      .03     10092.      .05     10194.      .035     10411.      .15
NH   11507.
X1  21.925        70.    9939.   10134.       285.      235.       240.
X3                                                    10340      2650.
GR    2650.    9196.     2645.0    9296.0    2644.0    9335.0     2643.0    9375.0    2642.0     9397.0
GR  2642.0     9424.0    2643.0    9447.0    2643.0    9670.0     2642.0    9692.0    2641.0     9701.0
GR  2640.0     9711.0    2639.0    9721.0    2639.0    9760.0     2640.0    9782.0    2640.0     9786.0
GR  2639.0     9790.0    2638.0    9794.0    2637.0    9797.0     2636.0    9802.0    2636.0     9844.0
GR  2637.0     9855.0    2638.0    9867.0    2638.0    9939.0     2637.0    9942.0    2636.0     9944.0
GR  2635.0     9946.0    2634.0    9949.0    2633.0    9952.0     2633.0    10067.0   2634.0     10072.0
GR  2635.0     10078.0   2636.0    10081.0   2637.0    10092.0    2638.0    10134.0   2638.      10175.
GR  2638.0     10194.0   2639.0    10200.    2639.0    10311.0    2640.0    10411.0   2641.0     10466.0
GR  2641.0     10510.0   2640.0    10555.    2640.0    10592.0    2639.0    10639.0   2639.0     10723.0
GR  2638.0     10930.0   2638.0    11153.    2637.0    11158.0    2636.0    11162.0   2635.0     11166.0
GR  2634.0     11168.0   2633.0    11172.    2632.0    11194.0    2632.0    11197.0   2633.0     11199.0
GR  2634.0     11201.0   2635.0    11203.    2636.0    11205.0    2637.0    11208.0   2638.0     11210.0
GR  2639.0     11214.0   2639.0    11260.    2640.0    11298.0    2640.0    11333.0   2641.0     11384.0
GR  2642.0     11423.0   2642.0    11468.    2643.0    11513.0    2644.0    11561.0   2645.0     11587.0
```

NH	4	.065	9902.	.03	10085.	.05	10353.	.15	11430.	
X1	21.972	59.	9870.	10133.	235.	250.	245.			
X3						10280	2650.			
GR	2650.	9100.	2645.0	9330.0	2644.0	9360.0	2643.0	9387.0	2642.0	9421.0
GR	2641.0	9456.0	2641.0	9700.0	2642.0	9706.0	2642.0	9711.0	2641.0	9722.0
GR	2640.0	9739.0	2639.0	9751.0	2638.0	9759.0	2637.0	9768.0	2637.0	9778.0
GR	2638.0	9787.0	2639.0	9840.0	2639.0	9870.0	2638.0	9892.0	2637.0	9895.0
GR	2636.0	9898.0	2635.0	9902.0	2634.0	9920.0	2634.0	9972.0	2635.0	9984.0
GR	2635.0	10020.0	2635.0	10077.0	2636.0	10080.0	2637.0	10082.0	2633.0	10085.0
GR	2639.0	10133.0	2639.5	10160.	2640.0	10211.0	2641.0	10288.0	2642.0	10353.0
GR	2642.0	10448.0	2641.0	10525.	2640.0	10619.0	2640.0	10878.0	2637.0	10912.0
GR	2639.0	11061.0	2638.0	11072.	2637.0	11075.0	2636.0	11078.0	2635.0	11081.0
GR	2634.0	11091.0	2634.0	11107.	2635.0	11110.0	2636.0	11113.0	2637.0	11116.0
GR	2638.0	11120.0	2639.0	11121.	2640.0	11131.0	2640.0	11231.0	2641.0	11288.0
GR	2642.0	11308.0	2643.0	11388.	2644.0	11405.0	2645.0	11430.0	.0	.0
NH	5	.065	9862.	.03	10141.	.05	10283.	.035	10490.	.07
NH	11432.									
X1	22.047	57.	9778.	10165.	295.	430.	395.			
X3						10440	2655.			
GR	2650.	9092.	2645.0	9432.0	2644.0	9487.0	2644.0	9634.0	2643.0	9703.0
GR	2642.0	9778.0	2641.0	9791.0	2640.0	9840.0	2639.0	9854.0	2638.0	9862.0
GR	2637.0	9865.0	2636.0	9868.0	2636.0	9921.0	2637.0	10050.0	2637.0	10066.0
GR	2636.0	10099.0	2636.0	10115.0	2637.0	10121.0	2638.0	10128.0	2639.0	10133.0
GR	2640.0	10138.0	2641.0	10141.0	2642.0	10165.0	2642.	10200.	2642.0	10251.0
GR	2643.0	10283.0	2644.0	10291.	2645.0	10300.0	2645.0	10383.0	2644.0	10389.0
GR	2643.0	10396.0	2643.0	10426.	2643.0	10490.0	2642.0	10698.0	2642.0	10895.0
GR	2641.0	10942.0	2640.0	11062.	2639.0	11071.0	2638.0	11092.0	2637.0	11110.0
GR	2636.0	11133.0	2636.0	11146.	2637.0	11156.0	2638.0	11168.0	2639.0	11185.0
GR	2640.0	11200.0	2641.0	11229.	2641.0	11259.0	2640.0	11268.0	2639.0	11279.0
GR	2639.0	11313.0	2640.0	11316.	2641.0	11319.0	2642.0	11325.0	2643.0	11346.0
GR	2644.0	11390.0	2645.0	11432.	0					
NH	5	.065	9830.	.03	10169.	.05	10592.	.035	11306.	.07
NH	11879.									
X1	22.125	65.	9769.	10183.	330.	490.	410.			
X3						10550	2655.			
GR	2655	8828.	2650.0	9128.0	2649.0	9152.0	2648.0	9288.0	2647.0	9276.0
GR	2646.0	9324.0	2645.0	9418.0	2644.0	9519.0	2645.0	9623.0	2645.0	9696.0
GR	2644.0	9745.0	2643.0	9756.0	2642.0	9769.0	2641.0	9824.0	2640.0	9830.0
GR	2639.0	9835.0	2638.0	9839.0	2638.0	9957.0	2639.0	9960.0	2640.0	9966.0
GR	2641.0	9969.0	2642.0	10008.0	2642.0	10040.0	2641.0	10082.0	2640.0	10091.0
GR	2639.0	10098.0	2638.0	10108.0	2638.0	10158.0	2639.0	10164.0	2640.0	10169.0
GR	2641.0	10176.0	2642.0	10183.0	2642.0	10245.0	2641.0	10255.0	2640.0	10259.0
GR	2639.0	10267.0	2639.0	10276.0	2640.0	10281.0	2641.0	10285.0	2641.0	10327.0
GR	2640.5	10350.	2640.0	10367.	2641.0	10377.0	2642.0	10452.0	2643.0	10470.0
GR	2644.0	10485.0	2645.0	10504.	2645.0	10520.0	2644.0	10536.0	2643.0	10548.0
GR	2643.0	10582.0	2644.0	10592.	2644.0	10871.0	2643.0	10905.0	2643.0	10970.0
GR	2644.0	11003.0	2645.0	11077.	2644.0	11306.0	2644.0	11330.0	2645.0	11562.0
GR	2646.0	11775.0	2647.0	11828.	2648.0	11850.0	2649.0	11859.0	2650.0	11879.0

NH	3	.065	9807.	.036	10192.	.065	11916.			
X1	22.195	67.	9807.	10238.	340.	380.	365.			
X3				9807.	2649.	10600	2655.			
GR	2655.	8845.	2650.0	9345.0	2649.0	9411.0	2648.0	9518.0	2647.0	9605.0
GR	2646.0	9621.0	2645.0	9632.0	2645.0	9701.0	2646.0	9729.0	2647.0	9752.0
GR	2648.0	9776.0	2649.0	9799.0	2649.0	9807.0	2648.0	9809.0	2647.0	9811.0
GR	2646.0	9813.0	2645.0	9815.0	2644.0	9817.0	2643.0	9818.0	2642.0	9819.0
GR	2641.0	9822.0	2640.0	9825.0	2639.0	9841.0	2639.0	9860.0	2640.0	9910.0
GR	2640.0	9937.0	2641.0	9943.0	2642.0	9952.0	2643.0	9958.0	2644.0	9976.0
GR	2644.0	9992.0	2643.0	10008.0	2642.0	10014.0	2641.0	10024.0	2641.0	10184.0
GR	2642.0	10192.0	2643.0	10225.0	2644.0	10233.0	2645.0	10238.0	2644.0	10343.0
GR	2644.0	10397.0	2645.0	10442.0	2646.0	10465.0	2647.0	10474.0	2647.0	10508.0
GR	2646.0	10515.0	2645.0	10522.0	2644.0	10529.0	2643.0	10534.0	2642.0	10541.0
GR	2641.0	10547.0	2641.0	10590.0	2642.0	10593.0	2643.0	10596.0	2644.0	10599.0
GR	2644.	10600.	2645.0	10603.	2646.0	10716.0	2646.0	10820.0	2645.0	10879.0
GR	2645.0	11006.0	2646.0	11091.	2646.0	11452.0	2647.0	11661.0	2648.0	11776.0
GR	2649.0	11854.0	2650.0	11916.	0					

NH	3	.065	9767.	.036	10247.	.065	11950			
X1	22.275	70.	9767.	10247.	425.	240.	370.			
X3						10800	2655			
GR	2655.	9388.	2652.0	9530.0	2651.0	9565.0	2650.0	9588.0	2649.0	9651.0
GR	2649.0	9728.0	2648.0	9749.0	2647.0	9755.0	2646.0	9761.0	2645.0	9767.0
GR	2644.0	9773.0	2643.0	9778.0	2642.0	9784.0	2641.0	9891.0	2641.0	9901.0
GR	2642.0	9903.0	2643.0	9907.0	2644.0	9910.0	2645.0	9913.0	2645.0	10043.0
GR	2644.0	10057.0	2643.0	10081.0	2642.0	10158.0	2642.0	10194.0	2643.0	10202.0
GR	2643.0	10239.0	2644.0	10243.0	2645.0	10247.0	2645.0	10325.0	2646.0	10338.0
GR	2647.0	10394.0	2648.0	10469.0	2649.0	10474.0	2650.0	10479.0	2651.0	10484.0
GR	2652.0	10487.0	2653.0	10491.0	2654.0	10495.0	2655.0	10499.0	2654.0	10501.0
GR	2653.0	10504.0	2652.0	10507.0	2652.0	10671.0	2653.0	10674.0	2654.0	10677.0
GR	2654.0	10683.0	2653.0	10687.0	2652.0	10691.0	2651.0	10693.0	2650.0	10696.0
GR	2649.0	10735.0	2648.0	10739.0	2647.0	10742.0	2646.0	10745.0	2645.0	10749.0
GR	2644.0	10752.0	2643.0	10755.0	2642.0	10758.0	2642.0	10794.0	2643.0	10796.0
GR	2644.0	10799.0	2645.0	10803.0	2646.0	10809.0	2647.0	10913.0	2647.0	11367.0
GR	2647.0	11665.0	2648.	11800.	2648.	11860.	2649.	11900.	2650.	11950.

WENTWORTH ROAD

NH	3	.065	9754.	.036	10330.	.065	12280.			
X1	22.338	37.	9708.	10390.	400.	280.	395.			
GR	2655.0	9393.0	2654.0	9434.0	2653.0	9506.0	2652.0	9560.0	2651.0	9612.0
GR	2650.0	9640.0	2649.0	9656.0	2648.0	9689.0	2647.0	9708.0	2646.0	9754.0
GR	2645.0	9782.0	2644.0	9809.0	2643.0	9835.0	2643.0	9891.0	2644.0	9916.0
GR	2645.0	9946.0	2646.0	10005.0	2645.	10020.	2644.	10130.	2644.	10230.
GR	2646.	10330.	2647.	10390.	2647.	10690.	2647.	10765.	2647.	10995.
GR	2647.6	11050.	2647.	11110.	2648.	11182.	2648.	11735.	2649.	11850.
GR	2649.	11935.	2650.	12005.	2651.	12040.	2652.	12115.	2653.	12170.
GR	2654.	12230.	2655.	12280.	.0	.0	.0	.0	.0	.0

NH	3	.065	9837.	.036	10304.	.065	11532.			
XI	22.373	36.	9823.	10330.	200.	350.	200.			
GR	2653.	9292.	2654.	9481.	2653.	9590.	2652.	9634.	2651.	9673.
GR	2651.	9767.	2651.	9823.	2650.	9825.	2649.	9826.	2648.	9828.
GR	2647.	9831.	2646.	9834.	2645.	9837.	2644.	9898.	2644.	9954.
GR	2645.	9957.	2646.	9959.	2647.	9961.	2648.	9966.	2648.	10010.
GR	2647.	10051.	2646.	10061.	2646.	10248.	2647.	10304.	2648.	10316.
GR	2649.	10327.	2650.	10338.	2650.	10457.	2651.	10605.	2651.	10719.
GR	2650.	10941.	2649.	11044.	2649.	11159.	2650.	11283.	2651.	11319.
GR	2655.	11532.								
NH	3	.065	9825.	.036	10167.	.065	11651.			
XI	22.454	50.	9770.	10366.	170.	230.	170.			
GR	2660.0	8996.0	2659.0	9102.0	2658.0	9161.0	2658.0	9206.0	2657.0	9219.0
GR	2656.0	9337.0	2655.0	9396.0	2654.0	9555.0	2653.0	9578.0	2652.0	9668.0
GR	2651.0	9770.0	2650.0	9784.0	2649.0	9793.0	2648.0	9805.0	2647.0	9815.0
GR	2646.0	9825.0	2645.0	9850.0	2645.0	9975.0	2646.0	9978.0	2647.0	9979.0
GR	2648.0	9980.0	2648.0	9986.0	2647.0	10020.0	2647.0	10167.0	2648.0	10199.0
GR	2648.0	10336.0	2649.0	10345.0	2650.0	10355.0	2651.0	10366.0	2651.0	10435.0
GR	2652.0	10536.0	2651.0	10655.0	2650.0	10700.0	2650.0	10711.0	2651.0	10723.0
GR	2652.0	10739.0	2653.0	10756.0	2653.0	10912.0	2652.0	10920.0	2651.0	10951.0
GR	2651.0	11126.0	2652.0	11182.0	2653.0	11235.0	2654.0	11310.0	2655.0	11343.0
GR	2656.0	11377.0	2657.0	11440.0	2658.0	11490.0	2659.0	11575.0	2660.0	11651.0
NH	3	.065	9825.	.03	10137.	.065	11239.			
XI	22.511	30.	9790.	10559.	300.	300.	300.			
GR	2660.0	9177.0	2659.0	9290.0	2658.0	9321.0	2657.0	9377.0	2656.0	9456.0
GR	2655.0	9522.0	2654.0	9867.0	2653.0	9723.0	2652.0	9790.0	2651.0	9801.0
GR	2650.0	9818.0	2649.0	9825.0	2648.0	9842.0	2647.0	9917.0	2647.0	10092.0
GR	2648.0	10096.0	2648.0	10137.0	2649.0	10153.0	2650.0	10183.0	2650.0	10481.0
GR	2651.0	10511.0	2652.0	10559.0	2652.0	10754.0	2653.0	10962.0	2654.0	11036.0
GR	2654.0	11064.0	2655.0	11115.0	2656.0	11175.0	2657.0	11205.0	2658.0	11239.0
NH	3	.065	9606.	.036	10239.	.065	11137.			
XI	22.591	55.	9456.	10279.	420.	345.	420.			
GR	2660.0	8946.0	2659.0	9082.0	2658.0	9124.0	2657.0	9215.0	2656.0	9337.0
GR	2656.0	9456.0	2655.0	9470.0	2654.0	9517.0	2653.0	9589.0	2652.0	9594.0
GR	2651.0	9597.0	2650.0	9601.0	2649.0	9603.0	2648.0	9606.0	2648.0	9618.0
GR	2649.0	9653.0	2650.0	9657.0	2651.0	9660.0	2652.0	9662.0	2653.0	9665.0
GR	2654.0	9670.0	2654.0	9751.0	2653.0	9770.0	2652.0	9777.0	2651.0	9783.0
GR	2650.0	9788.0	2649.0	9793.0	2649.0	9877.0	2648.0	9964.0	2648.0	9970.0
GR	2649.0	9971.0	2650.0	9973.0	2651.0	9976.0	2651.0	10027.0	2650.0	10042.0
GR	2649.0	10057.0	2649.0	10080.0	2650.0	10140.0	2651.0	10239.0	2652.0	10248.0
GR	2653.0	10279.0	2653.0	10317.0	2652.0	10407.0	2652.0	10438.0	2653.0	10446.0
GR	2654.0	10478.0	2654.0	10537.0	2653.0	10609.0	2654.0	10696.0	2655.0	10774.0
GR	2656.0	10870.0	2657.0	10937.0	2658.0	10990.0	2659.0	11084.0	2660.0	11137.0
NH	3	.065	9803.	.036	10272.	.065	10937.			
XI	22.670	35.	9746.	10280.	420.	380.	420.			
GR	2660.0	8924.0	2659.0	8952.0	2658.0	9050.0	2657.0	9147.0	2656.0	9407.0
GR	2655.0	9536.0	2655.0	9656.0	2655.0	9746.0	2654.0	9760.0	2653.0	9790.0
GR	2652.0	9798.0	2651.0	9803.0	2650.0	9810.0	2650.0	9817.0	2651.0	9880.0
GR	2652.0	9887.0	2653.0	9905.0	2654.0	9954.0	2654.0	10023.0	2654.0	10078.0

GR	2653.0	10111.0	2652.0	10173.0	2652.0	10272.0	2653.0	10276.0	2654.0	10278.0
GR	2655.0	10280.0	2655.0	10572.0	2654.0	10592.0	2654.0	10598.0	2655.0	10612.0
GR	2656.	10667.	2657.	10722.	2658.	10797.	2659.	10857.	2660.	10937.

***** REACH #4 *****

TAKEN FROM DATA BY ARMY CORPS OF ENGINEERS, 1975

NC	.065	.065	.040	.1	.3					
X1	10580	15	1975	2200	544	544	544			
GR	2675	0	2672	150	2672	485	2668	690	2664	985
GR	2660	1245	2656	1975	2653.5	2030	2653.5	2200	2653.6	2420
GR	2656	2585	2657.6	2930	2660	3125	2664	3395	2672	3870
X1	10640	15	1875	2100	230	435	320			
GR	2676	0	2672	265	2668	615	2665	815	2664	925
GR	2660	1185	2657	1545	2656	1875	2655	1925	2655	2100
GR	2656	2415	2660	2700	2664	3110	2668	3300	2676	3525
X1	10700	15	1800	2060	290	445	330			
GR	2676	0	2672	340	2668	630	2664	980	2660.5	1190
GR	2660	1270	2656	1800	2655.9	1930	2656	2060	2657	2230
GR	2656	2390	2660	2530	2668	2960	2672	3290	2676	3470
X1	10780	19	1600	1775	360	510	425			
GR	2680	0	2676	250	2672	490	2672	530	2673	570
GR	2672	590	2669	750	2668	890	2664.5	1045	2664	1280
GR	2661	1480	2660	1600	2658	1640	2658	1775	2658.6	1940
GR	2660	2300	2660	2420	2664	2700	2668	2890		
X1	10860	14	1410	1480	320	480	420			
GR	2680	0	2676	100	2672	210	2673	350	2672	500
GR	2672	730	2668	900	2664	1060	2660	1410	2660	1480
GR	2664	2410	2668	2735	2676	3150	2680	3600		
X1	10940	12	1230	1450	465	380	430			
GR	2684	0	2672	295	2668	430	2668	535	2664	1020
GR	2662	1230	2662	1450	2664	1570	2664.5	2085	2668	2540
GR	2676	3120	2680	3480						
X1	11020	18	1240	1450	470	380	425			
X3	10									
GR	2682	0	2681	160	2680	320	2676	490	2672	560
GR	2668	940	2664	1040	2664	1115	2668	1185	2668	1220
GR	2664	1240	2664	1450	2666.4	1740	2668	2540	2672	2630
GR	2676	2850	2680	3225	2684	3350				
X1	11100	19	950	1990	460	270	420			
X3	10									
GR	2684	0	2676	210	2672	515	2671.7	615	2668.5	750
GR	2668	875	2669	940	2668	950	2667.3	1670	2668	1990
GR	2667.6	2110	2668	2220	2672	2390	2676	2610	2680	2830
GR	2681	2940	2680	3070	2684	3150	2680	3470		

X1	11160	24	815	1260	245	300	315			
GR	2684	0	2680	55	2676	170	2672	600	2672	700
GR	2668	740	2668.2	770	2668	815	2667	950	2668	1100
GR	2668	1170	2668.3	1260	2668	1310	2668	1350	2668.3	1420
GR	2669	1650	2672	1930	2672	2072	2670.2	2460	2676	2680
GR	2680	2980	2684	3140	2684	3340	2688	3560		
X1	11240	24	760	1075	680	280	425			
X3	10									
GR	2692	0	2688	40	2684	125	2680	150	2676	170
GR	2673.5	315	2672	350	2671.8	375	2672	400	2672	760
GR	2670	890	2670	1040	2672	1075	2672.3	1095	2672	1135
GR	2672	1370	2676	1545	2675.8	1620	2675	1740	2672	1845
GR	2676	2190	2680	2520	2684	2720	2688	3150		
X1	11320	21	1175	1395	445	310	425			
X3	10									
GR	2692	0	2688	30	2684	90	2680	155	2676	305
GR	2675.8	515	2672	685	2671.5	965	2672	1175	2672	1360
GR	2676	1395	2679	1590	2678	1895	2678	2200	2680	2380
GR	2681	2435	2680	2470	2679	2590	2680	2700	2684	2940
GR	2688	3440								
NC	.065	.065	.040	.1	.3					
X1	11400	24	1185	1735	390	415	435			
X3	10									
GR	2696	0	2692	30	2688	50	2684	125	2680	450
GR	2679.1	600	2676	860	2675	930	2676	1010	2676.5	1060
GR	2676	1165	2674	1285	2674	1390	2676	1520	2674.5	1540
GR	2676	1570	2674	1590	2674	1650	2676	1735	2680	1970
GR	2681	2220	2684	2480	2688	2740	2692	3050		
X1	11480	26	1485	1800	335	480	425			
GR	2700	0	2696	15	2692	50	2688	245	2684	575
GR	2680	910	2677	1050	2676	1280	2675.5	1325	2676	1370
GR	2676	1420	2675.8	1450	2676	1485	2676	1715	2675.5	1725
GR	2675.5	1760	2676	1800	2680	1850	2684	2200	2684.5	2290
GR	2684	2355	2682	2440	2684	2520	2688	2670	2692	2900
GR	2696	3325								
X1	11560	28	400	1165	615	305	420			
X3	10									
GR	2700	0	2696	25	2692	45	2688	60	2692	85
GR	2695	150	2692	225	2688	270	2684	365	2680	400
GR	2678.5	440	2678.5	490	2680	510	2680.4	545	2680	740
GR	2679.2	810	2680	900	2679.8	920	2680	940	2680.5	1000
GR	2676.5	1050	2676.5	1090	2680	1165	2684	1440	2686	1620
GR	2688	1930	2692	2150	2696	2290				

X1	11640	27	860	1380	710	440	420			
X3	10									
GR	2700	0	2696	120	2692	230	2691.5	255	2692	275
GR	2696	310	2697	380	2696	445	2692	475	2688	510
GR	2684	530	2682.6	680	2684	860	2681.5	940	2684	1050
GR	2684	1160	2680	1300	2680	1335	2678.6	1340	2678.6	1370
GR	2680	1380	2683	1425	2684	1480	2686	1755	2688	2050
GR	2692	2250	2696	2400						
NC	.065	.065	.035	.1	.3					
X1	11700	20	840	1120	315	300	315			
GR	2700	0	2696	50	2696	100	2692	175	2692	240
GR	2694	310	2692	350	2688	400	2684	450	2684	665
GR	2685	740	2684	840	2684	910	2680	950	2684	1120
GR	2685	1290	2688	1440	2692	1790	2696	1970	2700	2235
X1	11760	15	820	1000	215	255	315			
GR	2700	0	2697	110	2696	190	2692	255	2688	290
GR	2687.5	385	2685.5	670	2684	820	2682.5	830	2682.5	990
GR	2684	1000	2688	1170	2692	1430	2696	1620	2700	1750
X1	11840	24	1170	1330	345	340	420			
X3	10									
GR	2704	0	2700	40	2696	210	2692	470	2691	725
GR	2688	770	2687.8	850	2688	935	2688.3	975	2686	1020
GR	2688	1075	2688.5	1135	2688	1170	2685.5	1195	2685.5	1295
GR	2688	1330	2688.2	1380	2688	1485	2688.5	1535	2689	1575
GR	2688	1690	2692	1710	2696	1740	2700	1945		
X1	11900	10	1390	1510	315	320	330			
GR	2704	0	2700	60	2700	180	2696	410	2696	545
GR	2698.5	670	2696	775	2692	920	2690	1210	2686	1390
GR	2687	1400	2687	1490	2686	1510	2692	1730	2696	1930
GR	2696	1980	2700	1990	2704	2010				
X1	11960	21	970	1080	200	470	320			
GR	2704	0	2700	200	2696	390	2692	530	2691	745
GR	2692	910	2687.5	970	2687.5	1010	2689	1030	2688.1	1080
GR	2692	1110	2694	1140	2692	1160	2692	1200	2691	1235
GR	2692	1255	2692	1380	2693	1665	2694	1870	2700	1930
GR	2700	2040								
X1	12020	16	910	995	270	315	310			
GR	2705	0	2700	250	2696	450	2692	700	2691.5	740
GR	2692	775	2693	850	2692	910	2689.0	925	2689.0	995
GR	2692	1060	2692.5	1085	2692	1120	2692	1165	2694	1645
GR	2712	1880								

X1	12100	15	1050	1170	380	440	430			
GR	2709	0	2708	60	2704	300	2700	530	2700	600
GR	2696	790	2690.6	1050	2690.6	1170	2691.5	1250	2696	1375
GR	2696	1540	2700	1550	2700	1580	2700	1775	2700	1810
X1	12180	12	1020	1110	210	195	200			
GR	2720	0	2716	190	2700	650	2696	725	2694	910
GR	2692.2	1020	2692.2	1110	2696	1260	2704	1550	2702	1690
GR	2716	1770	2720	1825						
X1	12250	19	850	927	365	340	370			
GR	2716	0	2708	140	2708	280	2704	390	2700	435
GR	2697.8	520	2700	625	2701	695	2700	760	2696	820
GR	2692.7	850	2692.7	927	2696	940	2700	965	2699.5	1095
GR	2700	1165	2704	1300	2708	1415	2720	1670		
X1	12300	20	530	685	360	265	270			
GR	2720	0	2716	70	2712	180	2704	210	2701.5	380
GR	2700	480	2692.7	530	2692.8	560	2704.5	630	2696	665
GR	2692.8	675	2696	685	2700	700	2701	760	2700	820
GR	2699.5	910	2700	975	2708	1240	2712	1345	2716	1410
X1	12380	17	420	590	640	190	425			
GR	2720	0	2716	50	2712	180	2712	160	2708	240
GR	2704	390	2700	400	2696	420	2694.6	435	2694.6	460
GR	2696	490	2700	590	2701.5	720	2700	830	2700	900
GR	2704	1040	2708	1190						
X1	12460	15	360	430	515	350	425			
GR	2720	0	2715	50	2712	70	2700	120	2706	320
GR	2706	330	2704	340	2700	350	2698	360	2698	430
GR	2700	450	2704	480	2704	595	2708	840	2712	1025
X1	12540	19	510	560	410	350	410			
GR	2720	0	2712	60	2708	425	2709	450	2708	490
GR	2704	490	2701	510	2701	560	2704	585	2708	610
GR	2712	625	2714	710	2716	775	2714	810	2716	880
GR	2718	945	2716	1050	2716	1140	2720	1290		
QT	1	19000								
X1	12620	14	575	620	190	570	425			
GR	2720	0	2716	30	2712	60	2710	290	2712	415
GR	2708	480	2703	575	2708	620	2708	675	2704	725
GR	2708	735	2712	740	2716	790	2720	840		
QT	1	16000								
X1	12700	18	695	790	285	585	425			
GR	2728	0	2724	100	2700	230	2700	300	2720	345
GR	2716	390	2712	530	2711.5	590	2712	635	2712	685
GR	2707	695	2705	780	2705	775	2707	790	2712	880
GR	2716	820	2720	845	2726	1010				

X1	12780	10	90	170	415	480	435			
GR	2726	0	2724	45	2720	70	2712	90	2707.5	100
GR	2707.5	170	2712	220	2716	250	2720	300	2732	450
X1	12840	12	150	185	270	280	335			
GR	2732	0	2728	45	2720	85	2716	100	2712	130
GR	2709	150	2709	185	2712	220	2716	295	2720	320
GR	2732	420	2736	440						
X1	12900	10	295	310	320	245	340			
GR	2732	0	2724	50	2720	150	2716	200	2712	295
GR	2711.9	300	2712	310	2716	335	2720	345	2736	440
X1	12980	11	300	330	410	430	425			
GR	2740	0	2732	40	2728	130	2724	210	2720	300
GR	2720	330	2724	370	2724	415	2728	460	2732	495
GR	2736	530								
X1	13060	14	315	350	360	490	430			
GR	2744	0	2740	75	2736	170	2732	270	2728	300
GR	2722	315	2722	350	2728	375	2728	415	2732	450
GR	2732	480	2732	515	2736	535	2740	600		
X1	13140	15	200	230	370	470	420			
GR	2752	0	2748	40	2744	75	2740	140	2736	175
GR	2732	200	2731	210	2732	230	2736	265	2738	310
GR	2736	340	2736	370	2740	420	2744	485	2752	585
X1	13200	13	280	325	295	320	313			
GR	2760	0	2756	70	2744	160	2740	280	2738	300
GR	2740	310	2744	325	2746	385	2744	445	2740	500
GR	2752	585	2756	620	2760	685				
X1	13280	15	185	250	400	350	425			
GR	2768	0	2764	60	2756	160	2752	185	2748	200
GR	2746	220	2748	250	2752	370	2755	430	2752	495
GR	2748	575	2744	600	2752	640	2760	665	2776	745
X1	13360	18	80	120	440	300	415			
GR	2776	0	2760	75	2756	80	2754	95	2756	120
GR	2757	190	2756	250	2757	290	2756	310	2752	370
GR	2752	395	2756	420	2757	460	2756	490	2755	535
GR	2755	575	2760	580	2772	620				
X1	13440	11	130	190	460	450	430			
GR	2784	0	2776	30	2768	110	2764	130	2760	150
GR	2757	190	2760	260	2764	400	2768	465	2776	555
GR	2788	610								

XI	13520	11	125	150	460	285	420			
GR	2780	0	2776	40	2772	80	2768	120	2758	135
GR	2760	150	2764	230	2768	310	2776	365	2780	395
GR	2768	460								
XI	13600	7	60	80	450	350	420			
GR	2780	0	2764	60	2760	80	2774	160	2776	200
GR	2780	210	2792	265						

THIS RUN EXECUTED 09DEC92 10:01:18

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

TANQUE VERDE CREEK

SUMMARY PRINTOUT

	SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
	1.000	.00	2548.70	23000.00	2554.67	2550.00	2550.00	10.25	2.43	2.58	2555.72
	101.000	850.00	2552.00	23000.00	2558.25	2554.00	2554.00	11.81	2.82	3.18	2559.9[illegible]
	102.000	950.00	2556.00	23000.00	2563.07	2556.00	2558.00	10.20	2.34	3.38	2564.87
	103.000	575.00	2558.00	23000.00	2564.99	2560.00	2562.00	8.84	1.73	3.63	2565.77
	104.000	770.00	2560.00	23000.00	2567.25	2564.00	2564.00	11.40	2.86	4.00	2568.50
	105.000	500.00	2563.00	23000.00	2569.77	2568.00	2566.00	12.65	1.35	3.80	2571.1[illegible]
	106.000	430.00	2564.40	23000.00	2572.02	2568.00	2568.00	10.85	2.05	2.66	2573.23
	107.000	500.00	2566.00	23000.00	2574.02	2570.00	2570.00	9.95	2.18	3.00	2574.91
*	108.000	450.00	2570.00	23000.00	2576.44	2572.00	2572.00	14.80	3.16	5.29	2577.9[illegible]
*	108.100	5.00	2570.00	23000.00	2577.18	2572.00	2572.00	12.23	2.91	4.78	2578.1[illegible]
	108.200	40.00	2570.00	23000.00	2577.64	2572.00	2572.00	10.98	2.60	4.39	2578.42
	108.300	5.00	2570.00	23000.00	2577.76	2572.00	2573.00	10.48	2.51	4.03	2578.4[illegible]
	109.000	410.00	2572.00	23000.00	2578.99	2576.00	2574.00	10.22	2.78	4.00	2579.9[illegible]
*	110.000	730.00	2574.00	23000.00	2581.04	2578.00	2576.50	5.62	1.60	2.25	2581.23
*	111.000	530.00	2576.00	23000.00	2581.92	2580.00	2579.00	11.07	2.00	2.92	2582.9[illegible]
*	112.000	590.00	2578.00	23000.00	2584.64	2580.00	2581.00	8.56	2.66	1.91	2585.0[illegible]
	113.000	540.00	2580.00	23000.00	2586.12	2584.00	2583.30	8.36	2.90	1.79	2586.44

	SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
*	114.000	520.00	2582.00	23000.00	2587.99	2586.00	100000.00	10.86	4.46	.00	2588.47
	1.000	1056.00	2585.50	23000.00	2592.81	2590.00	2590.00	10.75	2.90	2.05	2593.73
*	2.000	180.00	2586.40	23000.00	2594.52	2592.00	2590.00	11.82	2.63	1.80	2595.68
	3.000	517.00	2589.00	23000.00	2596.45	2592.00	2592.00	9.19	2.61	1.52	2597.07
*	4.000	484.00	2590.40	23000.00	2599.67	2594.00	2598.00	10.79	3.16	1.19	2600.68
	5.000	200.00	2590.00	23000.00	2600.42	2591.00	2596.40	9.03	1.58	1.54	2601.10
*	6.000	234.00	2591.40	23000.00	2602.44	2598.00	2594.00	10.46	2.23	.95	2603.68
*	20.195	675.00	2593.00	23000.00	2604.28	2598.00	2602.00	5.43	1.83	1.74	2604.46
*	20.361	850.00	2595.00	23000.00	2605.52	2602.00	2606.00	10.51	2.91	3.21	2606.69
*	20.442	410.00	2598.00	23000.00	2607.53	2606.00	2606.00	11.17	1.50	2.76	2608.67
	20.520	450.00	2602.00	23000.00	2609.65	2606.00	2610.00	6.79	2.42	2.61	2610.03
	20.604	470.00	2604.00	23000.00	2610.83	2608.00	2609.00	7.99	3.19	3.60	2611.27
	20.660	300.00	2606.00	23000.00	2611.76	2610.00	2610.00	9.29	3.42	3.37	2612.44
	20.722	320.00	2607.00	23000.00	2612.96	2610.00	2609.00	9.43	3.42	3.75	2613.64
*	20.780	315.00	2608.00	23000.00	2614.46	2612.00	2611.00	12.19	3.99	4.19	2615.89
*	20.840	315.00	2609.00	23000.00	2616.45	2613.00	2612.00	8.14	3.10	5.02	2617.12
*	20.932	325.00	2611.00	23000.00	2617.90	2614.00	2614.00	13.57	4.95	3.82	2619.83
	20.983	425.00	2613.00	23000.00	2620.75	2616.00	2619.00	11.54	4.35	1.93	2622.27
*	21.066	440.00	2614.00	23000.00	2623.01	2620.00	2621.00	7.69	2.31	3.18	2623.81
	21.125	315.00	2615.00	23000.00	2623.55	2621.00	2618.00	9.82	1.72	4.97	2624.73
	21.207	425.00	2617.00	23000.00	2624.87	2623.00	2620.00	9.64	1.61	3.76	2625.93
	21.325	615.00	2619.00	23000.00	2626.67	2623.00	2623.00	11.37	2.59	5.81	2628.04
	21.468	755.00	2623.00	23000.00	2630.44	2626.00	2626.00	9.57	2.98	6.60	2631.45
	21.544	390.00	2624.00	23000.00	2631.08	2628.00	2628.00	13.77	2.84	6.85	2633.94
	21.628	440.00	2626.00	23000.00	2635.27	2632.00	2631.00	10.37	2.15	6.22	2636.47
	21.707	410.00	2628.00	23000.00	2637.55	2634.00	2633.00	7.42	2.41	4.30	2638.17

	SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	SS
	21.770	430.00	2630.00	23000.00	2638.82	2634.00	2635.00	7.53	2.03	4.05	2639.74
	21.880	470.00	2631.00	23000.00	2639.58	2636.00	2636.00	11.18	2.59	3.84	2640.97
*	21.925	240.00	2632.00	23000.00	2641.26	2638.00	2638.00	12.95	3.96	5.13	2643.38
*	21.972	245.00	2634.00	23000.00	2643.23	2639.00	2639.00	9.18	2.56	3.33	2644.28
	22.047	395.00	2636.00	23000.00	2644.18	2642.00	2642.00	8.75	1.31	2.44	2645.32
	22.125	410.00	2638.00	23000.00	2645.72	2642.00	2642.00	7.05	1.25	3.59	2646.35
*	22.195	365.00	2639.00	23000.00	2646.55	2649.00	2645.00	8.84	.00	3.60	2647.63
	22.275	370.00	2641.00	23000.00	2648.39	2645.00	2645.00	7.94	2.34	3.50	2649.27
*	22.338	395.00	2643.00	23000.00	2649.95	2647.00	2647.00	4.79	1.34	1.64	2650.22
*	22.373	200.00	2644.00	23000.00	2650.36	2651.00	2650.00	10.23	.00	2.24	2651.92
*	22.454	170.00	2645.00	23000.00	2652.34	2651.00	2651.00	6.92	1.22	1.63	2653.85
	22.511	300.00	2647.00	23000.00	2653.47	2652.00	2652.00	6.47	1.19	1.48	2654.10
	22.591	420.00	2648.00	23000.00	2654.91	2656.00	2653.00	6.65	.00	2.13	2655.55
	22.670	420.00	2650.00	23000.00	2656.91	2655.00	2655.00	8.41	2.63	3.04	2657.84
*	10580.000	544.00	2653.50	23000.00	2659.88	2656.00	2653.50	6.46	1.86	3.31	2660.22
	10640.000	320.00	2655.00	23000.00	2660.88	2656.00	2655.00	6.30	2.60	3.25	2661.19
	10700.000	330.00	2655.90	23000.00	2661.83	2656.00	2656.00	6.00	2.69	3.26	2662.15
*	10780.000	425.00	2658.00	23000.00	2663.35	2660.00	2658.00	8.66	3.04	4.42	2663.93
	10860.000	420.00	2660.00	23000.00	2665.78	2660.00	2660.00	8.58	3.86	3.89	2666.16
	10940.000	430.00	2662.00	23000.00	2667.59	2662.00	2662.00	7.23	3.09	3.03	2667.99
	11020.000	425.00	2664.00	23000.00	2669.33	2664.00	2664.00	8.02	3.82	3.28	2669.83
	11100.000	420.00	2667.30	23000.00	2671.13	2668.00	2668.00	5.12	2.50	2.00	2671.48
	11160.000	315.00	2667.00	23000.00	2672.26	2668.00	2668.30	6.85	3.46	2.99	2672.76
*	11240.000	425.00	2670.00	23000.00	2674.70	2672.00	2672.00	9.62	4.30	3.69	2675.60
*	11320.000	425.00	2671.50	23000.00	2677.59	2672.00	2676.00	6.63	3.92	1.15	2677.97
	11400.000	435.00	2674.00	23000.00	2679.15	2676.00	2676.00	7.22	3.25	2.23	2679.80

	SECNO	XLCH	ELMIN	Q	CWSEL	XLSEL	RSEL	VCH	VLOB	VROB	SS
	11480.000	425.00	2675.50	23000.00	2681.13	2676.00	2676.00	7.31	4.06	2.62	2681.68
	11560.000	420.00	2676.50	23000.00	2683.31	2680.00	2680.00	7.29	2.51	2.52	2684.11
	11640.000	420.00	2678.60	23000.00	2686.31	2684.00	2680.00	7.87	3.97	3.52	2687.86
	11700.000	315.00	2680.00	23000.00	2688.02	2684.00	2684.00	9.24	3.80	3.25	2688.93
	11760.000	315.00	2682.50	23000.00	2689.18	2684.00	2684.00	12.09	4.06	3.80	2690.69
	11840.000	420.00	2685.50	23000.00	2692.13	2688.00	2688.00	9.97	3.77	4.00	2692.92
	11900.000	330.00	2686.00	23000.00	2693.66	2688.00	2686.00	12.54	4.43	5.07	2694.92
*	11960.000	320.00	2687.50	23000.00	2695.88	2687.50	2688.10	9.09	3.31	2.87	2696.41
	12020.000	310.00	2689.00	23000.00	2696.84	2692.00	2689.00	10.21	3.47	3.76	2697.45
	12100.000	430.00	2690.60	23000.00	2698.31	2690.60	2690.60	11.09	4.33	4.39	2699.33
	12180.000	200.00	2692.20	23000.00	2699.18	2692.20	2692.20	14.02	5.87	5.47	2700.66
*	12250.000	370.00	2692.70	23000.00	2702.94	2692.70	2692.70	14.23	4.46	3.80	2704.61
	12300.000	270.00	2692.70	23000.00	2705.10	2692.70	2696.00	9.38	3.68	3.57	2705.88
	12380.000	425.00	2694.60	23000.00	2706.88	2696.00	2700.00	9.14	3.24	3.24	2706.95
*	12460.000	425.00	2698.00	23000.00	2709.06	2698.00	2698.00	15.46	3.92	4.76	2711.15
*	12540.000	410.00	2701.00	23000.00	2713.56	2701.00	2701.00	16.76	4.63	6.60	2715.79
*	12620.000	425.00	2703.00	19000.00	2716.54	2703.00	2708.00	7.63	3.07	3.50	2716.85
	12700.000	425.00	2700.00	16000.00	2716.93	2707.00	2707.00	5.71	2.64	1.69	2717.20
*	12780.000	435.00	2707.50	16000.00	2717.10	2712.00	2707.50	16.90	3.68	7.02	2720.75
	12840.000	335.00	2709.00	16000.00	2720.84	2709.00	2709.00	16.25	6.62	6.57	2722.96
	12900.000	340.00	2711.90	16000.00	2722.91	2712.00	2712.00	20.67	8.44	8.48	2725.19
*	12980.000	425.00	2720.00	16000.00	2728.89	2720.00	2720.00	18.91	7.50	7.14	2731.22
*	13060.000	430.00	2722.00	16000.00	2735.02	2722.00	2722.00	18.14	5.33	5.96	2737.91
*	13140.000	420.00	2731.00	16000.00	2742.18	2732.00	2732.00	18.81	6.67	6.66	2744.68
*	13200.000	313.00	2738.00	16000.00	2747.55	2740.00	2744.00	17.20	7.36	6.83	2749.68
*	13280.000	425.00	2744.00	16000.00	2753.94	2752.00	2748.00	16.28	2.53	7.16	2756.10

	SECNO	XLOH	ELMIN	Q	CWSEL	XLSEL	RSEL	VCH	VLOB	VROB	ES
	13360.000	415.00	2752.00	16000.00	2759.57	2756.00	2756.00	13.99	3.43	7.29	2760.75
*	13440.000	430.00	2757.00	16000.00	2765.98	2764.00	2757.00	17.31	2.69	8.47	2768.54
*	13520.000	420.00	2758.00	16000.00	2770.59	2760.00	2760.00	20.74	6.53	8.00	2773.69
*	13600.000	420.00	2760.00	16000.00	2776.74	2764.00	2760.00	22.35	6.81	8.64	2780.56

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 100.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 100.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 100.100 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 110.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 111.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 111.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 111.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 112.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 114.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 2.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 2.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 2.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 4.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 4.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 4.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 6.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 6.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 6.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 20.195 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 20.361 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 20.361 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 20.361 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 20.442 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 20.442 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 20.780 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 20.780 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 20.780 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 20.840 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 20.902 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 20.902 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 20.902 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 21.866 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 21.925 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 21.925 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 21.925 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

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WARNING SECNO=    21.972  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    22.195  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    22.338  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=    22.373  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    22.373  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    22.373  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=    22.454  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 10500.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 10780.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 11240.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 11320.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 11960.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 12250.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12250.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 12250.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 12460.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12460.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 12460.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 12540.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12540.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 12540.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 12620.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 12780.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12780.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 12780.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 12980.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12980.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 13060.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13060.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13060.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 13140.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13140.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13140.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 13200.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13200.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
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CAUTION SECNO=  13200.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=  13280.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=  13280.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=  13440.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=  13440.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=  13520.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=  13520.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=  13600.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=  13600.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=  13600.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
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1*****************************************          ***************************************
*  HEC-2 WATER SURFACE PROFILES           *          *  U.S. ARMY CORPS OF ENGINEERS       *
*                                         *          *  HYDROLOGIC ENGINEERING CENTER      *
*  Version   4.6.2;  May 1991             *          *  609 SECOND STREET, SUITE D         *
*                                         *          *  DAVIS, CALIFORNIA 95616-4687       *
*  RUN DATE    27SEP93    TIME   14:45:02  *          *          (916) 756-1104             *
*****************************************          ***************************************

                                    X     X  XXXXXXX   XXXXX             XXXXX
                                    X     X  X        X     X           X     X
                                    X     X  X        X                       X
                                    XXXXXXX  XXXX     X          XXXXX    XXXXX
                                    X     X  X        X                X
                                    X     X  X        X     X          X
                                    X     X  XXXXXXX   XXXXX           XXXXXXX
1
     27SEP93      14:45:02                                                                PAGE    1


                                                                  THIS RUN EXECUTED 27SEP93    14:45:02
 ************************************
  HEC-2 WATER SURFACE PROFILES

  Version   4.6.2;  May 1991
 ************************************


 T1      TANQUE VERDE 2-YR STORM
 T2      TANQUE VERDE CREEK MODEL, FILENAME: H2_MULTI.DAT
 T2      COMBINED HEC2 RUNS, NEW CONDITION REACH 1 THRU REACH 4
 T2      REACH 1 (MILE 5.898 TO MILE 7.488)  PATCHWORK MODEL W/ BERM
 T3      TANQUE VERDE CREEK

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

        0        2                           .004                                  2555.6

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       1                 -1                                                                    0


 J3  VARIABLE CODES FOR SUMMARY PRINTOUT

      38        39        42        43         1        23        24        26        55        56
       3

 J5  LPRNT    NUMSEC                    ********REQUESTED SECTION NUMBERS********

     -10       -10

 NC      .06       .06       .03        .1         .3
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185

QT	6	2300	6900	11500	16100	23000	28500			
NH	4	.06	1010	.085	1235	.03	1470	.06	2790	
X1	1	25	1235	1470						
GR	2556.0	580	2554.0	600	2554.0	610	2556.0	630	2554.0	660
GR	2552.0	1010	2552.0	1110	2550.0	1165	2550.2	1200	2550.0	1235
GR	2548.7	1240	2548.7	1460	2550.0	1470	2554.0	1480	2554.0	1730
GR	2552.0	1800	2552.0	1930	2554.0	1970	2552.0	2020	2552.0	2160
GR	2554.0	2200	2552.0	2220	2552.0	2420	2556.0	2720	2560.0	2790
NH	4	.060	1300	.085	1615	.03	1895	.06	2215	
X1	101	10	1615	1895	650	1050	850			
GR	2562	1000	2558	1165	2556	1300	2554	1615	2552	1635
GR	2552	1710	2554	1895	2556	1960	2558	2150	2558.9	2215
NH	4	.060	1220	.085	1390	.03	1580	.06	2480	
X1	102	13	1390	1580	1100	800	950			
GR	2568	1000	2566	1080	2564	1150	2562	1220	2560	1315
GR	2558	1370	2556	1390	2556	1530	2558	1580	2558.5	1780
GR	2560	2040	2562	2260	2563.2	2480				

NH	5	.060	1205	.085	1440	.03	1650	.045	2320	.06
NH	2570									
X1	103	15	1440	1650	600	550	575			
GR	2568	1000	2566	1080	2564	1205	2562	1370	2560	1440
GR	2558	1490	2558	1630	2560	1650	2562	1670	2562	1720
GR	2560	1840	2562	2120	2563	2320	2564	2470	2564.6	2570
NH	7	.060	370	.085	560	.03	750	.045	1200	.06
NH	1400	.085	1520	.06	1740					
X1	104	16	560	750	780	760	770			
GR	2582	0	2570	370	2566	400	2564	560	2562	575
GR	2562	620	2560	690	2560	740	2564	750	2565	800
GR	2564	900	2564	980	2564	1200	2565	1400	2566	1520
GR	2567.2	1740								
NH	5	.060	340	.085	460	.03	640	.06	1100	.085
NH	1570									
X1	105	12	460	640	530	400	500			
GR	2580.0	0	2572.0	275	2570.0	340	2568.0	460	2566.0	485
GR	2564.0	500	2563.0	540	2564.0	600	2566.0	640	2567.0	760
GR	2566.0	1100	2567.9	1570						
NH	5	.06	320	.085	510	.03	720	.06	1170	.085
NH	1590									
X1	106	16	510	720	450	390	430			
GR	2582	0	2574	250	2572	320	2570	390	2568	510
GR	2564.4	550	2565.2	700	2568	720	2570	850	2570.2	930
GR	2570	990	2568	1170	2568	1320	2570	1480	2570.2	1570
GR	2570.3	1590								
NH	6	.085	220	.06	380	.085	690	.03	865	.06
NH	1425	.085	1550							
X1	107	15	690	865	530	430	500			
GR	2580.0	0	2574.0	220	2570.0	380	2571.0	620	2570.0	690
GR	2568.0	700	2566.0	720	2566.5	790	2566.5	840	2568.0	850
GR	2570.0	865	2571.5	1045	2570.0	1170	2570.0	1425	2570.7	1550

HOUGHTON ROAD X-SECTION

NC	.085	.060	.030	.3	.5					
X1	108	11	1030	1130	450	450	450			
GR	2575.0	600	2574.5	640	2574.0	860	2572.0	1030	2571.0	1040
GR	2570.0	1045	2570.0	1100	2571.0	1110	2572.0	1130	2573.0	1430
GR	2573.7	1700								
X1	108.1	52	1030	1130	5	5	5			
BT	-6	600	2582.5	2577.1	1030	2585.6	2580.2	1098	2586	2580.6
BT		1180	2586.2	2580.8	1275	2586	2580.6	1700	2584	2578.6
GR	2575.0	600	2574.5	640	2574.4	698	2577.9	698	2577.9	702
GR	2574.4	702	2574.1	798	2578.6	798	2578.6	802	2574.1	802
GR	2574.0	860	2573.5	898	2579.4	898	2579.4	902	2573.5	902
GR	2572.4	998	2580.2	998	2580.2	1002	2572.4	1002	2572.0	1030
GR	2571.0	1040	2570.0	1045	2570.0	1098	2580.8	1098	2580.8	1102
GR	2570.0	1102	2571.0	1110	2572.0	1130	2572.1	1180	2572.2	1198

1

GR	2580.8	1198	2580.8	1202	2572.2	1202	2572.5	1275	2572.6	1298
GR	2580.4	1298	2580.4	1302	2572.6	1302	2572.9	1398	2580.1	1398
GR	2580.1	1402	2572.9	1402	2573.0	1430	2573.2	1498	2579.6	1498
GR	2579.6	1502	2573.2	1502	2573.5	1598	2579.2	1598	2579.2	1602
GR	2573.5	1602	2573.7	1700						
X1	108.2				40	40	40			
X2							1			
X1	108.3	11	1030	1130	5	5	5			
GR	2575.0	600	2574.5	640	2574.0	860	2572.0	1030	2571.0	1040
GR	2570.0	1045	2570.0	1100	2571.0	1110	2572.0	1130	2573.0	1430
GR	2573.7	1700								
NC				.1	.3					
NH	8	.06	290	.085	1035	.03	1230	.06	1480	.085
NH	1815	.06	2040	.085	2810	.06	3200			
X1	109	18	1035	1230	390	450	410			
X3						1300				
GR	2688.0	0	2682.0	290	2575.3	290	2574.0	340	2574.0	560
GR	2576.0	1035	2574.0	1060	2572.2	1080	2572.0	1165	2572.0	1220
GR	2574.0	1230	2575.0	1350	2575.0	1480	2575.0	1815	2576.0	2040
GR	2578.0	2540	2578.0	2810	2580.0	3200				
NH	10	.06	320	.085	910	.03	1100	.06	1350	.035
NH	1460	.06	1710	.085	2200	.06	2570	.085	3100	.06
NH	3400									
X1	110	25	910	1100	630	600	730			
X3						2360				
GR	2578	200	2576	320	2575.8	350	2576	510	2578	740
GR	2578.8	910	2574	950	2574	1040	2574.2	1080	2576.5	1100
GR	2575.8	1220	2576.0	1300	2576	1350	2574	1390	2574	1450
GR	2577	1460	2577.6	1600	2577.9	1710	2577	2000	2577.5	2200
GR	2578	2420	2579	2570	2580	2800	2581	3100	2582.0	3400
NH	7	.085	920	.03	1140	.06	1545	.085	2370	.06
NH	2530	.085	2950	.06	3260					
X1	111	19	920	1140	850	410	530			
X3						2340				

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GR     2600        0      2594      270      2592      830      2589      840      2589      910
GR     2592     1000      2594     1100      2590     1370      2589     1400      2590     1420
GR     2594     2000      2594     2240      2592     2520      2594     2840      2596     3000

X1        4       20       790      930       500      301       484        0         0        0
X3                                                    930      2598
GR     2610        0      2600      330      2596      460      2594      790    2590.4      810
GR   2590.4      900      2598      930      2596      950      2594     1180      2592     1200
GR     2591     1215      2592     1235      2594     1250      2596     1530      2594     1630
GR   2592.5     1660      2594     1690      2594     2940      2596     3200      2598     3470
          TANQUE VERDE LOOP ROAD
1
   27SEP93      14:45:02                                                              PAGE     5


X1        5       28       737      878       200      250       200        0         0        0
X3                                  737      2598      878    2596.4
GR     2609        0      2600      250      2598      340      2596      490      2596      620
GR     2598      670      2599      730      2591      737    2590.9      766    2590.8      795
GR   2590.8      823      2591      841    2591.2      865    2591.5      878      2599      895
GR     2598      920      2596     1190      2594     1225      2592     1245      2592     1265
GR     2594     1270      2596     1290      2597     1330      2596     1530      2596     1630
GR     2596     2210      2598     2445      2600     2635

X1        6       18       670      830       319       64       234        0         0        0
X3                                                    850      2601
GR     2610        0      2608       65      2606      160      2602      250      2600      340
GR     2598      670    2591.4      710    2591.4      790      2594      830      2601      850
GR     2598      890      2596      990      2594     1230      2594     1260      2596     1290
GR     2596     1600      2598     1920      2600     3420
      ***REACH 3****
  HEC2 DATA FROM PIMA CO. PLANNING DEPT 10/8/92
  20.780  BEGIN X3 ENCROACHMENT
  22.195  END X3 ENCROACHMNET
  TANQUE VERDE CREEK 49ER ESTATE REACH: IMPROVED        FILE = FIN1_100.DAT
  Q100 = 23,000 CFS, TOPOS ARE 1988 1"=100' AND 1" = 200'      DL 7-27-92
       FIN1_100 7-29-92
  J1          2                  .0039                          2603
  J2   -1             -1       5      20
  J3   38      43     13       14      15       1       55      26      56
  J3   28             38        1      53      54       42       8      25
  J3   50
  QT    1   23000

NC                                      .1        .3
NH        3      .056     9925.       .03    10082.      .056    12493.
X1   20.195       66.     9925.    10082.       675       675       675
GR   2620.0    8948.0   2619.0    8962.0   2618.0    8974.0   2617.0    8998.0   2616.0    9024.0
GR   2615.0    9058.0   2614.0    9089.0   2613.0    9131.0   2612.0    9171.0   2611.0    9231.0
GR   2610.0    9296.0   2609.0    9323.0   2608.0    9360.0   2607.0    9413.0   2606.0    9475.0
GR   2605.0    9518.0   2604.0    9574.0   2603.0    9617.0   2602.0    9663.0   2601.0    9704.0
GR   2600.0    9776.0   2599.0    9845.0   2598.0    9925.0   2597.0    9945.0   2596.0    9960.0
GR   2595.0    9963.0   2594.0    9964.0   2593.0   10001.0   2594.0   10030.0   2595.0   10040.0
GR   2596.0   10050.0   2597.0   10063.0   2598.0   10072.0   2599.0   10074.0   2600.0   10078.0
GR   2601.0   10079.0   2602.0   10082.0   2602.0   10094.0   2601.0   10196.0   2600.0   10259.0
GR   2599.0   10307.0   2598.0   10358.0   2597.0   10365.0   2596.0   10372.0   2596.0   10440.0
GR   2597.0   10456.0   2598.0   10472.0   2599.0   10493.0   2600.0   10513.0   2600.0   10687.0
GR   2600.0   11065.0   2601.0   11224.0   2602.0   11349.0   2601.0   11515.0   2602.0   11654.0
GR   2602.0   11718.0   2601.0   11852.0   2602.0   11948.0   2603.0   12113.0   2604.0   12216.0
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GR  2590.0     0    2580.0   280   2580.0   920   2576.0   940   2576.0  1050
GR  2578.0  1070    2579.0  1140   2580.0  1345     2578  1470     2578  1495
GR    2580  1545    2579.0  1885   2580.0  2110     2580  2370   2580.0  2430
GR    2581  2530    2582.0  2640   2583.0  2950   2584.0  3260

NH       7  .085      1250  .035     1330   .06     1380   .03     1520  .085
NH    2200   .06      2550  .085     3280
X1     112    28      1380  1520      480   470      590
X3                                         2550
GR    2594     0      2584   220     2582   300     2580   580     2580   720
GR    2582   820    2582.5   930     2582   980   2580.8  1100     2582  1170
GR    2581  1250      2579  1270     2579  1320     2580  1330     2580  1380
GR    2578  1400    2578.5  1500     2581  1520     2582  1570     2583  1670
GR    2582  1780    2581.8  1900     2582  2200   2581.8  2280     2582  2340
GR    2583  2550      2584  2760   2586.0  3280
1
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NH       8   .06       520  .085     1265  .035     1340   .06     1490   .03
NH    1600  .085      2240   .06     2520  .085     3470
X1     113    21      1490  1600      440   510      540
X3                                         2320
GR    2586     0      2584    50     2582   150     2582   220   2582.3   520
GR    2582   940      2582   970     2584  1160     2584  1265   2581.5  1280
GR  2581.5  1330      2583  1340     2584  1490     2580  1510   2580.2  1580
GR  2583.3  1600    2583.5  1790     2584  2240     2586  2520     2588  3050
GR    2590  3470

NH       6   .06      2250  .085     2390   .03     2500  .085     3200   .06
NH    3550  .085      4410
X1     114    20      2390  2500      440   510      520
X3                                         2440
GR    2590   900      2584  1090   2584.2  1270   2583.8  1410   2584.3  1540
GR    2584  1680    2585.2  2050     2586  2250   2586.4  2310     2586  2340
GR    2586  2390      2582  2415     2582  2470     2584  2500     2586  2810
GR  2587.5  3000    2587.7  3200     2588  3550     2590  4000     2592  4410
        **** FINAL RUN FOR REVISED MODEL WITH DIP CROSSING ****
        **** DATA USED FOR JANUARY 31, 1991 MEMO TO COUNTY ATTY ****
         FILENAME TVLR26.H2I:  THIS FILE SAME AS TVLR24.H2I EXCEPT:
        ***** REACH #2 *****

NC     .060   .085     .027    .1      .3
X1        1     16      700   880    1056   1056     1056     0        0     0
X3                                         880     2590
GR     2594      0      2590   155    2590   700   2585.5   730   2585.5   800
GR     2588    830      2590   880    2590   990     2588  1010     2586  1030
GR     2588   1040      2590  1080    2590  1140     2590  1980     2592  2110
GR   2593.2   2400

X1        2     19      700   840     180   184      180     0        0     0
X3                                         910     2592
GR     2594      0      2592    60    2592   700   2586.4   730   2586.4   810
GR     2590    840      2592   910    2592   960     2590  1090   2588.4  1130
GR     2590   1170      2592  1240  2591.5  1540     2592  1720     2592  1910
GR     2590   1930      2590  1980    2592  2120     2594  2300

X1        3     15      830  1000     368   525      517     0        0     0
X3                                         1100     2594
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GR	2605.0	12273.0	2606.0	12315.0	2607.0	12354.0	2608.0	12400.0	2609.0	12444.0
GR	2610.0	12493.0	.0	.0	.0	.0	.0	.0	.0	.0
NH	3	.056	9837.	.03	10155.	.056	12650			
X1	20.361	62.	9837.	10121.	835.	855.	850.			
GR	2620.0	9205.0	2619.0	9252.0	2618.0	9300.0	2617.0	9338.0	2616.0	9376.0
GR	2615.0	9407.0	2614.0	9441.0	2613.0	9488.0	2612.0	9550.0	2611.0	9593.0
GR	2610.0	9637.0	2609.0	9684.0	2608.0	9731.0	2607.0	9764.0	2606.0	9791.0
GR	2605.0	9811.0	2604.0	9823.0	2603.0	9830.0	2602.0	9837.0	2601.0	9875.0

1

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GR	2600.0	9911.0	2600.0	9974.0	2601.0	9974.0	2602.0	9979.0	2602.0	9994.0
GR	2601.0	9998.0	2600.0	10004.0	2599.0	10010.0	2598.0	10014.0	2597.0	10020.0
GR	2596.0	10025.0	2595.	10030.0	2595.	10038.0	2595.0	10045.0	2596.0	10050.0
GR	2597.0	10052.0	2598.0	10055.0	2599.0	10056.0	2600.0	10061.0	2601.0	10071.0
GR	2602.0	10082.0	2603.0	10089.0	2604.0	10094.0	2605.0	10097.0	2606.0	10099.0
GR	2606.0	10121.0	2605.0	10136.0	2604.0	10155.0	2604.0	10387.0	2603.0	10420.0
GR	2602.0	10465.0	2602.0	10771.0	2603.0	10798.0	2604.0	10825.0	2605.0	11455.0
GR	2606.0	11627.0	2606.0	11948.0	2607.0	12226.0	2608.0	12462.0	2609.0	12513.0
GR	2610.0	12577.0	2612	12650	.0	.0	.0	.0	.0	.0
NH	3	.056	9939.	.03	10111.	.056	12900			
X1	20.442	61.	9910.	10069.	500.	390.	410.			
GR	2620.0	9401.0	2619.0	9408.0	2618.0	9416.0	2617.0	9440.0	2616.0	9470.0
GR	2617.0	9491.0	2618.0	9498.0	2618.0	9520.0	2617.0	9524.0	2616.0	9529.0
GR	2615.0	9542.0	2614.0	9553.0	2613.0	9585.0	2612.0	9609.0	2612.0	9708.0
GR	2611.0	9755.0	2610.0	9823.0	2609.0	9854.0	2608.0	9891.0	2607.0	9901.0
GR	2606.0	9910.0	2605.0	9917.0	2604.0	9925.0	2603.0	9932.0	2602.0	9939.0
GR	2601.0	9947.0	2600.0	9955.0	2599.0	9962.0	2598.0	9968.0	2598.0	10037.0
GR	2599.0	10041.0	2600.0	10046.0	2601.0	10049.0	2602.0	10052.0	2603.0	10055.0
GR	2604.0	10060.0	2605.0	10063.0	2606.0	10069.0	2606.0	10111.0	2606.0	10210.0
GR	2605.0	10284.0	2604.0	10372.0	2604.0	10418.0	2605.0	10511.0	2606.0	10612.0
GR	2606.0	10656.0	2605.0	10690.0	2604.0	10713.0	2603.0	10723.0	2602.0	10740.0
GR	2602.0	10801.0	2603.0	10808.0	2604.0	10815.0	2605.0	10821.0	2606.0	10827.0
GR	2606.0	11382.0	2607.0	12109.0	2608.0	12324.0	2609.0	12368.0	2610.0	12440.0
GR	2615	12900								
NH	3	.056	9900.	.03	10102.	.056	12529			
X1	20.520	51.	9836.	10102.	420.	470.	450.			
GR	2620.0	8998.0	2619.0	9050.0	2618.0	9106.0	2617.0	9175.0	2616.0	9255.0
GR	2615.0	9323.0	2614.0	9389.0	2613.0	9424.0	2613.0	9517.0	2612.0	9558.0
GR	2611.0	9596.0	2610.0	9645.0	2609.0	9660.0	2608.0	9676.0	2607.0	9749.0
GR	2606.0	9836.0	2605.0	9867.0	2604.0	9900.0	2603.0	9997.0	2604.0	10085.0
GR	2605.0	10089.0	2606.0	10093.0	2607.0	10095.0	2608.0	10096.0	2609.0	10099.0
GR	2610.0	10102.0	2610.0	10205.0	2609.0	10209.0	2608.0	10212.0	2608.0	10310.0
GR	2607.0	10422.0	2606.0	10555.0	2605.0	10561.0	2604.0	10567.0	2603.0	10573.0
GR	2602.0	10581.0	2602.0	10633.0	2603.0	10643.0	2604.0	10651.0	2605.0	10693.0
GR	2606.0	10744.0	2607.0	10872.0	2608.0	10985.0	2608.0	11039.0	2607.0	11155.0
GR	2608.0	11473.0	2608.0	11966.0	2609.0	12035.0	2610.0	12129.0	2612.	12229.
GR	2615	12529								
NH	3	.056	9905.	.03	10098.	.056	11580			
X1	20.604	43.	9905.	10108	415.	440.	470.			
GR	2620.0	8917.0	2619.0	8953.0	2618.0	8996.0	2617.0	9044.0	2616.0	9081.0
GR	2615.0	9115.0	2614.0	9148.0	2613.0	9205.0	2612.0	9254.0	2611.0	9328.0
GR	2610.0	9420.0	2609.0	9495.0	2608.0	9561.0	2607.0	9653.0	2608.0	9868.0
GR	2608.0	9905.0	2607.0	9912.0	2606.0	9916.0	2606.0	10090.0	2607.0	10091.0
GR	2608.0	10098.0	2609.0	10108.0	2610.0	10305.0	2610.0	10324.0	2609.0	10331.0

GR	2608.0	10334.0	2607.0	10337.0	2606.0	10340.0	2605.0	10347.0	2604.0	10353.0
GR	2604.0	10400.0	2605.0	10422.0	2606.0	10458.0	2607.0	10549.0	2608.0	10643.0
GR	2608.0	11025.0	2609.0	11083.0	2610.0	11129.0	2610.0	11180.0	2612.	11230.
GR	2612.	11440.	2614.	11490.	2616.	11580				

NH	3	.056	9914.	.03	10102.	.056	12000			
X1	20.660	42.	9914.	10112.	275.	320.	300.			
X3										
GR	2620.0	9011.0	2619.0	9048.0	2618.0	9068.0	2617.0	9078.0	2616.0	9088.0
GR	2615.0	9110.0	2614.0	9132.0	2613.0	9152.0	2612.0	9180.0	2611.0	9322.0
GR	2610.0	9459.0	2609.0	9485.0	2608.0	9507.0	2608.0	9732.0	2609.0	9818.0
GR	2610.0	9893.0	2610.0	9914.0	2609.0	9920.0	2608.0	9924.0	2607.0	9934.0
GR	2606.0	9944.0	2606.0	10091.0	2607.0	10097.0	2608.0	10102.0	2609.0	10107.0
GR	2610.0	10112.0	2610.5	10190.	2611.0	10233.0	2610.0	10441.0	2609.0	10474.0
GR	2608.0	10497.	2607.0	10653.0	2608.0	10788.0	2609.0	10816.0	2610.0	10847.0
GR	2611.0	10921.	2612.0	11401.0	2613.0	11536.0	2614.0	11677.0	2615.0	11771.0
GR	2616.0	11840.	2618	12000						
NH	3	.056	9923.	.03	10149.	.056	11756			
X1	20.722	54.	9923.	10099.	300.	350.	320.			
GR	2630.0	8472.0	2629.0	8528.0	2628.0	8559.0	2627.0	8586.0	2626.0	8617.0
GR	2625.0	8647.0	2624.0	8691.0	2623.0	8738.0	2622.0	8785.0	2621.0	8802.0
GR	2620.0	8823.0	2619.0	8849.0	2618.0	8888.0	2617.0	8951.0	2616.0	9008.0
GR	2615.0	9074.0	2614.0	9140.0	2613.0	9209.0	2612.0	9266.0	2611.0	9421.0
GR	2610.0	9440.0	2609.0	9456.0	2609.0	9573.0	2610.0	9806.0	2610.0	9923.0
GR	2609.0	9926.0	2608.0	9930.0	2607.0	9985.0	2607.0	10092.0	2608.0	10095.0
GR	2609.0	10099.0	2609.0	10149.0	2610.0	10160.0	2611.0	10168.0	2611.	10175.
GR	2612.0	10206.	2612.0	10304.0	2612.0	10405.0	2611.0	10454.0	2610.0	10531.0
GR	2609.0	10546.	2609.0	10658.0	2608.0	10712.0	2608.0	10735.0	2609.0	10744.0
GR	2610.0	10753.	2611.0	10778.0	2612.0	10817.0	2613.0	10896.0	2613.0	11282.0
GR	2614.0	11456.	2615.	11706.	2616.	11736.	2620	11756.		
NH	4	.056	9895.	.03	10080.	.056	10651.	.10	11860	
X1	20.780	58.	9895.	10080.	295.	330.	315.			
X3						10550	2622.			
GR	2630.0	8477.0	2629.0	8527.0	2628.0	8597.0	2627.0	8606.0	2626.0	8630.0
GR	2625.0	8687.0	2624.0	8737.0	2623.0	8779.0	2622.0	8800.0	2621.0	8835.0
GR	2620.0	8863.0	2619.0	8904.0	2618.0	8937.0	2617.0	8953.0	2616.0	8960.0
GR	2615.0	9089.0	2614.0	9382.0	2613.0	9519.0	2612.0	9524.0	2611.0	9529.0
GR	2611.0	9690.0	2612.0	9845.0	2612.0	9895.0	2611.0	9899.0	2610.0	9903.0
GR	2609.0	9907.0	2608.0	10045.0	2608.0	10074.0	2609.0	10076.0	2610.0	10078.0
GR	2611.0	10080.0	2611.0	10145.0	2611.	10150.	2610.0	10181.0	2610.0	10245.0
GR	2611.0	10254.	2612.0	10267.0	2613.0	10334.0	2614.0	10396.0	2614.0	10426.0
GR	2613.0	10503.	2613.0	10631.0	2612.0	10651.0	2611.0	10660.0	2611.0	10753.0
GR	2610.0	10770.	2609.0	10786.0	2609.0	10823.0	2610.0	10834.0	2611.0	10853.0
GR	2612.0	10866.	2613.0	10877.0	2614.0	10992.0	2614.	11182.	2615.	11602.
GR	2616.	11677.	2617.	11702.	2620	11860				
NH	5	.056	9912.	.03	10088.	.05	10230.	.035	10346.	.150
NH	11980									
X1	20.840	59.	9912.	10141.	310.	325.	315.			
X3						10370	2622			
GR	2630.0	8524.0	2629.0	8572.0	2628.0	8626.0	2627.0	8672.0	2626.0	8715.0
GR	2625.0	8746.0	2624.0	8855.0	2623.0	8882.0	2622.0	8891.0	2622.0	8920.0
GR	2621.0	8934.0	2620.0	8976.0	2619.0	8993.0	2618.0	9005.0	2617.0	9025.0
GR	2616.0	9233.0	2616.0	9338.0	2615.0	9544.0	2614.0	9549.0	2613.0	9555.0

GR	2612.0	9561.0	2612.0	9776.0	2613.0	9865.0	2613.0	9912.0	2612.0	9915.0
GR	2611.0	9917.0	2610.0	9918.0	2609.0	10015.0	2609.0	10043.0	2610.0	10083.0

GR	2611.0	10088.0	2612.0	10141.0	2612.	10155.	2612.0	10172.0	2611.0	10230.0
GR	2611.0	10286.	2612.0	10314.0	2613.0	10346.0	2613.0	10431.0	2614.0	10446.0
GR	2615.0	10468.	2616.0	10507.0	2616.0	10778.0	2615.0	10796.0	2614.0	10809.0
GR	2613.0	10843.	2612.0	10853.0	2611.0	10860.0	2611.0	10901.0	2612.0	10906.0
GR	2613.0	10912.	2613.0	10984.0	2614.0	10997.0	2615.0	11014.0	2616.	11334.
GR	2616.	11414.	2617.	11584.	2618.	11604.	2622	11980		
NH	5	.056	9925.	.03	10088	.07	10247	.05	10503.	.15
NH	11486.									
X1	20.902	59.	9925.	10088.	320.	345.	325.			
X3						10330	2625.			
GR	2625.0	8856.0	2624.0	8910.0	2623.0	8942.0	2622.0	8978.0	2622.0	9112.0
GR	2621.0	9123.0	2620.0	9138.0	2620.0	9314.0	2621.0	9319.0	2622.0	9326.0
GR	2623.0	9349.0	2623.0	9377.0	2622.0	9388.0	2621.0	9392.0	2620.0	9398.0
GR	2619.0	9404.0	2618.0	9409.0	2618.0	9422.0	2619.0	9430.0	2620.0	9433.0
GR	2621.0	9438.0	2622.0	9443.0	2623.0	9447.0	2623.0	9464.0	2622.0	9467.0
GR	2621.0	9470.0	2620.0	9475.0	2619.0	9479.0	2618.0	9568.0	2617.0	9604.0
GR	2616.0	9608.0	2615.0	9621.0	2614.0	9696.0	2614.0	9925.0	2613.0	9930.0
GR	2612.0	9934.0	2611.0	9958.0	2611.0	10073.0	2612.0	10078.0	2613.0	10083.0
GR	2614.0	10088.0	2614.	10210.	2614.0	10224.0	2615.0	10233.0	2616.0	10239.0
GR	2617.0	10247.	2617.0	10503.0	2616.0	10641.0	2615.0	10836.0	2614.	10981.
GR	2613.	10991.	2613.	11016.	2614.	11021.	2615.	11026.	2616.	11031.
GR	2617.	11081.	2618.	11176.	2618.	11426.	2619.	11486.		
NH	5	.056	9921.	.03	10093.	.07	10176.	.035	10313.	.15
NH	11770.									
X1	20.983	49.	9921.	10112.	405.	440.	425.			
X3						10270	2627.			
GR	2630	8740	2625.0	8970.0	2624.0	9068.0	2623.0	9073.0	2622.0	9191.0
GR	2622.0	9214.0	2623.0	9220.0	2623.0	9240.0	2622.0	9256.0	2621.0	9271.0
GR	2620.0	9291.0	2619.0	9652.0	2619.0	9691.0	2618.0	9695.0	2617.0	9700.0
GR	2616.0	9750.0	2616.0	9921.0	2615.0	9925.0	2614.0	9929.0	2613.0	9932.0
GR	2613.0	10081.0	2614.0	10088.0	2615.0	10093.0	2616.0	10097.0	2617.0	10103.0
GR	2618.0	10106.0	2619.0	10112.0	2620.0	10176.0	2621.0	10190.0	2621.	10200.
GR	2621.0	10239.0	2620.0	10250.	2619.0	10313.0	2619.0	10710.0	2618.0	10865.0
GR	2617.0	10899.0	2616.0	10923.	2615.0	10938.0	2615.0	10977.0	2616.0	10988.0
GR	2617.0	11000.0	2618.0	11012.	2619.0	11133.0	2620.0	11400.0	2621.	11440.
GR	2622.	11495.	2623.	11620.	2624.	11690.	2625.	11770.		
NH	5	.056	9936.	.03	10100.	.07	10136.	.035	10327.	.15
NH	11434.									
X1	21.066	42.	9835.	10198.	415.	460.	440.			
X3						10280	2630.			
GR	2630.	8868.	2627.	9018.	2625.0	9118.0	2624.0	9179.0	2623.0	9224.0
GR	2622.0	9380.0	2621.0	9393.0	2620.0	9748.0	2620.0	9835.0	2619.0	9844.0
GR	2618.0	9852.0	2617.0	9907.0	2616.0	9916.0	2615.0	9936.0	2614.0	9974.0
GR	2614.0	10100.0	2615.0	10101.0	2616.0	10103.0	2617.0	10136.0	2618.0	10157.0
GR	2619.0	10180.0	2620.0	10191.0	2621.0	10198.0	2621.	10215.	2621.0	10255.0
GR	2622.0	10281.0	2622.0	10303.0	2621.0	10327.	2621.0	10520.0	2620.0	10933.0
GR	2619.0	10949.0	2618.0	10965.0	2617.0	10985.	2617.0	11014.0	2618.0	11020.0
GR	2619.0	11028.0	2620.0	11039.0	2621.	11061.	2622.	11154.	2623.	11214.
GR	2624.	11379.	2625.	11434.						

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 NH      5      .056    9897.      .03    10096.      .05    10276.     .035    10341.      .1
 NH  11373.
 X1  21.125       45.    9857.   10096.      305.     325.     315.
 X3                                                10280    2635.
 GR    2630.    9035.    2629.    9095.    2628.    9135.    2627.    9155.    2626.    9215.
 GR  2625.0   9305.0   2624.0   9315.0   2623.0   9325.0   2623.0   9334.0   2623.0   9415.0
 GR  2622.0   9694.0   2622.0   9782.0   2621.0   9857.0   2620.0   9871.0   2619.0   9889.0
 GR  2618.0   9897.0   2617.0   9903.0   2616.0   9907.0   2615.0   9913.0   2615.0   9918.0
 GR  2616.0  10077.0   2617.0  10086.0   2618.0  10096.0     2618.    10150.   2618.0  10276.0
 GR  2619.0  10296.    2620.0  10311.0   2621.0  10325.0   2622.0   10341.0  2622.0  10503.0
 GR  2621.0  10510.    2620.0  10521.0   2620.0  10622.0   2621.0   10640.0  2621.0  10728.0
 GR  2622.0  10914.    2622.0  10954.0   2621.0  11054.0   2620.0   11063.0  2620.0  11190.0
 GR  2621.0  11200.    2622.0  11208.0   2623.0  11222.0   2624.0   11259.0  2625.0  11373.0

 NH      4      .056    9891.      .03    10118.      .05    10360.       .1    11644
 X1  21.207       38.    9891.   10118.      420.     425.     425.
 X3                                                10465    2635.
 GR    2630.    9350.    2628.    9450.  2626.0     9544.    2625.    9554.    2625.    9644.
 GR  2624.0   9719.0   2623.0   9891.0   2622.0   9893.0   2621.0   9894.0   2620.0   9897.0
 GR  2619.0   9898.0   2618.0   9900.0   2617.0   9902.0   2617.0   10016.   2618.0  10082.0
 GR  2619.0  10095.0   2620.0  10118.0     2620.    10280.   2620.0   10360.   2619.0  10384.
 GR  2619.0  10469.0   2620.0  10486.0   2621.0   10502.   2622.0   10524.   2623.0  10530.
 GR  2624.0  10835.0   2623.0  11126.0   2622.0   11145.   2621.0   11157.   2621.0  11197.
 GR  2622.0  11202.0   2622.0  11244.0   2623.0   11260.   2623.0   11463.   2624.0  11517.
 GR  2625.0  11579.0   2626.0  11609.    2627.0   11644.       .0       .0       .0       .0

 NH      5      .07     9900.      .03    10067.      .05    10297.     .035    10441.      .1
 NH  12156.
 X1  21.325       55    9900.   10067.      630.     610.     615.
 X3                                                10450    2635.
 GR  2640.0   9201.0   2639.0   9230.0   2638.0   9267.0   2637.0   9305.0   2636.0   9377.0
 GR  2635.0   9409.0   2634.0   9445.0   2633.0   9490.0   2632.0   9544.0   2631.0   9572.0
 GR  2630.0   9595.0   2629.0   9632.0   2628.0   9663.0   2628.0   9790.0   2627.0   9807.0
 GR  2626.0   9825.0   2625.0   9843.0   2624.0   9858.0   2623.0   9900.0   2622.0   9905.0
 GR  2621.0   9909.0   2620.0   9914.0   2619.0   9917.0   2619.0   9922.0   2620.0  10059.0
 GR  2621.0  10061.0   2622.0  10064.0   2623.0  10067.0   2623.0  10200.0     2622.    10290.
 GR  2622.0  10297.      2622    10441   2622.0  10525.0   2623.0  10543.0   2624.0  10557.0
 GR  2625.0  10571.0   2626.0  10586.    2627.0  11441.0   2627.0  11512.0   2627.0  11512.0
 GR  2626.0  11514.0   2625.0  11519.    2624.0  11521.0   2624.0  11532.0   2625.0  11543.0
 GR  2626.0  11558.0   2627.0  11624.    2628.0  11698.0   2629.0  11749.0   2630.0  11782.0
 GR  2631.0  11845.0   2632.0  11931.    2633.0  12008.0   2634.0  12063.0   2635.0  12156.0

 NH      5      .07     9914.      .03    10033.      .07    10207.     .035    10466.      .12
 NH  11904.
 X1  21.468       47.    9885.   10041.      780.     720.     755.
 X3                                                10430    2640.
 GR  2640.0   9244.0   2639.0   9279.0   2638.0   9314.0   2637.0   9343.0   2636.0   9377.0
 GR  2635.0   9428.0   2634.0   9504.0   2633.0   9579.0   2632.0   9676.0   2631.0   9713.0
 GR  2630.0   9763.0   2630.0   9791.0   2629.0   9817.0   2628.0   9833.0   2627.0   9861.0
 GR  2626.0   9885.0   2625.0   9893.0   2624.0   9901.0   2623.0   9914.0   2623.0  10033.0
 GR  2624.0  10036.0   2625.0  10039.0   2626.0  10041.0   2626.0  10153.0   2625.0  10196.0
 GR  2625.0  10207.0   2625.2  10240.    2626.0  10354.0   2627.0  10402.0   2628.0  10415.0
 GR  2629.0  10466.    2630.0  10606.0   2630.0  11326.0   2630.0  11381.0   2629.0  11393.0
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GR	2628.0	11403.	2628.0	11471.0	2627.0	11478.0	2627.0	11516.0	2628.0	11521.0
GR	2629.0	11525.	2630.0	11571.0	2631.0	11673.0	2632.0	11738.0	2633.0	11798.0
GR	2634.0	11833.	2635.0	11904.0	.0	.0	.0	.0	.0	.0
NH	5	.07	9917.	.03	10041.	.07	10229.	.035	10512.	.15
NH	11737.									
X1	21.544	54.	9903.	10051.	400.	390.	390.			
X3						10430	2645.			
GR	2640.0	9239.0	2639.0	9278.0	2638.0	9338.0	2637.0	9371.0	2636.0	9417.0
GR	2635.0	9440.0	2634.0	9445.0	2634.0	9456.0	2635.0	9463.0	2636.0	9472.0
GR	2636.0	9493.0	2635.0	9555.0	2634.0	9681.0	2633.0	9770.0	2632.0	9807.0
GR	2632.0	9868.0	2631.0	9880.0	2630.0	9891.0	2629.0	9896.0	2628.0	9903.0
GR	2627.0	9917.0	2626.0	9920.0	2625.0	9924.0	2624.0	9927.0	2624.0	10032.0
GR	2625.0	10034.0	2626.0	10036.0	2627.0	10041.0	2628.0	10051.0	2628.0	10150.0
GR	2629.0	10175.0	2629.0	10206.0	2628.0	10229.0	2628.	10230.	2628.0	10384.0
GR	2629.0	10413.	2630.0	10442.0	2631.0	10512.0	2631.0	10939.0	2631.0	11248.0
GR	2630.0	11279.	2630.0	11323.0	2629.0	11391.0	2628.0	11413.0	2627.0	11448.0
GR	2627.0	11456.	2628.0	11481.0	2629.0	11494.0	2630.0	11510.0	2631.0	11525.0
GR	2632.0	11585.	2633.0	11627.0	2634.0	11692.0	2635.0	11737.0	.0	.0
NH	5	.07	9970.	.03	10054.	.07	10292.	.035	10605.	.1
NH	11944.									
X1	21.628	53	9970.	10150.	430.	450.	440.			
X3						10490	2645.			
GR	2645	9200	2640.0	9452.0	2639.0	9491.0	2638.0	9542.0	2637.0	9586.0
GR	2636.0	9692.0	2635.0	9761.0	2634.0	9797.0	2633.0	9964.0	2632.0	9970.0
GR	2631.0	9973.0	2630.0	9976.0	2629.0	9978.0	2628.0	9980.0	2627.0	9983.0
GR	2626.0	9984.0	2626.0	10035.0	2627.0	10054.0	2628.0	10058.0	2629.0	10090.0
GR	2630.0	10112.0	2631.0	10150.0	2631.	10270.	2631.0	10292.0	2631.0	10562.0
GR	2632.0	10573.0	2633.0	10580.	2634.0	10605.0	2634.0	10733.0	2633.0	10750.0
GR	2632.0	10764.0	2632.0	10807.	2633.0	10836.0	2633.0	11168.0	2632.0	11251.0
GR	2632.0	11398.0	2632.0	11410.	2631.0	11416.0	2630.0	11423.0	2629.0	11430.0
GR	2629.0	11462.0	2630.0	11497.	2631.0	11504.0	2632.0	11509.0	2633.0	11515.0
GR	2634.0	11516.0	2634.0	11586.	2635.0	11671.0	2636.0	11727.0	2637.0	11800.0
GR	2638.0	11835.0	2639.0	11896.	2640.0	11944.0	.0	.0	.0	.0
NH	5	.065	9975.	.03	10046.	.07	10307.	.035	10611.	.1
NH	11853									
X1	21.707	65.	9834.	10090.	420.	405.	410.			
X3						10550	2645.			
GR	2641.0	9279.	2640.	9314.	2639.0	9345.0	2639.0	9439.0	2638.0	9569.0
GR	2637.0	9590.0	2637.0	9628.0	2636.0	9689.0	2635.0	9716.0	2634.0	9834.0
GR	2633.0	9849.0	2632.0	9861.0	2631.0	9871.0	2630.0	9927.0	2629.0	9971.0
GR	2628.0	9975.0	2628.0	10039.0	2629.0	10043.0	2630.0	10046.0	2631.0	10051.0
GR	2632.0	10071.	2633.0	10090.0	2633.0	10101.0	2632.0	10116.0	2634.	10130.
GR	2631.0	10132.	2630.0	10185.	2631.0	10205.0	2632.0	10264.0	2633.0	10275.0
GR	2634.0	10307.	2634.0	10416.	2635.0	10436.0	2636.0	10444.0	2637.0	10453.0
GR	2637.0	10532.	2636.0	10540.	2635.0	10552.0	2635.0	10597.0	2636.0	10611.0
GR	2636.0	10708.	2635.0	10719.	2634.0	10733.0	2634.0	10830.0	2635.0	10853.0
GR	2635.0	10992.	2634.0	11020.	2634.0	11224.0	2633.0	11289.0	2632.0	11324.0
GR	2631.0	11332.	2630.0	11339.	2630.0	11354.0	2631.0	11362.0	2632.0	11366.0
GR	2633.0	11376.	2634.0	11397.	2634.0	11432.0	2635.0	11465.0	2636.0	11509.0
GR	2637.0	11613.	2638.0	11658.	2639.0	11705.0	2640.0	11783.0	2641.	11853.

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NH	5	.065	9947.	.03	10050.	.07	10258.	.035	10593.	.15
NH	11770									

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X1   21.790        64      9922.     10116.      435.      430.      430.
X3                                                10540     2650.
GR    2645      8978.      2642.      8998.      2641.      9028.     2640.      9078.     2639.0     9178.0
GR  2638.0      9207.0     2637.0     9228.0     2636.0     9294.0    2636.0     9857.0    2635.0     9860.0
GR  2634.0      9866.0     2633.0     9872.0     2632.0     9878.0    2632.0     9903.0    2633.0     9907.0
GR  2634.0      9912.0     2634.0     9922.0     2633.0     9930.0    2632.0     9937.0    2631.0     9941.0
GR  2630.0      9947.0     2630.0     10050.     2631.0     10053.    2632.0     10070.0   2633.0     10092.0
GR  2634.0      10101.0    2635.0     10116.     2634.0     10129.    2633.0     10137.0   2633.0     10155.0
GR  2634.0      10161.0    2635.0     10171.     2635.0     10187.    2635.0     10258.0   2635.      10320.
GR  2635.0      10469.0    2636.0     10569.     2637.0     10593.    2638.0     10635.    2638.0     10699.0
GR  2637.0      10711.0    2636.0     10724.     2636.0     11059.    2635.0     11074.    2634.0     11081.0
GR  2634.0      11132.0    2635.0     11272.     2634.0     11319.    2633.0     11324.    2632.0     11328.0
GR  2631.0      11332.0    2630.0     11335.     2630.0     11357.    2631.0     11359.    2632.0     11364.0
GR  2633.0      11367.0    2634.0     11369.     2635.0     11373.    2636.0     11378.    2637.0     11408.0
GR  2638.0      11546.0    2639.0     11621.     2640.0     11695.    2641.0     11770.

NH        5       .065     9862.        .03     10046.        .05    10160.       .035    10455.        .15
NH  11690.
X1   21.880        58.      9854.     10055.      520.      440.      470.
X3                                                10390     2650.
GR  2645.0      8983.0     2644.0     9013.0     2643.0     9045.0    2642.0     9058.0    2641.0     9102.0
GR  2640.0      9126.0     2639.0     9150.0     2638.0     9177.0    2637.0     9330.0    2637.0     9496.0
GR  2638.0      9717.0     2638.0     9765.0     2637.0     9774.0    2636.0     9780.0    2635.0     9787.0
GR  2635.0      9808.0     2636.0     9820.0     2636.0     9854.0    2635.0     9862.0    2634.0     9865.0
GR  2633.0      9870.0     2633.0     9910.0     2632.0     9919.0    2632.0     9942.0    2631.0     10026.0
GR  2632.0      10032.0    2633.0     10036.0    2634.0     10040.0   2635.0     10046.0   2636.0     10055.0
GR  2637.0      10160.0    2638.0     10225.0    2638.0     10355.0   2637.0     10442.0   2638.0     10449.0
GR  2639.0      10455.0    2639.0     10637.0    2638.0     10645.0   2637.0     10861.0   2636.0     11182.0
GR  2635.0      11193.0    2634.0     11198.0    2633.0     11201.0   2632.0     11204.0   2632.0     11232.0
GR  2633.0      11235.0    2634.0     11237.0    2635.0     11241.0   2636.0     11245.0   2637.0     11249.0
GR  2638.0      11278.0    2639.0     11301.0    2640.0     11352.0   2641.0     11487.0   2642.0     11495.0
GR  2643.0      11531.0    2644.0     11627.0    2645.0     11690.0     .0         .0        .0         .0

NH        5       .065     9939.        .03     10092.        .05    10194.       .035    10411.        .15
NH  11587.
X1   21.925        70.      9939.     10134.      285.      235.      240.
X3                                                10340     2650.
GR   2650.      9196.      2645.0     9296.0     2644.0     9335.0    2643.0     9375.0    2642.0     9397.0
GR  2642.0      9424.0     2643.0     9447.0     2643.0     9670.0    2642.0     9692.0    2641.0     9701.0
GR  2640.0      9711.0     2639.0     9721.0     2639.0     9760.0    2640.0     9782.0    2640.0     9786.0
GR  2639.0      9790.0     2638.0     9794.0     2637.0     9797.0    2636.0     9802.0    2636.0     9844.0
GR  2637.0      9855.0     2638.0     9867.0     2638.0     9939.0    2637.0     9942.0    2636.0     9944.0
GR  2635.0      9946.0     2634.0     9949.0     2633.0     9952.0    2633.0     10067.0   2634.0     10072.0
GR  2635.0      10078.0    2636.0     10081.0    2637.0     10092.0   2638.0     10134.0   2638.      10175.
GR  2638.0      10194.0    2639.0     10208.     2639.0     10311.0   2640.0     10411.0   2641.0     10466.0
GR  2641.0      10510.0    2640.0     10555.     2640.0     10592.0   2639.0     10639.0   2639.0     10723.0
GR  2638.0      10930.0    2638.0     11153.     2637.0     11158.0   2636.0     11162.0   2635.0     11166.0
GR  2634.0      11168.0    2633.0     11172.     2632.0     11194.0   2632.0     11197.0   2633.0     11199.0
GR  2634.0      11201.0    2635.0     11203.     2636.0     11205.0   2637.0     11208.0   2638.0     11210.0
GR  2639.0      11214.0    2639.0     11260.     2640.0     11298.0   2640.0     11333.0   2641.0     11384.0
GR  2642.0      11423.0    2642.0     11468.     2643.0     11513.0   2644.0     11561.0   2645.0     11587.0
1
   27SEP93      14:45:02                                                                          PAGE   12


NH        4       .065     9902.        .03     10085.        .05    10353.       .15     11430.
X1   21.972        59.      9870.     10133.      235.      250.      245.
X3                                                10280     2650.
GR   2650.      9100.      2645.0     9330.0     2644.0     9360.0    2643.0     9387.0    2642.0     9421.0
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GR	2641.0	9456.0	2641.0	9700.0	2642.0	9706.0	2642.0	9711.0	2641.0	9722.0
GR	2640.0	9739.0	2639.0	9751.0	2638.0	9759.0	2637.0	9768.0	2637.0	9778.0
GR	2638.0	9787.0	2639.0	9840.0	2639.0	9870.0	2638.0	9892.0	2637.0	9895.0
GR	2636.0	9898.0	2635.0	9902.0	2634.0	9920.0	2634.0	9972.0	2635.0	9984.0
GR	2635.0	10020.0	2635.0	10077.0	2636.0	10080.0	2637.0	10082.0	2638.0	10085.0
GR	2639.0	10133.0	2639.5	10160.	2640.0	10211.0	2641.0	10288.0	2642.0	10353.0
GR	2642.0	10448.0	2641.0	10525.	2640.0	10619.0	2640.0	10878.0	2639.0	10912.0
GR	2639.0	11061.0	2638.0	11072.	2637.0	11075.0	2636.0	11078.0	2635.0	11081.0
GR	2634.0	11091.0	2634.0	11107.	2635.0	11110.0	2636.0	11113.0	2637.0	11116.0
GR	2638.0	11120.0	2639.0	11121.	2640.0	11131.0	2640.0	11231.0	2641.0	11288.0
GR	2642.0	11308.0	2643.0	11388.	2644.0	11405.0	2645.0	11430.0	.0	.0
NH	5	.065	9862.	.03	10141.	.05	10283.	.035	10490.	.07
NH	11432.									
X1	22.047	57.	9778.	10165.	295.	430.	395.			
X3						10440	2655.			
GR	2650.	9092.	2645.0	9432.0	2644.0	9487.0	2644.0	9634.0	2643.0	9703.0
GR	2642.0	9778.0	2641.0	9791.0	2640.0	9840.0	2639.0	9854.0	2638.0	9862.0
GR	2637.0	9865.0	2636.0	9868.0	2636.0	9921.0	2637.0	10050.0	2637.0	10066.0
GR	2636.0	10099.0	2636.0	10115.0	2637.0	10121.0	2638.0	10128.0	2639.0	10133.0
GR	2640.0	10138.0	2641.0	10141.0	2642.0	10165.0	2642.	10200.	2642.0	10251.0
GR	2643.0	10283.0	2644.0	10291.	2645.0	10300.0	2645.0	10383.0	2644.0	10389.0
GR	2643.0	10396.0	2643.0	10426.	2643.0	10490.0	2642.0	10698.0	2642.0	10895.0
GR	2641.0	10942.0	2640.0	11062.	2639.0	11071.0	2638.0	11092.0	2637.0	11110.0
GR	2636.0	11133.0	2636.0	11146.	2637.0	11156.0	2638.0	11168.0	2639.0	11185.0
GR	2640.0	11200.0	2641.0	11229.	2641.0	11259.0	2640.0	11268.0	2639.0	11279.0
GR	2639.0	11313.0	2640.0	11316.	2641.0	11319.0	2642.0	11325.0	2643.0	11346.0
GR	2644.0	11390.0	2645.0	11432.	0					
NH	5	.065	9830.	.03	10169.	.05	10592.	.035	1'306.	.07
NH	11879.									
X1	22.125	65.	9769.	10183.	330.	490.	410.			
X3						10550	2655.			
GR	2655	8828.	2650.0	9128.0	2649.0	9152.0	2648.0	9208.0	2647.0	9276.0
GR	2646.0	9324.0	2645.0	9418.0	2644.0	9519.0	2645.0	9623.0	2645.0	9696.0
GR	2644.0	9745.0	2643.0	9756.0	2642.0	9769.0	2641.0	9824.0	2640.0	9830.0
GR	2639.0	9835.0	2638.0	9839.0	2638.0	9957.0	2639.0	9960.0	2640.0	9966.0
GR	2641.0	9969.0	2642.0	10008.0	2642.0	10040.0	2641.0	10082.0	2640.0	10091.0
GR	2639.0	10098.0	2638.0	10108.0	2638.0	10158.0	2639.0	10164.0	2640.0	10169.0
GR	2641.0	10176.0	2642.0	10183.0	2642.0	10245.0	2641.0	10255.0	2640.0	10259.0
GR	2639.0	10267.0	2639.0	10276.0	2640.0	10281.0	2641.0	10285.0	2641.0	10327.0
GR	2640.5	10350.	2640.0	10367.	2641.0	10377.0	2642.0	10452.0	2643.0	10470.0
GR	2644.0	10485.0	2645.0	10504.	2645.0	10520.0	2644.0	10536.0	2643.0	10548.0
GR	2643.0	10582.0	2644.0	10592.	2644.0	10871.0	2643.0	10905.0	2643.0	10970.0
GR	2644.0	11003.0	2645.0	11077.	2644.0	11306.0	2644.0	11330.0	2645.0	11562.0
GR	2646.0	11775.0	2647.0	11828.	2648.0	11850.0	2649.0	11859.0	2650.0	11879.0

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NH	3	.065	9807.	.036	10192.	.065	11916.			
X1	22.195	67.	9807.	10238.	340.	380.	365.			
X3				9807.	2649.	10600	2655.			
GR	2655.	8845.	2650.0	9345.0	2649.0	9411.0	2648.0	9518.0	2647.0	9605.0
GR	2646.0	9621.0	2645.0	9632.0	2645.0	9701.0	2646.0	9729.0	2647.0	9752.0
GR	2648.0	9776.0	2649.0	9799.0	2649.0	9807.0	2648.0	9809.0	2647.0	9811.0
GR	2646.0	9813.0	2645.0	9815.0	2644.0	9817.0	2643.0	9818.0	2642.0	9819.0
GR	2641.0	9822.0	2640.0	9825.0	2639.0	9841.0	2639.0	9860.0	2640.0	9910.0
GR	2640.0	9937.0	2641.0	9943.0	2642.0	9952.0	2643.0	9958.0	2644.0	9976.0

GR	2644.0	9992.0	2643.0	10008.0	2642.0	10014.0	2641.0	10024.0	2641.0	10184.0
GR	2642.0	10192.0	2643.0	10225.0	2644.0	10233.0	2645.0	10238.0	2644.0	10343.0
GR	2644.0	10397.0	2645.0	10442.0	2646.0	10465.0	2647.0	10474.0	2647.0	10508.0
GR	2646.0	10515.0	2645.0	10522.0	2644.0	10529.0	2643.0	10534.0	2642.0	10541.0
GR	2641.0	10547.0	2641.0	10590.0	2642.0	10593.0	2643.0	10596.0	2644.0	10599.0
GR	2644.	10600.	2645.0	10603.	2646.0	10716.0	2646.0	10820.0	2645.0	10879.0
GR	2645.0	11006.0	2646.0	11091.	2646.0	11452.0	2647.0	11661.0	2648.0	11776.0
GR	2649.0	11854.0	2650.0	11916.	0					
NH	3	.065	9767.	.036	10247.	.065	11950			
X1	22.275	70.	9767.	10247.	425.	240.	370.			
X3						10800	2655			
GR	2655.	9388.	2652.0	9530.0	2651.0	9565.0	2650.0	9588.0	2649.0	9651.0
GR	2649.0	9728.0	2648.0	9749.0	2647.0	9755.0	2646.0	9761.0	2645.0	9767.0
GR	2644.0	9773.0	2643.0	9778.0	2642.0	9784.0	2641.0	9891.0	2641.0	9901.0
GR	2642.0	9903.0	2643.0	9907.0	2644.0	9910.0	2645.0	9913.0	2645.0	10043.0
GR	2644.0	10057.0	2643.0	10081.0	2642.0	10158.0	2642.0	10194.0	2643.0	10202.0
GR	2643.0	10239.0	2644.0	10243.0	2645.0	10247.0	2645.0	10325.0	2646.0	10338.0
GR	2647.0	10394.0	2648.0	10469.0	2649.0	10474.0	2650.0	10479.0	2651.0	10484.0
GR	2652.0	10487.0	2653.0	10491.0	2654.0	10495.0	2655.0	10499.0	2654.0	10501.0
GR	2653.0	10504.0	2652.0	10507.0	2652.0	10671.0	2653.0	10674.0	2654.0	10677.0
GR	2654.0	10683.0	2653.0	10687.0	2652.0	10691.0	2651.0	10693.0	2650.0	10696.0
GR	2649.0	10735.0	2648.0	10739.0	2647.0	10742.0	2646.0	10745.0	2645.0	10749.0
GR	2644.0	10752.0	2643.0	10755.0	2642.0	10758.0	2642.0	10794.0	2643.0	10796.0
GR	2644.0	10799.0	2645.0	10803.0	2646.0	10809.0	2647.0	10913.0	2647.0	11367.0
GR	2647.0	11665.0	2648.	11800.	2648.	11860.	2649.	11900.	2650.	11950.

WENTWORTH ROAD

NH	3	.065	9754.	.036	10330.	.065	12280.			
X1	22.338	37.	9708.	10390.	400.	280.	395.			
GR	2655.0	9393.0	2654.0	9434.0	2653.0	9506.0	2652.0	9560.0	2651.0	9612.0
GR	2650.0	9640.0	2649.0	9656.0	2648.0	9689.0	2647.0	9708.0	2646.0	9754.0
GR	2645.0	9782.0	2644.0	9809.0	2643.0	9835.0	2643.0	9891.0	2644.0	9916.0
GR	2645.0	9946.0	2646.0	10005.0	2645.	10020.	2644.	10130.	2644.	10230.
GR	2646.	10330.	2647.	10390.	2647.	10690.	2647.	10765.	2647.	10995.
GR	2647.6	11050.	2647.	11110.	2648.	11182.	2648.	11735.	2649.	11850.
GR	2649.	11935.	2650.	12005.	2651.	12040.	2652.	12115.	2653.	12170.
GR	2654.	12230.	2655.	12280.	.0	.0	.0	.0	.0	.0

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NH	3	.065	9837.	.036	10304.	.065	11532.			
X1	22.373	36.	9823.	10338.	200.	350.	200.			
GR	2655.	9292.	2654.	9481.	2653.	9590.	2652.	9634.	2651.	9673.
GR	2651.	9787.	2651.	9823.	2650.	9825.	2649.	9826.	2648.	9828.
GR	2647.	9831.	2646.	9834.	2645.	9837.	2644.	9898.	2644.	9954.
GR	2645.	9957.	2646.	9959.	2647.	9961.	2648.	9966.	2648.	10010.
GR	2647.	10051.	2646.	10061.	2646.	10248.	2647.	10304.	2648.	10316.
GR	2649.	10327.	2650.	10338.	2650.	10457.	2651.	10605.	2651.	10719.
GR	2650.	10941.	2649.	11044.	2649.	11159.	2650.	11283.	2651.	11319.
GR	2655.	11532.								
NH	3	.065	9825.	.036	10167.	.065	11651.			
X1	22.454	50.	9770.	10366.	170.	230.	170.			
GR	2660.0	8996.0	2659.0	9102.0	2658.0	9161.0	2658.0	9206.0	2657.0	9219.0
GR	2656.0	9337.0	2655.0	9396.0	2654.0	9555.0	2653.0	9578.0	2652.0	9668.0
GR	2651.0	9770.0	2650.0	9784.0	2649.0	9793.0	2648.0	9805.0	2647.0	9815.0
GR	2646.0	9825.0	2645.0	9850.0	2645.0	9975.0	2646.0	9978.0	2647.0	9979.0

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 GR   2648.0     9980.0    2648.0     9986.0    2647.0    10020.0   2647.0    10167.0   2648.0    10199.0
 GR   2648.0    10336.0    2649.0    10345.0    2650.0    10355.0   2651.0    10366.0   2651.0    10435.0
 GR   2652.0    10536.0    2651.0    10655.0    2650.0    10700.0   2650.0    10711.0   2651.0    10723.0
 GR   2652.0    10739.0    2653.0    10756.0    2653.0    10912.0   2652.0    10920.0   2651.0    10951.0
 GR   2651.0    11126.0    2652.0    11182.0    2653.0    11235.0   2654.0    11310.0   2655.0    11343.0
 GR   2656.0    11377.0    2657.0    11440.0    2658.0    11490.0   2659.0    11575.0   2660.0    11651.0

 NH         3        .065      9825.       .03     10137.       .065    11239.
 X1    22.511          30.      9790.     10559.       300.       300.      300.
 GR   2660.0     9177.0    2659.0     9290.0    2658.0     9321.0   2657.0     9377.0   2656.0     9456.0
 GR   2655.0     9522.0    2654.0     9667.0    2653.0     9723.0   2652.0     9790.0   2651.0     9801.0
 GR   2650.0     9818.0    2649.0     9825.0    2648.0     9842.0   2647.0     9917.0   2647.0    10092.0
 GR   2648.0    10096.0    2648.0    10137.0    2649.0    10153.0   2650.0    10183.0   2650.0    10481.0
 GR   2651.0    10511.0    2652.0    10559.0    2652.0    10754.0   2653.0    10962.0   2654.0    11036.0
 GR   2654.0    11064.0    2655.0    11115.0    2656.0    11175.0   2657.0    11205.0   2658.0    11239.0

 NH         3        .065      9606.       .036    10239.       .065    11137.
 X1    22.591          55.      9456.     10279.       420.       345.      420.
 GR   2660.0     8946.0    2659.0     9082.0    2658.0     9124.0   2657.0     9215.0   2656.0     9337.0
 GR   2656.0     9456.0    2655.0     9470.0    2654.0     9517.0   2653.0     9589.0   2652.0     9594.0
 GR   2651.0     9597.0    2650.0     9601.0    2649.0     9603.0   2648.0     9606.0   2648.0     9618.0
 GR   2649.0     9653.0    2650.0     9657.0    2651.0     9660.0   2652.0     9662.0   2653.0     9665.0
 GR   2654.0     9670.0    2654.0     9751.0    2653.0     9770.0   2652.0     9777.0   2651.0     9783.0
 GR   2650.0     9788.0    2649.0     9793.0    2649.0     9877.0   2648.0     9964.0   2648.0     9970.0
 GR   2649.0     9971.0    2650.0     9973.0    2651.0     9976.0   2651.0    10027.0   2650.0    10042.0
 GR   2649.0    10057.0    2649.0    10080.0    2650.0    10140.0   2651.0    10239.0   2652.0    10248.0
 GR   2653.0    10279.0    2653.0    10317.0    2652.0    10407.0   2652.0    10438.0   2653.0    10446.0
 GR   2654.0    10478.0    2654.0    10537.0    2653.0    10609.0   2654.0    10696.0   2655.0    10774.0
 GR   2656.0    10870.0    2657.0    10937.0    2658.0    10990.0   2659.0    11084.0   2660.0    11137.0

 NH         3        .065      9803.       .036    10272.       .065    10937.
 X1    22.670          35.      9746.     10280.       420.       380.      420.
 GR   2660.0     8924.0    2659.0     8952.0    2658.0     9050.0   2657.0     9147.0   2656.0     9407.0
 GR   2655.0     9536.0    2655.0     9656.0    2655.0     9746.0   2654.0     9760.0   2653.0     9790.0
 GR   2652.0     9798.0    2651.0     9803.0    2650.0     9810.0   2650.0     9817.0   2651.0     9880.0
 GR   2652.0     9887.0    2653.0     9905.0    2654.0     9954.0   2654.0    10023.0   2654.0    10078.0
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    27SEP93       14:45:02                                                                    PAGE   15

 GR   2653.0    10111.0    2652.0    10173.0    2652.0    10272.0   2653.0    10276.0   2654.0    10278.0
 GR   2655.0    10280.0    2655.0    10572.0    2654.0    10592.0   2654.0    10598.0   2655.0    10612.0
 GR    2656.     10667.     2657.     10722.     2658.     10797.    2659.     10857.    2660.     10937.
          ***** REACH #4 *****
          TAKEN FROM DATA BY ARMY CORPS OF ENGINEERS, 1975

 NC      .065       .065       .040        .1         .3
 X1     10580         15       1975       2200        544        544       544
 GR      2675          0       2672        150       2672        485      2668        690      2664        985
 GR      2660       1245       2656       1975     2653.5       2030    2653.5       2200    2653.6       2420
 GR      2656       2585     2657.6       2930       2660       3125      2664       3395      2672       3870

 X1     10640         15       1875       2100        230        435       320
 GR      2676          0       2672        265       2668        615      2665        815      2664        925
 GR      2660       1185       2657       1545       2656       1875      2655       1925      2655       2100
 GR      2656       2415       2660       2700       2664       3110      2668       3300      2676       3525

 X1     10700         15       1800       2060        290        445       330
 GR      2676          0       2672        340       2668        630      2664        980    2660.5       1190
 GR      2660       1270       2656       1800     2655.9       1930      2656       2060      2657       2230
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GR	2656	2390	2660	2530	2668	2960	2672	3290	2676	3470
X1	10780	19	1600	1775	360	510	425			
GR	2680	0	2676	250	2672	490	2672	530	2673	570
GR	2672	590	2669	750	2668	890	2664.5	1045	2664	1280
GR	2661	1480	2660	1600	2658	1640	2658	1775	2658.6	1940
GR	2660	2300	2660	2420	2664	2700	2668	2890		
X1	10860	14	1410	1480	320	400	420			
GR	2680	0	2676	100	2672	210	2673	350	2672	500
GR	2672	730	2668	900	2664	1060	2660	1410	2660	1480
GR	2664	2410	2668	2735	2676	3150	2680	3600		
X1	10940	12	1230	1450	465	380	430			
GR	2684	0	2672	295	2668	430	2668	535	2664	1020
GR	2662	1230	2662	1450	2664	1570	2664.5	2085	2668	2540
GR	2676	3120	2680	3480						
X1	11020	18	1240	1450	470	380	425			
X3	10									
GR	2682	0	2681	160	2680	320	2676	490	2672	560
GR	2668	940	2664	1040	2664	1115	2668	1185	2668	1220
GR	2664	1240	2664	1450	2666.4	1740	2668	2540	2672	2630
GR	2676	2850	2680	3225	2684	3350				
X1	11100	19	950	1990	460	270	420			
X3	10									
GR	2684	0	2676	210	2672	515	2671.7	615	2668.5	750
GR	2668	875	2669	940	2668	950	2667.3	1670	2668	1990
GR	2667.6	2110	2668	2220	2672	2390	2676	2610	2680	2830
GR	2681	2940	2680	3070	2684	3150	2688	3470		

X1	11160	24	815	1260	245	300	315			
GR	2684	0	2680	55	2676	170	2672	600	2672	700
GR	2668	740	2668.2	770	2668	815	2667	950	2668	1100
GR	2668	1170	2668.3	1260	2668	1310	2668	1350	2668.3	1420
GR	2669	1650	2672	1930	2672	2072	2670.2	2460	2676	2680
GR	2680	2980	2684	3140	2684	3340	2688	3560		
X1	11240	24	760	1075	680	280	425			
X3	10									
GR	2692	0	2688	40	2684	125	2680	150	2676	170
GR	2673.5	315	2672	350	2671.8	375	2672	400	2672	760
GR	2670	890	2670	1040	2672	1075	2672.5	1095	2672	1135
GR	2672	1370	2676	1545	2675.8	1620	2675	1740	2672	1845
GR	2676	2190	2680	2520	2684	2720	2688	3150		
X1	11320	21	1175	1395	445	310	425			
X3	10									
GR	2692	0	2688	30	2684	90	2680	155	2676	305
GR	2675.8	515	2672	685	2671.5	965	2672	1175	2672	1360
GR	2676	1395	2679	1590	2678	1895	2678	2200	2680	2380
GR	2681	2435	2680	2470	2679	2590	2680	2700	2684	2940
GR	2688	3440								
NC	.065	.065	.040	.1	.3					

X1	11400	24	1185	1735	390	415	435			
X3	10									
GR	2696	0	2692	30	2688	50	2684	125	2680	450
GR	2679.1	600	2676	860	2675	930	2676	1010	2676.5	1060
GR	2676	1185	2674	1285	2674	1390	2676	1520	2674.5	1540
GR	2676	1570	2674	1590	2674	1650	2676	1735	2680	1970
GR	2681	2220	2684	2480	2688	2740	2692	3050		
X1	11480	26	1485	1800	335	480	425			
GR	2700	0	2696	15	2692	50	2688	245	2684	575
GR	2680	910	2677	1050	2676	1280	2675.5	1325	2676	1370
GR	2676	1420	2675.8	1450	2676	1485	2676	1715	2675.5	1725
GR	2675.5	1760	2676	1800	2680	1850	2684	2200	2684.5	2290
GR	2684	2355	2682	2440	2684	2520	2688	2670	2692	2900
GR	2696	3325								
X1	11560	28	400	1165	615	305	420			
X3	10									
GR	2700	0	2696	25	2692	45	2688	60	2692	85
GR	2695	150	2692	225	2688	270	2684	365	2680	400
GR	2678.5	440	2678.5	490	2680	510	2680.4	545	2680	740
GR	2679.2	810	2680	900	2679.8	920	2680	940	2680.5	1000
GR	2676.5	1050	2676.5	1090	2680	1165	2684	1440	2686	1620
GR	2688	1930	2692	2150	2696	2290				

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X1	11640	27	860	1380	710	440	420			
X3	10									
GR	2700	0	2696	120	2692	230	2691.5	255	2692	275
GR	2696	310	2697	380	2696	445	2692	475	2688	510
GR	2684	530	2682.6	680	2684	860	2681.5	940	2684	1050
GR	2684	1160	2680	1300	2680	1335	2678.6	1340	2678.6	1370
GR	2680	1380	2683	1425	2684	1480	2686	1755	2688	2050
GR	2692	2250	2696	2400						
NC	.065	.065	.035	.1	.3					
X1	11700	20	840	1120	315	300	315			
GR	2700	0	2696	50	2696	100	2692	175	2692	240
GR	2694	310	2692	350	2688	400	2684	450	2684	665
GR	2685	740	2684	840	2684	910	2680	950	2684	1120
GR	2685	1290	2688	1440	2692	1790	2696	1970	2700	2235
X1	11760	15	820	1000	215	255	315			
GR	2700	0	2697	110	2696	190	2692	255	2688	290
GR	2687.5	385	2685.5	670	2684	820	2682.5	830	2682.5	990
GR	2684	1000	2688	1170	2692	1430	2696	1620	2700	1750
X1	11840	24	1170	1330	345	340	420			
X3	10									
GR	2704	0	2700	40	2696	210	2692	470	2691	725
GR	2688	770	2687.8	850	2688	935	2688.3	975	2688	1020
GR	2688	1075	2688.5	1135	2688	1170	2685.5	1195	2685.5	1295
GR	2688	1330	2688.2	1380	2688	1485	2688.5	1535	2688	1575
GR	2688	1690	2692	1710	2696	1740	2700	1945		
X1	11900	18	1390	1510	315	320	330			
GR	2704	0	2700	60	2700	180	2696	410	2696	545

GR	2698.5	670	2696	775	2692	920	2690	1210	2688	1390
GR	2687	1400	2687	1490	2686	1510	2692	1730	2696	1930
GR	2696	1980	2700	1990	2704	2010				
X1	11960	21	970	1080	200	470	320			
GR	2704	0	2700	200	2696	390	2692	530	2691	745
GR	2692	910	2687.5	970	2687.5	1010	2689	1030	2688.1	1080
GR	2692	1110	2694	1140	2692	1160	2692	1200	2691	1235
GR	2692	1255	2692	1380	2693	1665	2694	1870	2700	1930
GR	2708	2040								
X1	12020	16	910	995	270	315	310			
GR	2705	0	2700	250	2696	450	2692	700	2691.5	740
GR	2692	775	2693	850	2692	910	2689.0	925	2689.0	995
GR	2692	1060	2692.5	1085	2692	1120	2692	1165	2694	1645
GR	2712	1880								

X1	12100	15	1050	1170	380	440	430			
GR	2709	0	2708	80	2704	300	2700	530	2700	680
GR	2696	790	2690.6	1050	2690.6	1170	2691.5	1250	2696	1375
GR	2696	1540	2700	1550	2700	1580	2700	1775	2708	1810
X1	12180	12	1020	1110	210	195	200			
GR	2720	0	2716	190	2700	650	2696	725	2694	910
GR	2692.2	1020	2692.2	1110	2696	1260	2704	1550	2702	1690
GR	2716	1770	2720	1825						
X1	12250	19	850	927	365	340	370			
GR	2716	0	2708	140	2708	280	2704	390	2700	435
GR	2697.0	520	2700	625	2701	695	2700	760	2696	820
GR	2692.7	850	2692.7	927	2696	940	2700	965	2699.5	1095
GR	2700	1165	2704	1300	2708	1415	2720	1670		
X1	12300	20	530	685	360	265	270			
GR	2720	0	2716	70	2712	180	2704	210	2701.5	380
GR	2700	480	2692.7	530	2692.8	560	2704.5	630	2696	665
GR	2692.8	675	2696	685	2700	700	2701	760	2700	820
GR	2699.5	910	2700	975	2708	1240	2712	1345	2716	1410
X1	12380	17	420	590	640	190	425			
GR	2720	0	2716	50	2712	100	2712	160	2708	240
GR	2704	390	2700	400	2696	420	2694.6	435	2694.6	460
GR	2696	490	2700	590	2701.5	720	2700	830	2700	900
GR	2704	1040	2708	1190						
X1	12460	15	360	430	515	350	425			
GR	2720	0	2715	50	2712	70	2708	120	2706	320
GR	2706	330	2704	340	2700	350	2698	360	2698	430
GR	2700	450	2704	480	2704	595	2708	840	2712	1025
X1	12540	19	510	560	410	350	410			
GR	2720	0	2712	60	2708	425	2709	450	2708	480
GR	2704	490	2701	510	2701	560	2704	585	2708	610
GR	2712	625	2714	710	2716	775	2714	810	2716	880
GR	2718	945	2716	1050	2716	1140	2720	1290		

QT	5	1900	5700	9500	13300	11200				
X1	12620	14	575	620	190	570	425			
GR	2720	0	2716	30	2712	60	2710	290	2712	415
GR	2708	480	2703	575	2708	620	2708	675	2704	725
GR	2708	735	2712	740	2716	790	2720	840		
QT	5	1600	4800	8000	11200	16000				
X1	12700	18	695	790	285	585	425			
GR	2728	0	2724	100	2700	230	2700	300	2720	345
GR	2716	390	2712	530	2711.5	590	2712	635	2712	685
GR	2707	695	2705	700	2705	775	2707	790	2712	800
GR	2716	820	2720	845	2728	1010				

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X1	12780	10	90	170	415	480	435			
GR	2728	0	2724	45	2720	70	2712	90	2707.5	100
GR	2707.5	170	2712	220	2716	250	2720	300	2732	450
X1	12840	12	150	185	270	280	335			
GR	2732	0	2728	45	2720	85	2716	100	2712	130
GR	2709	150	2709	185	2712	220	2716	295	2720	320
GR	2732	420	2736	440						
X1	12900	10	295	310	320	245	340			
GR	2732	0	2724	50	2720	150	2716	200	2712	295
GR	2711.9	300	2712	310	2716	335	2720	345	2736	440
X1	12980	11	300	330	410	430	425			
GR	2740	0	2732	40	2728	130	2724	210	2720	300
GR	2720	330	2724	370	2724	415	2728	460	2732	495
GR	2736	530								
X1	13060	14	315	350	360	490	430			
GR	2744	0	2740	75	2736	170	2732	270	2728	300
GR	2722	315	2722	350	2728	375	2728	415	2732	450
GR	2732	480	2732	515	2736	535	2740	600		
X1	13140	15	200	230	370	470	420			
GR	2752	0	2748	40	2744	75	2740	140	2736	175
GR	2732	200	2731	210	2732	230	2736	265	2738	310
GR	2736	340	2736	370	2740	420	2744	485	2752	585
X1	13200	13	280	325	295	320	313			
GR	2760	0	2756	70	2744	160	2740	280	2738	300
GR	2740	310	2744	325	2746	385	2744	445	2740	500
GR	2752	585	2756	620	2760	685				
X1	13280	15	185	250	400	350	425			
GR	2768	0	2764	60	2756	160	2752	185	2748	200
GR	2746	220	2748	250	2752	370	2755	430	2752	495
GR	2748	575	2744	600	2752	640	2760	665	2776	745
X1	13360	18	80	120	440	300	415			
GR	2776	0	2760	75	2756	80	2754	95	2756	120
GR	2757	190	2756	250	2757	290	2756	310	2752	370
GR	2752	395	2756	420	2757	460	2756	490	2755	535
GR	2755	575	2760	580	2772	620				

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X1    13440      11      130      190      460      450      430
GR     2784       0     2776       30     2768      110     2764      130     2760      150
GR     2757     190     2760      260     2764      400     2768      465     2776      555
GR     2780     610
1
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X1    13520      11      125      150      460      285      420
GR     2780       0     2776       40     2772       80     2760      125     2758      135
GR     2760     150     2764      230     2768      310     2776      365     2780      395
GR     2788     460

X1    13600       7       60       80      450      350      420
GR     2780       0     2764       60     2760       80     2774      160     2776      200
GR     2780     210     2792      265
1
    27SEP93      14:45:02                                                              PAGE   21

T1     TANQUE VERDE 10-YR STORM

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       -10      3                           .004                                  2555.6

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

        2                -1

1
    27SEP93      14:45:02                                                              PAGE   22

T1     TANQUE VERDE 25-YR STORM

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       -10      4                           .004                                  2555.6

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

        3                -1

1
    27SEP93      14:45:02                                                              PAGE   23

T1     TANQUE VERDE 50-YR STORM

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       -10      5                           .004                                  2555.6

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

        4                -1
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T1 TANQUE VERDE 100-YR STORM

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	-10	6			.004				2555.6	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	5		-1							

T1 TANQUE VERDE 500-YR STORM

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	-10	7			.004				2555.6	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	6		-1							

THIS RUN EXECUTED 27SEP93 14:46:14

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

TANQUE VERDE CREEK

SUMMARY PRINTOUT

SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
1.000	.00	2548.70	2300.00	2550.71	2550.00	2550.00	4.90	.76	.74	2551.07
1.000	.00	2548.70	6900.00	2552.37	2550.00	2550.00	7.39	1.53	.82	2553.15
1.000	.00	2548.70	11500.00	2553.28	2550.00	2550.00	8.54	1.78	1.70	2554.18
1.000	.00	2548.70	16100.00	2553.93	2550.00	2550.00	9.36	2.02	2.18	2554.92
1.000	.00	2548.70	23000.00	2554.67	2550.00	2550.00	10.25	2.43	2.58	2555.72

	1.000	.00	2548.70	28500.00	2555.16	2550.00	2550.00	10.81	2.71	2.88	2556.25
	101.000	850.00	2552.00	2300.00	2554.41	2554.00	2554.00	4.86	.43	.60	2554.78
	101.000	850.00	2552.00	6900.00	2555.94	2554.00	2554.00	7.17	1.14	1.62	2556.69
	101.000	850.00	2552.00	11500.00	2556.84	2554.00	2554.00	8.77	1.78	2.21	2557.89
	101.000	850.00	2552.00	16100.00	2557.51	2554.00	2554.00	10.07	2.24	2.56	2558.84
	101.000	850.00	2552.00	23000.00	2558.25	2554.00	2554.00	11.81	2.82	3.10	2559.99
*	101.000	850.00	2552.00	28500.00	2558.85	2554.00	2554.00	12.63	3.18	3.48	2560.77
	102.000	950.00	2556.00	2300.00	2558.49	2556.00	2558.00	5.27	1.32	.60	2558.91
	102.000	950.00	2556.00	6900.00	2560.02	2556.00	2558.00	7.83	1.79	2.00	2560.80
	102.000	950.00	2556.00	11500.00	2561.08	2556.00	2558.00	8.87	2.02	2.65	2561.97
	102.000	950.00	2556.00	16100.00	2561.95	2556.00	2558.00	9.55	2.13	3.03	2562.90
	102.000	950.00	2556.00	23000.00	2563.07	2556.00	2558.00	10.20	2.34	3.38	2564.07
	102.000	950.00	2556.00	28500.00	2563.75	2556.00	2558.00	10.79	2.52	3.64	2564.81
	103.000	575.00	2558.00	2300.00	2560.58	2560.00	2560.00	4.80	.43	.82	2560.93
	103.000	575.00	2558.00	6900.00	2562.27	2560.00	2560.00	6.83	1.10	2.09	2562.87
	103.000	575.00	2558.00	11500.00	2563.24	2560.00	2560.00	7.74	1.35	2.79	2563.92
	103.000	575.00	2558.00	16100.00	2564.01	2560.00	2560.00	8.30	1.48	3.23	2564.73
	103.000	575.00	2558.00	23000.00	2564.99	2560.00	2560.00	8.84	1.73	3.63	2565.73
	103.000	575.00	2558.00	28500.00	2565.65	2560.00	2560.00	9.22	1.89	3.93	2566.42
	104.000	770.00	2560.00	2300.00	2563.34	2564.00	2564.00	5.59	.00	.00	2563.82
*	104.000	770.00	2560.00	6900.00	2565.05	2564.00	2564.00	8.07	.75	1.88	2565.92
*	104.000	770.00	2560.00	11500.00	2565.84	2564.00	2564.00	9.43	1.13	2.83	2566.87
	104.000	770.00	2560.00	16100.00	2566.46	2564.00	2564.00	10.34	1.56	3.42	2567.59
	104.000	770.00	2560.00	23000.00	2567.25	2564.00	2564.00	11.40	2.06	4.00	2568.50
	104.000	770.00	2560.00	28500.00	2567.81	2564.00	2564.00	11.94	2.35	4.36	2569.11

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	SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
	105.000	500.00	2563.00	2300.00	2566.06	2568.00	2566.00	7.31	.00	.20	2566.89
*	105.000	500.00	2563.00	6900.00	2567.84	2568.00	2566.00	8.25	.00	1.80	2568.62
*	105.000	500.00	2563.00	11500.00	2568.57	2568.00	2566.00	9.69	.57	2.52	2569.52
*	105.000	500.00	2563.00	16100.00	2569.12	2568.00	2566.00	10.96	.94	3.08	2570.25
	105.000	500.00	2563.00	23000.00	2569.77	2568.00	2566.00	12.65	1.35	3.80	2571.19
	105.000	500.00	2563.00	28500.00	2570.24	2568.00	2566.00	13.73	1.72	4.27	2571.85
*	106.000	430.00	2564.40	2300.00	2568.04	2568.00	2568.00	3.90	.01	.08	2568.28
	106.000	430.00	2564.40	6900.00	2569.55	2568.00	2568.00	6.93	.78	1.10	2570.23
	106.000	430.00	2564.40	11500.00	2570.40	2568.00	2568.00	8.75	1.28	1.65	2571.39
	106.000	430.00	2564.40	16100.00	2571.10	2568.00	2568.00	9.82	1.67	2.11	2572.24
	106.000	430.00	2564.40	23000.00	2572.02	2568.00	2568.00	10.85	2.05	2.66	2573.28
	106.000	430.00	2564.40	28500.00	2572.64	2568.00	2568.00	11.57	2.31	3.03	2574.01
*	107.000	500.00	2566.00	2300.00	2569.06	2570.00	2570.00	5.87	.00	.00	2569.60
*	107.000	500.00	2566.00	6900.00	2571.04	2570.00	2570.00	8.36	.79	1.37	2572.01
	107.000	500.00	2566.00	11500.00	2572.22	2570.00	2570.00	8.59	1.44	2.02	2573.04
	107.000	500.00	2566.00	16100.00	2573.06	2570.00	2570.00	9.06	1.78	2.46	2573.87
	107.000	500.00	2566.00	23000.00	2574.02	2570.00	2570.00	9.95	2.18	3.00	2574.91
	107.000	500.00	2566.00	28500.00	2574.69	2570.00	2570.00	10.50	2.47	3.33	2575.63
*	108.000	450.00	2570.00	2300.00	2573.24	2572.00	2572.00	7.04	.93	1.43	2573.88
*	108.000	450.00	2570.00	6900.00	2574.55	2572.00	2572.00	9.52	1.54	2.72	2575.38
*	108.000	450.00	2570.00	11500.00	2575.31	2572.00	2572.00	11.10	2.01	3.57	2576.28

*	108.000	450.00	2570.00	16100.00	2575.77	2572.00	2572.00	12.93	2.53	4.38	2577.02
*	108.000	450.00	2570.00	23000.00	2576.44	2572.00	2572.00	14.80	3.16	5.29	2577.96
*	108.000	450.00	2570.00	28500.00	2576.97	2572.00	2572.00	15.78	3.55	5.83	2578.63
	108.100	5.00	2570.00	2300.00	2573.63	2572.00	2572.00	5.57	.91	1.40	2573.99
	108.100	5.00	2570.00	6900.00	2575.03	2572.00	2572.00	7.62	1.40	2.48	2575.51
	108.100	5.00	2570.00	11500.00	2575.71	2572.00	2572.00	9.63	1.96	3.39	2576.39
	108.100	5.00	2570.00	16100.00	2576.40	2572.00	2572.00	10.64	2.37	3.96	2577.18
*	108.100	5.00	2570.00	23000.00	2577.18	2572.00	2572.00	12.23	2.91	4.78	2578.16
	108.100	5.00	2570.00	28500.00	2577.54	2572.00	2572.00	13.89	3.29	5.53	2578.79
	108.200	40.00	2570.00	2300.00	2573.89	2572.00	2572.00	4.72	.83	1.24	2574.12
	108.200	40.00	2570.00	6900.00	2575.31	2572.00	2572.00	6.75	1.29	2.28	2575.67
	108.200	40.00	2570.00	11500.00	2576.14	2572.00	2572.00	8.23	1.78	3.01	2576.62
	108.200	40.00	2570.00	16100.00	2576.83	2572.00	2572.00	9.33	2.17	3.58	2577.42
	108.200	40.00	2570.00	23000.00	2577.64	2572.00	2572.00	10.98	2.60	4.39	2578.42
	108.200	40.00	2570.00	28500.00	2578.13	2572.00	2572.00	12.40	2.86	5.06	2579.11
	108.300	5.00	2570.00	2300.00	2573.90	2572.00	2572.00	4.61	.70	1.13	2574.13
	108.300	5.00	2570.00	6900.00	2575.34	2572.00	2572.00	6.59	1.20	2.13	2575.68
	108.300	5.00	2570.00	11500.00	2576.17	2572.00	2572.00	8.09	1.67	2.83	2576.63
	108.300	5.00	2570.00	16100.00	2576.88	2572.00	2572.00	9.12	2.04	3.35	2577.44
	108.300	5.00	2570.00	23000.00	2577.76	2572.00	2572.00	10.48	2.51	4.03	2578.46
	108.300	5.00	2570.00	28500.00	2578.38	2572.00	2572.00	11.37	2.83	4.47	2579.19

	SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
	109.000	410.00	2572.00	2300.00	2574.75	2576.00	2574.00	4.88	.70	.81	2575.09
	109.000	410.00	2572.00	6900.00	2576.31	2576.00	2574.00	6.69	1.42	2.20	2576.82
	109.000	410.00	2572.00	11500.00	2577.27	2576.00	2574.00	7.90	1.91	2.86	2577.91
	109.000	410.00	2572.00	16100.00	2578.04	2576.00	2574.00	8.92	2.30	3.37	2578.80
	109.000	410.00	2572.00	23000.00	2578.99	2576.00	2574.00	10.22	2.78	4.00	2579.95
	109.000	410.00	2572.00	28500.00	2579.64	2576.00	2574.00	11.14	3.12	4.43	2580.76
	110.000	730.00	2574.00	2300.00	2576.58	2578.80	2576.50	3.63	.55	2.21	2576.73
*	110.000	730.00	2574.00	6900.00	2578.16	2578.80	2576.50	4.65	1.05	1.87	2578.34
*	110.000	730.00	2574.00	11500.00	2579.14	2578.80	2576.50	4.99	1.25	1.93	2579.31
*	110.000	730.00	2574.00	16100.00	2579.96	2578.80	2576.50	5.27	1.41	2.06	2580.14
*	110.000	730.00	2574.00	23000.00	2581.04	2578.80	2576.50	5.62	1.60	2.25	2581.23
*	110.000	730.00	2574.00	28500.00	2581.81	2578.80	2576.50	5.87	1.72	2.38	2582.02
*	111.000	530.00	2576.00	2300.00	2578.39	2580.00	2579.00	7.37	.00	1.11	2579.22
*	111.000	530.00	2576.00	6900.00	2580.33	2580.00	2579.00	7.44	.57	1.43	2581.00
*	111.000	530.00	2576.00	11500.00	2581.02	2580.00	2579.00	8.32	1.18	1.91	2581.71
*	111.000	530.00	2576.00	16100.00	2581.41	2580.00	2579.00	9.60	1.59	2.36	2582.26
*	111.000	530.00	2576.00	23000.00	2581.92	2580.00	2579.00	11.07	2.08	2.92	2582.96
*	111.000	530.00	2576.00	28500.00	2582.24	2580.00	2579.00	12.19	2.42	3.33	2583.44
*	112.000	590.00	2578.00	2300.00	2581.22	2580.00	2581.00	4.16	1.40	.18	2581.41
	112.000	590.00	2578.00	6900.00	2582.55	2580.00	2581.00	6.23	1.83	.71	2582.88
	112.000	590.00	2578.00	11500.00	2583.24	2580.00	2581.00	7.34	2.18	1.17	2583.63
	112.000	590.00	2578.00	16100.00	2583.87	2580.00	2581.00	7.85	2.38	1.51	2584.26
*	112.000	590.00	2578.00	23000.00	2584.64	2580.00	2581.00	8.56	2.66	1.91	2585.06
*	112.000	590.00	2578.00	28500.00	2585.18	2580.00	2581.00	9.03	2.85	2.16	2585.62
*	113.000	540.00	2580.00	2300.00	2582.77	2584.00	2583.30	6.22	1.38	.00	2583.15

	113.000	540.00	2580.00	6900.00	2584.06	2584.00	2583.30	6.65	2.01	.64	2584.34
	113.000	540.00	2580.00	11500.00	2584.81	2584.00	2583.30	7.14	2.30	1.10	2585.09
	113.000	540.00	2580.00	16100.00	2585.38	2584.00	2583.30	7.69	2.57	1.43	2585.68
	113.000	540.00	2580.00	23000.00	2586.12	2584.00	2583.30	8.36	2.90	1.79	2586.44
	113.000	540.00	2580.00	28500.00	2586.64	2584.00	2583.30	8.80	3.13	2.02	2586.99
	114.000	520.00	2582.00	2300.00	2585.27	2586.00	100000.00	5.76	1.67	.00	2585.45
	114.000	520.00	2582.00	6900.00	2586.18	2586.00	100000.00	7.71	2.79	.00	2586.45
	114.000	520.00	2582.00	11500.00	2586.79	2586.00	100000.00	9.01	3.42	.00	2587.13
*	114.000	520.00	2582.00	16100.00	2587.31	2586.00	100000.00	9.85	3.88	.00	2587.72
*	114.000	520.00	2582.00	23000.00	2587.99	2586.00	100000.00	10.86	4.46	.00	2588.47
*	114.000	520.00	2582.00	28500.00	2588.46	2586.00	100000.00	11.52	4.85	.00	2589.01
	1.000	1056.00	2585.50	2300.00	2589.10	2590.00	2590.00	6.02	.00	.00	2589.66
*	1.000	1056.00	2585.50	6900.00	2590.93	2590.00	2590.00	7.54	1.30	.92	2591.61
	1.000	1056.00	2585.50	11500.00	2591.51	2590.00	2590.00	9.13	1.97	1.39	2592.36
	1.000	1056.00	2585.50	16100.00	2592.09	2590.00	2590.00	9.87	2.41	1.71	2592.96
	1.000	1056.00	2585.50	23000.00	2592.81	2590.00	2590.00	10.75	2.90	2.05	2593.73
	1.000	1056.00	2585.50	28500.00	2593.30	2590.00	2590.00	11.33	3.21	2.25	2594.26

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	SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
	2.000	180.00	2586.40	2300.00	2589.67	2592.00	2590.00	6.86	.00	.00	2590.40
*	2.000	180.00	2586.40	6900.00	2591.52	2592.00	2590.00	11.84	.00	1.20	2593.68
*	2.000	180.00	2586.40	11500.00	2593.37	2592.00	2590.00	9.40	1.57	1.15	2594.32
*	2.000	180.00	2586.40	16100.00	2593.88	2592.00	2590.00	10.56	2.06	1.48	2594.94
*	2.000	180.00	2586.40	23000.00	2594.52	2592.00	2590.00	11.82	2.63	1.88	2595.68
*	2.000	180.00	2586.40	28500.00	2594.88	2592.00	2590.00	13.00	3.06	2.18	2596.19
	3.000	517.00	2589.00	2300.00	2592.06	2592.00	2592.00	6.20	.17	.12	2592.66
*	3.000	517.00	2589.00	6900.00	2594.77	2592.00	2592.00	5.68	1.29	.57	2595.12
	3.000	517.00	2589.00	11500.00	2594.95	2592.00	2592.00	8.66	2.04	.95	2595.71
	3.000	517.00	2589.00	16100.00	2595.66	2592.00	2592.00	8.71	2.29	1.23	2596.31
	3.000	517.00	2589.00	23000.00	2596.45	2592.00	2592.00	9.19	2.61	1.52	2597.07
	3.000	517.00	2589.00	28500.00	2597.02	2592.00	2592.00	9.44	2.79	1.70	2597.62
	4.000	484.00	2590.40	2300.00	2593.84	2594.00	2598.00	6.30	.00	.00	2594.45
*	4.000	484.00	2590.40	6900.00	2595.95	2594.00	2598.00	10.09	1.57	.00	2597.42
*	4.000	484.00	2590.40	11500.00	2597.30	2594.00	2598.00	11.46	2.70	.00	2598.99
*	4.000	484.00	2590.40	16100.00	2598.98	2594.00	2598.00	9.65	2.73	.79	2599.92
*	4.000	484.00	2590.40	23000.00	2599.67	2594.00	2598.00	10.79	3.16	1.19	2600.68
*	4.000	484.00	2590.40	28500.00	2599.86	2594.00	2598.00	12.53	3.70	1.47	2601.18
*	5.000	200.00	2590.80	2300.00	2594.54	2591.00	2596.40	4.55	.00	.00	2594.86
*	5.000	200.00	2590.80	6900.00	2597.22	2591.00	2596.40	7.25	.00	.56	2597.98
*	5.000	200.00	2590.80	11500.00	2598.98	2591.00	2596.40	6.91	.74	.97	2599.48
	5.000	200.00	2590.80	16100.00	2599.73	2591.00	2596.40	7.66	1.13	1.21	2600.28
	5.000	200.00	2590.80	23000.00	2600.42	2591.00	2596.40	9.03	1.58	1.54	2601.10
*	5.000	200.00	2590.80	28500.00	2600.95	2591.00	2596.40	9.80	1.89	1.76	2601.70
*	6.000	234.00	2591.40	2300.00	2594.83	2598.00	2594.00	5.82	.00	.50	2595.35
	6.000	234.00	2591.40	6900.00	2597.38	2598.00	2594.00	8.87	.00	1.33	2598.60
*	6.000	234.00	2591.40	11500.00	2597.92	2598.00	2594.00	13.32	.00	2.08	2600.67
*	6.000	234.00	2591.40	16100.00	2599.91	2598.00	2594.00	13.19	1.53	2.20	2602.52
*	6.000	234.00	2591.40	23000.00	2602.44	2598.00	2594.00	10.46	2.23	.95	2603.68
*	6.000	234.00	2591.40	28500.00	2602.85	2598.00	2594.00	11.53	2.57	1.19	2604.24

	20.195	675.00	2593.00	2300.00	2597.25	2598.00	2602.00	6.49	.00	2.04	2597.85
	20.195	675.00	2593.00	6900.00	2599.97	2598.00	2602.00	7.13	1.57	2.81	2600.59
*	20.195	675.00	2593.00	11500.00	2602.06	2598.00	2602.00	5.56	1.65	1.58	2602.32
*	20.195	675.00	2593.00	16100.00	2603.45	2598.00	2602.00	4.83	1.57	1.47	2603.61
*	20.195	675.00	2593.00	23000.00	2604.28	2598.00	2602.00	5.43	1.83	1.74	2604.46
*	20.195	675.00	2593.00	28500.00	2604.90	2598.00	2602.00	5.76	1.97	1.91	2605.09
	20.361	850.00	2595.00	2300.00	2601.49	2602.00	2606.00	5.51	.00	.00	2601.96
*	20.361	850.00	2595.00	6900.00	2603.01	2602.00	2606.00	7.99	1.29	1.97	2603.90
*	20.361	850.00	2595.00	11500.00	2603.80	2602.00	2606.00	9.67	2.26	3.02	2605.02
*	20.361	850.00	2595.00	16100.00	2604.59	2602.00	2606.00	10.22	2.69	3.12	2605.85
*	20.361	850.00	2595.00	23000.00	2605.52	2602.00	2606.00	10.51	2.91	3.21	2606.69
*	20.361	850.00	2595.00	28500.00	2606.03	2602.00	2606.00	10.77	3.16	3.59	2607.17

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	SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
*	20.442	410.00	2598.00	2300.00	2602.77	2606.00	2606.00	4.97	.00	.92	2603.14
	20.442	410.00	2598.00	6900.00	2604.68	2606.00	2606.00	8.74	.00	2.33	2605.75
	20.442	410.00	2598.00	11500.00	2605.79	2606.00	2606.00	10.65	.00	2.92	2607.23
*	20.442	410.00	2598.00	16100.00	2607.05	2606.00	2606.00	9.51	.94	2.23	2607.96
*	20.442	410.00	2598.00	23000.00	2607.53	2606.00	2606.00	11.17	1.50	2.76	2608.67
*	20.442	410.00	2598.00	28500.00	2607.96	2606.00	2606.00	11.78	1.81	3.07	2609.11
*	20.520	450.00	2602.00	2300.00	2604.59	2606.00	2610.00	5.70	.00	5.70	2605.10
	20.520	450.00	2602.00	6900.00	2606.97	2606.00	2610.00	5.83	.95	3.22	2607.37
*	20.520	450.00	2602.00	11500.00	2608.36	2606.00	2610.00	5.67	1.62	2.16	2608.67
	20.520	450.00	2602.00	16100.00	2608.84	2606.00	2610.00	6.49	2.05	2.40	2609.22
	20.520	450.00	2602.00	23000.00	2609.65	2606.00	2610.00	6.79	2.42	2.61	2610.03
	20.520	450.00	2602.00	28500.00	2610.12	2606.00	2610.00	7.22	2.70	2.85	2610.52
*	20.604	470.00	2604.00	2300.00	2607.61	2608.00	2609.00	3.58	.65	2.62	2607.75
	20.604	470.00	2604.00	6900.00	2608.73	2608.00	2609.00	5.75	1.80	2.92	2609.02
	20.604	470.00	2604.00	11500.00	2609.54	2608.00	2609.00	6.50	2.36	3.07	2609.87
	20.604	470.00	2604.00	16100.00	2610.13	2608.00	2609.00	7.17	2.75	3.27	2610.50
	20.604	470.00	2604.00	23000.00	2610.83	2608.00	2609.00	7.99	3.19	3.60	2611.27
	20.604	470.00	2604.00	28500.00	2611.30	2608.00	2609.00	8.56	3.47	3.86	2611.80
	20.660	300.00	2606.00	2300.00	2608.43	2610.00	2610.00	4.58	.79	1.35	2608.69
	20.660	300.00	2606.00	6900.00	2609.71	2610.00	2610.00	6.30	1.98	2.44	2610.11
	20.660	300.00	2606.00	11500.00	2610.47	2610.00	2610.00	7.52	2.59	2.98	2610.99
	20.660	300.00	2606.00	16100.00	2611.05	2610.00	2610.00	8.41	3.00	3.21	2611.65
	20.660	300.00	2606.00	23000.00	2611.76	2610.00	2610.00	9.29	3.42	3.39	2612.44
	20.660	300.00	2606.00	28500.00	2612.25	2610.00	2610.00	9.76	3.65	3.49	2612.95
	20.722	320.00	2607.00	2300.00	2609.44	2610.00	2609.00	5.19	.85	1.51	2609.81
	20.722	320.00	2607.00	6900.00	2610.76	2610.00	2609.00	6.81	1.93	2.71	2611.23
	20.722	320.00	2607.00	11500.00	2611.60	2610.00	2609.00	7.72	2.53	3.19	2612.13
	20.722	320.00	2607.00	16100.00	2612.23	2610.00	2609.00	8.50	2.93	3.46	2612.83
	20.722	320.00	2607.00	23000.00	2612.96	2610.00	2609.00	9.43	3.42	3.75	2613.64
	20.722	320.00	2607.00	28500.00	2613.43	2610.00	2609.00	10.01	3.72	3.77	2614.16
	20.780	315.00	2608.00	2300.00	2610.69	2612.00	2611.00	5.67	.00	1.32	2611.18
*	20.780	315.00	2608.00	6900.00	2612.09	2612.00	2611.00	8.65	1.86	2.80	2613.05
*	20.780	315.00	2608.00	11500.00	2612.93	2612.00	2611.00	10.14	2.85	3.55	2614.11
*	20.780	315.00	2608.00	16100.00	2613.61	2612.00	2611.00	11.18	3.49	3.87	2614.93

*	20.780	315.00	2608.00	23000.00	2614.46	2612.00	2611.00	12.19	3.99	4.19	2615.89
*	20.780	315.00	2608.00	28500.00	2615.00	2612.00	2611.00	12.85	4.20	4.52	2616.51
	20.840	315.00	2609.00	2300.00	2612.00	2613.00	2612.00	4.60	.00	1.75	2612.30
*	20.840	315.00	2609.00	6900.00	2613.79	2613.00	2612.00	5.37	1.63	2.83	2614.12
*	20.840	315.00	2609.00	11500.00	2614.81	2613.00	2612.00	6.23	2.28	3.56	2615.23
*	20.840	315.00	2609.00	16100.00	2615.58	2613.00	2612.00	7.05	2.73	4.20	2616.10
*	20.840	315.00	2609.00	23000.00	2616.45	2613.00	2612.00	8.14	3.10	5.02	2617.12
*	20.840	315.00	2609.00	28500.00	2617.01	2613.00	2612.00	8.88	3.33	5.57	2617.78

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	SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
*	20.902	325.00	2611.00	2300.00	2613.12	2614.00	2614.00	7.74	.00	.00	2614.05
*	20.902	325.00	2611.00	6900.00	2615.27	2614.00	2614.00	9.06	2.17	1.80	2616.35
*	20.902	325.00	2611.00	11500.00	2616.19	2614.00	2614.00	10.81	3.27	2.58	2617.58
*	20.902	325.00	2611.00	16100.00	2616.93	2614.00	2614.00	12.15	4.09	3.32	2618.58
*	20.902	325.00	2611.00	23000.00	2617.90	2614.00	2614.00	13.57	4.95	3.82	2619.83
*	20.902	325.00	2611.00	28500.00	2618.56	2614.00	2614.00	14.49	5.41	4.26	2620.68
*	20.983	425.00	2613.00	2300.00	2615.85	2616.00	2619.00	4.98	.00	.00	2616.24
	20.983	425.00	2613.00	6900.00	2617.60	2616.00	2619.00	7.86	2.36	.00	2618.46
	20.983	425.00	2613.00	11500.00	2618.79	2616.00	2619.00	9.30	3.67	.00	2619.91
	20.983	425.00	2613.00	16100.00	2619.67	2616.00	2619.00	10.53	4.17	.76	2621.05
	20.983	425.00	2613.00	23000.00	2620.75	2616.00	2619.00	11.54	4.35	1.98	2622.27
	20.983	425.00	2613.00	28500.00	2621.52	2616.00	2619.00	12.00	4.66	2.69	2623.07
	21.066	440.00	2614.00	2300.00	2617.05	2620.00	2621.00	4.24	.00	.00	2617.33
*	21.066	440.00	2614.00	6900.00	2619.37	2620.00	2621.00	5.55	.00	.00	2619.85
*	21.066	440.00	2614.00	11500.00	2620.79	2620.00	2621.00	6.50	.85	.00	2621.44
*	21.066	440.00	2614.00	16100.00	2621.88	2620.00	2621.00	6.95	1.65	1.74	2622.58
*	21.066	440.00	2614.00	23000.00	2623.01	2620.00	2621.00	7.69	2.31	3.10	2623.81
*	21.066	440.00	2614.00	28500.00	2623.71	2620.00	2621.00	8.23	2.70	3.86	2624.59
*	21.125	315.00	2615.00	2300.00	2617.84	2621.00	2618.00	5.42	.00	.00	2618.30
	21.125	315.00	2615.00	6900.00	2620.05	2621.00	2618.00	6.72	.00	2.51	2620.67
	21.125	315.00	2615.00	11500.00	2621.48	2621.00	2618.00	7.62	.51	3.42	2622.24
	21.125	315.00	2615.00	16100.00	2622.48	2621.00	2618.00	8.59	1.02	4.13	2623.42
	21.125	315.00	2615.00	23000.00	2623.55	2621.00	2618.00	9.82	1.72	4.97	2624.73
	21.125	315.00	2615.00	28500.00	2624.24	2621.00	2618.00	10.59	2.27	5.49	2625.57
	21.207	425.00	2617.00	2300.00	2619.59	2623.00	2620.00	4.94	.00	.61	2619.96
	21.207	425.00	2617.00	6900.00	2621.32	2623.00	2620.00	7.00	.00	1.83	2621.98
	21.207	425.00	2617.00	11500.00	2622.64	2623.00	2620.00	7.80	.00	2.60	2623.40
	21.207	425.00	2617.00	16100.00	2623.70	2623.00	2620.00	8.53	.69	3.13	2624.57
	21.207	425.00	2617.00	23000.00	2624.87	2623.00	2620.00	9.64	1.61	3.76	2625.93
	21.207	425.00	2617.00	28500.00	2625.60	2623.00	2620.00	10.45	2.03	4.20	2626.81
	21.325	615.00	2619.00	2300.00	2621.99	2623.00	2623.00	6.13	.00	.00	2622.57
	21.325	615.00	2619.00	6900.00	2623.63	2623.00	2623.00	8.51	.69	3.08	2624.56
	21.325	615.00	2619.00	11500.00	2624.64	2623.00	2623.00	9.72	1.53	4.19	2625.73
	21.325	615.00	2619.00	16100.00	2625.54	2623.00	2623.00	10.43	2.08	4.94	2626.73
	21.325	615.00	2619.00	23000.00	2626.67	2623.00	2623.00	11.37	2.59	5.81	2628.04
	21.325	615.00	2619.00	28500.00	2627.43	2623.00	2623.00	12.13	2.92	6.41	2628.95
	21.468	755.00	2623.00	2300.00	2626.01	2626.00	2626.00	4.98	.02	1.83	2626.37
	21.468	755.00	2623.00	6900.00	2627.67	2626.00	2626.00	6.51	1.44	3.54	2628.16

	21.468	755.00	2623.00	11500.00	2628.66	2626.00	2626.00	7.62	2.09	4.66	2629.30
	21.468	755.00	2623.00	16100.00	2629.43	2626.00	2626.00	8.55	2.59	5.56	2630.24
	21.468	755.00	2623.00	23000.00	2630.44	2626.00	2626.00	9.57	2.98	6.60	2631.45
	21.468	755.00	2623.00	28500.00	2631.19	2626.00	2626.00	10.16	3.16	7.24	2632.32

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	SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
	21.544	390.00	2624.00	2300.00	2627.41	2628.00	2628.00	5.84	.00	.00	2627.94
*	21.544	390.00	2624.00	6900.00	2629.21	2628.00	2628.00	9.17	1.11	2.41	2630.35
*	21.544	390.00	2624.00	11500.00	2630.21	2628.00	2628.00	10.78	1.89	3.76	2631.62
*	21.544	390.00	2624.00	16100.00	2630.95	2628.00	2628.00	12.16	2.32	4.80	2632.64
	21.544	390.00	2624.00	23000.00	2631.88	2628.00	2628.00	13.77	2.84	6.05	2633.94
	21.544	390.00	2624.00	28500.00	2632.57	2628.00	2628.00	14.70	2.50	6.83	2634.85
*	21.628	440.00	2626.00	2300.00	2629.34	2632.00	2631.00	8.53	.00	.00	2630.47
*	21.628	440.00	2626.00	6900.00	2632.01	2632.00	2631.00	8.68	.00	2.64	2633.04
	21.628	440.00	2626.00	11500.00	2632.98	2632.00	2631.00	9.93	1.07	4.31	2634.20
	21.628	440.00	2626.00	16100.00	2634.02	2632.00	2631.00	10.05	1.14	5.28	2635.19
	21.628	440.00	2626.00	23000.00	2635.27	2632.00	2631.00	10.37	2.15	6.22	2636.47
	21.628	440.00	2626.00	28500.00	2636.10	2632.00	2631.00	10.70	2.59	6.81	2637.36
*	21.707	410.00	2628.00	2300.00	2632.03	2634.00	2633.00	4.11	.00	1.25	2632.28
*	21.707	410.00	2628.00	6900.00	2634.35	2634.00	2633.00	5.19	.37	2.22	2634.70
*	21.707	410.00	2628.00	11500.00	2635.57	2634.00	2633.00	6.02	1.27	2.94	2636.01
	21.707	410.00	2628.00	16100.00	2636.43	2634.00	2633.00	6.73	1.89	3.61	2636.97
	21.707	410.00	2628.00	23000.00	2637.55	2634.00	2633.00	7.42	2.41	4.30	2638.17
	21.707	410.00	2628.00	28500.00	2638.34	2634.00	2633.00	7.77	2.74	4.74	2639.01
	21.790	430.00	2630.00	2300.00	2633.17	2634.00	2635.00	5.54	1.45	.38	2633.64
	21.790	430.00	2630.00	6900.00	2635.45	2634.00	2635.00	7.39	2.84	1.59	2636.21
	21.790	430.00	2630.00	11500.00	2636.73	2634.00	2635.00	7.54	1.81	2.85	2637.38
	21.790	430.00	2630.00	16100.00	2637.66	2634.00	2635.00	7.49	2.02	3.47	2638.23
	21.790	430.00	2630.00	23000.00	2638.82	2634.00	2635.00	7.53	2.38	4.05	2639.34
	21.790	430.00	2630.00	28500.00	2639.61	2634.00	2635.00	7.66	2.60	4.42	2640.13
	21.880	470.00	2631.00	2300.00	2634.77	2636.00	2636.00	4.88	.00	.00	2635.14
	21.880	470.00	2631.00	6900.00	2636.98	2636.00	2636.00	7.40	1.59	.99	2637.80
	21.880	470.00	2631.00	11500.00	2637.94	2636.00	2636.00	9.40	1.58	2.15	2639.17
*	21.880	470.00	2631.00	16100.00	2638.75	2636.00	2636.00	10.12	2.00	2.79	2640.02
	21.880	470.00	2631.00	23000.00	2639.58	2636.00	2636.00	11.18	2.59	3.84	2640.97
	21.880	470.00	2631.00	28500.00	2640.30	2636.00	2636.00	11.38	2.90	4.45	2641.64
*	21.925	240.00	2632.00	2300.00	2635.44	2638.00	2638.00	7.53	.00	.00	2636.32
*	21.925	240.00	2632.00	6900.00	2637.71	2638.00	2638.00	10.37	2.52	.00	2639.33
*	21.925	240.00	2632.00	11500.00	2639.39	2638.00	2638.00	10.56	2.83	2.27	2640.94
*	21.925	240.00	2632.00	16100.00	2640.28	2638.00	2638.00	11.53	3.27	3.62	2642.00
*	21.925	240.00	2632.00	23000.00	2641.26	2638.00	2638.00	12.95	3.96	5.13	2643.30
*	21.925	240.00	2632.00	28500.00	2641.91	2638.00	2638.00	13.94	4.44	6.10	2644.19
*	21.972	245.00	2634.00	2300.00	2637.14	2639.00	2639.00	5.06	.30	.00	2637.54
*	21.972	245.00	2634.00	6900.00	2639.72	2639.00	2639.00	6.39	1.49	.78	2640.33
*	21.972	245.00	2634.00	11500.00	2641.04	2639.00	2639.00	7.56	2.14	1.72	2641.85
	21.972	245.00	2634.00	16100.00	2642.00	2639.00	2639.00	8.38	2.15	2.49	2642.94
*	21.972	245.00	2634.00	23000.00	2643.23	2639.00	2639.00	9.18	2.58	3.33	2644.28
*	21.972	245.00	2634.00	28500.00	2644.08	2639.00	2639.00	9.66	2.90	3.82	2645.20

	SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
	22.047	395.00	2636.00	2300.00	2638.49	2642.00	2642.00	4.21	.00	.00	2638.77
	22.047	395.00	2636.00	6900.00	2640.71	2642.00	2642.00	5.73	.00	.00	2641.22
	22.047	395.00	2636.00	11500.00	2642.09	2642.00	2642.00	6.74	.14	.29	2642.80
	22.047	395.00	2636.00	16100.00	2643.03	2642.00	2642.00	7.69	.75	1.40	2643.94
	22.047	395.00	2636.00	23000.00	2644.18	2642.00	2642.00	8.75	1.31	2.44	2645.32
	22.047	395.00	2636.00	28500.00	2644.99	2642.00	2642.00	9.32	1.63	3.10	2646.25
*	22.125	410.00	2638.00	2300.00	2640.03	2642.00	2642.00	5.82	.00	2.03	2640.55
*	22.125	410.00	2638.00	6900.00	2641.92	2642.00	2642.00	7.08	.00	2.82	2642.64
	22.125	410.00	2638.00	11500.00	2643.35	2642.00	2642.00	6.53	1.13	3.01	2643.92
	22.125	410.00	2638.00	16100.00	2644.42	2642.00	2642.00	6.71	1.12	3.29	2645.02
	22.125	410.00	2638.00	23000.00	2645.72	2642.00	2642.00	7.05	1.25	3.59	2646.35
	22.125	410.00	2638.00	28500.00	2646.58	2642.00	2642.00	7.30	1.58	3.81	2647.23
	22.195	365.00	2639.00	2300.00	2642.27	2649.00	2645.00	3.99	.00	1.73	2642.51
	22.195	365.00	2639.00	6900.00	2643.99	2649.00	2645.00	5.49	.00	2.85	2644.43
	22.195	365.00	2639.00	11500.00	2644.77	2649.00	2645.00	7.04	.00	3.04	2645.48
*	22.195	365.00	2639.00	16100.00	2645.53	2649.00	2645.00	7.92	.00	3.16	2646.42
*	22.195	365.00	2639.00	23000.00	2646.55	2649.00	2645.00	8.84	.00	3.60	2647.63
*	22.195	365.00	2639.00	28500.00	2647.26	2649.00	2645.00	9.47	.00	3.94	2648.48
	22.275	370.00	2641.00	2300.00	2643.90	2645.00	2645.00	3.92	.00	2.26	2644.13
	22.275	370.00	2641.00	6900.00	2645.62	2645.00	2645.00	5.20	.71	2.90	2646.02
	22.275	370.00	2641.00	11500.00	2646.64	2645.00	2645.00	6.11	1.44	3.01	2647.18
	22.275	370.00	2641.00	16100.00	2647.42	2645.00	2645.00	6.94	1.90	3.22	2648.10
	22.275	370.00	2641.00	23000.00	2648.39	2645.00	2645.00	7.94	2.34	3.50	2649.27
	22.275	370.00	2641.00	28500.00	2649.07	2645.00	2645.00	8.59	2.27	3.77	2650.09
	22.338	395.00	2643.00	2300.00	2645.65	2647.00	2647.00	3.25	.00	.00	2645.82
	22.338	395.00	2643.00	6900.00	2647.16	2647.00	2647.00	4.18	.24	.37	2647.43
	22.338	395.00	2643.00	11500.00	2648.10	2647.00	2647.00	4.63	.80	1.11	2648.41
*	22.338	395.00	2643.00	16100.00	2648.90	2647.00	2647.00	4.74	1.06	1.37	2649.19
*	22.338	395.00	2643.00	23000.00	2649.95	2647.00	2647.00	4.79	1.34	1.64	2650.22
*	22.338	395.00	2643.00	28500.00	2650.70	2647.00	2647.00	4.82	1.47	1.80	2650.96
*	22.373	200.00	2644.00	2300.00	2646.76	2651.00	2650.00	4.94	.00	.00	2647.14
*	22.373	200.00	2644.00	6900.00	2647.81	2651.00	2650.00	7.80	.00	.00	2648.75
*	22.373	200.00	2644.00	11500.00	2648.63	2651.00	2650.00	8.97	.00	.00	2649.88
*	22.373	200.00	2644.00	16100.00	2649.32	2651.00	2650.00	9.86	.00	1.15	2650.82
*	22.373	200.00	2644.00	23000.00	2650.36	2651.00	2650.00	10.23	.00	2.24	2651.92
*	22.373	200.00	2644.00	28500.00	2651.08	2651.00	2650.00	10.28	.39	2.61	2652.58
*	22.454	170.00	2645.00	2300.00	2647.97	2651.00	2651.00	3.62	.00	.00	2648.18
*	22.454	170.00	2645.00	6900.00	2649.56	2651.00	2651.00	4.60	.00	.00	2649.89
*	22.454	170.00	2645.00	11500.00	2650.60	2651.00	2651.00	5.47	.00	.76	2651.07
*	22.454	170.00	2645.00	16100.00	2651.44	2651.00	2651.00	6.13	.50	.97	2652.01
*	22.454	170.00	2645.00	23000.00	2652.34	2651.00	2651.00	6.92	1.22	1.63	2653.05
*	22.454	170.00	2645.00	28500.00	2652.86	2651.00	2651.00	7.54	1.61	2.08	2653.67

	SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROE	EG

	22.511	300.00	2647.00	2300.00	2649.11	2652.00	2652.00	4.09	.00	.00	2649.37
	22.511	300.00	2647.00	6900.00	2650.55	2652.00	2652.00	5.55	.00	.00	2651.03
	22.511	300.00	2647.00	11500.00	2651.64	2652.00	2652.00	5.70	.00	.00	2652.14
	22.511	300.00	2647.00	16100.00	2652.50	2652.00	2652.00	5.96	.52	.76	2653.05
	22.511	300.00	2647.00	23000.00	2653.47	2652.00	2652.00	6.47	1.19	1.48	2654.10
	22.511	300.00	2647.00	28500.00	2654.07	2652.00	2652.00	6.89	1.55	1.89	2654.77
	22.591	420.00	2648.00	2300.00	2650.81	2656.00	2653.00	3.32	.00	.00	2650.98
	22.591	420.00	2648.00	6900.00	2652.25	2656.00	2653.00	4.77	.00	.49	2652.60
	22.591	420.00	2648.00	11500.00	2653.16	2656.00	2653.00	5.79	.00	1.18	2653.67
	22.591	420.00	2648.00	16100.00	2653.93	2656.00	2653.00	6.34	.00	1.58	2654.54
	22.591	420.00	2648.00	23000.00	2654.91	2656.00	2653.00	6.65	.00	2.13	2655.55
	22.591	420.00	2648.00	28500.00	2655.50	2656.00	2653.00	7.00	.00	2.43	2656.20
*	22.670	420.00	2650.00	2300.00	2653.22	2655.00	2655.00	5.44	.00	.00	2653.68
*	22.670	420.00	2650.00	6900.00	2654.65	2655.00	2655.00	6.66	.00	1.48	2655.33
*	22.670	420.00	2650.00	11500.00	2655.46	2655.00	2655.00	7.53	1.35	1.64	2656.31
*	22.670	420.00	2650.00	16100.00	2656.10	2655.00	2655.00	7.98	2.13	2.39	2657.00
	22.670	420.00	2650.00	23000.00	2656.91	2655.00	2655.00	8.41	2.63	3.04	2657.84
	22.670	420.00	2650.00	28500.00	2657.41	2655.00	2655.00	8.85	2.96	3.41	2658.39
*	10580.000	544.00	2653.50	2300.00	2655.84	2656.00	2653.50	2.67	.00	1.59	2655.92
*	10580.000	544.00	2653.50	6900.00	2657.51	2656.00	2653.50	4.02	.86	2.15	2657.67
*	10580.000	544.00	2653.50	11500.00	2658.44	2656.00	2653.50	4.87	1.23	2.53	2658.66
*	10580.000	544.00	2653.50	16100.00	2659.10	2656.00	2653.50	5.59	1.52	2.88	2659.37
*	10580.000	544.00	2653.50	23000.00	2659.88	2656.00	2653.50	6.46	1.86	3.31	2660.22
*	10580.000	544.00	2653.50	28500.00	2660.41	2656.00	2653.50	6.97	2.18	3.58	2660.79
*	10640.000	320.00	2655.00	2300.00	2656.83	2656.00	2655.00	3.58	.86	1.80	2656.97
	10640.000	320.00	2655.00	6900.00	2658.36	2656.00	2655.00	4.34	1.70	2.26	2658.53
	10640.000	320.00	2655.00	11500.00	2659.31	2656.00	2655.00	5.02	2.09	2.59	2659.53
	10640.000	320.00	2655.00	16100.00	2660.03	2656.00	2655.00	5.63	2.39	2.89	2660.29
	10640.000	320.00	2655.00	23000.00	2660.88	2656.00	2655.00	6.30	2.80	3.25	2661.19
	10640.000	320.00	2655.00	28500.00	2661.44	2656.00	2655.00	6.80	3.08	3.49	2661.79
*	10700.000	330.00	2655.90	2300.00	2657.95	2656.00	2656.00	2.62	1.00	1.27	2658.02
	10700.000	330.00	2655.90	6900.00	2659.30	2656.00	2656.00	3.99	1.53	2.07	2659.46
	10700.000	330.00	2655.90	11500.00	2660.24	2656.00	2656.00	4.79	1.90	2.53	2660.44
	10700.000	330.00	2655.90	16100.00	2660.97	2656.00	2656.00	5.34	2.26	2.85	2661.22
	10700.000	330.00	2655.90	23000.00	2661.83	2656.00	2656.00	6.08	2.69	3.26	2662.15
	10700.000	330.00	2655.90	28500.00	2662.41	2656.00	2656.00	6.59	2.98	3.53	2662.78
*	10780.000	425.00	2658.00	2300.00	2659.63	2660.00	2658.00	5.51	.00	2.60	2659.95
*	10780.000	425.00	2658.00	6900.00	2660.94	2660.00	2658.00	6.58	1.26	3.17	2661.33
*	10780.000	425.00	2658.00	11500.00	2661.80	2660.00	2658.00	7.26	2.13	3.62	2662.25
*	10780.000	425.00	2658.00	16100.00	2662.49	2660.00	2658.00	7.89	2.59	3.99	2662.99
*	10780.000	425.00	2658.00	23000.00	2663.35	2660.00	2658.00	8.66	3.04	4.42	2663.93
*	10780.000	425.00	2658.00	28500.00	2663.94	2660.00	2658.00	9.17	3.31	4.70	2664.58

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	SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
*	10860.000	420.00	2660.00	2300.00	2662.46	2660.00	2660.00	4.20	1.63	1.63	2662.57
	10860.000	420.00	2660.00	6900.00	2663.68	2660.00	2660.00	6.31	2.45	2.45	2663.90
	10860.000	420.00	2660.00	11500.00	2664.40	2660.00	2660.00	7.32	3.00	3.00	2664.68
	10860.000	420.00	2660.00	16100.00	2665.00	2660.00	2660.00	7.89	3.41	3.42	2665.32

	10860.000	420.00	2660.00	23000.00	2665.78	2660.00	2660.00	8.58	3.86	3.89	2666.16
	10860.000	420.00	2660.00	28500.00	2666.34	2660.00	2660.00	9.03	4.14	4.18	2666.75
	10940.000	430.00	2662.00	2300.00	2664.08	2662.00	2662.00	3.85	1.53	1.50	2664.26
	10940.000	430.00	2662.00	6900.00	2665.43	2662.00	2662.00	5.05	2.20	1.77	2665.67
	10940.000	430.00	2662.00	11500.00	2666.21	2662.00	2662.00	5.86	2.54	2.26	2666.51
	10940.000	430.00	2662.00	16100.00	2666.82	2662.00	2662.00	6.51	2.81	2.63	2667.16
	10940.000	430.00	2662.00	23000.00	2667.59	2662.00	2662.00	7.23	3.09	3.03	2667.99
	10940.000	430.00	2662.00	28500.00	2668.12	2662.00	2662.00	7.66	3.26	3.27	2668.55
	11020.000	425.00	2664.00	2300.00	2665.90	2664.00	2664.00	3.79	2.00	1.47	2666.07
	11020.000	425.00	2664.00	6900.00	2667.18	2664.00	2664.00	5.81	2.91	2.25	2667.52
	11020.000	425.00	2664.00	11500.00	2667.97	2664.00	2664.00	6.84	3.34	2.49	2668.40
	11020.000	425.00	2664.00	16100.00	2668.58	2664.00	2664.00	7.38	3.57	2.82	2669.04
	11020.000	425.00	2664.00	23000.00	2669.33	2664.00	2664.00	8.02	3.82	3.28	2669.83
	11020.000	425.00	2664.00	28500.00	2669.84	2664.00	2664.00	8.48	3.99	3.59	2670.38
	11100.000	420.00	2667.30	2300.00	2668.38	2668.00	2668.00	2.76	.69	1.44	2668.49
	11100.000	420.00	2667.30	6900.00	2669.29	2668.00	2668.00	3.44	1.44	1.91	2669.46
	11100.000	420.00	2667.30	11500.00	2669.96	2668.00	2668.00	3.97	1.84	2.20	2670.17
	11100.000	420.00	2667.30	16100.00	2670.47	2668.00	2668.00	4.50	2.15	2.48	2670.75
	11100.000	420.00	2667.30	23000.00	2671.13	2668.00	2668.00	5.12	2.50	2.80	2671.48
	11100.000	420.00	2667.30	28500.00	2671.59	2668.00	2668.00	5.55	2.72	3.01	2672.00
*	11160.000	315.00	2667.00	2300.00	2669.46	2668.00	2668.30	2.26	1.14	1.00	2669.52
	11160.000	315.00	2667.00	6900.00	2670.41	2668.00	2668.30	4.01	2.11	1.91	2670.60
	11160.000	315.00	2667.00	11500.00	2671.06	2668.00	2668.30	5.13	2.73	2.38	2671.36
	11160.000	315.00	2667.00	16100.00	2671.60	2668.00	2668.30	5.94	3.16	2.67	2671.99
	11160.000	315.00	2667.00	23000.00	2672.26	2668.00	2668.30	6.85	3.46	2.99	2672.76
	11160.000	315.00	2667.00	28500.00	2672.72	2668.00	2668.30	7.35	3.46	3.23	2673.28
*	11240.000	425.00	2670.00	2300.00	2671.65	2672.00	2672.00	6.41	.00	.00	2672.28
*	11240.000	425.00	2670.00	6900.00	2672.89	2672.00	2672.00	7.18	2.31	2.07	2673.53
*	11240.000	425.00	2670.00	11500.00	2673.44	2672.00	2672.00	8.54	3.25	2.87	2674.25
*	11240.000	425.00	2670.00	16100.00	2674.01	2672.00	2672.00	8.96	3.76	3.27	2674.84
*	11240.000	425.00	2670.00	23000.00	2674.70	2672.00	2672.00	9.62	4.30	3.69	2675.60
*	11240.000	425.00	2670.00	28500.00	2675.14	2672.00	2672.00	10.20	4.67	3.99	2676.12
*	11320.000	425.00	2671.50	2300.00	2673.87	2672.00	2676.00	2.08	1.39	.00	2673.91
*	11320.000	425.00	2671.50	6900.00	2675.26	2672.00	2676.00	3.61	2.32	.00	2675.39
*	11320.000	425.00	2671.50	11500.00	2676.18	2672.00	2676.00	4.62	2.89	.24	2676.38
*	11320.000	425.00	2671.50	16100.00	2676.81	2672.00	2676.00	5.52	3.34	.68	2677.09
*	11320.000	425.00	2671.50	23000.00	2677.59	2672.00	2676.00	6.63	3.92	1.15	2677.97
*	11320.000	425.00	2671.50	28500.00	2678.12	2672.00	2676.00	7.36	4.31	1.22	2678.58

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	SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
*	11400.000	435.00	2674.00	2300.00	2675.41	2676.00	2676.00	5.59	.00	.00	2675.89
*	11400.000	435.00	2674.00	6900.00	2676.68	2676.00	2676.00	5.85	2.12	1.12	2677.17
*	11400.000	435.00	2674.00	11500.00	2677.59	2676.00	2676.00	6.15	2.55	1.61	2678.10
	11400.000	435.00	2674.00	16100.00	2678.29	2676.00	2676.00	6.60	2.87	1.90	2678.86
	11400.000	435.00	2674.00	23000.00	2679.15	2676.00	2676.00	7.22	3.25	2.23	2679.80
	11400.000	435.00	2674.00	28500.00	2679.72	2676.00	2676.00	7.65	3.51	2.44	2680.44
*	11480.000	425.00	2675.50	2300.00	2677.74	2676.00	2676.00	2.40	1.33	.90	2677.80
*	11480.000	425.00	2675.50	6900.00	2678.94	2676.00	2676.00	4.08	2.28	1.54	2679.12

	11480.000	425.00	2675.50	11500.00	2679.70	2676.00	2676.00	5.30	2.96	2.02	2680.00
	11480.000	425.00	2675.50	16100.00	2680.33	2676.00	2676.00	6.22	3.47	2.41	2680.74
	11480.000	425.00	2675.50	23000.00	2681.13	2676.00	2676.00	7.31	4.06	2.62	2681.68
	11480.000	425.00	2675.50	28500.00	2681.67	2676.00	2676.00	8.05	4.44	2.74	2682.33
*	11560.000	420.00	2676.50	2300.00	2679.55	2680.00	2680.00	6.27	.00	.00	2680.16
*	11560.000	420.00	2676.50	6900.00	2681.01	2680.00	2680.00	5.49	1.54	1.55	2681.47
*	11560.000	420.00	2676.50	11500.00	2681.82	2680.00	2680.00	6.00	1.91	1.92	2682.37
	11560.000	420.00	2676.50	16100.00	2682.49	2680.00	2680.00	6.56	2.18	2.19	2683.14
	11560.000	420.00	2676.50	23000.00	2683.31	2680.00	2680.00	7.29	2.51	2.52	2684.11
	11560.000	420.00	2676.50	28500.00	2683.88	2680.00	2680.00	7.81	2.73	2.74	2684.78
*	11640.000	420.00	2678.60	2300.00	2683.25	2684.00	2680.00	3.49	.00	2.01	2683.43
*	11640.000	420.00	2678.60	6900.00	2684.54	2684.00	2680.00	4.70	1.94	2.79	2684.83
	11640.000	420.00	2678.60	11500.00	2685.11	2684.00	2680.00	6.02	2.75	3.10	2685.57
	11640.000	420.00	2678.60	16100.00	2685.63	2684.00	2680.00	6.89	3.32	3.25	2686.22
	11640.000	420.00	2678.60	23000.00	2686.31	2684.00	2680.00	7.87	3.97	3.52	2687.06
	11640.000	420.00	2678.60	28500.00	2686.81	2684.00	2680.00	8.42	4.34	3.72	2687.66
	11700.000	315.00	2680.00	2300.00	2684.41	2684.00	2684.00	4.11	.76	.51	2684.67
	11700.000	315.00	2680.00	6900.00	2685.83	2684.00	2684.00	5.65	1.88	1.59	2686.22
	11700.000	315.00	2680.00	11500.00	2686.63	2684.00	2684.00	6.92	2.58	2.22	2687.18
	11700.000	315.00	2680.00	16100.00	2687.26	2684.00	2684.00	7.95	3.13	2.69	2687.95
	11700.000	315.00	2680.00	23000.00	2688.02	2684.00	2684.00	9.24	3.80	3.25	2688.93
	11700.000	315.00	2680.00	28500.00	2688.52	2684.00	2684.00	10.15	4.28	3.67	2689.59
	11760.000	315.00	2682.50	2300.00	2685.39	2684.00	2684.00	4.31	.92	.92	2685.66
	11760.000	315.00	2682.50	6900.00	2686.79	2684.00	2684.00	7.50	2.12	1.94	2687.52
	11760.000	315.00	2682.50	11500.00	2687.64	2684.00	2684.00	9.45	2.81	2.58	2688.71
	11760.000	315.00	2682.50	16100.00	2688.32	2684.00	2684.00	10.72	3.35	3.14	2689.61
	11760.000	315.00	2682.50	23000.00	2689.18	2684.00	2684.00	12.09	4.06	3.80	2690.69
	11760.000	315.00	2682.50	28500.00	2689.75	2684.00	2684.00	13.03	4.56	4.18	2691.43
*	11840.000	420.00	2685.50	2300.00	2688.13	2688.00	2688.00	6.51	.72	.47	2688.78
*	11840.000	420.00	2685.50	6900.00	2689.34	2688.00	2688.00	8.49	2.41	2.34	2690.11
	11840.000	420.00	2685.50	11500.00	2690.34	2688.00	2688.00	8.79	3.04	3.01	2691.05
	11840.000	420.00	2685.50	16100.00	2691.15	2688.00	2688.00	9.22	3.46	3.46	2691.87
	11840.000	420.00	2685.50	23000.00	2692.13	2688.00	2688.00	9.97	3.77	4.00	2692.92
	11840.000	420.00	2685.50	28500.00	2692.81	2688.00	2688.00	10.40	3.96	4.32	2693.64

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	SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
*	11900.000	330.00	2686.00	2300.00	2689.96	2688.00	2686.00	4.40	1.12	1.79	2690.18
	11900.000	330.00	2686.00	6900.00	2691.42	2688.00	2686.00	7.48	2.30	2.89	2691.97
	11900.000	330.00	2686.00	11500.00	2692.16	2688.00	2686.00	9.77	3.09	3.77	2693.03
	11900.000	330.00	2686.00	16100.00	2692.80	2688.00	2686.00	11.13	3.71	4.43	2693.86
	11900.000	330.00	2686.00	23000.00	2693.66	2688.00	2686.00	12.54	4.43	5.07	2694.92
	11900.000	330.00	2686.00	28500.00	2694.24	2688.00	2686.00	13.51	4.91	5.47	2695.65
*	11960.000	320.00	2687.50	2300.00	2690.91	2687.50	2688.10	6.60	2.55	2.24	2691.52
*	11960.000	320.00	2687.50	6900.00	2692.79	2687.50	2688.10	8.87	2.42	1.83	2693.62
	11960.000	320.00	2687.50	11500.00	2693.96	2687.50	2688.10	8.66	2.78	2.13	2694.58
	11960.000	320.00	2687.50	16100.00	2694.83	2687.50	2688.10	8.74	3.01	2.45	2695.38
*	11960.000	320.00	2687.50	23000.00	2695.88	2687.50	2688.10	9.09	3.31	2.87	2696.41
*	11960.000	320.00	2687.50	28500.00	2696.59	2687.50	2688.10	9.38	3.53	3.14	2697.12

	12020.000	310.00	2689.00	2300.00	2692.63	2692.00	2689.00	6.20	1.11	1.79	2693.10
	12020.000	310.00	2689.00	6900.00	2694.50	2692.00	2689.00	6.92	1.95	2.05	2694.86
	12020.000	310.00	2689.00	11500.00	2695.25	2692.00	2689.00	8.42	2.56	2.74	2695.73
	12020.000	310.00	2689.00	16100.00	2695.91	2692.00	2689.00	9.38	2.98	3.25	2696.47
	12020.000	310.00	2689.00	23000.00	2696.84	2692.00	2689.00	10.21	3.47	3.76	2697.45
	12020.000	310.00	2689.00	28500.00	2697.49	2692.00	2689.00	10.74	3.78	4.09	2698.14
*	12100.000	430.00	2690.60	2300.00	2693.97	2690.60	2690.60	3.62	1.23	1.57	2694.11
	12100.000	430.00	2690.60	6900.00	2695.65	2690.60	2690.60	6.44	2.18	2.73	2696.06
	12100.000	430.00	2690.60	11500.00	2696.64	2690.60	2690.60	8.20	2.96	3.23	2697.26
	12100.000	430.00	2690.60	16100.00	2697.40	2690.60	2690.60	9.49	3.58	3.70	2698.18
	12100.000	430.00	2690.60	23000.00	2698.31	2690.60	2690.60	11.09	4.33	4.39	2699.33
	12100.000	430.00	2690.60	28500.00	2698.93	2690.60	2690.60	12.18	4.83	4.90	2700.13
*	12180.000	200.00	2692.20	2300.00	2694.41	2692.20	2692.20	8.02	2.94	2.72	2695.14
*	12180.000	200.00	2692.20	6900.00	2696.16	2692.20	2692.20	10.35	3.82	3.60	2697.15
*	12180.000	200.00	2692.20	11500.00	2697.33	2692.20	2692.20	11.26	4.44	4.27	2698.39
	12180.000	200.00	2692.20	16100.00	2698.17	2692.20	2692.20	12.44	5.07	4.82	2699.40
	12180.000	200.00	2692.20	23000.00	2699.18	2692.20	2692.20	14.02	5.87	5.47	2700.66
	12180.000	200.00	2692.20	28500.00	2699.86	2692.20	2692.20	15.08	6.40	5.89	2701.53
*	12250.000	370.00	2692.70	2300.00	2696.78	2692.70	2692.70	6.48	2.36	2.32	2697.37
*	12250.000	370.00	2692.70	6900.00	2698.66	2692.70	2692.70	12.19	3.57	4.39	2700.57
*	12250.000	370.00	2692.70	11500.00	2700.83	2692.70	2692.70	12.02	3.40	2.77	2702.36
*	12250.000	370.00	2692.70	16100.00	2701.79	2692.70	2692.70	13.07	3.83	3.20	2703.39
*	12250.000	370.00	2692.70	23000.00	2702.94	2692.70	2692.70	14.23	4.46	3.80	2704.61
*	12250.000	370.00	2692.70	28500.00	2703.42	2692.70	2692.70	15.89	5.11	4.38	2705.43
	12300.000	270.00	2692.70	2300.00	2697.90	2692.70	2696.00	6.54	2.90	1.46	2698.50
*	12300.000	270.00	2692.70	6900.00	2701.38	2692.70	2696.00	7.52	3.27	1.74	2702.06
	12300.000	270.00	2692.70	11500.00	2702.90	2692.70	2696.00	8.01	3.25	2.52	2703.56
	12300.000	270.00	2692.70	16100.00	2703.93	2692.70	2696.00	8.56	3.40	3.04	2704.62
	12300.000	270.00	2692.70	23000.00	2705.10	2692.70	2696.00	9.38	3.80	3.57	2705.88
	12300.000	270.00	2692.70	28500.00	2705.95	2692.70	2696.00	9.92	4.06	3.85	2706.79

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	SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
	12380.000	425.00	2694.60	2300.00	2699.69	2696.00	2700.00	4.53	1.72	.00	2700.00
*	12380.000	425.00	2694.60	6900.00	2702.63	2696.00	2700.00	5.61	2.43	1.45	2703.03
	12380.000	425.00	2694.60	11500.00	2703.96	2696.00	2700.00	6.81	2.96	2.09	2704.50
	12380.000	425.00	2694.60	16100.00	2704.92	2696.00	2700.00	7.85	3.20	2.62	2705.60
	12380.000	425.00	2694.60	23000.00	2706.08	2696.00	2700.00	9.14	3.24	3.24	2706.95
	12380.000	425.00	2694.60	28500.00	2706.89	2696.00	2700.00	9.95	3.25	3.63	2707.89
*	12460.000	425.00	2698.00	2300.00	2701.02	2698.00	2698.00	9.69	3.79	3.77	2702.34
*	12460.000	425.00	2698.00	6900.00	2704.33	2698.00	2698.00	12.61	5.15	4.24	2706.38
*	12460.000	425.00	2698.00	11500.00	2706.43	2698.00	2698.00	13.42	4.96	3.84	2708.44
*	12460.000	425.00	2698.00	16100.00	2707.84	2698.00	2698.00	14.04	3.62	4.10	2709.78
*	12460.000	425.00	2698.00	23000.00	2709.06	2698.00	2698.00	15.46	3.92	4.76	2711.15
*	12460.000	425.00	2698.00	28500.00	2709.78	2698.00	2698.00	16.60	4.39	5.24	2712.04
	12540.000	410.00	2701.00	2300.00	2705.02	2701.00	2701.00	9.36	3.60	3.55	2706.17
*	12540.000	410.00	2701.00	6900.00	2707.78	2701.00	2701.00	14.99	6.27	5.94	2710.49
*	12540.000	410.00	2701.00	11500.00	2710.69	2701.00	2701.00	14.59	3.63	6.02	2712.87
*	12540.000	410.00	2701.00	16100.00	2712.24	2701.00	2701.00	15.16	3.78	6.32	2714.30
*	12540.000	410.00	2701.00	23000.00	2713.56	2701.00	2701.00	16.76	4.63	6.60	2715.79

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*	12540.000	410.00	2701.00	28500.00	2714.40	2701.00	2701.00	17.87	5.22	6.65	2716.77
	12620.000	425.00	2703.00	1900.00	2708.29	2703.00	2708.00	5.67	3.05	2.45	2708.55
*	12620.000	425.00	2703.00	5700.00	2711.92	2703.00	2708.00	5.91	2.28	2.71	2712.15
*	12620.000	425.00	2703.00	9500.00	2713.79	2703.00	2708.00	6.26	2.35	2.91	2714.02
*	12620.000	425.00	2703.00	13300.00	2715.08	2703.00	2708.00	6.79	2.64	3.14	2715.33
*	12620.000	425.00	2703.00	11200.00	2716.48	2703.00	2708.00	4.54	1.83	2.08	2716.58
*	12620.000	425.00	2703.00	28500.00	2717.50	2703.00	2708.00	9.97	4.09	4.54	2718.02
*	12700.000	425.00	2700.00	1600.00	2708.78	2707.00	2707.00	1.42	1.22	.28	2708.81
*	12700.000	425.00	2700.00	4800.00	2712.34	2707.00	2707.00	2.91	1.81	.78	2712.42
*	12700.000	425.00	2700.00	8000.00	2714.17	2707.00	2707.00	3.91	2.05	1.12	2714.30
	12700.000	425.00	2700.00	11200.00	2715.46	2707.00	2707.00	4.71	2.29	1.35	2715.65
	12700.000	425.00	2700.00	16000.00	2716.57	2707.00	2707.00	5.94	2.77	1.74	2716.86
	12700.000	425.00	2700.00	28500.00	2718.04	2707.00	2707.00	9.06	4.09	2.72	2718.69
*	12780.000	435.00	2707.50	1600.00	2709.91	2712.00	2707.50	8.58	.00	2.99	2710.99
*	12780.000	435.00	2707.50	4800.00	2712.32	2712.00	2707.50	11.69	.65	4.32	2714.23
*	12780.000	435.00	2707.50	8000.00	2713.91	2712.00	2707.50	13.79	2.06	5.54	2716.48
*	12780.000	435.00	2707.50	11200.00	2715.28	2712.00	2707.50	15.28	2.87	6.27	2718.36
*	12780.000	435.00	2707.50	16000.00	2717.10	2712.00	2707.50	16.89	3.68	7.02	2720.75
*	12780.000	435.00	2707.50	28500.00	2720.88	2712.00	2707.50	19.71	5.17	8.03	2725.52
*	12840.000	335.00	2709.00	1600.00	2713.00	2709.00	2709.00	8.19	3.05	3.01	2713.78
	12840.000	335.00	2709.00	4800.00	2715.43	2709.00	2709.00	12.59	4.76	4.55	2717.02
	12840.000	335.00	2709.00	8000.00	2717.24	2709.00	2709.00	14.28	5.54	5.35	2719.08
	12840.000	335.00	2709.00	11200.00	2718.81	2709.00	2709.00	15.22	6.07	5.94	2720.78
	12840.000	335.00	2709.00	16000.00	2720.84	2709.00	2709.00	16.26	6.62	6.58	2722.96
	12840.000	335.00	2709.00	28500.00	2725.05	2709.00	2709.00	18.25	7.51	7.60	2727.48

	SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
*	12900.000	340.00	2711.90	1600.00	2715.96	2712.00	2712.00	11.48	3.86	3.83	2716.98
	12900.000	340.00	2711.90	4800.00	2718.33	2712.00	2712.00	15.07	5.98	5.99	2719.78
	12900.000	340.00	2711.90	8000.00	2719.86	2712.00	2712.00	17.72	7.22	7.27	2721.74
	12900.000	340.00	2711.90	11200.00	2721.14	2712.00	2712.00	19.38	7.99	8.04	2723.29
	12900.000	340.00	2711.90	16000.00	2722.91	2712.00	2712.00	20.69	8.44	8.49	2725.19
	12900.000	340.00	2711.90	28500.00	2727.09	2712.00	2712.00	20.84	8.54	8.15	2729.14
*	12980.000	425.00	2720.00	1600.00	2723.26	2720.00	2720.00	10.23	3.47	3.46	2724.35
*	12980.000	425.00	2720.00	4800.00	2725.50	2720.00	2720.00	13.12	5.00	4.33	2726.90
*	12980.000	425.00	2720.00	8000.00	2726.70	2720.00	2720.00	15.47	6.03	5.42	2728.46
*	12980.000	425.00	2720.00	11200.00	2727.67	2720.00	2720.00	17.18	6.72	6.23	2729.71
*	12980.000	425.00	2720.00	16000.00	2728.89	2720.00	2720.00	18.92	7.50	7.15	2731.22
*	12980.000	425.00	2720.00	28500.00	2731.19	2720.00	2720.00	22.61	9.01	8.97	2734.22
*	13060.000	430.00	2722.00	1600.00	2726.61	2722.00	2722.00	8.65	2.79	2.88	2727.64
*	13060.000	430.00	2722.00	4800.00	2729.66	2722.00	2722.00	13.58	4.56	4.08	2731.90
*	13060.000	430.00	2722.00	8000.00	2731.66	2722.00	2722.00	15.78	5.13	5.11	2734.37
*	13060.000	430.00	2722.00	11200.00	2733.47	2722.00	2722.00	16.27	5.08	5.14	2736.04
*	13060.000	430.00	2722.00	16000.00	2735.02	2722.00	2722.00	18.15	5.34	5.96	2737.91
*	13060.000	430.00	2722.00	28500.00	2738.01	2722.00	2722.00	21.11	6.16	7.43	2741.34
*	13140.000	420.00	2731.00	1600.00	2735.55	2732.00	2732.00	10.61	3.27	3.29	2736.99
*	13140.000	420.00	2731.00	4800.00	2738.49	2732.00	2732.00	12.97	4.59	3.77	2740.08
*	13140.000	420.00	2731.00	8000.00	2739.95	2732.00	2732.00	14.91	5.28	4.76	2741.78

*	13140.000	420.00	2731.00	11200.00	2740.93	2732.00	2732.00	16.78	6.01	5.66	2743.08
*	13140.000	420.00	2731.00	16000.00	2742.18	2732.00	2732.00	18.81	6.67	6.66	2744.68
*	13140.000	420.00	2731.00	28500.00	2744.70	2732.00	2732.00	22.27	7.78	8.34	2747.80
*	13200.000	313.00	2738.00	1600.00	2742.65	2740.00	2744.00	8.97	2.79	2.78	2743.55
*	13200.000	313.00	2738.00	4800.00	2744.71	2740.00	2744.00	11.44	4.29	3.97	2745.87
*	13200.000	313.00	2738.00	8000.00	2745.75	2740.00	2744.00	13.70	5.53	4.57	2747.27
*	13200.000	313.00	2738.00	11200.00	2746.57	2740.00	2744.00	15.27	6.37	5.13	2748.34
*	13200.000	313.00	2738.00	16000.00	2747.55	2740.00	2744.00	17.20	7.36	6.03	2749.68
*	13200.000	313.00	2738.00	28500.00	2749.56	2740.00	2744.00	20.86	9.18	7.88	2752.46
*	13280.000	425.00	2744.00	1600.00	2748.67	2752.00	2748.00	9.19	.00	6.21	2749.62
*	13280.000	425.00	2744.00	4800.00	2750.74	2752.00	2748.00	12.03	.00	5.66	2752.12
*	13280.000	425.00	2744.00	8000.00	2752.06	2752.00	2748.00	13.25	.03	5.83	2753.62
*	13280.000	425.00	2744.00	11200.00	2752.87	2752.00	2748.00	14.72	1.52	6.51	2754.73
*	13280.000	425.00	2744.00	16000.00	2753.94	2752.00	2748.00	16.28	2.53	7.16	2756.10
*	13280.000	425.00	2744.00	28500.00	2756.04	2752.00	2748.00	19.19	4.03	8.42	2758.82
	13360.000	415.00	2752.00	1600.00	2755.81	2756.00	2756.00	4.94	.00	4.85	2756.17
	13360.000	415.00	2752.00	4800.00	2757.17	2756.00	2756.00	9.16	1.75	5.41	2757.77
	13360.000	415.00	2752.00	8000.00	2757.97	2756.00	2756.00	11.19	2.46	6.06	2758.77
	13360.000	415.00	2752.00	11200.00	2758.68	2756.00	2756.00	12.43	2.90	6.55	2759.63
	13360.000	415.00	2752.00	16000.00	2759.57	2756.00	2756.00	13.99	3.43	7.29	2760.75
	13360.000	415.00	2752.00	28500.00	2761.45	2756.00	2756.00	17.05	4.47	8.86	2763.18

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	SECNO	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
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	13440.000	430.00	2757.00	4800.00	2762.98	2764.00	2757.00	10.89	.00	5.57	2764.08
	13440.000	430.00	2757.00	8000.00	2764.06	2764.00	2757.00	13.24	.03	6.65	2765.64
*	13440.000	430.00	2757.00	11200.00	2764.77	2764.00	2757.00	15.56	1.49	7.72	2766.91
*	13440.000	430.00	2757.00	16000.00	2765.98	2764.00	2757.00	17.31	2.69	8.47	2768.54
*	13440.000	430.00	2757.00	28500.00	2768.53	2764.00	2757.00	20.38	4.62	9.78	2771.89
	13520.000	420.00	2758.00	1600.00	2763.70	2760.00	2760.00	9.68	2.76	2.82	2764.78
*	13520.000	420.00	2758.00	4800.00	2766.23	2760.00	2760.00	14.17	4.29	4.97	2768.06
*	13520.000	420.00	2758.00	8000.00	2767.93	2760.00	2760.00	16.45	5.08	5.93	2770.14
*	13520.000	420.00	2758.00	11200.00	2769.11	2760.00	2760.00	18.43	5.75	6.86	2771.72
*	13520.000	420.00	2758.00	16000.00	2770.59	2760.00	2760.00	20.74	6.53	8.00	2773.69
*	13520.000	420.00	2758.00	28500.00	2773.75	2760.00	2760.00	24.38	8.16	9.88	2777.65
	13600.000	420.00	2760.00	1600.00	2766.61	2764.00	2760.00	10.73	2.47	4.64	2767.84
*	13600.000	420.00	2760.00	4800.00	2769.78	2764.00	2760.00	17.07	4.70	6.77	2772.58
*	13600.000	420.00	2760.00	8000.00	2772.27	2764.00	2760.00	19.64	5.71	7.52	2775.69
*	13600.000	420.00	2760.00	11200.00	2774.64	2764.00	2760.00	20.27	6.07	7.78	2778.03
*	13600.000	420.00	2760.00	16000.00	2776.74	2764.00	2760.00	22.35	6.81	8.64	2780.56
*	13600.000	420.00	2760.00	28500.00	2780.64	2764.00	2760.00	26.51	8.41	10.61	2785.47

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SUMMARY OF ERRORS AND SPECIAL NOTES

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CAUTION SECNO= 20.780 PROFILE= 6 20 TRIALS ATTEMPTED TO BALANCE WSEL

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WARNING SECNO= 20.840 PROFILE= 3 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 20.840 PROFILE= 4 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 20.840 PROFILE= 5 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 20.840 PROFILE= 6 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 20.902 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO= 20.902 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 20.902 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 20.902 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 20.902 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 20.902 PROFILE= 3 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 20.902 PROFILE= 3 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 20.902 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 20.902 PROFILE= 4 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 20.902 PROFILE= 4 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 20.902 PROFILE= 5 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 20.902 PROFILE= 5 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 20.902 PROFILE= 5 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 20.902 PROFILE= 6 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 20.902 PROFILE= 6 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 20.902 PROFILE= 6 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 20.983 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 21.066 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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WARNING SECNO= 21.066 PROFILE= 4 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 21.066 PROFILE= 5 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 21.066 PROFILE= 6 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 21.125 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 21.544 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 21.544 PROFILE= 2 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 21.544 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 21.544 PROFILE= 3 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 21.544 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 21.544 PROFILE= 4 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 21.628 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 21.628 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 21.628 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 21.628 PROFILE= 2 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 21.707 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 21.707 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 21.707 PROFILE= 3 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 21.880 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 21.880 PROFILE= 4 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 21.925 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO= 21.925 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 21.925 PROFILE= 2 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 21.925 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 21.925 PROFILE= 3 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 21.925 PROFILE= 3 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 21.925 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 21.925 PROFILE= 4 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 21.925 PROFILE= 4 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 21.925 PROFILE= 5 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 21.925 PROFILE= 5 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 21.925 PROFILE= 5 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 21.925 PROFILE= 6 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 21.925 PROFILE= 6 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 21.925 PROFILE= 6 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 21.972 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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WARNING SECNO= 21.972 PROFILE= 5 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 21.972 PROFILE= 6 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 22.125 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 22.125 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 22.195 PROFILE= 4 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 22.195 PROFILE= 5 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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WARNING SECNO= 22.195 PROFILE= 6 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 22.338 PROFILE= 4 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 22.338 PROFILE= 5 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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WARNING SECNO= 22.373 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 22.373 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO= 22.373 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 22.373 PROFILE= 3 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 22.373 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 22.373 PROFILE= 4 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 22.373 PROFILE= 4 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 22.373 PROFILE= 5 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 22.373 PROFILE= 5 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 22.373 PROFILE= 5 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 22.373 PROFILE= 6 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 22.373 PROFILE= 6 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 22.373 PROFILE= 6 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 22.454 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 22.454 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 22.454 PROFILE= 3 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 22.454 PROFILE= 4 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 22.454 PROFILE= 5 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 22.454 PROFILE= 6 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 22.670 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 22.670 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 22.670 PROFILE= 3 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 22.670 PROFILE= 4 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 10580.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 10580.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 10580.000 PROFILE= 3 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 10580.000 PROFILE= 4 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 10580.000 PROFILE= 5 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 10580.000 PROFILE= 6 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 10640.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 10700.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 10780.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 10780.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 10780.000 PROFILE= 3 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 10780.000 PROFILE= 4 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 10780.000 PROFILE= 5 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 10780.000 PROFILE= 6 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 10860.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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WARNING SECNO= 11160.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 11240.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 11240.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 11240.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 11240.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 11240.000 PROFILE= 2 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 11240.000 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 11240.000 PROFILE= 3 MINIMUM SPECIFIC ENERGY
WARNING SECNO= 11240.000 PROFILE= 4 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 11240.000 PROFILE= 5 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 11240.000 PROFILE= 6 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 11320.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 11320.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 11320.000 PROFILE= 3 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 11320.000 PROFILE= 4 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 11320.000 PROFILE= 5 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 11320.000 PROFILE= 6 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 11400.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 11400.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 11400.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
WARNING SECNO= 11400.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 11400.000 PROFILE= 3 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 11480.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 11480.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 11560.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 11560.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY
WARNING SECNO= 11560.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 11560.000 PROFILE= 3 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 11640.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 11640.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 11840.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 11840.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 11840.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 11840.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 11840.000 PROFILE= 2 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 11900.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 11960.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO= 11960.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 11960.000 PROFILE= 2 MINIMUM SPECIFIC ENERGY
WARNING SECNO= 11960.000 PROFILE= 5 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 11960.000 PROFILE= 6 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 12100.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 12180.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12180.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 12180.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
WARNING SECNO= 12180.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 12180.000 PROFILE= 3 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 12250.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO= 12250.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12250.000 PROFILE= 2 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 12250.000 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12250.000 PROFILE= 3 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 12250.000 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12250.000 PROFILE= 4 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 12250.000 PROFILE= 4 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 12250.000 PROFILE= 5 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12250.000 PROFILE= 5 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 12250.000 PROFILE= 5 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 12250.000 PROFILE= 6 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12250.000 PROFILE= 6 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 12250.000 PROFILE= 6 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 12300.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 12380.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 12460.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO= 12460.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12460.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 12460.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 12460.000 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12460.000 PROFILE= 3 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 12460.000 PROFILE= 3 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 12460.000 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12460.000 PROFILE= 4 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 12460.000 PROFILE= 4 20 TRIALS ATTEMPTED TO BALANCE WSEL

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 CAUTION SECNO=  12460.000  PROFILE=  5  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  12460.000  PROFILE=  5  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  12460.000  PROFILE=  5  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  12460.000  PROFILE=  6  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  12460.000  PROFILE=  6  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  12460.000  PROFILE=  6  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=  12540.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  12540.000  PROFILE=  2  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  12540.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  12540.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  12540.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  12540.000  PROFILE=  4  CRITICAL DEPTH ASSUMED
1
    27SEP93      14:45:02                                                    PAGE   49


 CAUTION SECNO=  12540.000  PROFILE=  4  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  12540.000  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  12540.000  PROFILE=  5  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  12540.000  PROFILE=  5  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  12540.000  PROFILE=  5  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  12540.000  PROFILE=  6  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  12540.000  PROFILE=  6  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  12540.000  PROFILE=  6  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=  12620.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  12620.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  12620.000  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  12620.000  PROFILE=  5  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  12620.000  PROFILE=  6  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  12700.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  12700.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  12700.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=  12780.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  12780.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  12780.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  12780.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  12780.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  12780.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  12780.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  12780.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  12780.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  12780.000  PROFILE=  4  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  12780.000  PROFILE=  4  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  12780.000  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  12780.000  PROFILE=  5  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  12780.000  PROFILE=  5  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  12780.000  PROFILE=  5  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  12780.000  PROFILE=  6  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  12780.000  PROFILE=  6  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  12780.000  PROFILE=  6  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=  12840.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=  12900.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  12900.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
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CAUTION SECNO= 12980.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12980.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 12980.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12980.000 PROFILE= 2 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 12980.000 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12980.000 PROFILE= 3 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 12980.000 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12980.000 PROFILE= 4 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 12980.000 PROFILE= 5 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12980.000 PROFILE= 5 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 12980.000 PROFILE= 6 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 12980.000 PROFILE= 6 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 12980.000 PROFILE= 6 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 13060.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO= 13060.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13060.000 PROFILE= 2 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13060.000 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13060.000 PROFILE= 3 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13060.000 PROFILE= 3 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 13060.000 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13060.000 PROFILE= 4 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13060.000 PROFILE= 4 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 13060.000 PROFILE= 5 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13060.000 PROFILE= 5 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13060.000 PROFILE= 5 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 13060.000 PROFILE= 6 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13060.000 PROFILE= 6 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13060.000 PROFILE= 6 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 13140.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13140.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13140.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 13140.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13140.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13140.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 13140.000 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13140.000 PROFILE= 3 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13140.000 PROFILE= 3 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 13140.000 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13140.000 PROFILE= 4 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13140.000 PROFILE= 4 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 13140.000 PROFILE= 5 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13140.000 PROFILE= 5 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13140.000 PROFILE= 5 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 13140.000 PROFILE= 6 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13140.000 PROFILE= 6 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13140.000 PROFILE= 6 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 13200.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13200.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13200.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 13200.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13200.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13200.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 13200.000 PROFILE= 3 CRITICAL DEPTH ASSUMED

CAUTION SECNO= 13200.000 PROFILE= 3 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13200.000 PROFILE= 3 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 13200.000 PROFILE= 4 CRITICAL DEPTH ASSUMED

1

CAUTION SECNO= 13200.000 PROFILE= 4 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13200.000 PROFILE= 4 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 13200.000 PROFILE= 5 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13200.000 PROFILE= 5 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13200.000 PROFILE= 5 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 13200.000 PROFILE= 6 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13200.000 PROFILE= 6 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13200.000 PROFILE= 6 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 13280.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO= 13280.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13280.000 PROFILE= 2 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13280.000 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13280.000 PROFILE= 3 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13280.000 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13280.000 PROFILE= 4 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13280.000 PROFILE= 5 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13280.000 PROFILE= 5 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13280.000 PROFILE= 6 CRITICAL DEPTH ASSUMED
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TANQUE VERDE RIVER MANAGEMENT STUDY

ATTACHMENT 3 --

GEOMORPHIC ASSESSMENT

Submitted to:

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July 12, 1993

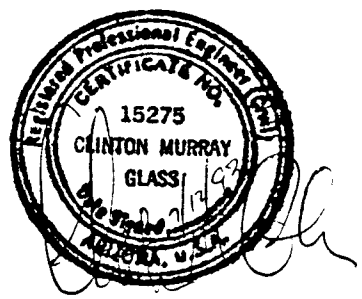
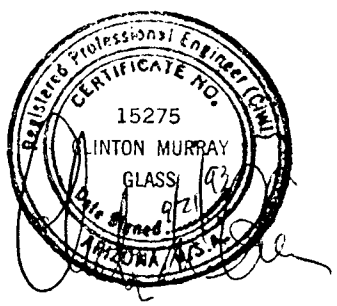


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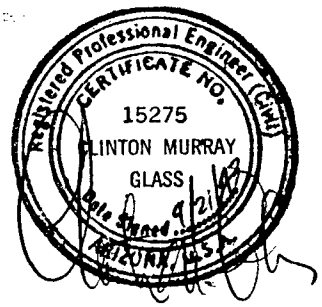


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I. DESCRIPTION OF EXISTING RIVER ENVIRONMENT

1.1 Channel Plan Form

The reach of the Tanque Verde Creek above Houghton Road remains largely unaffected by manmade changes within the floodplain environment. The primary low-flow channel is entrenched 3 to 7 feet below the overbank floodplain elevations and channel width varies from less than 100 feet in the reach adjoining 49er's Country Club to more than 400 feet upstream of Wentworth Road. The capacity of the low-flow channel also varies from reach to reach but averages between 4000 cfs and 8000 cfs, and generally (except for the Tanque Verde Loop Road to Wentworth Road reach) increases in the upstream direction. The width and depth of the low-flow conveyance channel is the primary cause of change in channel capacity. Slope remains uniform (about 0.44%) from Houghton Road to near the Canyon Del Salto confluence, then steepens to more than 1.0% at the upstream end of the study area. Table 1 lists the average geometric and hydraulic parameters for four sub-reaches within the project boundaries.

The plan form of Tanque Verde Creek is mildly sinuous. The amplitude and wavelength of meanders vary from one location to another and observation of aerial photographs lend to the conclusion that primary sinuosity developed to conform with the geologic boundaries rather than as a function of the sediment transport environment and need to reduce channel slope. The general alignment and width of the low-flow channel for present day conditions is very similar to that shown on the 1936 aerial photographs (which is the earliest available

TABLE 1 - AVERAGE CHANNEL GEOMETRICS AND BANK FULL VELOCITY

Reach	Channel Width (ft)	Channel Depth (ft)	Channel Capacity (cfs)	Velocity (fps)
Houghton-TV Loop	80-120	4-5	4000-6000	7-8
TV Loop-Wentworth	50-150	3-6	6000-8000	8-9
Wentworth-La Cebadia	200-400	4-5	7000-8000	7-8
La Cebadia-Canyon del Salto	100-150	6-7	7000-8000	9-13

photographic information). Previous studies have characterized Tanque Verde Creek as a braided river system and today's channel pattern would lend some support to that conclusion. However, this is not believed to be a process dominant in the development of the Tanque Verde Creek's plan form. Braiding is only observed east of Wentworth Road in the wider sections of the low-flow channel and where avulsions have occurred during the infrequent high-magnitude floods.

The width of the geologic floodplain increases in the downstream direction. This parameter ranges from 2600 to 2800 feet along the reach between Houghton Road and Tanque Verde Loop Road, 1900 to 2600 feet along the reach between Tanque Verde Loop Road and Wentworth Road, and 900 to 1700 feet along the reach between Wentworth Road and the Canyon Del Salto confluence. The geologic floodplain boundaries for Tanque Verde Creek commingle with that of Agua Caliente in the reach just above Houghton Road, and fluvial activity (erosion and deposition) associated with Agua Caliente appear to dominate and shift the Tanque Verde Creek channel location and primary overbank conveyance area to the south. The significance of the geologic floodplain width will be discussed later, but it is believed that this is one of the parameters influencing the form and stability of the low-flow channel.

1.2 Geology

Soils within the overbank floodplain areas are fluvial deposits comprised of about 50 percent sand and 50 percent silt. The median diameter of this soil is about

0.07mm (Pearthree, 1987). The channel bottom soils consist of about 19 percent gravel, 81 percent sand, and 0.1 percent silt/clay. The median diameter of the channel bottom sediments is about 1.7mm (reference 8). A comparison of the channel bottom and bank samples taken by Simons & Li (reference 2) show little variation between Houghton Road and Canyon del Salto.

The channel bed sediments have a very high infiltration capacity. Previous studies conducted by the U.S. Geological Survey estimate average annual recharge along this section of Tanque Verde Creek to be significant. This capacity is confirmed by the high groundwater table conditions that exist beneath the Tanque Verde Creek after prolonged flows and the dense riparian vegetation is supported by this high water table condition. Previous studies (Reference 8) have identified the cohesive overbank soils (silts and clays) along with root systems of the phreatophyte vegetation to be a factor that contributes to a reduced rate of bank erosion.

II. REVIEW OF HISTORICAL CHANGES

The earliest available aerial photography from which to define historical changes in the channel plan form were taken in 1936. Aerial photographs were also available for 1960, 1967, 1983, 1990, and 1993. The channel conditions which were observed at these points in time were compared to the USGS discharge records to correlate observed changes with occurrence of significant flows (see Table 2). Figure 1 is a map showing channel migration during the 1936 to 1993 period. Sheet 2 of the Tanque Verde Creek River Management Study - Phase I report is a 1" = 1000' scale 1990 aerial photograph of the project area.

The 1936 aerial photos showed large areas of the overbank floodplains to have been cleared and graded for agricultural purposes by that date. The largest area was that which is now occupied by the 49er's Country Club. Even though the vegetative cover and ground had been altered, close observation of the photographs detected historical meander patterns which indicate that the primary low-flow channel has probably occupied a location about 1200 feet north of its current alignment sometime prior to 1936 (see Figure 1). Low overbank ground elevations in this area and the broad width of the geologic floodplain would tend to also support the conclusion that the 49er's Country Club occupies a historical channel alignment.

The available records of stream flow are intermittent, but it is believed that the period between 1936 and 1963 was a period of infrequent flows and of low discharge. Consequently, the channel narrowed as a result of sediment

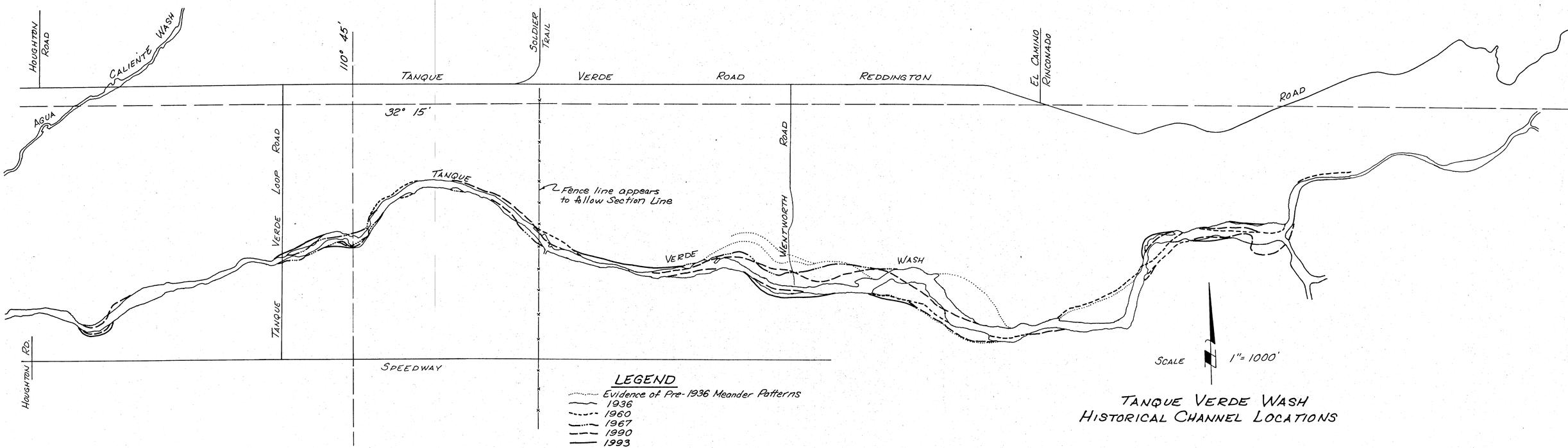
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TABLE 2 - RECORDED PEAK DISCHARGES

TANQUE VERDE CREEK AT SABINO CANYON ROAD

Water Year	Peak Flow (cfs)	Date
1940	6,400	12/30/40
1941	9,000	
1942	639	
1943	1,090	
1944	825	
1945	573	
1966	12,200	12/22/65
1968	3,080	12/20/67
1969	460	
1970	7,340	09/06/70
1971	7,000	08/19/72
1972	630	
1973	4,930	
1974	420	
1975	10	
1976	2,020	
1977	600	
1978	3,880	
1979	12,700	12/18/78
1980	1,600	
1981	3,500	07/31/81
1984	20,000	10/02/83
1985	7880	12/28/84
1988	3700	08/20/88
1989	2070	08/18/89
1993	16,100	01/08/93 (prelim. from USGS)

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TANQUE VERDE WASH
HISTORICAL CHANNEL LOCATIONS

FIGURE 1

deposition during the 1936 to 1963 timeframe. Between 1963 and 1967, there was at least one major flood (12/22/65) which washed out the sediment deposits and widened the low-flow channel. No avulsions were observed during this time period, but noticeable widening of the channel occurred as a result of bank erosion, primarily along the outer banks of meander bends. 1967 to 1974 was a period which contained several flows, but none exceeding about 7300 cfs which corresponds to about a 5- to 10-year return period. The channel again narrowed during this time period as a result of sediment deposition. 1978 to present has been a period during which there has been three major flows which have resulted in channel widening and avulsions that have opened braids along historical channel alignments. The 1983 flood (approximately 20,000 cfs) was the most significant cause of bank erosion and channel widening during this period.

Although bank erosion has caused the channel location to shift by as much as 400 feet in some locations, the overall pattern and location of the present day channel remains remarkably similar to that shown on the 1936 photographs. The most significant changes that we can observe today are a result of the largest flood of record which occurred in 1983. Prior to this event, differences in the channel plan form between 1936 and 1983 were much less evident.

The available records on channel bottom profile show that there has been very little change in the channel flowline elevation between 1936 and present (References 2, 3, 4, and 9). The historical changes in channel bottom elevation have been cyclical in response to flow volume and duration, but the overall

change along the entire project length between Houghton Road and the Canyon Del Salto confluence is estimated to be on the order of ± 1 foot. Figure 2 provides plots of the available channel bottom profile data. The slope of the channel as derived from this profile information varies between 0.0039 fpf and 0.0043 fpf. The minor amount of bed elevation change during the period of record between 1936 and present would suggest that this reach of the Tanque Verde Creek is in an equilibrium condition. This equilibrium exists, however, primarily as a result of the river system's tendency to dissipate energy by channel widening and overbank storage rather than by reduction in slope.

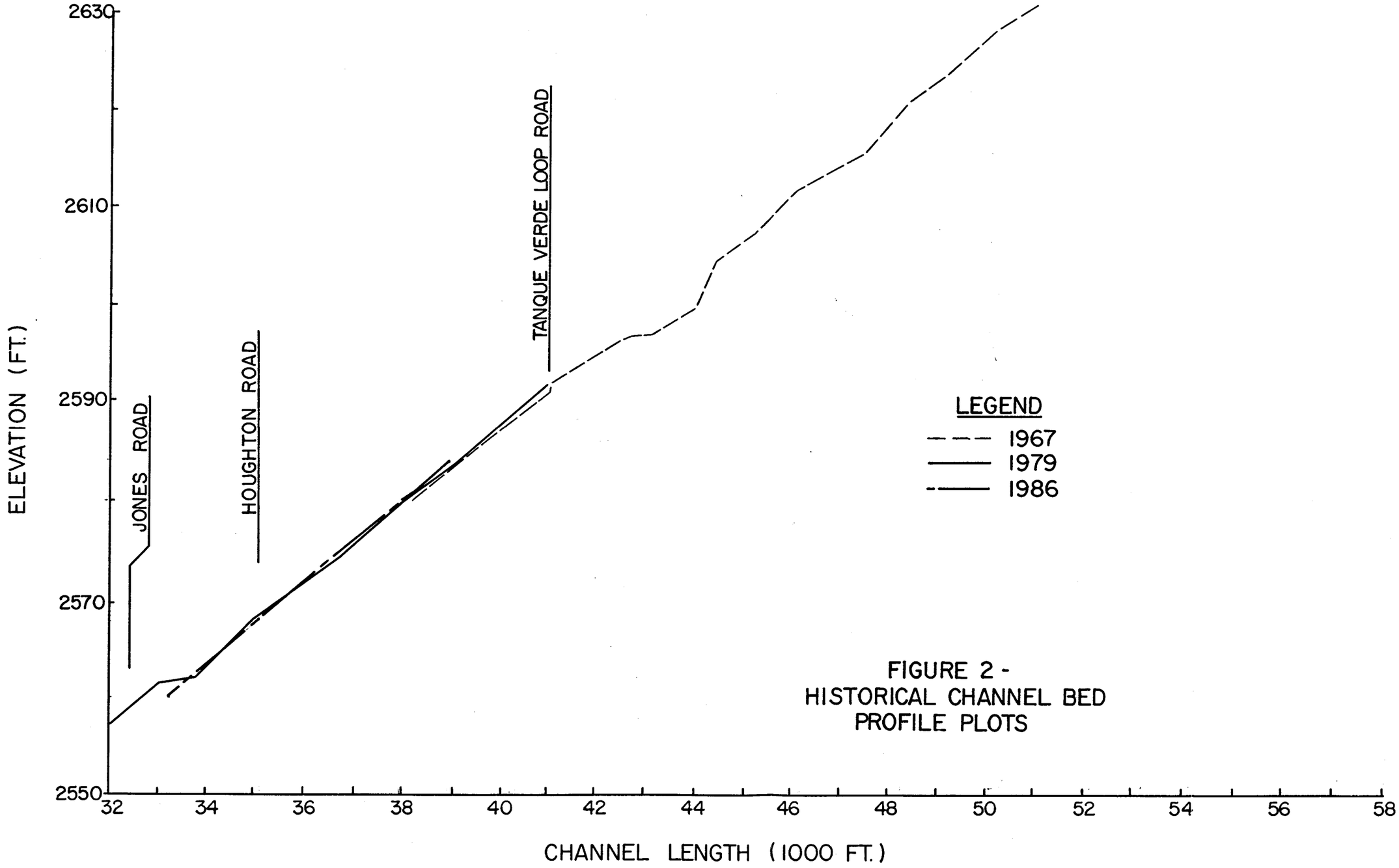


FIGURE 2 -
HISTORICAL CHANNEL BED
PROFILE PLOTS

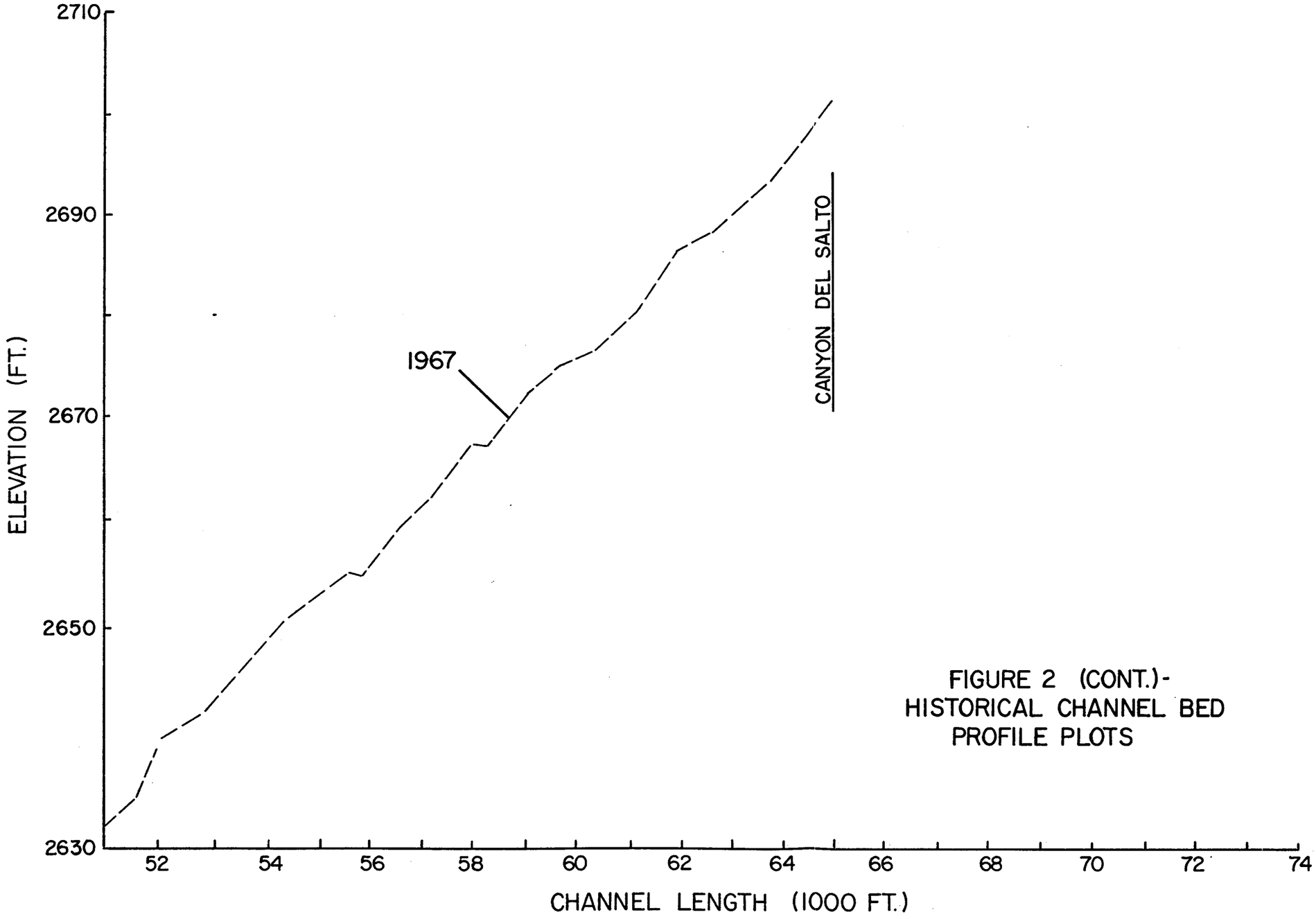


FIGURE 2 (CONT.)-
HISTORICAL CHANNEL BED
PROFILE PLOTS

III. INTERPRETATION OF FINDINGS

Review of available information has found that the plan and profile characteristics of the Tanque Verde Creek at any point in time is a function of the peak and duration of recent flows. During periods of low flow, the channel infills and aggrades and is subsequently scoured and cleaned during the less frequent high-magnitude floods. Bank erosion causes gradual but continual displacement of the bank location, particularly along the outside bank of meander bends, and these bends tend to shift in the downstream direction. Discussions provided in Section 1.1 of this report noted the significant changes in channel width and depth along the three primary subsections of the Tanque Verde Creek within the project area. Interpretation of the cause for these longitudinal changes in channel plan for was sought because it is believed that understanding the cause of these plan form changes will be significant to understanding the impact of proposed floodplain management alternatives. As previously indicated, the upper most section of the Tanque Verde Creek between Wentworth Road and the Canyon Del Salto confluence has an average channel width of about 200 to 400 feet and this is more than twice that of the downstream channel sections. This wider channel width may be the function of three possible different factors which are related to upstream watershed sediment supply, slope, and the width of the geologic floodplain. Runoff from the watershed is believed to yield less sediment than the upper steep sections of Tanque Verde Creek are capable of transporting, thus lending to a higher degree of bank erosion to satisfy this deficit. The watershed geology is extremely rocky and may not yield adequate quantities of small diameter sands and silts to equal the transport capacity along

this upper reach. As flow proceeds downstream, the high infiltration capacity of the channel and overbank storage attenuate the floodpeak and the channel stabilizes both horizontally and vertically toward the approach to Wentworth Road.

The second factor influencing channel form along the section of Tanque Verde Creek between Wentworth Road and the Canyon Del Salto confluence is the narrow width of the geologic floodplain. The narrower floodplain width forces more flow to remain confined to the channel area. This in turn increases the velocity of flow and rate of bank erosion. This factor, along with the above conditions of slope and disparity between upstream sediment supply and local transport capacity, act to make this section of Tanque Verde Creek more geomorphically active and dynamic than some of the downstream sections.

The width of the geologic floodplain increases significantly beginning at the approach to Wentworth Road and continuing downstream thereof to about Tanque Verde Loop Road. The low-flow channel width along this section of Tanque Verde Creek is also much less than along the reach upstream of Wentworth Road. The width varies from about 50 feet to about 150 feet, and the capacity of the low-flow channel is about 6000 to 8000 cfs. The north overbank is quite low (only about 3 to 4 feet above channel flowline), and this elevation difference along with a choke point (located about 3000 feet downstream of Wentworth Road) act to force a significant volume of runoff onto the north overbank area during major floods. The diversion of the large volume of flow

onto the north overbank acts to reduce velocity and sediment transport within the channel and decreases the rate of bank erosion. Examination of the 1936 and 1990 aerial photographs shows little change in channel width or alignment along this section of Tanque Verde Creek. The existence of this choke point is believed to be due to the dense vegetation along the banks and a path of lesser resistance (overbank flow) along the north overbank through the 49er's golf course.

The lower section of the project along the section between Tanque Verde Loop Road and Houghton Road also exhibits similar plan form characteristics to that of the immediate upstream section between Tanque Verde Loop Road and Wentworth Road. The channel width averages about 80 to 120 feet and channel capacity is about 4000 to 6000 cfs. Comparison of the 1936 and 1990 aerial photographs shows that there has been little change in channel width and alignment along this section of Tanque Verde Creek. Again, it is believed that the tendency to displace flow onto the overbank area acts to reduce velocity and the rate of fluvial processes in the channel during major floods.

The results of the qualitative geomorphic analyses conducted as a part of this study and the quantitative investigations completed by previous authors have concluded the Tanque Verde Creek to be in a state of dynamic equilibrium. This equilibrium exists, however, because man's activities within the river environment have been limited and the fluvial system functions naturally. Two distinct responses have been identified which appear to be a function of location within

the watershed and width of the geologic floodplain. The channel is naturally wider along sections where the geologic floodplain is confined to a narrower width, and narrower along sections where flow can spread onto a broad overbank floodplain during high-magnitude flows. These correlations would suggest that the ability to convey and store floodwaters on the overbank is an important element toward reducing flood velocity and attenuating downstream floodpeaks. If this capacity is lost, then it is expected that the channel would respond by widening its section via bank erosion.

VI. EROSION HAZARD ASSESSMENT

Horizontal movement of a river channel may occur by bank erosion or by avulsion. The plan form of Tanque Verde Creek shows patterns ranging from essentially straight to meandering and can even be considered to be braided in some locations. The variations in pattern can be explained by differences in geology, water discharge, and sediment transport capacity. An increase or decrease in sinuosity often reflects changes in gradient of the valley floor on which the river flows. The channel is more sinuous along reaches where the valley floor is steeper and straighter along reaches where the valley floor slopes more gently. This response reflects the river system's tendency to lengthen its course by meandering on steeper reaches. Experimental work conducted by Schumm and Khan (reference 10) show that for a given discharge, as valley floor slope is progressively increased, a straight river becomes sinuous, then eventually braided at high values of stream power and sediment transport. Rivers that are situated close to the meandering/braided threshold should have a history characterized by transitions and morphology from braided to meandering and vice versa. Previous discussions have mentioned the Tanque Verde Creek's tendency to cross the meandering/braided stream threshold as a function of flow discharge.

An estimate of the sediment transport capacity along different sections of the Tanque Verde Creek was obtained by use of the regression formula given as equation 5.8b in reference 6 of this report. These computations identified a generalized trend depicting a progressive decrease in sediment transport

capacity in the downstream direction. This sediment transport capacity decreased in the downstream direction for the reach between Houghton Road and Wentworth Road, but it was of the same relative order of magnitude. The pattern of sediment transport capacity reductions in the downstream direction appear to be due to the gradual decrease in channel capacity, slope, and velocity.

The most interesting result of the sediment transport computation was the finding that the section of Tanque Verde Creek upstream of the Tanque Verde Guest Ranch area has a transport capacity which is 2 to 10 times greater than any of the downstream channel reaches. This finding confirms previously discussed conclusions regarding the cause of channel instability along the upper reaches from Wentworth Road to Canyon Del Salto. This reach of the Tanque Verde Creek is characterized by a much higher stream power and discontinuity between transport capacity/upstream supply and is the probable explanation for a much higher degree of horizontal instability (bank erosion and avulsions).

Three different methodologies were used to delineate erosion hazard areas along Tanque Verde Creek. These methodologies included a delineation based upon criteria given by Pima County's erosion hazard ordinance, a delineation based upon geologic floodplain boundaries, and third, a delineation based upon hydraulic/geomorphic parameters.

Pima County Floodplain Management Ordinance #1988-FC1, Article XII,

establishes a 500-foot setback requirement from the primary channel bank of Tanque Verde Creek. This requirement established the erosion hazard setback distance based only upon regulatory criteria.

The second approach used (the geologic floodplain approach) which defines the boundaries within which the channel has occupied during recent geologic time. These boundaries are defined by topography and the limits of fluvial deposits associated with flows on Tanque Verde Creek. This approach can be considered extremely conservative because available records (aerial photographs dating back to 1936) do not show evidence that the channel has occupied some of the areas within these geologic boundaries for a great period of time, possibly even on the order of 1000 years or more. On the other hand, geologic boundaries are not necessarily a fixed limit beyond which the channel could migrate during future floods.

The third method used to evaluate erosion hazard potential involved a tabulation of several hydraulic and geomorphic parameters that identify erosion hazard potential. These parameters include channel flow velocity, amplitude of existing meanders, vegetation densities, historical bank erosion and avulsion patterns, and overbank flow velocities. Channel flow velocities and the order of magnitude of historical bank erosion were the two primary factors in establishing a relative measure for erosion hazard classifications. The channel setbacks recommended for channel reaches identified as having a low erosion hazard classification were from 200 to 400 feet. A setback distance of 400 feet to 600 feet was used for

channel reaches identified as having a moderate erosion hazard. A setback distance between 600 feet and 800 feet was recommended for channel reaches identified as having high erosion hazard. The actual delineated erosion hazard setback distance varied from the upper to lower limits of the classification boundaries based upon other parameters such as meander amplitude, overbank vegetation densities, and overbank flow velocities. Table 3 summarizes the erosion hazard evaluation parameters and recommended erosion setback distances for both the north and south banks of the previously established sub-reaches within the project area. The actual erosion hazard boundary delineations are provided on sheet 12 of Attachment I to the Johnson-Brittain Report.

TABLE 3 - PARAMETERS FOR ESTIMATING EROSION HAZARD POTENTIAL

Reach & Side	Bank Full Discharge (cfs)	Channel Velocity (fps)	Meander Amplitude (ft)	Vegetation** (Densities)	Historical Changes (ft)	Overbank Velocity (fps)	Erosion Hazard Classification	Recommended Setback Distance (ft)
Houghton Rd. to 1/2 mi upstream	4000-6000	7-8						
South Bank			600 ft.	High	±100	1-2	Moderate	400-600
North Bank			250 ft.	Moderate	<50	1-2	Low	200-400
1/2 mi upstream of Houghton to TV Loop Rd.	4000-6000	8-9						
South Bank			250 ft.	Low	<50	1-2	Low	200-400
North Bank			250 ft.	Moderate	<50	0-1	Low	200-400
TV Loop Rd. to 1 mi upstream	6000-8000	8-9						
South Bank			500 ft.	Low	±200	2-3	Moderate	400-600
North Bank			300 ft.	Moderate	±200	2-3	Moderate	400-600
1 mi upstream of TV Loop to Wentworth Rd.	6000-8000	6-8						
South Bank			none	High	<50	2-3	Low	200-400
North Bank			*	Low	±600	3-5	High	600-800
Wentworth Rd. to 1.5 mi upstream	7000-8000	7-8						
South Bank			*	Moderate	±400	2-3	Moderate	400-600
North Bank			*	Low	±500	2-3	Moderate	400-600
1.5 mi upstream of Wentworth Rd. to Canyon Del Salto	7000-8000	9-13						
South Bank			900*	Moderate	±300	3-4	Moderate	400-600
North Bank			500*	Moderate	±200	3-4	Moderate	400-600

*Channel braiding by avulsions occurs
**by aerial photographic observations

V. SUMMARY OF PREVIOUS QUANTITATIVE ASSESSMENTS

Four other studies have been conducted which lend some quantitative information on channel stability and sediment transport in the project area. These studies include:

1. Fluvial Analysis for Tanque Verde Creek Bank Protection Near 49er's Country Club Estates, Pima County Department of Transportation and Flood Control District, Design Section, October 1991.
2. Rillito System Sediment Transport Study, Simons, Li & Associates, February 1982.
3. Hydrologic/Hydraulic Assessments for the Houghton Road Bridge, Cella Barr Associates, April 1989.
4. Final River Dynamic Analysis for the Houghton Road Bridge, Hydro-Sciences Engineering, Southwest Inc., May 1987.

The first reference listed above included a sediment transport model for the section of Tanque Verde Creek between Tanque Verde Loop Road and a point about 2000 feet upstream of Wentworth Road, and an estimate of the equilibrium channel slope. Results of this analysis found peak channel bed changes during the 100-year return period event to be about 4.0 feet and net end of hydrograph bed elevation change to be about 1.0 feet. The equilibrium slope analysis determined long-term aggradation/degradation to be negligible and concluded the reach of Tanque Verde Creek between Tanque Verde Loop Road and Wentworth Road to be stable for long-term conditions. The existing channel

slope was stated to be 0.0044 fpf, and the computed equilibrium slope 0.0045 fpf.

The second reference listed above included a sediment transport model for the entire length of the Tanque Verde Creek system between its confluence with the Pantano Wash and Canyon Del Salto. Results of this study also found the bed elevation changes during the 100-year return period event to be minimal, and that the vertical profile of Tanque Verde Creek is stable for long-term conditions.

The study conducted by Cella Barr Associates was largely a hydrologic and hydraulic analysis conducted for design of the Houghton Road bridge aperture. The results of the HEC-1 model conducted as a part of that study suggests the 100-year discharge for Tanque Verde Creek at Houghton Road to be about 28,500 cfs. The existing 100-year discharge for this point of concentration is 23,000 cfs. Cursory geomorphic analyses conducted as a part of the Cella Barr Associates study noted no discernable movement of the channel during the period between 1973 and 1989. Their comparison of channel bed profiles found that the bed slopes of the Tanque Verde Creek had not changed significantly and the vertical profile to be in essentially an equilibrium condition. They noted some channel bed aggradation had occurred upstream of Houghton Road, possibly due to the roadway crossing acting as a grade control structure.

The study conducted by Hydro-Sciences Southwest Inc. noted some aggradation immediately upstream of the Houghton Road culverts and minor degradation

downstream thereof. The general slope of the channel in the vicinity of the Houghton Road crossing was determined to be 0.0040 fpf. Channel stability analyses estimate vertical changes in the bed profile to be ±2 feet, and that the overall channel system is generally in an equilibrium condition. These assessments were based upon comparison of the bed profile at Houghton Road and Tanque Verde Loop Road during the period between 1931 and present. The existing slope of the channel was noted to vary between 0.0039 fpf and 0.0043 fpf along the reach upstream of Houghton Road. Equilibrium slope and sediment transport study results were cited from the Rillito System Sediment Transport Study conducted by Simons, Li & Associates.

It should be noted that none of those studies on equilibrium slope incorporate lateral erosion into the estimation procedures. The only available methodology for making such an analysis is the FLUVIAL-12 program. This methodology is time consuming and requires calibration to measured events in order to be verified.

VI. EROSION HAZARD DAMAGE ASSESSMENT

6.1 Development of Theoretical Model

The location, extent, and rate of bank erosion are related to several factors which generally fall under the categories of hydrology, hydraulics, channel geometrics, soils, and sediment transport. The primary hydrologic variables are the discharge and duration of flow. Hydraulic variables include the velocity and depth of flow, and the channel geometrics of alignment and cross section define how hydraulic forces are directed upon the channel banks. The soils variable defines the resistance of the bank materials to the hydraulic forces and sediment transport relates to suspended load. Studies conducted by Simons & Richardson have defined several other parameters which affect bank erosion processes, and the relative significance of these parameters (such as viscosity of water and bed material fall diameter) is less than the primary variables defined above. A review of available literature should be made for more detailed information regarding variables related to bank erosion. Equation 6.1 presented below defines bank erosion relative to the primary variables described above.

Equation 6.1: $E_h = f(V, A_m, R_b, D_f, W)$

where,

E_h = Erosion Hazard Function

V = velocity of flow (ft/sec)

A_m = meander amplitude/wave length

R_b = bank erodibility factor

D_f = duration of flow (hours)

W = channel width (ft)

6.2 Development of Historical Model for Erosion Losses

The aerial photographic information for the period between 1936 to 1993 was used to assess the magnitude of historical bank erosion-related property losses. The initial step to the methodology was to define land areas between bank locations during each of the time intervals given by the photographic records. The measured land area lost due to erosion of the channel banks during the given time period was converted to an average annual rate by dividing by the length of time. As an example, the total land area lost due to bank erosion during the period between 1936 and 1960 was measured to be 16.0 acres. This converts to an average annual loss of about 0.7 acres per year. Conversion of the total land losses to an average annual amount helps to delineate changes in bank erosion rates as a function of wet or dry precipitation cycles. The lowest rate of bank erosion losses recorded during the period of record was the 1936 to 1960 period which yielded a rate of 0.7 acres per year. The highest rate of erosion was for the 1990 to 1993 period which recorded a total area loss of 15.0 acres, and this translates to an average annual rate of 5.0 acres per year. The next highest rate of erosion was experienced during the 1960 to 1967 period when the total area loss was 26.8 acres. This translates to an average annual erosion loss of 3.8 acres per year. It should also be realized that some of the observed erosion losses were recurring as a result of aggrading and degrading cycles.

These average annual rates of erosion were used to plot relationships between property loss and cumulative time (see Figure 3). The 0.7 acres per year

minimum and 5.0 acres per year maximum annual erosion loss rates define the upper and lower boundaries of the potential property losses, based on historical record. The mean annual loss rate was computed for the 1936 to 1993 period and was determined to be 1.3 acres per year. This loss rate does not reflect cyclical aggrading/degrading areas within activity fluvial zone associated with the low-flow channel discharges.

Figure 3 was used to project the potential magnitude of future bank erosion-related land losses for any given planning horizon. The economic value of the bank erosion-related losses was defined by estimating the change in land value that occurs when overbank riparian area becomes channel bottom land. Using assessor data, Johnson-Brittain has determined the value of land (without structures) to range from $8,000 to $60,000 with the average being $15,000. For this discussion, the change in land value caused by erosion has been assumed to be $10,000. The differential land value between these two conditions was then multiplied by 1.3 acres (the projected mean annual land loss due to bank erosion) to estimate the value of average annual damages. Using this approach, the average annual erosion damage losses to raw land was determined to be $13,000 per year. The average annual value of bank erosion-related land losses is merely a statistical measure which can be used to project the potential value of long-term losses over some established planning horizon. The actual erosion-related losses occur very infrequently and over a very short period of time during the higher magnitude flows. Therefore, a very high amount of erosion damage losses can occur during a very short period of time. The land losses during the

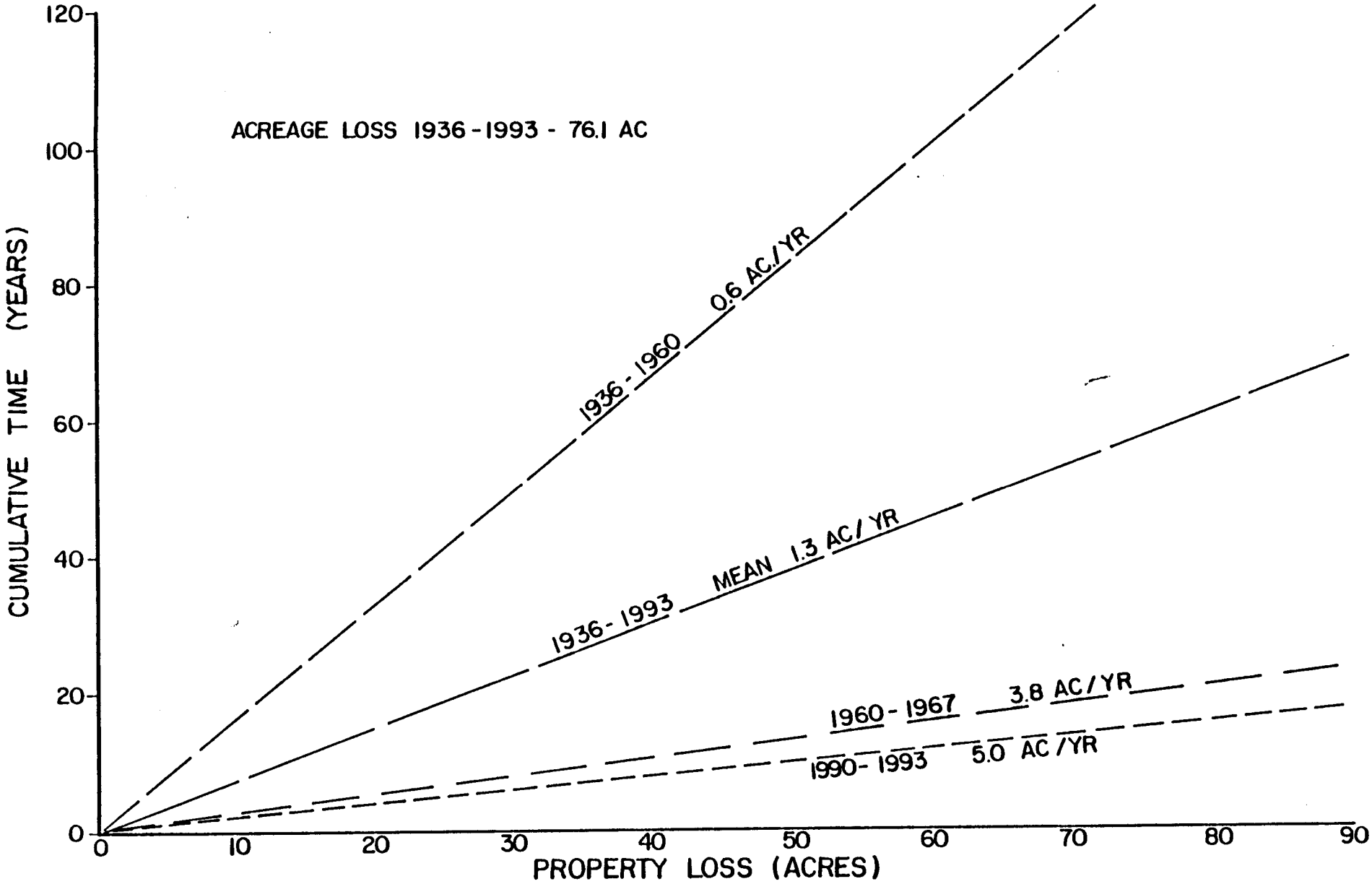


FIGURE 3 - HISTORICAL EROSION DAMAGE LOSSES FOR RAW LAND

January 1993 floods was estimated to be $150,000 based upon the above-defined relationship and assuming the full 15 acres lost between 1990 and 1993 occurred during that storm.

6.3 Loss of Structures

The approximate method presented herein was limited to determining the total number of existing structures within the delineated erosion hazard area, and to estimate the average distance of these structures from existing channel banks. Then, the average distance from channel bank was related to a probability measure which assumes a 100% probability of failure at channel bank, and a 0% probability of failure at the defined erosion hazard limit. Using this approach, the 300-foot distance equivocates to a probability for erosion-related structural losses of approximately 40% over long term. If a logarithmic method were used rather than the linear relationship presented on Figure 3, then the probability of losses would be less than that predicted by the linear relationship.

The total number of existing structures located within 300 feet of the banks of the Tanque Verde Creek was determined to be 21 based upon 1990 aerial photography. This count excludes all existing residential structures within the 49er's Country Club under the assumption that these homes will not be vulnerable to erosion damages once the Corps of Engineers' project has been constructed. Multiplying the 21 structures by the probability of loss over the long-term planning horizon establishes that 8.4 structures should be expected to be lost. Using a planning horizon of 110 years, which equivocates to the

average time required for erosion of the land upon which the 8.4 structures exist, the annual rate of structure loss is 0.076 structures per year. This is equal to an average expected loss rate of 1 structure every 13 years. Johnson-Brittain has found the average value of structures (without land) to be approximately $130,000, not including those to be protected by the levee. This results in an average annualized loss of $9,900. It should be noted that structural losses could be much higher in any given year due to the occurrence of an infrequent, high-magnitude event or where a large number of structures are concentrated at a vulnerable point such as a meander bend.

6.4 Infrastructure Losses

No analysis has been conducted to estimate the value of public infrastructure losses due to channel bank erosion. It is known that there are very few public improvements within the limits of this study. The existing bridge at Houghton Road has been designed to withstand damages during flows greater than the 100-year flood event, so the dollar value of potential damages at this location is minimal. In addition, there are no bridge structures at Tanque Verde Loop Road or at Wentworth Road. The extent of required repairs due to periodic flooding would therefore be limited to reconstruction of dip crossings. Additionally, there are no identified public utilities located in the vicinity of the Tanque Verde Creek.

6.5 Estimated Average Annual Erosion-Related Losses

The total average annual erosion-related losses was estimated by summing the vacant land-related losses estimated in Section 6.2 of this report with the value

of structural-related losses estimated in Section 6.3 of this report. The sum of these two erosion-related property losses is $23,000 per year. The present worth of this amount (using the Johnson-Brittain's present worth factor of 21.48) is $494,000, suggesting the amount that could be cost-effectively spent for improvements to correct the problem of erosion throughout the entire area -- obviously a very small amount to accomplish such a feat. Improvements that mitigate flood damage as well as erosion could provide a greater level of benefit, however.

The estimate for erosion-related property losses is largely a function of the low land use density within the limits of the defined erosion hazard area. This low land use density is a function of acknowledged hazards and damages which have occurred during past floods, and as a result of existing regulatory controls such as FEMA's floodway delineation and Pima County's floodplain and erosion hazard management ordinance which have restricted development within this area. Discussion presented in Section II of this report have indicated that the extent of historical erosion-related losses along Tanque Verde Creek have been limited except along the reach upstream of Wentworth Road where hydraulic and geomorphic processes lend to a much more dynamic system. The number of existing structures along the section of Tanque Verde Creek east of Wentworth Road is very few, so there are relatively few structures which have a high degree of vulnerability to erosion-related losses. However, a few structures have been identified to be particularly vulnerable due to relative location to the channel bank

and position relative to active meander bends. These structures are shown on sheet 12A of the Tanque Verde Creek River Management Study - Phase I Report.

VII. GEOMORPHIC IMPACT OF STRUCTURAL ALTERNATIVES

Several structural flood control alternatives have been outlined by this report. Section III of this report described the existing geomorphic environment and the channel's response to change in cross section, slope, and distance from headwaters. Two characteristics which were defined as key components to channel system stability were: a) the ability to derive materials from the channel banks to satisfy sediment transport capacity during high-magnitude flows, and b) overbank storage.

The upper reaches of the channel above Wentworth Road were identified to be more dynamic because there has historically been a much higher rate of bank erosion in this area. Conversely, the lower sections of the channel below Wentworth Road were determined to have a much more stable channel plan form and this was related to energy dissipation resulting from overbank storage. These two distinctly different geomorphic qualities between the upper and lower sections of the channel lend very useful information about the nature of potential changes due to manmade modifications. The following sub-sections of this report qualitatively describe expected channel response to implementation of the structural flood control alternatives described in this report.

7.1 Response to Channelization

The reaches of Tanque Verde Creek above Wentworth Road are characterized by wide channel sections with high discharge capacity. Channelization along this section of the wash would imply only small changes in hydraulic conditions given

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a width reasonably consistent with the existing cross section. The geomorphic analysis of existing channel conditions identified this reach as being particularly vulnerable to lateral migration and bank erosion losses due to the high velocity of flow associated with containment of a large quantity of water to a well-defined channel section. Therefore, it can be reasonably implied that widening of the downstream channel cross section to contain a greater quantity of flow would have the consequence of an increased rate of bank erosion. The magnitude of erosion potential would be a function of the channel width and the channel capacity. Narrower channel sections which would provide for flow onto the overbank area (and consequent storage) would be expected to have a lesser bank erosion response than a higher capacity cross section.

7.2 Response to Bank Stabilization

The geomorphic analysis for existing channel conditions determined that the dynamic response of the river during high-magnitude flows has been to erode the banks to satisfy a sediment deficit and reduce potential energy. This capacity to move laterally, particularly along the reaches upstream of Wentworth Road, is the primary reason why there has been little change in the vertical profile of the channel during the course of historical record. Therefore, it can be anticipated that stabilization of the channel banks will initiate a degradation response as the system attempts to adjust and derive an alternate source of sediment supply. This response would be particularly pronounced along the reaches east of Wentworth Road where the channel banks have been a necessary source of sediments during past floods. Stabilization of the channel banks along the

reaches downstream of Wentworth Road would not have as pronounced of an effect since lateral migration and bank erosion have not been noticeable responses along this reach. However, the most important factor with respect to the magnitude of response to bank protection along the reaches downstream of Wentworth Road would be the degree to which overbank storage were lost due to a channelization or bank stabilization project. In other words, the response would not be expected to be as significant with low-flow channel stabilization as it would be due to a channelization project which contained discharges up to the regulatory event. In any case, it should be anticipated that grade control structures to limit bed degradation will have to be a part of any bank stabilization plan.

7.3 Response to Upstream Detention

The river system response to upstream detention would be a function of the ability of the control features to pass sediment to the downstream channel reaches. The conveyance of the sediment materials through such a system would be needed in order to prevent a clearwater response which would take the form of increased bed and bank erosion.

7.4 Response to Jetty Field Installation

Jetties have been used along the south bank for a short section of the Tanque Verde Creek adjoining the Tanque Verde Guest Ranch. The intent of the jetties is to stabilize the bank by initiating sediment deposition between the structures. Examination of the existing structures has found that the jetties have indeed

initiated sediment deposition between the structures. The structures themselves have experienced frequent damage due to an inability to withstand the hydraulic forces of flow impacting upon the structures. The observed damage has included structural deformation, wire breakage, and scouring of the rock riprap materials which were placed in the wire baskets. A significant amount of erosion has been observed along the channel sections immediately downstream of the existing jetty structures; however, an attempt to define the extent to which the structures increased the natural rate of erosion processes was inconclusive. It is believed, however, that the entrapment of sediments between the structures at least temporarily resulted in clearwater scour along the downstream channel sections.

Installation of the jetty structures requires a relatively wide channel section since they extend well out into the flowage area. The scope of the downstream channel response to the jetty structures would be a function of the length of the project and alignment of the downstream channel. It is not anticipated that jetties would be used over a significant length of channel because of the alignment and cross section constraints. Therefore, being that a sediment deficit condition would only be expected for a short period of time, the remaining factor relating to downstream impacts would be alignment and the degree to which these structures altered the natural flow pattern.

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7.5 Response to Extended 49er's Levee

One of the flood control options explored in this report proposed a downstream extension of the U.S. Army Corps of Engineers 49er's Country Club levee. This alternative would not involve any modifications to the low-flow channel; therefore, it is not anticipated that the structure would initiate any geomorphic adjustment for flows contained within the channel banks. Previous discussion has been given about the predicted channel response to loss of overbank storage along this reach. The expected channel responses included a possible increase in the rate of erosion along the south bank adjoining the structure and along downstream reaches. This response would occur as a result of the increased velocities and conveyance within the channel area which add to the system's erosion capacity. The degree to which such channel adjustments could occur would depend upon the increase in flow velocity (which is a function of the amount of overbank storage lost) and the frequency of occurrence.

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VIII. NON-STRUCTURAL ALTERNATIVES

Non-structural flood control alternatives include methods that do not involve large-scale changes to the channel environment. Such methodologies may include (1) individual floodproofing of structures, (2) regulatory guidelines to control the location and manner in which future construction occurs within the flood and erosion hazard areas, and (3) local bank modifications which do not disrupt the geomorphic processes occurring within the channel environment. These non-structural flood control alternatives relate to distinctly different needs. The individual structure floodproofing methodologies are methods which respond to the potential for flood damage to existing structures. On the other hand, the regulatory guidelines control the manner in which future use of the land occurs. Finally, the spot improvement methodology for recovering lost property responds to the periodic erosion threats which area residents face. All of these alternatives are useful if applied properly by the regulatory environment.

8.1 Individual Flood Proofing

The available literature is replete with documents addressing alternative methodologies for floodproofing individual structures. Several of these documents are listed in the references section of this report. Several of the older homes which have been constructed on the overbank floodplain areas of the Tanque Verde Creek were built at or near existing grade and have proven to be vulnerable to flood damages during past floods. Some of these homes have been protected by construction of perimeter walls which enclose the home and have elevated access driveways and walkways which keep flow from entering

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through the entries. The primary regulatory considerations affecting the feasibility of the individual floodproofing option is whether or not the structure exists within a FEMA floodway and the extent to which the perimeter wall construction affects adjoining properties. Current FEMA requirements prohibit construction of any improvement within the regulatory floodway area which obstructs the passage of floodwaters. Outside of the floodway area, the issue is to restrict the scope of the wall construction to the extent necessary to avoid increase in flow depths or velocities upon adjoining properties. Each individual site would have to be analyzed with respect to location and orientation of the obstruction and potential for impacts to adjoining properties. It is not certain as to the need for an individual hydraulic analysis to support of each application because the cumulative impacts of all potential adjoining improvements could not be adequately addressed in this manner. Rather, the approach should consider the existing regulatory water surface elevations and the allowable regulatory surcharge as a basis for considering the minimum elevation of proposed improvements. An approach is needed which streamlines the application procedure for those who restrict the scope of proposed encroachments to a level which is not expected to adversely impact adjoining properties. Such an approach might include rounding or sharpening the leading edge of perimeter walls to transition flow around the sides. Another approach might include limiting the lateral extent of encroachments to less than 50 feet from property line or less than 10 feet from side of residential structure where the property line setback approach is not applicable. Guidance could be given either by specifying a conservative minimum wall height in lieu of providing additional engineering data,

or the flood damage model developed for this project could be used to provide specific heights if the HEC-II and finished floor data were improved.

8.2 Regulatory Guidelines

Existing FEMA regulatory guidelines and the Pima County Floodplain Management Ordinance provide adequate restriction and controls for new development within the regulatory floodway area. These guidelines should be strictly applied in view of the potential threat to life and property associated with significant flows on Tanque Verde Creek.

The geomorphic analysis conducted in Section IV of this study considered the potential magnitude of long-term changes in the horizontal alignment of the channel banks. The 500-foot erosion hazard setback was overlaid onto a property ownership map to delineate the areas subject to Pima County's current 500-foot erosion hazard setback criteria. The analysis went on from there to develop a more educated approach to the erosion hazard delineation which considered several factors such as historical changes, velocity of flow, channel alignment, and capacity. An erosion hazard setback limit was delineated based upon these criteria. In some instances, the mapped erosion hazard area was greater than the 500-foot setback distance as provided by present Pima County regulations, and in some instances it was less. It is believed that the methodology applied to develop this erosion hazard setback delineation is an improvement to the standardized methodology. Further refinements may be possible given more accurate data. In the mean time, it is suggested that the

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engineered erosion hazard setback delineation be adopted in lieu of the standard 500-foot setback because it is based upon observed geomorphic and hydraulic conditions. The extent of future construction activity within this erosion hazard area should be limited to non-residential uses.

8.3 Soft Bank Protection

The third non-structural alternative offered by this report was developed in response to the demand for spot improvements to prevent or repair damages which occur as a result of bank erosion. An examination of the drainage complaint files and floodplain use permit applications which have been filed with Pima County will show that the community's concerns and requests have been largely related to a demand for local improvements. The concept presented herein attempts to acknowledge the need for property owners to have the ability to respond to losses in a manner which provides at least a limited degree of protection while at the same time attempts to avoid adverse impacts to adjoining properties. This concept is an engineered riprap/fill material which provides some limited degree of erosion resistance to prevent further erosion damages during low-flow events. The concept furthermore defines a failure point wherein the material would wash out at a certain discharge level to avoid hardening the bank to such a degree that it acts to deflect high velocity flows onto adjoining properties. Further conditions and restrictions would also have to be applied and relate to details by which the transition from existing to proposed bank location can occur so as to avoid abrupt transitions which may alter flow directions. This spot bank improvement alternative is perceived as the greatest demand by area

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property owners. Several of the past applications for floodplain use permits have been related to requests for restoration of property lost by bank erosion. Further analysis of the best design frequency is needed and of other potentially applicable criteria which may limit where the approach can be applied. Pima County has prepared some draft guidelines in response to property owner requests arising after the January 1993 floods. Further work is needed to refine these guidelines and incorporate additional technical criteria to the structural design of the bank protection material. A much more detailed study of this alternative is needed to see if the technical problems associated with its implementation can be overcome. One of the main concerns is that the available design methodologies are only approximate. Additionally, there is a significant economic risk to the affected property owner upon the occurrence of a flood which exceeds the design frequency.

IX. REFERENCES

1. Fluvial Analysis for Tanque Verde Creek Bank Protection Near 49er's Country Club Estates, Pima County Department of Transportation and Flood Control District, Design Section, October 1991.
2. Rillito System Sediment Transport Study, Simons, Li & Associates, February 1982.
3. Hydrologic/Hydraulic Assessments for the Houghton Road Bridge, Cella Barr Associates, April 1989.
4. Final River Dynamic Analysis for the Houghton Road Bridge, Hydro-Sciences Engineering, Southwest Inc., May 1987.
5. Floodplain Management Ordinance 1988-FC1, Pima County, April 12, 1988.
6. Design Manual For Engineering Analysis of Fluvial Systems, Simons, Li & Associates, March 1985.
7. Engineering Analysis of Fluvial Systems, Simons, Li & Associates, 1982.
8. Channel Change Along the Rillito Creek System of Southeastern Arizona, 1941 Through 1983, Arizona Bureau of Geology & Mineral Technology, Geological Survey Branch, Special Paper 6, 1987.
9. Floodplain Information Tanque Verde Creek and Tributaries, U.S. Army Corps of Engineers, August 1975.
10. Experimental Study of Channel Patterns, Schumm and Khan, 1972, Geol. Soc. Am. Bull., V. 83, pp. 1755-1770.

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BASE AUTOCAD AND MICROSOFT EXCEL FILES

The files listed here have been transmitted on floppy disks. Printouts of all or representative portions of each are included here to document the various analysis procedures.

Disk 1

HEC-1 and HEC-2 files presented previously in Attachment 2.

Disk 2

A:\AUTOLISP--

*H2_XSEC.LSP	AutoLISP routine that plots HEC-2 cross-sections into AutoCAD drawing using data read from HEC-2 output file..
*H2_PLOT.LSP	AutoLISP routinethat plots flow profiles using data from HEC-2 output file.
*PLTFDMG.LSP	AutoLISP routines that plots filled circles wqith area proportional to amount of flood damage on master.dwg.
*TANQUE.LSP	Contains a number of AutoLISP routines used in conjunction with master.dwg for performing data collection and analysis.

A:\DRAWING--

MASTER.DWG	Basic AutoCAD drawing file containing property lines, rights-of-way, location of structures, tax codes, HEC-2 cross-section locations, erosion hazard setback lines, and other geographic information needed for the analyses performed in this study. A hard copy is not included in this Attachment. Sheets 3a-d, 12, 13a & b, 14, and 19 of Attachment 1 are all derived from this drawing however, using various layers. *FLOODDMG.XLS Flood damage model created as a Microsoft Excel spreadsheet.

Disk 3

A:\FLDMG_XL--

*MTJ.XLM	Macro to perform linear interpolation using tabular data.
*ASSESSOR.XLS	Assessor data for parcels in project area created from text file downloaded by Digitgraph Computer Systems from Pima County records.
*FLOODDMG.XLS	Flood damage model. Uses assessor data, HEC-2 output to determine total amount of flood damage for that particular storm.

Disk 4

A:\EROS_XL--

*NB.XLS	Excel spreadsheet used to determine property value for parcel clusters (reaches) along north bank (Areas 1-8).
SB.XLS	Same as above except for south bank (Areas 9-16). Printout not included.
X.XLS	Same as above except for behind proposed levee (Areas 12x and 13x).

Disk 5

A:\CHNL_XL--

*CHNLDATA.XLS	Excel spreadsheet used to determine average flow depths using data imported from HEC-2 output files.
*EXCAVDAT.XLS	Excel spreadsheet used to calculate excavation quantities for various alternatives using VEXT from HEC-2 output files.
*EXCAVSUM.XLS	Excel spreadsheet summary and plot of excavation quantities.

A:\DETEN_XL--

*DAM_LAND.XLS	Excel spreadsheet used to calculate land cost for detention alternative

A:\HEC2_XL--

*H2_EXIST.XLS	Import of HEC-2 output from existing conditions run. Used to provide water surface elevation data for flood damage model.
*H2_GIVEN.XLS	Import of HEC-2 output from given conditions run. Used to provide water surface elevation data for flood damage model.
*H2_MULTI.XLS	Import of HEC-2 output from given conditions run for multiple frequency (profile) analysis. Also used to provide water surface elevation data for flood damage model

A:\LEVEE_XL--

*BENECALC.XLS	Excel spreadsheet used to calculate benefit of extending levee.

A:\PURCH_XL--

*PARCELS.XLS	Excel spreadsheet used to calculate benefit of land purchase.

* indicates complete or partial printout included in this attachment.

DISK #2

h2_xsec.lsp

```
(defun c:vplot()
;Plot each view of cross-section drawing
; Name plots "drawing name" (up to 6 letters) & "V" & number of view

  (setq dnm (substr (getvar "DWGNAME") 1 6)
        i 1)
  (setvar "cmddia" 0)
  (textscr)
  (while (tblsearch "VIEW" (setq lbl (strcat "V" (itoa i))))
    (setq pltfile (strcat dnm lbl))
    (princ "\n\nPlotting view ")(princ lbl)(princ " to ")
    (princ pltfile)(princ ".dwg\n     ")
    (command "plot" "v" lbl "y" "n" "n" "y" "i" "0,0" "35.5,24" "0" "n" "n"
             "1=1" pltfile)
    (setq i (1+ i))
  )
)

;(c:vplot)


(defun c:h2_xsec()
;  Program to read hec2 output file and plot cross-sections

  (setq input "h2_given.out")
; (setq input "run15.out")
; (setq input "run10.out")
; (setq input "run8.out")

(setq tbl2 nil)(princ "\ntbl2 set to nil")
  (setq vsep 1.00
        hsep 1.50
      hscale 500.0
      vscale 20.0
         xo hsep
         yo vsep
      xsmax 3500.0
          n 1
      shtno 1
    oldorig nil
         ci nil)

  (setvar "cmdecho" 0)

  (command "zoom" "w" (list 0 -2) (list 9 4))
  (setvar "pdmode" 3)
  (setvar "pdsize" 0.05)
  (setvar "plinegen" 1)

  (command "layer" "s" "GRID" "")
  (setq lbl (strcat "c:\\acad12\\drawings\\tanque\\" input))
  (command "text" "s" "r010"  (list  0.50 0.25) "" (strcat lbl " 1 of 3"))
  (command "text" "s" "r010"  (list 36.50 0.25) "" (strcat lbl " 2 of 3"))
  (command "text" "s" "r010"  (list 72.50 0.25) "" (strcat lbl " 3 of 3"))
```

```
: Get list of output data [skip if already been run as happens
: during debugging]
 (if (= tbl2 nil)
  (progn
   (if (setq f (open input "r"))
    (princ (strcat "\n" input " successfully opened"))
    (getstring (strcat "\n" input "  can't be opened.  Press ^c")))

: Read to second summary table based on the following J3 card:
: J3 38   1    42    53    54    29    30    64    65
   (while (/= (setq line (substr (read-line f) 1 17))  " SUMMARY PRINTOUT"))
   (while (/= (setq line (substr (read-line f) 1 17))  " SUMMARY PRINTOUT"))

   (setq tbl2 (list "tbl2"))
   (while (setq line (read-line f))
    (if (= (substr line 91 1) ".")
     (progn
      (setq secno (atof (substr line  4 10))
            cwsel (atof (substr line 14 10))
            elmin (atof (substr line 24 10))
             ssta (atof (substr line 34 10))
            endst (atof (substr line 44 10))
            clsta (atof (substr line 54 10))
              bw (atof (substr line 64 10))
             vexr (atof (substr line 74 10))
             vext (atof (substr line 84 10))
             tbl2 (cons (list secno cwsel elmin ssta endst
                              clsta    bw  vexr vext) tbl2)) )) )
   (setq tbl2 (reverse tbl2))
   (close f)
  )
 )

 (setq f (open input "r"))
;********** X1 LOOP ***************************************************
 (while (and (setq line (read-line f)) (/= (substr line 2 3) "SUM"))
  (setq hdr (substr line 2 2))
  (if (= hdr "X1")
   (progn
    (setq lst (nth n tbl2))
    (setq secno (atof (substr line  4 10))
          npts (atoi (substr line 13 11)))
    (if (> npts 0)   ;Previous cross-section not repeated
     (progn
      (setq xlob (atof (substr line 24 11))
            xrob (atof (substr line 35 11))
            grnd (list))
      ;********* set nils ***************
      (setq stencl nil elencl nil stencr nil elencr nil
            clsta nil  celch nil
            x3ptl nil  x3ptr nil   cipt nil
            elencl nil elencr nil     le nil     er nil
            clsta nil vext   nil)

      (while (/= (setq line (read-line f)) " ")
```

```
 (setq hdr (substr line 2 2))

 ;***X3 cards***
 (if (= hdr "X3")
  (setq stencl (atof (substr line 35 12))
        elencl (atof (substr line 46 12))
        stencr (atof (substr line 58 12))
        elencr (atof (substr line 70 12))) )

 ;***CI cards***
 (if (= hdr "CI")                          ; Field
  (progn
    (setq clsta (atof (substr line  4  9))        ;  1
          celch (atof (substr line 13 11))        ;  2
            ci 1)  ; CHIMP active flag
    (if (> (setq tmp (atof (substr line 35 12))) 0)
      (setq xlss tmp) )                          ;  4
    (if (> (setq tmp (atof (substr line 46 12))) 0)
      (setq  rss tmp) )                          ;  5
    (setq bw (atof (substr line 58 12)))         ;  6
    (if (= bw 0.01) (setq ci nil)) ))

 ;***GR cards***
 (if (= hdr "GR")
  (progn                              ; Field
    (setq e1 (atof (substr line  4  9))  ;  1
          s1 (atof (substr line  13 11))  ;  2
          e2 (atof (substr line  24 11))  ;  3
          s2 (atof (substr line  35 12))  ;  4
          e3 (atof (substr line  46 12))  ;  5
          s3 (atof (substr line  58 12))  ;  6
          e4 (atof (substr line  70 12))  ;  7
          s4 (atof (substr line  82 12))  ;  8
          e5 (atof (substr line  94 12))  ;  9
          s5 (atof (substr line 106 12)))  ; 10
    (setq grnd (cons (list s1 e1) grnd))
    (if (> e2 0.0) (setq grnd (cons (list s2 e2) grnd)) )
    (if (> e3 0.0) (setq grnd (cons (list s3 e3) grnd)) )
    (if (> e4 0.0) (setq grnd (cons (list s4 e4) grnd)) )
    (if (> e5 0.0) (setq grnd (cons (list s5 e5) grnd)) )
  ) )
)
(setq grnd (reverse grnd)
      emx -100000  emn 100000
      smx -100000  smn 100000
        i     0    l (length grnd))
(while (< i l)
  (setq st (car (nth i grnd))  el (cadr (nth i grnd))
      emx (max emx el)       emn (min emn el)
      smx (max smx st)       smn (min smn st)
        i (1+ i)) )
(setq emax ( rup emx  10)    emin (rdwn emn  10)
     smax ( rup smx 500)    smin (rdwn smn 500)
       dv (- emax emin)      dh (- smax smin)
       dy (/ dv vscale)      dx (/ dh hscale)
      xdx (/ xsmax hscale))
```

```
    ) )

; See if this section will fit on current column.  If not,
; shift right to next column.
    (if (>= (+ yo dy vsep) 24.00)
     (setq xo (+ xo xdx hsep) yo vsep))

; See if this column will fit on current sheet.  If not,
; shift right to next sheet
   (if (>= (+ xo xdx hsep) (* shtno 36.00))
    (setq shtno (1+ shtno)
          xo (+ (* 36.00 (- shtno 1)) hsep)) )

; Pan to action
   (setq orig (list xo yo))
   (if oldorig  (command "pan" orig oldorig))
   (setq oldorig orig)

; Plot and label x-axis
     (command "layer" "s" "GRID" "")
     (command "line" (list xo yo) (list (+ xo dx 0.25) yo) "")
     (setq y1 (- yo 0.05)
         y2 (- yo 0.15)
         x xo
         s smin)
     (while (<= s smax)
      (command "line" (list x yo) (list x y1) "")
      (command "text" "s" "r005" "c" (list x y2) "" (rtos s 2 0))
      (setq s (+ s hscale)
           x (+ x 1.00))
      (if (<= s smax)
       (progn
        (command "line" (list x yo) (list x y1) "")
        (setq s (+ s hscale)
             x (+ x 1.00)) )) )

; Plot and label y-axis
     (command "line" (list xo yo) (list xo (+ yo dy 0.25)) "")
     (setq x1 (- xo 0.05)
         x2 (- xo 0.10)
         y yo
         e emin)
     (while (<= e emax)
      (command "line" (list xo y) (list x1 y) "")
      (command "text" "s" "r005" "r" (list x2 y) "" (rtos e 2 0))
      (setq e (+ e (/ vscale 2.0))
           y (+ y 0.50))
      (if (<= e emax)
       (progn
        (command "line" (list xo y) (list x1 y) "")
        (setq e (+ e (/ vscale 2.0))
             y (+ y 0.50)) )) )

; Plot section number
     (setq x (+ xo 0.15)
         y (+ yo dy 0.05))
```

```
        (command "text" "s" "r010"  (list x y) ""
              (strcat "Section " (rtos secno 2 3)) )

; Plot ground as polyline
;   Plot first point
        (command "layer" "s" "GROUND" "")
        (setq pt (nth 0 grnd)
           gptl pt          ;  save this point to plot wall at endpoints
             s (car pt)
             e (cadr pt)
             x (stox s)
             y (etoy e))
        (command "pline" (list x y))

        (setq l (length grnd)
            i 1)
        (while (< i l)
          (setq pt (nth i grnd)
                s (car pt)
                e (cadr pt)
                x (stox s)
                y (etoy e))
          (command (list x y))
          (setq i (1+ i)) )
        (command "")
        (setq ssg (ssget "L"))

; Plot left and right bank locations
        (setq xl (stox xlob)
             el (cadr (assoc xlob grnd))
             xr (stox xrob)
             er (cadr (assoc xrob grnd)) )
        (if el
          (progn
            (setq yl (etoy el))
            (command "layer" "s" "OVERBANK" "")
            (command "point" (list xl yl)) ))
        (if er
          (progn
            (setq yr (etoy er))
            (command "layer" "s" "OVERBANK" "")
            (command "point" (list xr yr)) ))

; Plot X3 card information (left side)
        (if (> stencl 0.0)
          (progn
            (command "layer" "s" "X3_DATA" "")
            (if (= elencl 0.0) (setq elencl emx))
            (setq x1 (stox stencl) y1 (etoy elencl) pt1 (list x1 y1)
                 x2 (- x1 1.0)   y2 y1          pt2 (list x2 y2)
                 x3 x1          y3 (- yo 0.25)   pt3 (list x3 y3)
              x3ptl pt2) ; (for object selection)
            (command "pline" pt2 pt1 pt3 "")
            (command "trim" ssg "" pt3 "") ))

; Plot X3 card information (right side)
```

```
      (if (> stencr 0)
       (progn
        (command "layer" "s" "X3_DATA" "")
        (if (= elencr 0.0) (setq elencr emx))
        (setq x4 (stox stencr) y4 (etoy elencr) pt4 (list x4 y4)
            x5 (+ x4 1.0)   y5 y4          pt5 (list x5 y5)
            x6 x4          y6 (- yo 0.25)   pt6 (list x6 y6)
          x3ptr pt5) ; (for object selection)
        (command "pline" pt5 pt4 pt6 "")
        (command "trim" ssg "" pt6 "") ))

; Plot CI card information
      (if ci                          ; CHIMP active flag
       (progn
        (setq elmin (nth 2 lst)
            clsta (nth 5 lst)          ; Switch to CHIMP-computed clsta
              bw (nth 6 lst))          ;
        (setq bw2 (/ bw 2.0)
             s2 (- clsta bw2)  s3 (+ clsta bw2)
             e2 elmin         e3 e2
             e1 emax          e4 e1
             s1 (- s2 (* xlss (- e1 e2)))
             s4 (+ s3 (*  rss (- e4 e3))))
        (setq pt1 (list (stox s1) (etoy e1))
            pt2 (list (stox s2) (etoy e2))
            pt3 (list (stox s3) (etoy e3))
            pt4 (list (stox s4) (etoy e4)))
        (command "layer" "s" "CHIMP" "")
        (command "pline" pt1 pt2 pt3 pt4 "")
        (command "trim" ssg "" pt1 pt4 "")
      ) )

; Plot cwsel
      (command "layer" "s" "CWSEL" "")
      (setq cwsel (nth 1 lst)
            s1 (nth 3 lst)
            s2 (nth 4 lst)
           pt1 (list (stox s1) (etoy cwsel))
           pt2 (list (stox s2) (etoy cwsel)))
      (command "line" pt1 pt2 "")

      (setq n (1+ n))     ; Index for reading from cwsel list


      (setq oldorig orig)
      (setq yo (+ dy yo vsep))
;  (getstring "  Press any key to continue...")

     )
    )
   )
;********** X1 LOOP ***************************************************

  (princ (strcat "\nNormal end for input file " input))
  (if vext
    (progn
```

```
    (setq v (strcat (rtos (* vext 1000) 2 0) "cy total excavation"))
    (command "text" "s" "r010"  (list 0.50 0.25) "" v) ))
  (prin1)
)


(defun stox (s) (+ xo (/ (- s smin) hscale)))
(defun etoy (e) (+ yo (/ (- e emin) vscale)))


(defun plist (lst / i a)
  (setq i 0)
  (while (setq a (nth i lst))
    (princ "\n")(princ a)
    (setq i (1+ i)) )
  (princ "\n")
  (prin1)
)

(defun rdwn (nm plc) (* plc (fix (- (/ nm plc) 0.01))) )
(defun  rup (nm plc) (* plc (fix (+ (/ nm plc) 1.01))) )

(defun c:r()
  (load "c:\\lsp\\tanque\\h2_xsec") )

(defun c:se( / y x)
  (setq pt (getpoint"  Pick point:"))(princ "\n")
  (setq y (cadr pt) x (car pt)
        e (+ emin (* vscale (- y yo)))
        s (+ smin (* hscale (- x xo)))
    newpt (list s e))  )


;(c:h2_xsec)
```

h2plot.lsp

```
; Runs with AutoCAD drawing prflbase.dwg
; Plots HEC-2 output file filenm.
; File hec2.out must have been created using the following J cards:
; J1  -10
; J3 38   39   42   43   1   23   24   26   55   56   3
;   SECNO XCHL ELMIN   Q  CWSEL XLBEL RBEL  VCH  CLOB  VROB EG


(defun c:hec2pp ()
;  Plot HEC2 profiles
;  Read HEC2 output summary file.  Plot profiles in current drawing.
;  Start current drawing as "This_dwg=H2PBASE"

; Name of HEC2 output file to be used
; (setq filenm  "h2_orig.out")  ; (getstring "\n   HEC2 output file name:")
; (setq filenm "h2_exist.out")  ; (getstring "\n   HEC2 output file name:")
  (setq filenm "h2_given.out")  ; (getstring "\n   HEC2 output file name:")

; Station and location of first cross section
; (setq ssta 4248.00    ; "orig" corps analysis
;       xb 6.62)

   (setq ssta 4950.00    ; "exist" and "given" (patchwork) analyses
         xb 8.375)

  (setq yb 8.5
    selev 2540.0)

  (setq xtbl 4.75              ; where to start table of output values
       ytbl 57.5)

  (setq sfx 400.0)             ; (getreal   "\n Horizontal scale factor:")
  (setq sfy 4.0)              ; (getreal   "\n   Vertical scale factor:")

  (if (null (setq f (open filenm "r")))
    (progn
      (princ "\nCan't open HEC2 output file ")(princ filnm)
      (getstring ("\n  Press ^c")) ))

; Find begining of output table
  (while (/= (setq ln (read-line f)) " SUMMARY PRINTOUT"))

  (setq sta ssta
        secl (list "sections")
        stal (list "stations")
      elminl (list "elmin")
          ql (list "Q")
      cwsell (list "cwsel")
      xlbell (list "xlbel")
       rbell (list "rbel")
        vchl (list "vch")
       vlobl (list "vlob")
       vrobl (list "vrob")
```

```
        egl (list "eg")
         i 0)

; Process each line after "SUMMARY OF RESULTS" in HEC2 printout
 (while (/= (substr (setq ln (read-line f)) 3 17) "SUMMARY OF ERRORS")

; Skip lines that don't contain data
   (if (and (/= (setq s (substr ln 13 1)) "") (/= s " "))
    (progn

; Process SECNO.  Convert to string, remove extraneaous zeros
      (setq secno (substr ln 5 9)
            sn (atof secno))
      (if (> sn 1000) (setq sn (* sn 0.001)) )
      (setq secno (rtos sn 2 3))
      (setq sni (fix sn))
      (if (>= sn 100)
       (while (= (substr secno (setq l (strlen secno)) 1) "0")
        (setq secno (substr secno 1 (- l 1))) ))
      (if (= sn sni) (setq secno (itoa sni)) )

; Build lists of HEC2 output results
      (setq                              secl (cons secno secl)
           sta (+ sta (atof (substr ln 14 10)))  stal (cons sta stal)
          elmin (atof (substr ln  24 10))      elminl (cons elmin elminl)
            q (atof (substr ln  34 10))         ql (cons q ql)
          cwsel (atof (substr ln  44 10))      cwsell (cons cwsel cwsell)
          xlbel (atof (substr ln  54 10))      xlbell (cons xlbel xlbell)
           rbel (atof (substr ln  64 10))      rbell (cons rbel rbell)
            vch (atof (substr ln  74 10))       vchl (cons vch vchl)
           vlob (atof (substr ln  84 10))      vlobl (cons vlob vlobl)
           vrob (atof (substr ln  94 10))      vrobl (cons vrob vrobl)
             eg (atof (substr ln 104 10))        egl (cons eg egl))
    )
   )
  )



; Plot results.  First reverse lists, and get length.
 (setq secl (reverse secl)
       stal (reverse stal)
      elminl (reverse elminl)
        ql (reverse ql)
      cwsell (reverse cwsell)
      xlbell (reverse xlbell)
       rbell (reverse rbell)
        vchl (reverse vchl)
       vlobl (reverse vlobl)
       vrobl (reverse vrobl)
         egl (reverse egl)
          l (- (length stal) 1))

; Make sure drawing is in mspace
; (command "mspace")
```

```
; Plot elmin
 (command "layer" "s" "c_elmin" "")
 (setq sta0 (nth 1 stal)
    elmin0 (nth 1 elminl)
       x0 (+ xb (/ (-  sta0  ssta) sfx))
       y0 (+ yb (/ (- elmin0 selev) sfy))
      pt0 (list x0 y0)
     sta1 (nth 2 stal)
    elmin1 (nth 2 elminl)
       x1 (+ xb (/ (-  sta1  ssta)  sfx))
       y1 (+ yb (/ (- elmin1 selev)  sfy))
      pt1 (list x1 y1))
 (command "pline" pt0 pt1)
 (setq i 3)
 (while (<= i l)
  (setq sta1 (nth i stal)
     elmin1 (nth i elminl)
        x1 (+ xb (/ (-  sta1  ssta)  sfx))
        y1 (+ yb (/ (- elmin1 selev)  sfy))
       pt1 (list x1 y1))
  (command pt1)
  (setq i (1+ i))
 )
 (command "")


; Plot cwsel
 (command "layer" "s" "c_cwsel" "")
 (setq sta0 (nth 1 stal)
    cwsel0 (nth 1 cwsell)
       x0 (+ xb (/ (-  sta0  ssta) sfx))
       y0 (+ yb (/ (- cwsel0 selev) sfy))
      pt0 (list x0 y0)
     sta1 (nth 2 stal)
    cwsel1 (nth 2 cwsell)
       x1 (+ xb (/ (-  sta1  ssta)  sfx))
       y1 (+ yb (/ (- cwsel1 selev)  sfy))
      pt1 (list x1 y1))
 (command "pline" pt0 pt1)
 (setq i 3)
 (while (<= i l)
  (setq sta1 (nth i stal)
     cwsel1 (nth i cwsell)
        x1 (+ xb (/ (-  sta1  ssta)  sfx))
        y1 (+ yb (/ (- cwsel1 selev)  sfy))
       pt1 (list x1 y1))
  (command pt1)
  (setq i (1+ i))
 )
 (command "")

; Insert top section identifiers and create table of output values

 (setq xlst xtbl
     ylst ytbl
```

```
 hdr "Section    Station    Q     cwsel    elmin   vlob    vch   vrob"
    plst (list xlst ylst))

(setq sec0 (nth 1 secl)
     sta0 (nth 1 stal)
   elmin0 (rtos (nth 1 elminl) 2 1)
      q0 (rtos (nth 1 ql) 2 0)
   cwsel0 (rtos (nth 1 cwsell) 2 2)
   xlbel0 (rtos (nth 1 xlbell) 2 1)
    rbel0 (rtos (nth 1 rbell) 2 1)
     vch0 (rtos (nth 1 vchl) 2 1)
    vlob0 (rtos (nth 1 vlobl) 2 1)
    vrob0 (rtos (nth 1 vrobl) 2 1)
      eg0 (rtos (nth 1 egl) 2 2)
      st0 (getst sta0)
       x0 (+ xb (/ (-  sta0  ssta) sfx))
       y0 (+ 0.5 yb (/ (- (atof cwsel0) selev) sfy))
      yt0 (float (+ 1 (fix y0)))
      pt0 (list x0 y0))
(command "layer" "s" "c_sections" "")
(command "insert" "top" pt0 "" "" "" sec0)
(while (< (strlen  sec0) 6) (setq  sec0 (strcat " "  sec0)) )
(while (< (strlen   st0) 9) (setq   st0 (strcat " "   st0)) )
(while (< (strlen vlob0) 4) (setq vlob0 (strcat " " vlob0)) )
(while (< (strlen  vch0) 4) (setq  vch0 (strcat " "  vch0)) )
(while (< (strlen vrob0) 4) (setq vrob0 (strcat " " vrob0)) )
(command "layer" "s" "c_table" "")
(command "text" "s" "m020" plst "0" (strcat "Output File:  " filenm))
(setq ylst (- ylst 0.32)
     plst (list xlst ylst))
(command "text" plst "" hdr)
(setq ylst (- ylst 0.32)
     plst (list xlst ylst)
      ln0 (strcat " " sec0 "   " st0 "   " Q0 "   " cwsel0 "   " elmin0
                  "   " vlob0 "   " vch0 "   " vrob0))
(command "text" plst "" ln0)

(setq sec1 (nth 2 secl)
     sta1 (nth 2 stal)
   elmin1 (rtos (nth 2 elminl) 2 1)
      q1 (rtos (nth 2 ql) 2 0)
   cwsel1 (rtos (nth 2 cwsell) 2 2)
   xlbel1 (rtos (nth 2 xlbell) 2 1)
    rbel1 (rtos (nth 2 rbell) 2 1)
     vch1 (rtos (nth 2 vchl) 2 1)
    vlob1 (rtos (nth 2 vlobl) 2 1)
    vrob1 (rtos (nth 2 vrobl) 2 1)
      eg1 (rtos (nth 2 egl) 2 2)
      st1 (getst sta1)
       x1 (+ xb (/ (-  sta1  ssta)  sfx))
       y1 (+ 0.5 yb (/ (- (atof cwsel1) selev)  sfy))
      pt1 (list x1 y1))
(command "layer" "s" "c_sections" "")
(command "insert" "top" pt1 "" "" "" sec1)
(while (< (strlen  sec1) 6) (setq  sec1 (strcat " "  sec1)) )
(while (< (strlen   st1) 9) (setq   st1 (strcat " "   st1)) )
```

```
  (while (< (strlen vlob1) 4) (setq vlob1 (strcat " " vlob1)) )
  (while (< (strlen  vch1) 4) (setq  vch1 (strcat " "  vch1)) )
  (while (< (strlen vrob1) 4) (setq vrob1 (strcat " " vrob1)) )
  (setq ylst (- ylst 0.32)
        plst (list xlst ylst)
        ln1 (strcat " " sec1 "   " st1 "   " Q1 "   " cwsel1 "   " elmin1
                    "   " vlob1 "   " vch1 "   "  vrob1))
  (command "layer" "s" "c_table" "")
  (command "text" plst "" ln1)

  (setq i 3)
  (while (<= i l)
   (setq sec1 (nth i secl)
         sta1 (nth i stal)
        elmin1 (rtos (nth i elminl) 2 1)
          q1 (rtos (nth i ql) 2 0)
        cwsel1 (rtos (nth i cwsell) 2 2)
        xlbel1 (rtos (nth i xlbell) 2 1)
         rbel1 (rtos (nth i rbell) 2 1)
          vch1 (rtos (nth i vchl) 2 1)
         vlob1 (rtos (nth i vlobl) 2 1)
         vrob1 (rtos (nth i vrobl) 2 1)
           eg1 (rtos (nth i egl) 2 2)
           st1 (getst sta1)
            x1 (+ xb (/ (-  sta1  ssta)  sfx))
            y1 (+ 0.5 yb (/ (- (atof cwsel1) selev)  sfy))
           pt1 (list x1 y1))
   (command "layer" "s" "c_sections" "")
   (command "insert" "top" pt1 "" "" "" sec1)
   (while (< (strlen  sec1) 6) (setq  sec1 (strcat " "  sec1)) )
   (while (< (strlen   st1) 9) (setq   st1 (strcat " "   st1)) )
   (while (< (strlen vlob1) 4) (setq vlob1 (strcat " " vlob1)) )
   (while (< (strlen  vch1) 4) (setq  vch1 (strcat " "  vch1)) )
   (while (< (strlen vrob1) 4) (setq vrob1 (strcat " " vrob1)) )
   (setq ylst (- ylst 0.32)
         plst (list xlst ylst)
         ln1 (strcat " " sec1 "   " st1 "   " Q1 "   " cwsel1 "   " elmin1
                     "   " vlob1 "   " vch1 "   "  vrob1))
   (command "layer" "s" "c_table" "")
   (command "text" plst "" ln1)

   (setq i (1+ i))
  )
)


(defun c:getse ()
  (princ "\nGet station and elevation of a drawing point")
  (setq pt (getpoint "\nPick point: ")
        x (car pt)
        y (cadr pt)
       sta (+  ssta (* sfx (- x xb)))
        st (getst sta)
      elev (+ selev (* sfy (- y yb))))
  (princ "\n   sta= ")(princ st)
  (princ "    elev= ")(princ elev)
```

```
  (prin1)
)


(defun getst(sta / l str stl st)
  (setq str (rtos (+ 100 sta) 2 2)
        l (strlen str)
       str (substr str (- l 4) 5)
       stl (itoa (fix (* 0.01 sta)))
        st (strcat stl "+" str))    )


(defun c:r()
  (load"c:\\lsp\\h2plot"))

(c:hec2pp)
```

pltfdmg.lsp

```
(defun c:plotdmg ()
;  FLOOD DAMAGE!
;  Read text file containing coordinates and damage amount.  Plot circle
;  with area proportional to amount.

  (princ "\nIn plotdmg\n")
  (setq f (open "c:\\acad11\\drawings\\given100.txt" "r"))
  (setq i 0)
  (setq t 0.00)

  (command "layer" "s" "k4_given_damage" "")
  (command "mspace")
  (while (setq l (read-line f))
    (setq x (atof (substr l  1  6))
          y (atof (substr l  8  6))
          d (atof (substr l 15 10))
          t (+ t d))
    (if (and (> x 0) (> d 0))
      (progn
        (setq r (* 0.5 (sqrt d))
              pt (list x y))
        (command "circle" pt r)
        (command "hatch" "ansi31" "100" "" "L" "")
        (setq i (1+ i))
        (princ "\n ")(princ i)
        (princ "      ")(princ x)
        (princ "  ")(princ y)
        (princ "  ")(princ d)
      )
    )
  )
  (close f)
  (princ "\nTotal damage:  ")(princ t)
)
;(c:plotdmg)
```

tanque.lsp

```
(defun c:r ()
  (load"c:\\lsp\\tanque") )
; For automatically reloading and running during debug



(defun c:asel ()

;  Create a text file "asel.txt" listing the tax id for each parcel selected
;  using normal AutoCAD selection procedures.  pt-blk


; Text output file is opened and closed as "a" to avoid overwriting previous entries
; Be sure to delete it if you are starting over.

  (setq f (open "idsel.txt" "a"))
  (princ "\n" f)

  (setq ss (ssget)
        i 0)
  (while (setq en (ssname ss i))
    (setq ed (entget en)
          et (cdr (assoc 0 ed))
          el (cdr (assoc 8 ed))
       blknm (cdr (assoc 2 ed)))
    (if (and (= et "INSERT") (= blknm "ID_PT") (= el "D1_ID_PTS"))
      (progn
        (setq idpt (cdr (assoc 10 ed))
              en1 (entnext en)
              ed1 (entget en1)
               id (cdr (assoc 1 ed1)))

    (princ "\n" f)(princ id f)
    (command "chprop" en "" "la" "d2_id_pts_temporary" "")
    (setq i (1+ i)) ))
  )

  (close f)

)

;(c:eros)
;(getstring "\n   Stopped")



(defun c:plotdmg ()
;  Read text file containing coordinates and damage amount.  Plot circle
;  with area proportional to amount.
```

```
  (princ "\nIn plotdmg\n")
  (setq f (open "c:\\acad11\\drawings\\given100.txt" "r"))
  (setq i 0)
  (setq t 0.00)

  (command "layer" "s" "k4_given_damage" "")
  (command "mspace")
  (while (setq l (read-line f))
    (setq x (atof (substr l  1  6))
          y (atof (substr l  8  6))
          d (atof (substr l 15 10))
          t (+ t d))
    (if (and (> x 0) (> d 0))
      (progn
        (setq r (* 0.5 (sqrt d))
              pt (list x y))
        (command "circle" pt r)
        (command "hatch" "ansi31" "100" "" "L" "")
        (setq i (1+ i))
        (princ "\n ")(princ i)
        (princ "      ")(princ x)
        (princ "  ")(princ y)
        (princ "  ")(princ d)
      )
    )
  )
  (close f)
  (princ "\nTotal damage:  ")(princ t)
)
;(c:plotdmg)

(defun c:sl ()
; Build selection set of all entities on same layer as selected entity
  (setq e (entsel "Select Layer.  Pick entity on desired layer")
        en (car e)
        ed (entget en)
        el (cdr (assoc 8 ed))
        ss (ssget "x" (list (cons 8 el)))
         l (sslength ss))
  (princ "\n")(princ l)(princ " entities on layer ")
  (princ el) (princ " selected")
  (command "select" ss)
)
;(c:sl)


(defun c:plot_ffe ()
;  Read text file containing coordinates and damage amount.  Plot circle
;  with area proportional to amount.

  (princ "\nIn plot_ffe\n")
  (setq f (open "c:\\acad11\\drawings\\ffe_elev.txt" "r"))
  (setq i 0)

  (command "layer" "s" "k3_ffe_elevations" "")
```

```
  (command "mspace")
  (command "style" "r20" "" "" "" "" "" "" "")

  (while (setq l (read-line f))
   (setq x (atof (substr l  1  6))
         y (atof (substr l  8  6))
         e (atof (substr l 15 10)))
   (if (and (> x 0) (> e 0))
    (progn
     (setq pt (list x y))
     (command "text" "c" pt "e" (rtos e 2 1))
     (setq i (1+ i))
     (princ "\n ")(princ i)
     (princ "      ")(princ x)
     (princ "  ")(princ y)
     (princ "  ")(princ e)
    )
   )
  )
  (close f)
)

;(c:plot_ffe)



(defun c:location()
  (princ"\n\nIn c:location()")
; Read base map to obtain assessor tax id number, x,y location.
; Assessor Id, x-y coords stored in location.txt which is later loaded by
;   Microsoft Excel to create base.xls

  (setq f (open "location.txt" "w"))

  (setq si (ssget "X" (list (cons 0 "INSERT")))
        l (sslength si))
  (princ "\n  ")(princ l)(princ " INSERTs")

  (setq i 0)
  (while (setq en (ssname si i))
   (setq ed (entget en)
     blknm (cdr (assoc 2 ed)))
   (if (= blknm "ID_PT")
    (progn
     (setq  ed (entget en)
          crds (cdr (assoc 10 ed))
            x (rtos (car crds) 2 0)     ; x (easting) coordinate
            y (rtos (cadr crds) 2 0)    ; y (northing) coordinate
          en1 (entnext en)
          ed1 (entget en1)
          et1 (cdr (assoc 1 ed1)) )     ; assessor id number
     (princ "\n" f)(princ et1 f)
     (princ "\t" f)(princ x f)
     (princ "\t" f)(princ y f) ))

   (setq i (1+ i))
```

```
  (princ "\n")(princ i)(princ " of ")(princ l)
 )

 (close f)
 (prin1)
)

;(c:location)
;(getstring "\nPaused")


(defun c:dsus ()

;  Create a file with one entry for each structure containing the following:
;     Downstream section label
;     Distance to downstream section
;     Upstream section label
;     Distance to upstream section
;  Text output file is "dsus.txt"
;  This file will be loaded by Microsoft Excel as dsus.xls, and the
;   data later copied over in fld_dmg.xls for computing flood damage.

; Text output file is opened and closed as "a" to overwriting previous entries
; Be sure to delete it if you are starting over.

;*****************************************************************************
 (regapp "lbl")        ; Register application for extended entity data

;*****************************************************************************
; Select downstream cross-section. Must be a polyline
 (setq ett nil)
 (princ "\nPick downstream cross-section:")
 (while (/= ett "POLYLINE")
  (setq pld (entsel "")                ; Pick downstream cross-section
        ptd (cadr pld)                 ; and obtain its label using
        end (car pld)                  ; extended entity data information
         ed (entget end (list "LBL"))    ;
        ett (cdr (assoc 0 ed))           ;
       xlst (cadr (assoc -3 ed))         ;
        ds (cdr (assoc 1000 (cdr xlst))) ;
  )
  (setq en (entnext end)                 ; Get next entity which is first
        ed (entget en)                   ; vertex.  Set location to pt.
        pt (cdr (assoc 10 ed))           ; dxdy is typically x-y components
      dxdy (list 0 0)                    ; of vector perpendicular to line
      dlst (list(list dxdy pt))          ; back to previous point (dummy for
       pto pt)                           ; first point).
  (while (= (setq et (cdr (assoc 0       ; Keep cycling through the entire
           (setq ed (entget              ; polyline constructing dlst which
           (setq en (entnext en)))))))   ; containes lists of (dx dy) of
         "VERTEX")                       ; perpendicular vectors as well as
    (setq pt (cdr (assoc 10 ed))         ; vertex points.
       ang (+ (/ pi 2) (angle pto pt))  ;
       ptmp (polar (list 0 0) ang 10000) ;
         dx (car ptmp)                   ;
         dy (cadr ptmp)                  ;
```

```
      dxdy (list dx dy)              ;
      dlst (cons (list dxdy pt) dlst)  ;
       pto pt)                       ;
  )
  (setq dlst (reverse dlst))
 )
 (redraw end 3)              ;  Highlight selected polyline

;*****************************************************************************
; Select upstream cross-section. Must be a polyline
 (setq ett nil)
 (princ "\nPick upstream cross-section:")
 (while (/= ett "POLYLINE")
  (setq plu (entsel "")              ; Pick upstream cross-section
      ptu (cadr plu)                 ; and obtain its label using
      enu (car plu)                  ; extended entity data information
       ed (entget enu (list "LBL"))    ;
      ett (cdr (assoc 0 ed))          ;
     xlst (cadr (assoc -3 ed))        ;
      us (cdr (assoc 1000 (cdr xlst))) ;
  )
  (setq en (entnext enu)             ; Get next entity which is first
      ed (entget en)                 ; vertex.  Set location to pt.
      pt (cdr (assoc 10 ed))         ; dxdy is typically x-y components
    dxdy (list 0 0)                  ; of vector perpendicular to line
    ulst (list(list dxdy pt))        ; back to previous point (dummy for
     pto pt)                         ; first point).
  (while (= (setq et (cdr (assoc 0       ; Keep cycling through the entire
          (setq ed (entget           ; polyline constructing dlst which
          (setq en (entnext en)))))))  ;
         "VERTEX")                   ;
   (setq pt (cdr (assoc 10 ed))      ;
      ang (+ (/ pi 2) (angle pto pt))  ;
     ptmp (polar (list 0 0) ang 10000) ;
       dx (car ptmp)                 ;
       dy (cadr ptmp)                ;
     dxdy (list dx dy)               ;
     ulst (cons (list dxdy pt) ulst)  ;
      pto pt)                        ;
  )
  (setq ulst (reverse ulst))
 )
 (redraw enu 3)                      ;  Highlight selected polyline

;*****************************************************************************
 (setq f (open "dsus.txt" "a"))
 (princ "\n" f)


;*****************************************************************************
 (setq ss (ssget)
     i 0)
 (while (setq en (ssname ss i))
  (setq ed (entget en)
      et (cdr (assoc 0 ed))
      el (cdr (assoc 8 ed))
```

```
      blknm (cdr (assoc 2 ed)))
    (if (and (= et "INSERT") (= blknm "ID_PT") (= el "ID_PTS"))
     (progn
      (setq idpt (cdr (assoc 10 ed))
            x (car idpt)
            y (cadr idpt)
           en1 (entnext en)
           ed1 (entget en1)
            id (cdr (assoc 1 ed1)))

; Find closest distance to downstream section (from dlst)
      (setq l (length dlst)
          j 1
        pto (cadr (nth 0 dlst))
        dds 100000.0)

      (while (< j l)
       (setq lst (nth j dlst)
             pt (cadr lst)
             dx (caar lst)
             dy (cadar lst)
            pta (list (+ x dx) (+ y dy) 0.0)
            ptb (list (- x dx) (- y dy) 0.0)
            pti (inters pto pt pta ptb))
       (if pti
        (progn
         (setq d (distance idpt pti))
         (if (< d dds) (setq dds d))
        )
       )
       (setq pto pt
             j (1+ j))
      )

; Find closest distance to upstream section (from ulst)
      (setq l (length ulst)
          j 1
        pto (cadr (nth 0 ulst))
        dus 100000.0)

      (while (< j l)
       (setq lst (nth j ulst)
             pt (cadr lst)
             dx (caar lst)
             dy (cadar lst)
            pta (list (+ x dx) (+ y dy) 0.0)
            ptb (list (- x dx) (- y dy) 0.0)
            pti (inters pto pt pta ptb))
       (if pti
        (progn
         (setq d (distance idpt pti))
         (if (< d dus) (setq dus d))
        )
       )
       (setq pto pt
             j (1+ j))
```

```
      )
    )
  )

  (princ "\n" f)(princ id          f)
  (princ "\t" f)(princ ds          f)
  (princ "\t" f)(princ (rtos dds 2 0) f)
  (princ "\t" f)(princ us          f)
  (princ "\t" f)(princ (rtos dus 2 0) f)
  (command "chprop" en "" "la" "id_pts_tmp" "")

  (setq i (1+ i))
 )

 (redraw end 4)
 (redraw enu 4)
 (close f)
;*************************************************************************


)

;(c:dsus)
;(getstring "\n   Stopped")




(defun c:lblxs()

; Attach labels to polylines representing HEC2 cross-sections
; Also plot label on current layer using current color and text style

; Select cross-section to label.  Must be polyline.  Pick near end where you
; wish label to be plotted.

 (regapp "lbl")       ; Register application for extended entity data

 (while T             ; Endless loop.  Use ^C to terminate

  (setq et nil)       ; Entity type.  Will continue to select until et
                      ; becomes "POLYLINE"

  (princ "\nPick upper end point of xsec to label:")
  (while (/= et "POLYLINE")

  (setq pl (entsel "")
      en (car pl)
      ed (entget en)
      et (cdr (assoc 0 ed))))

  (redraw en 3)            ;  Highlight selected polyline

; Get endpoint of polyline nearest point of selection
  (setq pt (cadr pl)
```

```
        ept (osnap pt "endp"))

; Get label you wish to attach to section as extended entity data
   (setq lbl (getstring "\nEnter cross-section label: "))

   (setq newlst (list -3 (list "LBL" (cons 1002  "{")
                             (cons 1000 lbl)
                             (cons 1002  "}") )) )

; Add extended data to entity data list, and modify entity within the drawing
   (setq ned (reverse (cons newlst (reverse   ed))) )
   (entmod ned)

; Plot label centered on selected end point
   (command "text" "c" ept "" lbl)

   (redraw en 4)
   (prin1)
  )
)

;(c:lblxs)




(defun plist (lst)
  (setq i 0)
  (while (setq a (nth i lst))
    (princ "\n")(princ a)
    (setq i (1+ i)) )
  (princ "\n")
  (prin1)
)


(defun c:br()
  (princ"\n\nIn br()")
; Read base map to obtain assessor tax id number, x,y location.

  (setq f (open "location.txt" "w"))

  (setq si (ssget "X" (list (cons 0 "INSERT")))
        l (sslength si))
  (princ "\n  ")(princ l)(princ " INSERTs")

  (setq i 0)
  (while (setq en (ssname si i))
    (setq ed (entget en)
      blknm (cdr (assoc 2 ed)))
    (if (= blknm "DATA")
      (progn
        (setq  ed (entget en)
            crds (cdr (assoc 10 ed))
```

```
            x (rtos (car crds) 2 0)     ; x (easting) coordinate
            y (rtos (cadr crds) 2 0)    ; y (northing) coordinate
          en1 (entnext en)
          ed1 (entget en1)
          et1 (cdr (assoc 1 ed1)) )     ; assessor id number
      (princ "\n" f)(princ et1 f)
      (princ "\t" f)(princ x f)
      (princ "\t" f)(princ y f) ))

   (setq i (1+ i))
   (princ "\n")(princ i)(princ " of ")(princ l)
  )

  (close f)
  (prin1) )

;(c:br)


;(getstring "\n  Stopping...")
;(getstring "\n  Pausing...")
(prin1)
```

DISK #3

	interpolate
	=ARGUMENT("xi")
	=ARGUMENT("xt", 64)
	=ARGUMENT("yt", 64)
row1	=MATCH(xi, xt)
row2	=row1+1
xa	=INDEX(xt,row1)
xb	=INDEX(xt,row2)
ya	=INDEX(yt,row1)
yb	=INDEX(yt,row2)
yi	=ya+(yb-ya)/(xb-xa)*(xi-xa)
	=RETURN(yi)

	A	B	C	D	E	F	G	H
1	C:\EXCEL\FILES\TANQUE\WORKING\ASSESSOR\ASSESSOR.XLS							
2								
3								
4	Steps followed in creating this file:							
5								
6	1. Load tv2.dat received from Digitgraph as a comma delimited text file.							
7	Note that some repair work was needed on three of the records.							
8	Insert a bland column befor A and set up numbering. Insert three blank							
9	columns between B and C to use for processing the tax identification codes.							
10								
11	2. Apply the formula =IF(ISNUMBER(B31), TEXT(B31, "###-##-####"),							
12	LEFT(B31,3) & "-" & MID(B31,4,2) & "-" & RIGHT(B31,3)) to the new							
13	column C to convert numbers to text, and text to conventional format.							
14								
15	3. Apply the formula =IF(RIGHT(C31,1)="0", LEFT(C31,10), C31) to the new							
16	column D to lose extraneous zero.							
17								
18	4. Delete B, and C, making B the Tax ID to be used for referencing.							
19								
20								
21			Use	Full Cash Value				
22		Tax ID	Code	(Struc)	(Land)			
23		-1-	-2-	-3-	-4-	-5-	-6-	
24	1.	133-01-025	9027	$81,059	$405,132	4	14S15E01	
25	2.	133-01-026B	8800	0	500	4	14S15E01	
26	3.	133-01-026C	12	0	244,200	4	14S15E01	
27	4.	133-01-027A	12	0	166,850	4	14S15E01	
28	5.	133-01-028	9027	0	56,160	4	14S15E01	
29	6.	133-01-029	310	51,250	48,750	5	14S15E01	
30	7.	133-01-030	122	12,743	48,750	6	14S15E01	
31	8.	133-01-031	152	99,261	36,431	5	14S15E01	
32	9.	133-01-032	142	94,198	37,519	5	14S15E01	
33	10.	133-01-033	12	0	11,528	4	14S15E01	
34	11.	133-01-034	152	115,121	11,528	5	14S15E01	
35	12.	133-01-035	132	44,945	15,334	5	14S15E01	
36	13.	133-01-036	142	75,915	42,304	5	14S15E01	
37	14.	133-01-037	142	80,574	19,358	5	14S15E01	
38	15.	133-01-038	142	56,150	17,291	5	14S15E01	
39	16.	133-01-039A	12	0	19,901	4	14S15E01	
40	17.	133-01-039B	142	72,310	19,684	5	14S15E01	
41	18.	133-01-040	142	87,397	35,453	5	14S15E01	
42	19.	133-01-041A	131	57,433	32,625	5	14S15E01	
43	20.	133-01-043A	12	0	343,545	4	14S15E01	
44	21.	133-01-044	142	61,254	39,694	5	14S15E01	
45	22.	133-01-045	142	82,556	39,694	5	14S15E01	
46	23.	133-01-046	132	64,113	46,871	5	14S15E01	
47	24.	133-01-047	12	0	9,135	4	14S15E01	
48	25.	133-01-048	132	19,405	24,795	5	14S15E01	
49	26.	133-01-049	9600	35,671	46,219	4	14S15E01	
50	27.	133-01-050	8712	88,665	66,300	5	14S15E01	
51	28.	133-01-051	112	500	39,150	5	14S15E01	
52	29.	133-01-052	132	14,058	32,625	5	14S15E01	
53	30.	133-01-053	8800	0	500	4	14S15E01	
54	31.	133-01-054	9600	0	50,700	4	14S15E01	
55	32.	133-01-055A	9600	67,916	48,938	4	14S15E01	
56	33.	133-01-055B	12	0	43,500	4	14S15E01	
57	34.	133-01-056D	8722	437,978	475,310	4	14S15E01	

	I	J	K	L	M	N	P	Q
1								
2								
3								
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13								
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16								
17								
18								
19								
20								
21								
22								
23		-7-	-8-	-9-	-10-	-11-	-13-	
24		1. AMITY INC			PO BOX 314	TUCSON AZ	10500 E TANQUE VERDE RD	
25		2. SALYERS JOE F & ROSEMARY JT/RS			976 NW NOF	MIAMI FL		
26		3. R-J INC			3800 E GIE	TUCSON AZ		
27		4. TITLE SECURITY AGENCY OF AZ TR T-308			PO BOX 12(	TUCSON AZ		
28		5. AMITY INC			PO BOX 314	TUCSON AZ		
29		6. NEAL ANDREW J JR & CONSETTA JT/RS			10502 E TA	TUCSON AZ	10502 E TANQUE VERDE RD	
30		7. MEAD OVIS O'NEAL & JUDITH ANN JT/RS			1917 N KIN	TUCSON AZ	10510 E TANQUE VERDE RD	
31		8. MEAD OVIS O'NEAL & JUDITH ANN JT/RS			1917 N KIN	TUCSON AZ	1917 N KING	
32		9. WOOD GLEN R & CATHERINE A JT/RS			1911 N KIN	TUCSON AZ	1911 N KING	
33		10. HOWAYECK KAREN L			1907 N KIN	TUCSON AZ		
34		11. HOWAYECK THOMAS L & KAREN L JT/RS			1907 N KIN	TUCSON AZ	1907 N KING	
35		12. MC NARY MICHAEL DEAN & DAMA JT/RS			1905 W KIN	TUCSON AZ	1905 W KING AVE	
36		13. HERNANDEZ JAMES V & CAROL L JT/RS			1901 N KIN	TUCSON AZ	1901 N KING	
37		14. HARTNETT KENNETH &	ATTN: GMAC MORTGAGE		8360 OLD Y	ELKINS PAI	1815 N KING	
38		15. BOLSIUS LEORA B			1771 N KIN	TUCSON AZ	1771 N KING	
39		16. KITCHENS JERRY O & SYLVIA M JT/RS			1871 N KIN	TUCSON AZ		
40		17. KITCHENS JERRY O & SYLVIA M JT/RS			1871 N KIN	TUCSON AZ	1871 N KING	
41		18. WYANT JAMES C & LOUISE D JT/RS			1881 N KIN	TUCSON AZ	1881 N KING	
42		19. HITCHCOCK ROBERT W & NORMA J JT/RS			1891 N KIN	TUCSON AZ	1891 N KING	
43		20. SISSON ANNE EBERHARD			PO BOX 581	TUCSON AZ		
44		21. GONDA GERALD J & BEVERLY J JT/RS			1551 N KIN	TUCSON AZ	1551 N KING	
45		22. TURNER WILLIAM H &	1511 N KING		RURAL ROUT	TUCSON AZ	1511 N KING	
46		23. MC HAZLETT TRI THI			1660 N KIN	TUCSON AZ	1660 N KING	
47		24. RICE JOE E & MARY JANE JT/RS			1800 N KIN	TUCSON AZ		
48		25. BARANIUK MARY FOR L	GRAZIANO		1016 SEABF	SANTA CRUZ		
49		26. PIMA COUNTY FLOOD CONTROL DISTRICT			1313 S MIS	TUCSON AZ	10910 E LINDEN	
50		27. KINNISON ANN MARIE			1701 N TAN	TUCSON AZ	1701 N TANQUE VERDE LOOP RD	
51		28. PARK WILLIAM GENE			1717 N TAN	TUCSON AZ		
52		29. BENZIGER PHILIP E & ESTHER M JT/RS			1615 N TAN	TUCSON AZ	1615 N TANQUE VERDE LOOP RD	
53		30. BENZIGER PHILIP E & ESTER M			1615 N TAN	TUCSON AZ		
54		31. PIMA COUNTY FLOOD CONTROL DISTRICT			1313 S MIS	TUCSON AZ	10870 E LINDEN	
55		32. PIMA COUNTY ARIZONA					10790 E LINDEN	
56		33. HOLDEN HARROL R			PO BOX 116	TUCSON AZ		
57		34. MILLER NOLA E			10901 E SP	TUCSON AZ	10901 E SPEEDWAY BLVD	

	A	B	C	D	E	F	G	H
21			Use	Full Cash Value				
22		Tax ID	Code	(Struc)	(Land)			
23		-1-	-2-	-3-	-4-	-5-	-6-	
58	35.	133-01-056E	142	0	89,250	4	14S15E01	
59	36.	133-01-056F	12	0	61,880	4	14S15E01	
60	37.	133-01-057	142	46,730	59,740	5	14S15E01	
61	38.	133-01-058	132	30,441	41,651	5	14S15E01	
62	39.	133-01-059	8722	69,807	77,760	5	14S15E01	
63	40.	133-01-060	152	128,611	20,155	5	14S15E01	
64	41.	133-01-061	8712	69,035	62,919	5	14S15E01	
65	42.	133-01-062B	182	12,575	10,984	5	14S15E01	
66	43.	133-01-062C	9600	0	500	4	14S15E01	
67	44.	133-01-063	12	0	23,164	4	14S15E01	
68	45.	133-01-064C	192	500	37,736	4	14S15E01	
69	46.	133-01-064D	9600	0	13,594	4	14S15E01	
70	47.	133-01-064E	9612	0	2,719	4	14S15E01	
71	48.	133-01-066E	182	254,311	70,180	5	14S15E01	
72	49.	133-01-066F	12	0	85,030	4	14S15E01	
73	50.	133-02-002A	142	80,442	8,100	5	14S15E01	
74	51.	133-02-002B	9200	25,171	6,900	4	14S15E01	
75	52.	133-02-003	112	9,952	16,500	6	14S15E01	
76	53.	133-02-004	112	7,487	16,350	5	14S15E01	
77	54.	133-02-005	112	9,390	16,350	5	14S15E01	
78	55.	133-02-006B	8800	0	500	4	14S15E01	
79	56.	133-02-006D	132	0	13,500	5	14S15E01	
80	57.	133-02-006E	132	0	13,500	5	14S15E01	
81	58.	133-02-006F	132	66,398	13,500	5	14S15E01	
82	59.	133-02-007A	112	11,785	30,000	5	14S15E01	
83	60.	133-02-009	142	96,933	15,000	5	14S15E01	
84	61.	133-02-010	112	9,438	15,000	5	14S15E01	
85	62.	133-02-011	312	6,235	15,000	5	14S15E01	
86	63.	133-02-012	112	2,566	3,750	5	14S15E01	
87	64.	133-02-013	132	45,364	11,250	5	14S15E01	
88	65.	133-02-014	132	20,900	7,500	5	14S15E01	
89	66.	133-02-015D	122	45,924	19,050	5	14S15E01	
90	67.	133-02-015H	132	24,941	16,500	5	14S15E01	
91	68.	133-02-015J	3100	19,775	8,100	3	14S15E01	
92	69.	133-02-015K	124	17,457	6,900	6	14S15E01	
93	70.	133-02-015L	12	0	7,650	4	14S15E01	
94	71.	133-02-015M	122	23,833	12,450	5	14S15E01	
95	72.	133-02-015N	12	0	13,650	4	14S15E01	
96	73.	133-02-017A	132	22,785	16,800	5	14S15E01	
97	74.	133-02-017B	132	70,525	25,950	5	14S15E01	
98	75.	133-02-019C	132	33,785	29,850	5	14S15E01	
99	76.	133-02-021B	2900	37,372	9,900	6	14S15E01	
100	77.	133-02-022	12	0	15,000	4	14S15E01	
101	78.	133-02-023	142	144,911	15,000	5	14S15E01	
102	79.	133-02-024	122	15,006	7,500	5	14S15E01	
103	80.	133-02-025	192	733	7,500	4	14S15E01	
104	81.	133-02-026A	112	6,270	12,150	5	14S15E01	
105	82.	133-02-026B	12	0	11,700	4	14S15E01	
106	83.	133-02-027	132	34,756	15,900	5	14S15E01	
107	84.	133-02-028	112	8,530	15,000	5	14S15E01	
108	85.	133-02-029A	12	0	7,500	4	14S15E01	
109	86.	133-02-029B	112	4,232	7,650	5	14S15E01	
110	87.	133-02-030	112	6,235	15,000	5	14S15E01	
111	88.	133-02-031	112	11,785	30,000	5	14S15E01	

	I	J	K	L	M	N	P	Q
21								
22								
23		-7-	-8-	-9-	-10-	-11-	-13-	
58	35.	MILLER NOLA E	% BARTELS GUERLIND &		10625 E SE	TUCSON AZ		
59	36.	CONAWAY MICHAEL W & BARBARA S JT/RS			PO BOX 60(	TUCSON AZ		
60	37.	BARTELS PETER H & GERLIND H JT/RS			10625 E SE	TUCSON AZ	10625 E SPEEDWAY BLVD	
61	38.	RIEDELL GEORGE W			8620 NORTH	ALBUQUERQU	10645 E SPEEDWAY BLVD	
62	39.	VOEVODSKY PETER & JOSEPHINE REEVE			10603 E SE	TUCSON AZ	10603 E SPEEDWAY BLVD	
63	40.	CHOW WILLIAM W & ESTER S			10553 E SE	TUCSON AZ	10553 E SPEEDWAY BLVD	
64	41.	BRUCK REGINA			10525 E SE	TUCSON AZ	10525 E SPEEDWAY BLVD	
65	42.	HARTMAN WERNER M & SUSANNE B JT/RS			RT 12 BOX	TUCSON AZ		
66	43.	PIMA COUNTY						
67	44.	HARTMAN WERNER M & SUSANNE B JT/RS			RT 12 BOX	TUCSON AZ		
68	45.	ERWIN ELDON U & CLEO E JT/RS			14333 E RE	TUCSON AZ		
69	46.	PIMA COUNTY FLOOD CONTROL DISTRICT						
70	47.	PIMA COUNTY ARIZONA						
71	48.	LIGHT DAVID M JR & MARLYN M TRUSTEES			10475 E SE	TUCSON AZ	10475 E SPEEDWAY BLVD	
72	49.	LIGHT DAVID M JR & MARLYN M TRUSTEES			10475 E SE	TUCSON AZ		
73	50.	HAINES JOSEPH F & REGINA E JT/RS			2151 N TAN	TUCSON AZ	2151 N TANQUE VERDE LOOP RD	
74	51.	TANQUE VERDE YOUTH SERVICES INC			2141 N TAN	TUCSON AZ	2141 N TANQUE VERDE LOOP RD	
75	52.	REDMAN SAMUEL G & LINDA JT/RS			2131 N TAN	TUCSON AZ		
76	53.	VALDEZ ESTHER G			2121 N TAN	TUCSON AZ	2121 N TANQUE VERDE LOOP RD	
77	54.	CELAYA VICTORIA			2101 N TAN	TUCSON AZ	2101 N TANQUE VERDE LOOP RD	
78	55.	HICKEY RICHARD F 1/	& MAY E 1/	DOROTHY M	6713 E KIA	TUCSON AZ		
79	56.	DAVENPORT STEVEN R & TERESA L JT/RS			2033 N TAN	TUCSON AZ		
80	57.	DAVENPORT STEVEN R & TERESA L JT/RS			2033 N TAN	TUCSON AZ		
81	58.	DAVENPORT STEVEN R & TERESA L JT/RS			2033 N TAN	TUCSON AZ	2033 N TANQUE VERDE LOOP RD	
82	59.	ALCANTAR FRANCISCO & VIRGINIA M			RT 12 2051	TUCSON AZ	2051 N TANQUE VERDE LOOP RD	
83	60.	HYATT RICHARD G & ARLENE M JT/RS			2081 N TAN	TUCSON AZ	2081 N TANQUE VERDE LOOP RD	
84	61.	RIOS FRANK A & EVA B			10990 E TA	TUCSON AZ	10990 E TANQUE VERDE RD	
85	62.	FIGUEROA RAMON UND ANDY UND 1	ATTN: PHII		4777 E 5TH	TUCSON AZ		
86	63.	GRACIA SARAH			2110 N DUS	TUCSON AZ	2110 N DUSTY LANE	
87	64.	LUKER JERRY D & ADELA F JT/RS			RTE 12 BOX	TUCSON AZ	11000 E TANQUE VERDE RD	
88	65.	GAMEZ CONSUELO V			10988 E TA	TUCSON AZ	10988 E TANQUE VERDE RD	
89	66.	DE PORTER DAVID E & REBECCA J JT/RS			11050 E TA	TUCSON AZ	11050 E TANQUE VERDE RD	
90	67.	BOVELL MARK WILLIAM	WRIGHT JT/RS		11050 E TA	TUCSON AZ	11050 E TANQUE VERDE RD	
91	68.	HOCHEDER ENGLEBERT	% APPLEBY'S ORNAMENT		11050 E TA	TUCSON AZ	11050 E TANQUE VERDE RD	
92	69.	CURRY JOHN G & ANITA E JT/RS			31533 FERN	CORVALLIS		
93	70.	MINDER DOUGLAS & ALICE L JT/RS			220 N VINE	TUCSON AZ		
94	71.	MINDER DOUGLAS & ALICE L JT/RS			220 N VINE	TUCSON AZ	10992 E TANQUE VERDE RD	
95	72.	MINDER DOUGLAS & ALICE L JT/RS			220 N VINE	TUCSON AZ		
96	73.	CORDIER CHARLES I & THELMA J JT/RS			319 W LIME	TUCSON AZ	10980 E TANQUE VERDE RD	
97	74.	BROWN RICHARD S & MEG LOTA JT/RS			2250 DUSTY	TUCSON AZ	10980 E TANQUE VERDE RD	
98	75.	BAILEY EDITH			10932 E TA	TUCSON AZ	10932 E TANQUE VERDE RD	
99	76.	DOWNEY GEORGE S & ANN E JT/RS			2555 N TON	TUCSON AZ	10912 E TANQUE VERDE RD	
100	77.	ADAMS IVOR K & INA R			10910 TANQ	TUCSON AZ		
101	78.	ADAMS IVOR K & INA R			10910 TANQ	TUCSON AZ		
102	79.	KROEGER MARSHALL L & VICKI SUE JT/RS			2291 N DUS	TUCSON AZ	2291 N DUSTY LANE	
103	80.	MUNOZ ROBERT D & SYLVIA JT/RS			4028 E NOR	TUCSON AZ		
104	81.	ZAMORA JUANA 1/2 & FIGUEROA ROSA 1/2			RT 12 BOX	TUCSON AZ	10974 E TANQUE VERDE RD	
105	82.	ZAMORA REBECCA			10974 E TA	TUCSON AZ		
106	83.	ADAMS IVOR K & INA R			10910 E TA	TUCSON AZ	10910 E TANQUE VERDE RD	
107	84.	BENNETT FRANK R			2201 N DUS	TUCSON AZ		
108	85.	GAMEZ ROBERT & LENOR R			10986 E TA	TUCSON AZ		
109	86.	RUH LARRY & RITA			10984 E TA	TUCSON AZ	10986 E TANQUE VERDE RD	
110	87.	GAMEZ ROBERTO P & LENOR R			10986 E TA	TUCSON AZ	10986 E TANQUE VERDE RD	
111	88.	CRUZ FRANK M			2131 DUSTY	TUCSON AZ		

	A	B	C	D	E	F	G	H
21			Use	Full Cash Value				
22		Tax ID	Code	(Struc)	(Land)			
23		-1-	-2-	-3-	-4-	-5-	-6-	
112	89.	133-02-032B	12	0	15,000	4	14S15E01	
113	90.	133-02-032C	102	21,144	45,000	5	14S15E01	
114	91.	133-02-032D	132	39,531	15,000	5	14S15E01	
115	92.	133-02-033	132	26,923	24,900	5	14S15E01	
116	93.	133-02-034A	132	65,110	66,600	5	14S15E01	
117	94.	133-02-035A	8772	153,224	65,390	5	14S15E01	
118	95.	133-02-036	191	4,124	43,200	4	14S15E01	
119	96.	133-02-037	132	47,951	31,050	5	14S15E01	
120	97.	133-02-038A	182	11,061	14,400	5	14S15E01	
121	98.	133-02-038C	12	0	15,000	4	14S15E01	
122	99.	133-02-038F	12	0	66,450	4	14S15E01	
123	100.	133-02-039	310	247,399	58,200	5	14S15E01	
124	101.	133-02-040	312	86,854	48,750	5	14S15E01	
125	102.	133-02-041A	4010	223,482	33,710	4	14S15E01	
126	103.	133-02-041C	132	40,066	12,150	5	14S15E01	
127	104.	133-02-042	12	0	6,450	4	14S15E01	
128	105.	133-02-043	142	87,727	74,850	5	14S15E01	
129	106.	133-02-044	132	33,314	15,000	5	14S15E01	
130	107.	133-02-045	8772	75,399	71,370	5	14S15E01	
131	108.	133-02-046	122	55,835	45,000	5	14S15E01	
132	109.	133-02-050E	9700	2,174	19,600	4	14S15E01	
133	110.	133-02-051	121	10,971	27,800	5	14S15E01	
134	111.	133-02-053	131	56,543	30,600	5	14S15E01	
135	112.	133-02-054B	131	65,401	22,200	5	14S15E01	
136	113.	133-02-054C	121	35,390	44,704	5	14S15E01	
137	114.	133-02-054D	8800	0	500	4	14S15E01	
138	115.	133-02-056	131	40,453	62,760	5	14S15E01	
139	116.	133-02-057	121	32,894	57,552	5	14S15E01	
140	117.	133-02-058	131	92,049	39,200	5	14S15E01	
141	118.	133-02-059B	11	0	19,600	4	14S15E01	
142	119.	133-02-059D	131	42,318	19,000	5	14S15E01	
143	120.	133-02-059F	141	90,744	20,000	5	14S15E01	
144	121.	133-02-059G	11	0	20,200	4	14S15E01	
145	122.	133-02-059H	141	107,694	33,200	5	14S15E01	
146	123.	133-02-060A	181	177,877	64,560	5	14S15E01	
147	124.	133-02-060B	9500	0	500	4	14S15E01	
148	125.	133-02-061	310	105,504	64,680	5	14S15E01	
149	126.	133-02-062C	151	173,830	40,480	5	14S15E01	
150	127.	133-02-062D	141	178,351	70,400	5	14S15E01	
151	128.	133-02-063C	141	118,527	55,264	5	14S15E01	
152	129.	133-02-064	131	51,674	55,264	5	14S15E01	
153	130.	133-02-065B	141	96,615	21,400	5	14S15E01	
154	131.	133-02-065D	141	80,565	21,400	5	14S15E01	
155	132.	133-02-065E	141	110,590	21,400	5	14S15E01	
156	133.	133-02-065F	11	0	19,200	4	14S15E01	
157	134.	133-02-065G	11	0	21,200	4	14S15E01	
158	135.	133-02-065H	141	109,437	16,600	5	14S15E01	
159	136.	133-02-066B	141	64,336	17,600	5	14S15E01	
160	137.	133-02-066C	131	42,814	17,600	5	14S15E01	
161	138.	133-02-066D	141	106,389	17,600	6	14S15E01	
162	139.	133-02-067	141	95,979	20,000	5	14S15E01	
163	140.	133-02-068	141	101,323	20,000	5	14S15E01	
164	141.	133-02-069	141	103,775	20,000	5	14S15E01	
165	142.	133-02-070	141	97,113	20,000	5	14S15E01	

	I	J	K	L	M	N	P	Q
21								
22								
23		-7-	-8-	-9-	-10-	-11-	-13-	
112	89.	MORENO RICHARD			10925 E CA	TUCSON AZ	10925 E CALLE RINCON	
113	90.	MORENO RICHARD			10945 E CA	TUCSON AZ	10945 E CALLE RINCON	
114	91.	MORENO OCTAVIO H			10955 E CA	TUCSON AZ	10955 E CALLE RINCON	
115	92.	THARP ROBERT R			10851 E LI	TUCSON AZ	10851 E LINDEN	
116	93.	COOPER JACK & OLEINE M JT/RS			2020 N KIN	TUCSON AZ	2020 N KIMBERLEE RD	
117	94.	HAZEL FRANCES B			10800 E TA	TUCSON AZ	10800 E TANQUE VERDE RD	
118	95.	LORING THACHER JR			10858 E TA	TUCSON AZ	1901 N KING	
119	96.	LORING HELENE A			2739 N CAN	TUCSON AZ	10858 E TANQUE VERDE RD	
120	97.	LOPEZ LUIS M & ARMIDA M JT/RS			10880 E TA	TUCSON AZ	10880 E TANQUE VERDE RD	
121	98.	KEELINE JOE			3537 E HAR	TUCSON AZ		
122	99.	ROUSSEAU MARIE C			6062 E TIN	TUCSON AZ		
123	100.	SCANNELL CAROL E			10810 E TA	TUCSON AZ	10810 E TANQUE VERDE RD	
124	101.	LESTER HARRY N & JOAN B JT/RS			10760 E TA	TUCSON AZ	10760 E TANQUE VERDE RD	
125	102.	YARD PHILIP S JR & ANNA MARTIN			10700 E TA	TUCSON AZ	10700 E TANQUE VERDE RD	
126	103.	SPENCER PATRICIA A			1231 N ARE	TUCSON AZ	2380 N KIMBERLEE RD	
127	104.	GOODE GEORGE & SUZANNE L JT/RS			2200 N KIN	TUCSON AZ	2230 N KIMBERLEE RD	
128	105.	GOODE GEORGE & SUZANNE L JT/RS			2200 N KIN	TUCSON AZ	2200 N KIMBERLEE RD	
129	106.	BEVING REX J & BRUNO BARBARA JT/RS			2200 N KIN	TUCSON AZ	2130 N KIMBERLEE RD	
130	107.	KROEGER HAROLD J & JOYCE C JT/RS			2100 N KIN	TUCSON AZ	2100 N KIMBERLEE RD	
131	108.	HICKS JOHN R			2000 N KIN	TUCSON AZ	2000 N KIMBERLEE RD	
132	109.	CITY OF TUCSON						
133	110.	PARK WILLIAM GENE			1717 N TAN	TUCSON AZ		
134	111.	PAYETTE DAVID A & ANDREA C JT/RS			11030 E LI	TUCSON AZ	11030 E LINDEN	
135	112.	STEWART TITLE & TRUST TR 3368			PO BOX 422	TUCSON AZ	11020 E LINDEN	
136	113.	MASTRANGELO DONALD	JT/RS		11010 E LI	TUCSON AZ		
137	114.	MASTRANGELO DONALD	JT/RS		11010 E LI	TUCSON AZ		
138	115.	STONE ELIZABETH R			10996 E LI	TUCSON AZ	10996 E LINDEN	
139	116.	SUMMER LAURENCE L & JUDITH A JT/RS			10956 E LI	TUCSON AZ	10956 E LINDEN	
140	117.	LUPO JOSEPH J JR & DELLA JT/RS			10954 E LI	TUCSON AZ	10954 E LINDEN	
141	118.	LAFFERTY JERRY E & CAROL J JT/RS			2138 S CAI	TUCSON AZ		
142	119.	DYTKO JOHN & KATHLEEN L JT/RS			10852 E LI	TUCSON AZ	10852 E LINDEN	
143	120.	WOOD FRANK B & T CAVALERI JT/RS			10860 E LI	TUCSON AZ	10860 E LINDEN	
144	121.	KOUSSA LAWRENCE E			10880 E LI	TUCSON AZ		
145	122.	KOUSSA LAWRENCE E			10880 E LI	TUCSON AZ	10880 E LINDEN	
146	123.	FARKAS GREGORY J & BETTY A JT/RS			PO BOX 17(	TUCSON AZ	10810 E LINDEN	
147	124.	STATE OF ARIZONA						
148	125.	RICE JOE E & MARY JANE JT/RS			1800 N KIN	TUCSON AZ	1800 N KING	
149	126.	KAY FRANCIS G & JEANNE A JT/RS			PO BOX 89(	ST THOMAS	10779 E LINDEN	
150	127.	OSBORNE JOHN N & JOAN TENNEY			10801 E LI	TUCSON AZ	10801 E LINDEN	
151	128.	PARNELL DAVID			10841 E LI	TUCSON AZ	10841 E LINDEN	
152	129.	WILLOCK NORMAN A &	OF NORMAN	AGREEMENT	10999 E LI	TUCSON AZ	10951 E LINDEN	
153	130.	STOOPS THOMAS D & ARDYCE H JT/RS			10961 E LI	TUCSON AZ	10961 E LINDEN	
154	131.	MC GRIFF DUANE B & ANN JT/RS			10981 E LI	TUCSON AZ	10981 E LINDEN	
155	132.	WILLOCK NORMAN A &	OF NORMAN	AGREEMENT	10999 E LI	TUCSON AZ	10999 E LINDEN	
156	133.	TUELL GARY E & ELLEN J			3361 E TEP	TUCSON AZ		
157	134.	WILLOCK NORMAN A &	OF NORMAN A & KATHEF		10999 E LI	TUCSON AZ		
158	135.	BRUINS GARY H & SUE E JT/RS			11031 E LI	TUCSON AZ	11031 E LINDEN	
159	136.	LORBERBAUM LAURENCE H			11050 E CA	TUCSON AZ	11050 E CALLE RINCON	
160	137.	WILSON LAWRENCE B & MARY J JT/RS			1965 N TAN	TUCSON AZ	1965 N TANQUE VERDE LOOP RD	
161	138.	BURTON MADALYN M			6020 N SWA	TUCSON AZ	1945 N TANQUE VERDE LOOP RD	
162	139.	MC LEOD HARRY L & BERYL LEIGH JT/RS			11085 E LI	TUCSON AZ	11085 E LINDEN	
163	140.	RICHARDSON CHRIS F & KATHI E JT/RS			11065 E LI	TUCSON AZ	11065 E LINDEN	
164	141.	FUNDERBURG IVAN V & MARY L JT/RS			11045 E LI	TUCSON AZ	11045 E LINDEN	
165	142.	ATKIELSKI JOHN J & LINDA J JT/RS			1851 N PLA	TUCSON AZ	1851 N PLACITA DEL LENADOR	

	A	B	C	D	E	F	G	H
21			Use	Full Cash Value				
22		Tax ID	Code	(Struc)	(Land)			
23		-1-	-2-	-3-	-4-	-5-	-6-	
166	143.	133-02-071	131	61,593	20,000	5	14S15E01	
167	144.	133-02-072	141	113,886	20,000	5	14S15E01	
168	145.	133-02-073A	141	103,182	20,000	5	14S15E01	
169	146.	133-02-074A	141	79,143	20,000	6	14S15E01	
170	147.	133-02-075	141	98,619	20,000	5	14S15E01	
171	148.	133-02-076	141	112,676	20,000	5	14S15E01	
172	149.	133-02-077	141	118,154	20,000	5	14S15E01	
173	150.	133-02-078	1100	14,808	31,017	3	14S15E01	
174	151.	133-02-079	1100	56,571	35,246	3	14S15E01	
175	152.	133-02-080	21	0	11,250	4	14S15E01	
176	153.	133-02-081	21	0	6,750	4	14S15E01	
177	154.	133-02-082	21	0	6,750	4	14S15E01	
178	155.	133-02-083	21	0	20,924	4	14S15E01	
179	156.	133-02-084	21	0	24,900	4	14S15E01	
180	157.	133-02-085	21	0	25,800	4	14S15E01	
181	158.	133-02-086	21	0	26,100	4	14S15E01	
182	159.	133-02-087	21	0	24,900	4	14S15E01	
183	160.	133-02-088	21	0	24,900	4	14S15E01	
184	161.	133-37-003B	122	19,819	16,850	5	14S15E12	
185	162.	133-37-004B	8712	95,695	207,240	5	14S15E12	
186	163.	133-37-005B	12	0	226,920	4	14S15E12	
187	164.	133-37-006C	8712	91,021	79,380	4	14S15E12	
188	165.	133-37-009A	8712	12,849	88,600	4	14S15E12	
189	166.	133-37-010A	12	0	43,200	4	14S15E12	
190	167.	205-43-001	9400	170,728	391,000	4	14S16E09	
191	168.	205-43-002	9400	0	400,000	4	14S16E09	
192	169.	205-44-001	4700	119,111	3,551	5	14S16E02	
193	170.	205-44-002	12	0	97,920	4	14S16E02	
194	171.	205-44-003	12	0	27,000	4	14S16E02	
195	172.	205-44-004	12	0	84,080	4	14S16E02	
196	173.	205-44-005	8772	500	322,320	5	14S16E02	
197	174.	205-44-006	600	1,374,000	603,000	3	14S16E02	
198	175.	205-44-007	12	0	120,000	4	14S16E02	
199	176.	205-44-008A	12	0	474,480	4	14S16E02	
200	177.	205-44-008B	12	0	238,260	4	14S16E02	
201	178.	205-45-002A	8722	359,195	207,744	5	14S16E03	
202	179.	205-45-003B	8712	164,800	64,000	5	14S16E03	
203	180.	205-45-003C	8712	145,886	85,320	5	14S16E03	
204	181.	205-45-003D	12	0	64,000	4	14S16E03	
205	182.	205-45-004A	8722	385,767	947,072	4	14S16E03	
206	183.	205-45-005A	12	0	500	4	14S16E03	
207	184.	205-45-006	11	0	106,500	4	14S16E04	
208	185.	205-45-007A	161	641,329	109,500	5	14S16E04	
209	186.	205-45-007B	9700	0	500	4	14S16E04	
210	187.	205-45-008	11	0	145,500	4	14S16E04	
211	188.	205-45-009	151	154,048	65,000	5	14S16E04	
212	189.	205-45-010	141	95,833	65,000	5	14S16E04	
213	190.	205-45-011	151	118,230	65,000	5	14S16E04	
214	191.	205-45-012	141	106,617	65,000	5	14S16E04	
215	192.	205-45-013	141	134,730	67,500	5	14S16E04	
216	193.	205-45-014	151	110,494	65,000	5	14S16E04	
217	194.	205-45-015	161	216,853	65,000	5	14S16E04	
218	195.	205-45-016	151	169,063	65,000	5	14S16E04	
219	196.	205-45-017	141	84,058	65,000	5	14S16E04	

	A	B	C	D	E	F	G	H
21			Use	Full Cash Value				
22		Tax ID	Code	(Struc)	(Land)			
23		-1-	-2-	-3-	-4-	-5-	-6-	
976	953.	205-52-018	132	27,750	54,000	5	14S16E06	
977	954.	205-52-019	8772	69,291	125,970	4	14S16E06	
978	955.	205-52-020	8772	53,527	125,840	4	14S16E06	
979	956.	205-52-021	122	23,250	45,000	5	14S16E06	
980	957.	205-52-022	132	18,369	18,300	5	14S16E06	
981	958.	205-52-023	9700	0	500	4	14S16E06	
982	959.	205-52-024	132	28,494	45,000	5	14S16E06	
983	960.	205-52-025	142	147,899	76,180	5	14S16E06	
984	961.	205-52-026	8712	80,793	76,180	5	14S16E06	
985	962.	205-52-027	12	0	500	4	14S16E06	
986	963.	205-52-028	9700	0	500	4	14S16E06	
987	964.	205-52-029A	8712	500	86,190	5	14S16E06	
988	965.	205-52-029B	830	895	60,000	5	14S16E06	
989	966.	205-52-030B	132	40,112	38,400	5	14S16E06	
990	967.	205-52-030C	310	46,820	57,450	5	14S16E06	
991	968.	205-52-030D	14	0	9,600	4	14S16E06	
992	969.	205-52-031	12	0	20,475	4	14S16E06	
993	970.	205-52-032	9600	0	16,875	4	14S16E06	
994	971.	205-52-033A	112	500	31,500	5	14S16E06	
995	972.	205-52-034B	112	500	65,100	5	14S16E06	
996	973.	205-52-035	132	26,163	12,450	5	14S16E06	
997	974.	205-52-038A	122	6,623	11,745	5	14S16E06	
998	975.	205-52-039A	142	102,815	65,205	5	14S16E06	
999	976.	205-52-040	122	8,295	11,550	5	14S16E06	
1000	977.	205-52-041A	132	20,025	38,550	5	14S16E06	
1001	978.	205-52-041C	132	70,013	65,700	5	14S16E06	
1002	979.	205-52-042	132	37,000	13,500	5	14S16E06	
1003	980.	205-52-043	12	0	13,500	4	14S16E06	
1004	981.	205-52-044	132	44,226	13,500	5	14S16E06	
1005	982.	205-52-045	12	0	13,500	4	14S16E06	
1006	983.	205-52-046	12	0	13,500	4	14S16E06	
1007	984.	205-52-047A	182	108,867	26,850	5	14S16E06	
1008	985.	205-52-048C	132	46,938	13,650	5	14S16E06	
1009	986.	205-52-048E	122	7,575	13,650	5	14S16E06	
1010	987.	205-52-048F	112	500	46,500	5	14S16E06	
1011	988.	205-52-049	122	15,750	30,000	5	14S16E06	
1012	989.	205-52-050A	122	22,200	42,900	5	14S16E06	
1013	990.	205-52-051	8800	0	500	4	14S16E06	
1014	991.	205-52-052A	122	15,750	30,000	5	14S16E06	
1015	992.	205-52-053	132	36,375	71,250	5	14S16E06	
1016	993.	205-52-054A	8800	0	500	4	14S16E06	
1017	994.	205-52-054B	132	34,350	12,150	5	14S16E06	
1018	995.	205-52-055A	132	31,293	32,700	5	14S16E06	
1019	996.	205-52-056	8800	0	500	4	14S16E06	
1020	997.	205-52-057	132	17,027	10,650	5	14S16E06	
1021	998.	205-52-058	8800	0	500	4	14S16E06	
1022	999.	205-52-059	8800	0	500	4	14S16E06	
1023	1000.	205-52-060B	9700	0	1,875	4	14S16E06	
1024	1001.	205-52-060C	8774	85,433	65,880	4	14S16E06	
1025	1002.	205-58-002	9400	0	1,200,000	4	14S16E10	

	I	J	K	L	M	N	P	Q
21								
22								
23		-7-	-8-	-9-	-10-	-11-	-13-	
976	953.	HARRIS ROBERT PHILIP & SARA DIANNE JT/R			11144 E EI	TUCSON AZ	11144 E EDISON	
977	954.	LAVIGNE DONALD E & RUTH I JT/RS			11250 E EI	TUCSON AZ	11250 E EDISON	
978	955.	MENDOZA FERNANDO & SUSAN JT/RS			11310 E EI	TUCSON AZ	11310 E EDISON	
979	956.	MC VEAN JOHN L & ADDA L JT/RS			11350 E EI	TUCSON AZ	11350 E EDISON	
980	957.	WHITE ROBERT G & WH	TRUSTEES OF WHITE FA		11360 E EI	TUCSON AZ	11360 E EDISON	
981	958.	SCHEMBER LOUIS O & ARTHUR E GEORGE &			ADDISON H	% CITY OF		
982	959.	SLADE LELAND J & KATHLEEN MARR JT/RS			11370 E EI	TUCSON AZ	11370 E EDISON	
983	960.	CROSS HAROLD E & DIANE H JT/RS			11402 E EI	TUCSON AZ	11402 E EDISON	
984	961.	LOVITT GAIL ANNETTE & DAVID JR			2211 N CON	TUCSON AZ	11410 E EDISON	
985	962.	STEWART TITLE & TRU	% KNUTZEN BILL		3448 N CAI	TUCSON AZ		
986	963.	NELSON EDWARD H HURLBUT JESSIE F &			BELDEN WII	% CITY OF		
987	964.	GAMEZ CRUZ			11310 E SH	TUCSON AZ		
988	965.	GAMEZ FRANK L & GAY	% GAMEZ ALBERT L & A		2035 N CON	TUCSON AZ	2035 N CONESTOGA AVE	
989	966.	GONZALEZ DAVID & HERMINIA JT/RS			11351 E SH	TUCSON AZ	11351 E SHADY LANE	
990	967.	GAMEZ ALBERT S & CRUZ			11310 E SH	TUCSON AZ	11310 E SHADY LANE	
991	968.	GONZALEZ DAVID & HERMINIA JT/RS			11351 E SH	TUCSON AZ		
992	969.	DUARTE MANUEL & JULIA D			201 E EL \	TUCSON AZ		
993	970.	PIMA COUNTY					1790 N TANQUE VERDE LOOP RD	
994	971.	NORIEGA ARMANDO & LUPE JT/RS			11345 E SH	TUCSON AZ	11345 E SHADY LANE	
995	972.	HILL CHARLES D			11241 E SH	TUCSON AZ	11241 E SHADY LANE	
996	973.	MILLER KEITH LEE & MARLENE JEAN JT/RS			11231 E SH	TUCSON AZ	11231 E SHADY LANE	
997	974.	GOODWIN BURDETTE E	% LEE SCOTTFIELD DIC		1780 N TAN	TUCSON AZ	1780 N TANQUE VERDE LOOP RD	
998	975.	SCHMIDT HARRY & VELMA L JT/RS			1752 N TAN	TUCSON AZ	1752 N TANQUE VERDE LOOP RD	
999	976.	GOODWIN BURDETT E & JOYCE E JT/RS			1760-A N T	TUCSON AZ	1760 N TANQUE VERDE LOOP RD	
1000	977.	BARONE JAMES J & MARY V JT/RS			11220 E SH	TUCSON AZ	11220 E SHADY LANE	
1001	978.	BARONE JOSEPH D & AUDREY			11240 E SH	TUCSON AZ		
1002	979.	HOLMBERG JAMES H			11221 E SH	TUCSON AZ	11221 E SHADY LANE	
1003	980.	BRITTAIN DENISE			507 E MARY	PHOENIX AZ		
1004	981.	GALLOWAY FRANK S & HELEN L JT/RS			11207 E SH	TUCSON AZ	11207 E SHADY LANE	
1005	982.	LAUBSCHER JAMES A & GERI L JT/RS			737 GREENV	THOUSAND C		
1006	983.	LOWE JOHN R & JUDITH L JT/RS			11209 E SH	TUCSON AZ		
1007	984.	LOWE JOHN R & JUDITH L JT/RS			11209 E SH	TUCSON AZ	11209 E SHADY LANE	
1008	985.	KARTCHNER KEVIN K & KAREN S JT/RS			1942 N TAN	TUCSON AZ	1942 N TANQUE VERDE LOOP RD	
1009	986.	HILL SHELDON W & JOY S JT/RS			1944 N TAN	TUCSON AZ	1944 N TANQUE VERDE LOOP RD	
1010	987.	HILL LEONARD C			1958 N TAN	TUCSON AZ	1958 N TANQUE VERDE LOOP RD	
1011	988.	BRITTAIN DENISE ELIZABETH			507 E MARY	PHOENIX AZ	11115 E SHADY LANE	
1012	989.	PEACE ROBERT L & CECILIA M JT/RS			11115 E SH	TUCSON AZ	1902 N TANQUE VERDE LOOP RD	
1013	990.	ROBERTS JAMES H JR	EDWARD		6334 CALLE	TUCSON AZ		
1014	991.	ADAMS GERALD E & JOANN N JT/RS			11110 E SH	TUCSON AZ	11110 E SHADY LANE	
1015	992.	GREGORY DENNIS & MARY JT/RS			11112 E SH	TUCSON AZ	11112 E SHADY LANE	
1016	993.	SPILMAN JUDITH DARLENE			1808 N TAN	TUCSON AZ		
1017	994.	MEYER ADRIENNE			1808 N TAN	TUCSON AZ	1808 N TANQUE VERDE LOOP RD	
1018	995.	BUTLER DONALD & PALMER B JT/RS			1730 N TAN	TUCSON AZ	1730 N TANQUE VERDE LOOP RD	
1019	996.	WATT JOHN C & BERNICE J JT/RS			7005 N SKY	TUCSON AZ		
1020	997.	DAY WALTER HAL & MYRA JEAN JT/RS			1802 N TAN	TUCSON AZ	1802 N TANQUE VERDE LOOP RD	
1021	998.	PITTS GAIL C & CAME	CO-TRUSTEES		15571 WILL	HUNTINGTON		
1022	999.	WADDELL EMMETT P & ELSIE T			11103 E TA	TUCSON AZ		
1023	1000.	CITY OF TUCSON						
1024	1001.	STACKHOUSE HAMILTON L & BERNICE JT/RS			1700 N TAN	TUCSON AZ	1700 N TANQUE VERDE LOOP RD	
1025	1002.	UNITED STATES OF AMERICA						

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DAMAGE MODEL -- PRINTOUT 1

Base controls, FEMA Damage/Depth Table

Controls--

Assumed dh (ffe-fge) for homes

High Pad:	3.00
All others:	1.00
Apply levee?	yes

Percent of structure and content value lost as function of depth above FFE based on 1989 FEMA Depth Damage table for residential.

Results--

Return Frequency:	100
Factor to adjust full cash value to market value--	1.25
Value of contents as percent of value of structure:	30%
Structure damage:	$1,628,329
Content damage:	$646,346
Total:	$2,274,675

Depth	Percent Damage Structure	Content
-100	0.0000	0.0000
-1.00	0.0000	0.0000
-0.50	0.0385	0.0566
0.00	0.0778	0.1131
0.50	0.1056	0.1461
1.00	0.1335	0.1700
1.50	0.1679	0.2452
2.00	0.2023	0.3204
2.50	0.2336	0.3335
3.00	0.2649	0.3466
3.50	0.2757	0.3577
4.00	0.2865	0.3688
4.50	0.2925	0.3875
5.00	0.2985	0.4061
5.50	0.3525	0.4276
6.00	0.4066	0.4491
6.50	0.4174	0.4738
7.00	0.4283	0.4986
7.50	0.4341	0.5232
8.00	0.4400	0.5477
10.00	1.0000	1.0000
100	1.0000	1.0000

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DAMAGE MODEL -- PRINTOUT 2

HEC-2 sections, full cash values, and location related to parcel id's

Imported from DSUS.XLS Arranged in order of HEC-2 cross- sections. Ratio is distance from structure to downstream section (ds) to total distance between upstream section (us) and ds.

Imported from ASSESSOR.XLS

Imported from LOCATION.XLS

	Parcel	ds	ratio	us	Full Cash Values Struc	Land	Coordinates x	y
1	133-01-064D	6.850	.333	6.937	--	13,594	854,043	452,486
2	133-01-064C	6.937	.186	7.075	500	37,736	854,476	452,419
3	133-01-064E	6.937	.193	7.075	--	2,719	854,481	452,274
4	133-01-066F	6.937	.231	7.075	--	85,030	854,486	451,695
5	133-01-063	7.075	.046	7.176	--	23,164	855,014	452,427
6	133-01-066E	7.075	.061	7.176	254,311	70,180	854,995	451,557
7	133-01-027A	7.075	.246	7.176	--	166,850	854,867	454,358
8	133-01-026C	7.075	.414	7.176	--	244,200	854,744	456,005
9	133-01-061	7.075	.626	7.176	69,035	62,919	855,442	451,651
10	133-01-060	7.075	.837	7.176	128,611	20,155	855,691	451,542
11	133-01-043A	7.075	.881	7.176	--	343,545	855,264	453,236
12	133-01-030	7.176	.132	7.288	12,743	48,750	855,194	454,747
13	133-01-029	7.176	.176	7.288	51,250	48,750	855,188	454,952
14	133-01-062B	7.176	.257	7.288	12,575	10,984	855,519	452,539
15	133-01-059	7.176	.623	7.288	69,807	77,760	855,964	451,909
16	133-01-041A	7.288	.311	7.390	57,433	32,625	855,781	454,272
17	133-01-057	7.288	.424	7.390	46,730	59,740	856,409	451,794
18	133-01-028	7.288	.494	7.390	--	56,160	855,708	455,337
19	133-01-031	7.288	.629	7.390	99,261	36,431	855,881	454,651
20	133-01-058	7.288	.751	7.390	30,441	41,651	856,395	452,238
21	133-01-056E	7.288	.759	7.390	--	89,250	856,625	451,596
22	133-01-040	7.288	.899	7.390	87,397	35,453	856,081	454,235
23	133-01-039A	7.390	.139	7.488	--	19,901	856,241	454,002
24	133-01-025	7.390	.199	7.488	81,059	405,132	855,924	456,153
25	133-01-032	7.390	.284	7.488	94,198	37,519	856,179	454,849
26	133-01-039B	7.390	.428	7.488	72,310	19,684	856,355	454,219
27	133-01-035	7.390	.661	7.488	44,945	15,334	856,419	454,561
28	133-01-045	7.390	.713	7.488	82,556	39,694	856,659	453,273
29	133-01-034	7.390	.715	7.488	115,121	11,528	856,419	454,727
30	133-01-033	7.390	.736	7.488	--	11,528	856,410	454,842
31	133-01-044	7.390	.788	7.488	61,254	39,694	856,665	453,473
32	133-01-038	7.390	.955	7.488	56,150	17,291	856,662	454,013
33	133-01-037	7.390	.984	7.488	80,574	19,358	856,644	454,212
34	133-01-036	7.488	.124	7.688	75,915	42,304	856,703	454,541
35	133-01-055B	7.488	.280	7.688	--	43,500	857,154	453,048
36	133-01-047	7.488	.303	7.688	--	9,135	857,008	453,850
37	133-01-046	7.488	.346	7.688	64,113	46,871	857,066	453,779

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DAMAGE MODEL -- PRINTOUT 3

Finish floor elevations of parcels, and parcels protected by 49er's levee

fge is elevation in front yard read from project mapping High Pad? or not determined from drive-by field investigation. If so, dh adjusted accordingly. Behind Levee? determined from preliminary construction plans.

	Parcel	fge	High Pad?	dh	ffe	Behind Levee?
1	133-01-064D	--		1.0	--	
2	133-01-064C	2,573.00		1.0	2,574.00	
3	133-01-064E	--		1.0	--	
4	133-01-066F	--		1.0	--	
5	133-01-063	--		1.0	--	
6	133-01-066E	2,578.00		1.0	2,579.00	
7	133-01-027A	--		1.0	--	
8	133-01-026C	--		1.0	--	
9	133-01-061	2,580.00		1.0	2,581.00	
10	133-01-060	2,580.00		1.0	2,581.00	
11	133-01-043A	--		1.0	--	
12	133-01-030	2,586.00		1.0	2,587.00	
13	133-01-029	2,587.00		1.0	2,588.00	
14	133-01-062B	2,579.00		1.0	2,580.00	
15	133-01-059	2,582.50		1.0	2,583.50	
16	133-01-041A	2,586.50		1.0	2,587.50	
17	133-01-057	2,582.50		1.0	2,583.50	
18	133-01-028	--		1.0	--	
19	133-01-031	2,588.00		1.0	2,589.00	
20	133-01-058	2,582.50		1.0	2,583.50	
21	133-01-056E	--		1.0	--	
22	133-01-040	2,587.00		1.0	2,588.00	
23	133-01-039A	--		1.0	--	
24	133-01-025	2,594.00		1.0	2,595.00	
25	133-01-032	2,590.00		1.0	2,591.00	
26	133-01-039B	2,588.00		1.0	2,589.00	
27	133-01-035	2,589.00		1.0	2,590.00	
28	133-01-045	2,586.00		1.0	2,587.00	
29	133-01-034	2,590.00		1.0	2,591.00	
30	133-01-033	--		1.0	--	
31	133-01-044	2,586.00		1.0	2,587.00	
32	133-01-038	2,588.00	yes	3.0	2,591.00	
33	133-01-037	2,590.00	yes	3.0	2,593.00	
34	133-01-036	2,591.00		1.0	2,592.00	
35	133-01-055B	--		1.0	--	
36	133-01-047	--	yes	3.0	--	
37	133-01-046	2,588.00		1.0	2,589.00	

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DAMAGE MODEL -- PRINTOUT 4

Parcel Location Relative to HEC-2 Cross-Section

Table relating river-mile identification of HEC-2 sections to section number from HEC-2 printouts.

Excel row number (index)

HEC-2 Cross-section number from printout

Corresponding HEC-2 Section River- Mile (repeated)

SECNO	River Mile	ELMIN		Parcel	(ids) ds	(ius) us	Section No ds	Section No us	River Mile ds	River Mile us
1	5.898	2,548.7	1	133-01-064D	28	32	108	109	6.850	6.937
101	6.059	2,552.0	2	133-01-064C	32	33	109	110	6.937	7.075
102	6.239	2,556.0	3	133-01-064E	32	33	109	110	6.937	7.075
103	6.348	2,558.0	4	133-01-066F	32	33	109	110	6.937	7.075
104	6.494	2,560.0	5	133-01-063	33	34	110	111	7.075	7.176
105	6.589	2,563.0	6	133-01-066E	33	34	110	111	7.075	7.176
106	6.670	2,564.4	7	133-01-027A	33	34	110	111	7.075	7.176
107	6.765	2,566.0	8	133-01-026C	33	34	110	111	7.075	7.176
108	6.850	2,570.0	9	133-01-061	33	34	110	111	7.075	7.176
108.1	6.851	2,570.0	10	133-01-060	33	34	110	111	7.075	7.176
108.2	6.852	2,570.0	11	133-01-043A	33	34	110	111	7.075	7.176
108.3	6.853	2,570.0	12	133-01-030	34	35	111	112	7.176	7.288
109	6.937	2,572.0	13	133-01-029	34	35	111	112	7.176	7.288
110	7.075	2,574.0	14	133-01-062B	34	35	111	112	7.176	7.288
111	7.176	2,576.0	15	133-01-059	34	35	111	112	7.176	7.288
112	7.288	2,578.0	16	133-01-041A	35	36	112	113	7.288	7.390
113	7.390	2,580.0	17	133-01-057	35	36	112	113	7.288	7.390
114	7.488	2,582.0	18	133-01-028	35	36	112	113	7.288	7.390
1	7.688	2,585.5	19	133-01-031	35	36	112	113	7.288	7.390
2	7.723	2,586.4	20	133-01-058	35	36	112	113	7.288	7.390
3	7.820	2,589.0	21	133-01-056E	35	36	112	113	7.288	7.390
4	7.912	2,590.4	22	133-01-040	35	36	112	113	7.288	7.390
5	7.950	2,590.8	23	133-01-039A	36	37	113	114	7.390	7.488
6	7.994	2,591.4	24	133-01-025	36	37	113	114	7.390	7.488
20.195	8.065	2,593.0	25	133-01-032	36	37	113	114	7.390	7.488
20.361	8.231	2,595.0	26	133-01-039B	36	37	113	114	7.390	7.488
20.442	8.312	2,598.0	27	133-01-035	36	37	113	114	7.390	7.488
20.520	8.390	2,602.0	28	133-01-045	36	37	113	114	7.390	7.488
20.604	8.474	2,604.0	29	133-01-034	36	37	113	114	7.390	7.488
20.660	8.530	2,606.0	30	133-01-033	36	37	113	114	7.390	7.488
20.722	8.592	2,607.0	31	133-01-044	36	37	113	114	7.390	7.488
20.780	8.650	2,608.0	32	133-01-038	36	37	113	114	7.390	7.488
20.840	8.710	2,609.0	33	133-01-037	36	37	113	114	7.390	7.488
20.902	8.772	2,611.0	34	133-01-036	37	38	114	1	7.488	7.688
20.983	8.853	2,613.0	35	133-01-055B	37	38	114	1	7.488	7.688
21.066	8.936	2,614.0	36	133-01-047	37	38	114	1	7.488	7.688
21.125	8.995	2,615.0	37	133-01-046	37	38	114	1	7.488	7.688

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DAMAGE MODEL(1) -- PRINTOUT 5

Effective depth of flooding at each structure

HEC-2 Output (Insert this column from PRINTOUTs 7 & 8)

\ | /

v

Q = 23000

100

Compute depth of flooding for each structure. "Actual" depth is differenct between wse and ffe. Depth is zero for ffe > wse."Levee" is effective depth with levee in place which is actual depth for structures not protected by levee, and 0 for those that are.

	R. Mile	CWSEL		Parcel	ds Cwsel	us Cwsel	wse at struc	ffe (Repeat)	Effect Depth Actual	Effect Depth With Levee
	5.898	2,554.67	1	133-01-064D	2,576.44	2,578.99	2,577.29	--	--	--
	6.059	2,558.25	2	133-01-064C	2,578.99	2,581.04	2,579.37	2,574.00	5.37	5.37
	6.239	2,563.07	3	133-01-064E	2,578.99	2,581.04	2,579.38	--	--	--
	6.348	2,564.99	4	133-01-066F	2,578.99	2,581.04	2,579.46	--	--	--
	6.494	2,567.25	5	133-01-063	2,581.04	2,581.92	2,581.08	--	--	--
	6.589	2,569.77	6	133-01-066E	2,581.04	2,581.92	2,581.09	2,579.00	2.09	2.09
	6.670	2,572.02	7	133-01-027A	2,581.04	2,581.92	2,581.26	--	--	--
	6.765	2,574.02	8	133-01-026C	2,581.04	2,581.92	2,581.40	--	--	--
	6.850	2,576.44	9	133-01-061	2,581.04	2,581.92	2,581.59	2,581.00	0.59	0.59
	6.851	2,577.18	10	133-01-060	2,581.04	2,581.92	2,581.78	2,581.00	0.78	0.78
	6.852	2,577.64	11	133-01-043A	2,581.04	2,581.92	2,581.82	--	--	--
	6.853	2,577.76	12	133-01-030	2,581.92	2,584.64	2,582.28	2,587.00	--	--
	6.937	2,578.99	13	133-01-029	2,581.92	2,584.64	2,582.40	2,588.00	--	--
	7.075	2,581.04	14	133-01-062B	2,581.92	2,584.64	2,582.62	2,580.00	2.62	2.62
	7.176	2,581.92	15	133-01-059	2,581.92	2,584.64	2,583.61	2,583.50	0.11	0.11
X	2.288	2,584.64	16	133-01-041A	2,584.64	2,586.12	2,585.10	2,587.50	--	--
	7.390	2,586.12	17	133-01-057	2,584.64	2,586.12	2,585.27	2,583.50	1.77	1.77
	7.488	2,587.99	18	133-01-028	2,584.64	2,586.12	2,585.37	--	--	--
	7.688	2,592.81	19	133-01-031	2,584.64	2,586.12	2,585.57	2,589.00	--	--
	7.723	2,594.52	20	133-01-058	2,584.64	2,586.12	2,585.75	2,583.50	2.25	2.25
	7.820	2,596.45	21	133-01-056E	2,584.64	2,586.12	2,585.76	--	--	--
	7.912	2,599.67	22	133-01-040	2,584.64	2,586.12	2,585.97	2,588.00	--	--
	7.950	2,600.42	23	133-01-039A	2,586.12	2,587.99	2,586.38	--	--	--
	7.994	2,602.44	24	133-01-025	2,586.12	2,587.99	2,586.49	2,595.00	--	--
	8.065	2,604.28	25	133-01-032	2,586.12	2,587.99	2,586.65	2,591.00	--	--
	8.231	2,605.52	26	133-01-039B	2,586.12	2,587.99	2,586.92	2,589.00	--	--
	8.312	2,607.53	27	133-01-035	2,586.12	2,587.99	2,587.36	2,590.00	--	--
	8.390	2,609.65	28	133-01-045	2,586.12	2,587.99	2,587.45	2,587.00	0.45	0.45
	8.474	2,610.83	29	133-01-034	2,586.12	2,587.99	2,587.46	2,591.00	--	--
	8.530	2,611.76	30	133-01-033	2,586.12	2,587.99	2,587.50	--	--	--
	8.592	2,612.96	31	133-01-044	2,586.12	2,587.99	2,587.59	2,587.00	0.59	0.59
	8.650	2,614.46	32	133-01-038	2,586.12	2,587.99	2,587.91	2,591.00	--	--
	8.710	2,616.45	33	133-01-037	2,586.12	2,587.99	2,587.96	2,593.00	--	--
	8.772	2,617.90	34	133-01-036	2,587.99	2,592.81	2,588.59	2,592.00	--	--
	8.853	2,620.75	35	133-01-055B	2,587.99	2,592.81	2,589.34	--	--	--
	8.936	2,623.01	36	133-01-047	2,587.99	2,592.81	2,589.45	--	--	--
	8.995	2,623.55	37	133-01-046	2,587.99	2,592.81	2,589.66	2,589.00	0.66	0.66

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DAMAGE MODEL (2) -- PRINTOUT 6

Damage Calculation

Flood Damage Calculation--Damage to structure and contents based on structural value and depth with levee

	Value of Structure (Repeat)	Percent Damage Struc	Percent Damage Cont	Value of Damage Struc	Value of Damage Content	Value of Damage Total
1	--	--	--	--	--	--
2	500	.339	.422	212	79	291
3	--	--	--	--	--	--
4	--	--	--	--	--	--
5	--	--	--	--	--	--
6	254,311	.208	.323	66,174	30,790	96,964
7	--	--	--	--	--	--
8	--	--	--	--	--	--
9	69,035	.111	.150	9,549	3,894	13,443
10	128,611	.121	.159	19,457	7,684	27,141
11	--	--	--	--	--	--
12	12,743	--	--	--	--	--
13	51,250	--	--	--	--	--
14	12,575	.241	.337	3,790	1,587	5,377
15	69,807	.084	.121	7,347	3,159	10,506
16	57,433	--	--	--	--	--
17	46,730	.186	.286	10,885	5,003	15,888
18	--	--	--	--	--	--
19	99,261	--	--	--	--	--
20	30,441	.218	.327	8,295	3,732	12,028
21	--	--	--	--	--	--
22	87,397	--	--	--	--	--
23	--	--	--	--	--	--
24	81,059	--	--	--	--	--
25	94,198	--	--	--	--	--
26	72,310	--	--	--	--	--
27	44,945	--	--	--	--	--
28	82,556	.103	.143	10,631	4,428	15,060
29	115,121	--	--	--	--	--
30	--	--	--	--	--	--
31	61,254	.111	.151	8,488	3,459	11,947
32	56,150	--	--	--	--	--
33	80,574	--	--	--	--	--
34	75,915	--	--	--	--	--
35	--	--	--	--	--	--
36	--	--	--	--	--	--
37	64,113	.114	.154	9,176	3,696	12,872

H E C - 2 R E S U L T S - - P R I N T O U T 7

"Given Condition"

Move various cwsels to PRINTOUT 4 to evaluate damage.

	Given Condition					
	2-year	10-year	25-year	50-yr	100-yr	cba
	Q = 2,300	Q = 6,900	Q = 11,500	Q = 16100	Q = 23000	Q = 28,500
	Q = 2,300	Q = 6,900	Q = 11,500	Q = 16100	Q = 23000	Q = 28,500
	2	10	25	50	100	cba
SECNO	CWSEL	CWSEL	CWSEL	CWSEL	CWSEL	CWSEL
1	2,550.71	2,552.37	2,553.28	2,553.93	2,554.67	2,555.16
101	2,554.41	2,555.94	2,556.84	2,557.51	2,558.25	2,558.85
102	2,558.49	2,560.02	2,561.08	2,561.95	2,563.07	2,563.76
103	2,560.58	2,562.27	2,563.24	2,564.01	2,564.99	2,565.66
104	2,563.34	2,565.05	2,565.84	2,566.46	2,567.25	2,567.81
105	2,566.06	2,567.84	2,568.57	2,569.12	2,569.77	2,570.24
106	2,568.04	2,569.55	2,570.40	2,571.10	2,572.02	2,572.65
107	2,569.06	2,571.04	2,572.22	2,573.06	2,574.02	2,574.70
108	2,573.24	2,574.55	2,575.31	2,575.77	2,576.44	2,576.97
108.1	2,573.63	2,575.03	2,575.71	2,576.40	2,577.18	2,577.50
108.2	2,573.89	2,575.31	2,576.14	2,576.83	2,577.64	2,578.14
108.3	2,573.90	2,575.34	2,576.17	2,576.88	2,577.76	2,578.40
109	2,574.75	2,576.31	2,577.27	2,578.04	2,578.99	2,579.65
110	2,576.58	2,578.16	2,579.14	2,579.96	2,581.04	2,581.82
111	2,578.39	2,580.33	2,581.02	2,581.41	2,581.92	2,582.25
112	2,581.22	2,582.55	2,583.24	2,583.87	2,584.64	2,585.18
113	2,582.77	2,584.06	2,584.81	2,585.38	2,586.12	2,586.65
114	2,585.27	2,586.18	2,586.79	2,587.31	2,587.99	2,588.47
1	2,589.10	2,590.93	2,591.51	2,592.09	2,592.81	2,593.31
2	2,589.67	2,591.52	2,593.37	2,593.88	2,594.52	2,594.88
3	2,592.06	2,594.77	2,594.95	2,595.66	2,596.45	2,597.03
4	2,593.84	2,595.95	2,597.30	2,598.98	2,599.67	2,599.87
5	2,594.54	2,597.22	2,598.98	2,599.73	2,600.42	2,600.95
6	2,594.83	2,597.38	2,597.92	2,599.91	2,602.44	2,602.85
20.195	2,597.25	2,599.97	2,602.06	2,603.45	2,604.28	2,604.91
20.361	2,601.49	2,603.01	2,603.80	2,604.59	2,605.52	2,606.03
20.442	2,602.77	2,604.68	2,605.79	2,607.05	2,607.53	2,607.96
20.520	2,604.59	2,606.97	2,608.36	2,608.84	2,609.65	2,610.12
20.604	2,607.61	2,608.73	2,609.54	2,610.13	2,610.83	2,611.30
20.660	2,608.43	2,609.71	2,610.47	2,611.05	2,611.76	2,612.26
20.722	2,609.44	2,610.76	2,611.60	2,612.23	2,612.96	2,613.44
20.780	2,610.69	2,612.09	2,612.93	2,613.61	2,614.46	2,615.01
20.840	2,612.00	2,613.79	2,614.81	2,615.58	2,616.45	2,617.01
20.902	2,613.12	2,615.27	2,616.19	2,616.93	2,617.90	2,618.57
20.983	2,615.85	2,617.60	2,618.79	2,619.67	2,620.75	2,621.53
21.066	2,617.05	2,619.37	2,620.79	2,621.88	2,623.01	2,623.72
21.125	2,617.84	2,620.05	2,621.48	2,622.48	2,623.55	2,624.25

	CQ	CR	CS	CT	CU	CV	CW	CX	CY
1		C:\EXCEL\FILES\TANQUE\WORKING\FLD_DMG\FLOODDMG.XLS						Jul 29, 1993 9:17 am	
4									
5		H E C - 2 R E S U L T S - - P R I N T O U T 8							
6		"Existing Condition"							
7									
8									
9									
10									
11				Existing Condition					
12				2-year	10-year	25-year	50-year	100-year	
13				Q= 2,300	Q= 6,900	Q= 11,500	Q= 16,100	Q= 23,000	
14									
15									
16									
17									
18				2	10	25	50	100	
19			SECNO	CWSEL	CWSEL	CWSEL	CWSEL	CWSEL	
20			1	2,550.71	2,552.37	2,553.28	2,553.93	2,554.67	
21			101	2,554.41	2,555.94	2,556.84	2,557.51	2,558.25	
22			102	2,558.49	2,560.02	2,561.08	2,561.95	2,563.07	
23			103	2,560.58	2,562.27	2,563.24	2,564.01	2,564.99	
24			104	2,563.34	2,565.05	2,565.84	2,566.46	2,567.25	
25			105	2,566.06	2,567.84	2,568.57	2,569.12	2,569.77	
26			106	2,568.04	2,569.55	2,570.40	2,571.10	2,572.02	
27			107	2,569.06	2,571.04	2,572.22	2,573.06	2,574.02	
28			108	2,573.24	2,574.55	2,575.31	2,575.77	2,576.44	
29			108.1	2,573.63	2,575.03	2,575.71	2,576.40	2,577.18	
30			108.2	2,573.89	2,575.31	2,576.14	2,576.83	2,577.64	
31			108.3	2,573.90	2,575.34	2,576.17	2,576.88	2,577.76	
32			109	2,574.75	2,576.31	2,577.27	2,578.04	2,578.99	
33			110	2,576.58	2,578.16	2,579.14	2,579.96	2,581.04	
34			111	2,578.39	2,580.33	2,581.02	2,581.41	2,581.92	
35			112	2,581.22	2,582.55	2,583.24	2,583.87	2,584.64	
36			113	2,582.77	2,584.06	2,584.81	2,585.38	2,586.12	
37			114	2,585.27	2,586.18	2,586.79	2,587.31	2,587.99	
38			1	2,589.10	2,590.93	2,591.51	2,592.09	2,592.81	
39			2	2,589.67	2,591.52	2,593.37	2,593.88	2,594.52	
40			3	2,592.06	2,594.77	2,594.95	2,595.66	2,596.45	
41			4	2,593.84	2,595.95	2,597.30	2,598.98	2,599.67	
42			5	2,594.54	2,597.22	2,598.98	2,599.73	2,600.42	
43			6	2,594.83	2,597.38	2,597.92	2,599.91	2,602.44	
44			20.195	2,597.25	2,599.97	2,602.06	2,603.45	2,604.28	
45			20.361	2,601.49	2,603.01	2,603.80	2,604.59	2,605.52	
46			20.442	2,602.77	2,604.68	2,605.79	2,607.05	2,607.53	
47			20.520	2,604.59	2,606.97	2,608.36	2,608.84	2,609.65	
48			20.604	2,607.61	2,608.73	2,609.54	2,610.13	2,610.83	
49			20.660	2,608.43	2,609.71	2,610.47	2,611.05	2,611.76	
50			20.722	2,609.44	2,610.76	2,611.60	2,612.23	2,612.96	
51			20.780	2,610.68	2,611.91	2,612.68	2,613.34	2,614.14	
52			20.840	2,611.91	2,613.64	2,614.60	2,615.29	2,616.09	
53			20.902	2,613.17	2,615.26	2,616.19	2,616.82	2,617.81	
54			20.983	2,615.82	2,617.52	2,618.56	2,619.45	2,620.31	
55			21.066	2,617.04	2,619.29	2,620.65	2,621.61	2,622.60	
56			21.125	2,617.84	2,619.99	2,621.40	2,622.36	2,623.37	

EXPORTABLE RESULTS -- PRINTOUT 9

	Output file for AutoCAD plot of flood damage				Output file for AutoCAD plot of ffe's		
	Parcel	x	y	Amount	x	y	ffe
1	133-01-064D	854,043	452,486		854,043	452,486	
2	133-01-064C	854,476	452,419	291	854,476	452,419	2,574
3	133-01-064E	854,481	452,274		854,481	452,274	
4	133-01-066F	854,486	451,695		854,486	451,695	
5	133-01-063	855,014	452,427		855,014	452,427	
6	133-01-066E	854,995	451,557	96,964	854,995	451,557	2,579
7	133-01-027A	854,867	454,358		854,867	454,358	
8	133-01-026C	854,744	456,005		854,744	456,005	
9	133-01-061	855,442	451,651	13,443	855,442	451,651	2,581
10	133-01-060	855,691	451,542	27,141	855,691	451,542	2,581
11	133-01-043A	855,264	453,236		855,264	453,236	
12	133-01-030	855,194	454,747		855,194	454,747	2,587
13	133-01-029	855,188	454,952		855,188	454,952	2,588
14	133-01-062B	855,519	452,539	5,377	855,519	452,539	2,580
15	133-01-059	855,964	451,909	10,506	855,964	451,909	2,584
16	133-01-041A	855,781	454,272		855,781	454,272	2,588
17	133-01-057	856,409	451,794	15,888	856,409	451,794	2,584
18	133-01-028	855,708	455,337		855,708	455,337	
19	133-01-031	855,881	454,651		855,881	454,651	2,589
20	133-01-058	856,395	452,238	12,028	856,395	452,238	2,584
21	133-01-056E	856,625	451,596		856,625	451,596	
22	133-01-040	856,081	454,235		856,081	454,235	2,588
23	133-01-039A	856,241	454,002		856,241	454,002	
24	133-01-025	855,924	456,153		855,924	456,153	2,595
25	133-01-032	856,179	454,849		856,179	454,849	2,591
26	133-01-039B	856,355	454,219		856,355	454,219	2,589
27	133-01-035	856,419	454,561		856,419	454,561	2,590
28	133-01-045	856,659	453,273	15,060	856,659	453,273	2,587
29	133-01-034	856,419	454,727		856,419	454,727	2,591
30	133-01-033	856,410	454,842		856,410	454,842	
31	133-01-044	856,665	453,473	11,947	856,665	453,473	2,587
32	133-01-038	856,662	454,013		856,662	454,013	2,591
33	133-01-037	856,644	454,212		856,644	454,212	2,593
34	133-01-036	856,703	454,541		856,703	454,541	2,592
35	133-01-055B	857,154	453,048		857,154	453,048	
36	133-01-047	857,008	453,850		857,008	453,850	
37	133-01-046	857,066	453,779	12,872	857,066	453,779	2,589

Formulas--

Column	Formula
AG	=IF(AGi="yes", dh_near, dh_other)
AL	=IF(AFi,AFi+ AJi, 0)
AS	=Qi
AW	=MATCH($Qi,$AR:$AR)
AX	=MATCH($Si,$AR:$AR)
AZ	=INDIRECT(ADDRESS(AWi, COLUMN($AQ:$AQ)))
BA	=INDIRECT(ADDRESS(AXi, COLUMN($AQ:$AQ)))
BC	=INDIRECT(ADDRESS(AWi, COLUMN($AR:$AR)))
BD	=INDIRECT(ADDRESS(AXi, COLUMN($AR:$AR)))
BM	=INDIRECT(ADDRESS(ids,COLUMN(cwsel_exist)))
BN	=INDIRECT(ADDRESS(ius,COLUMN(cwsel_exist)))
BO	=BMi + Ri*(BNi-BMi)
BQ	=ALi
BS	=IF(AND(ALi<>0, BOi>$ALi), BOi-$ALi, 0)
BT	=IF(AND(ANi="yes", F13="yes"), 0, BSi)
BY	=ALi
BZ	=IF(BTi, MTJ.XLM!interpolate(BTi,table_depth, table_structure), 0)
CA	=IF(BTi, MTJ.XLM!interpolate(BTi,table_depth,table_content),0)
CC	=Ui * value_adjustment * BZi
CD	=Ui * value_adjustment *percent_content * CAi

Note: i = row number

	L	M	N	O	P	Q	R	S	T	U	V	W	X
18									Full Cash Values			Coordinates	
19				Parcel	ds	ratio	us		Struc	Land		x	y
57		38		133-02-061	7.488	.404	7.688		105,504	64,680		857,003	454,306
58		39		133-01-055A	7.488	.466	7.688		67,916	48,938		857,277	453,397
59		40		133-02-062C	7.488	.541	7.688		173,830	40,480		856,957	455,005
60		41		133-02-060B	7.488	.563	7.688		--	500		857,150	454,308
61		42		133-01-054	7.488	.762	7.688		--	50,700		857,657	453,179
62		43		133-02-060A	7.488	.778	7.688		177,877	64,560		857,344	454,334
63		44		133-01-048	7.488	.857	7.688		19,405	24,795		857,594	453,747
64		45		133-02-062D	7.488	.895	7.688		178,351	70,400		857,252	455,006
65		46		133-02-059H	7.488	.972	7.688		107,694	33,200		857,626	454,026
66		47		133-02-059G	7.688	.000	7.723		--	20,200		857,591	454,225
67		48		133-02-059D	7.688	.181	7.723		42,318	19,000		857,503	454,592
68		49		133-02-059F	7.688	.327	7.723		90,744	20,000		857,592	454,392
69		50		133-01-049	7.688	.647	7.723		35,671	46,219		857,899	453,622
70		51		133-02-059B	7.723	.200	7.820		--	19,600		857,673	454,576
71		52		133-02-058	7.723	.362	7.820		92,049	39,200		857,971	453,991
72		53		133-01-050	7.723	.737	7.820		88,665	66,300		858,230	453,816
73		54		133-02-057	7.820	.257	7.912		32,894	57,552		857,944	454,510
74		55		133-02-063C	7.820	.326	7.912		118,527	55,264		857,592	455,007
75		56		133-02-056	7.820	.702	7.912		40,453	62,760		858,112	454,473
76		57		133-01-056F	7.820	.881	7.912		--	61,880		858,997	452,930
77		58		133-01-053	7.912	.013	7.950		--	500		858,892	453,615
78		59		133-02-054C	7.912	.028	7.950		35,390	44,704		858,420	454,222
79		60		133-01-051	7.912	.069	7.950		500	39,150		858,786	453,779
80		61		133-02-064	7.912	.239	7.950		51,674	55,264		857,922	454,928
81		62		133-02-065B	7.912	.600	7.950		96,615	21,400		858,088	454,865
82		63		133-02-054D	7.912	.675	7.950		--	500		858,442	454,451
83		64		133-02-073A	7.912	.704	7.950		103,182	20,000		858,690	454,151
84		65		133-01-052	7.912	.808	7.950		14,058	32,625		859,076	453,667
85		66		133-02-065D	7.950	.050	7.994		80,565	21,400		858,195	454,920
86		67		133-02-054B	7.950	.078	7.994		65,401	22,200		858,466	454,596
87		68		133-02-072	7.950	.148	7.994		113,886	20,000		858,718	454,320
88		69		133-02-074A	7.950	.163	7.994		79,143	20,000		858,876	454,129
89		70		133-02-053	7.950	.329	7.994		56,543	30,600		858,568	454,613
90		71		133-02-051	7.950	.377	7.994		10,971	27,800		859,055	453,999
91		72		133-02-065E	7.950	.437	7.994		110,590	21,400		858,294	455,018
92		73		133-02-071	7.950	.496	7.994		61,593	20,000		858,744	454,487
93		74		133-02-050E	7.950	.557	7.994		2,174	19,600		859,048	454,142
94		75		133-02-065G	7.950	.653	7.994		--	21,200		858,379	455,035
95		76		133-02-065H	7.950	.714	7.994		109,437	16,600		858,508	454,908
96		77		133-02-070	7.950	.780	7.994		97,113	20,000		858,748	454,646
97		78		205-52-058	7.950	.808	7.994		--	500		859,225	453,940
98		79		133-02-075	7.950	.817	7.994		98,619	20,000		859,035	454,308
99		80		205-52-059	7.950	.889	7.994		--	500		859,247	453,940
100		81		133-02-076	7.994	.053	8.065		112,676	20,000		859,010	454,489
101		82		133-02-065F	7.994	.054	8.065		--	19,200		858,521	455,128
102		83		133-02-069	7.994	.054	8.065		103,775	20,000		858,708	454,884
103		84		205-52-060C	7.994	.086	8.065		85,433	65,880		859,388	453,701
104		85		133-02-009	7.994	.125	8.065		96,933	15,000		858,411	455,377
105		86		133-02-077	7.994	.179	8.065		118,154	20,000		858,969	454,666
106		87		205-52-055A	7.994	.211	8.065		31,293	32,700		859,344	454,017
107		88		133-02-068	7.994	.221	8.065		101,323	20,000		858,856	454,879
108		89		133-02-066C	7.994	.245	8.065		42,814	17,600		858,688	455,163

	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN
18								High						Behind	
19				Parcel		fge		Pad?		dh		ffe		Levee?	
57		38	|	133-02-061		2,591.20		yes		3.0		2,594.20			
58		39	|	133-01-055A		2,588.00				1.0		2,589.00			
59		40	|	133-02-062C		2,594.00		yes		3.0		2,597.00			
60		41	|	133-02-060B		--				1.0		--			
61		42	|	133-01-054		--				1.0		--			
62		43	|	133-02-060A		2,591.00		yes		3.0		2,594.00			
63		44	|	133-01-048		2,590.00				1.0		2,591.00			
64		45	|	133-02-062D		2,594.00		yes		3.0		2,597.00			
65		46	|	133-02-059H		2,590.00				1.0		2,591.00			
66		47	|	133-02-059G		--				1.0		--			
67		48	|	133-02-059D		2,593.00				1.0		2,594.00			
68		49	|	133-02-059F		2,592.00				1.0		2,593.00			
69		50	|	133-01-049		2,591.00				1.0		2,592.00			
70		51	|	133-02-059B		--				1.0		--			
71		52	|	133-02-058		2,591.70				1.0		2,592.70			
72		53	|	133-01-050		2,592.10				1.0		2,593.10			
73		54	|	133-02-057		2,593.00				1.0		2,594.00			
74		55	|	133-02-063C		2,594.00				1.0		2,595.00			
75		56	|	133-02-056		2,594.00				1.0		2,595.00			
76		57	|	133-01-056F		--				1.0		--			
77		58	|	133-01-053		--				1.0		--			
78		59	|	133-02-054C		2,595.80				1.0		2,596.80			
79		60	|	133-01-051		2,596.00				1.0		2,597.00			
80		61	|	133-02-064		2,594.00				1.0		2,595.00			
81		62	|	133-02-065B		2,594.60				1.0		2,595.60			
82		63	|	133-02-054D		--				1.0		--			
83		64	|	133-02-073A		2,593.00				1.0		2,594.00			
84		65	|	133-01-052		2,594.00				1.0		2,595.00			
85		66	|	133-02-065D		2,595.00				1.0		2,596.00			
86		67	|	133-02-054B		2,596.00				1.0		2,597.00			
87		68	|	133-02-072		2,594.00				1.0		2,595.00			
88		69	|	133-02-074A		2,593.10				1.0		2,594.10			
89		70	|	133-02-053		2,597.00				1.0		2,598.00			
90		71	|	133-02-051		2,596.00				1.0		2,597.00			
91		72	|	133-02-065E		2,595.20				1.0		2,596.20			
92		73	|	133-02-071		2,596.00				1.0		2,597.00			
93		74	|	133-02-050E		2,596.00				1.0		2,597.00			
94		75	|	133-02-065G		--				1.0		--			
95		76	|	133-02-065H		2,595.80				1.0		2,596.80			
96		77	|	133-02-070		2,596.40				1.0		2,597.40			
97		78	|	205-52-058		--				1.0		--			
98		79	|	133-02-075		2,595.00				1.0		2,596.00			
99		80	|	205-52-059		--				1.0		--			
100		81	|	133-02-076		2,595.50				1.0		2,596.50			
101		82	|	133-02-065F		--				1.0		--			
102		83	|	133-02-069		2,596.50				1.0		2,597.50			
103		84	|	205-52-060C		2,596.00				1.0		2,597.00			
104		85	|	133-02-009		2,596.00				1.0		2,597.00			
105		86	|	133-02-077		2,596.00				1.0		2,597.00			
106		87	|	205-52-055A		2,597.00				1.0		2,598.00			
107		88	|	133-02-068		2,597.50				1.0		2,598.50			
108		89	|	133-02-066C		2,596.00				1.0		2,597.00			

	AP	AQ	AR	AS	AT	AU	AV	AW	AY	AZ	BB	BC
18		River							Section No		River Mile	
19	SECNO	Mile	ELMIN			Parcel	ds	us	ds	us	ds	us
57	21.207	9.077	2,617.0		38	133-02-061	37	38	114	1	7.488	7.688
58	21.325	9.195	2,619.0		39	133-01-055A	37	38	114	1	7.488	7.688
59	21.468	9.338	2,623.0		40	133-02-062C	37	38	114	1	7.488	7.688
60	21.544	9.414	2,624.0		41	133-02-060B	37	38	114	1	7.488	7.688
61	21.628	9.498	2,626.0		42	133-01-054	37	38	114	1	7.488	7.688
62	21.707	9.577	2,628.0		43	133-02-060A	37	38	114	1	7.488	7.688
63	21.790	9.660	2,630.0		44	133-01-048	37	38	114	1	7.488	7.688
64	21.880	9.750	2,631.0		45	133-02-062D	37	38	114	1	7.488	7.688
65	21.925	9.795	2,632.0		46	133-02-059H	37	38	114	1	7.488	7.688
66	21.972	9.842	2,634.0		47	133-02-059G	38	39	1	2	7.688	7.723
67	22.047	9.917	2,636.0		48	133-02-059D	38	39	1	2	7.688	7.723
68	22.125	9.995	2,638.0		49	133-02-059F	38	39	1	2	7.688	7.723
69	22.195	10.065	2,639.0		50	133-01-049	38	39	1	2	7.688	7.723
70	22.275	10.145	2,641.0		51	133-02-059B	39	40	2	3	7.723	7.820
71	22.338	10.208	2,643.0		52	133-02-058	39	40	2	3	7.723	7.820
72	22.373	10.243	2,644.0		53	133-01-050	39	40	2	3	7.723	7.820
73	22.454	10.324	2,645.0		54	133-02-057	40	41	3	4	7.820	7.912
74	22.511	10.381	2,647.0		55	133-02-063C	40	41	3	4	7.820	7.912
75	22.591	10.461	2,648.0		56	133-02-056	40	41	3	4	7.820	7.912
76	22.670	10.540	2,650.0		57	133-01-056F	40	41	3	4	7.820	7.912
77	10580	10.580	2,653.5		58	133-01-053	41	42	4	5	7.912	7.950
78	10640	10.640	2,655.0		59	133-02-054C	41	42	4	5	7.912	7.950
79	10700	10.700	2,655.9		60	133-01-051	41	42	4	5	7.912	7.950
80	10780	10.780	2,658.0		61	133-02-064	41	42	4	5	7.912	7.950
81	10860	10.860	2,660.0		62	133-02-065B	41	42	4	5	7.912	7.950
82	10940	10.940	2,662.0		63	133-02-054D	41	42	4	5	7.912	7.950
83	11020	11.020	2,664.0		64	133-02-073A	41	42	4	5	7.912	7.950
84	11100	11.100	2,667.3		65	133-01-052	41	42	4	5	7.912	7.950
85	11160	11.160	2,667.0		66	133-02-065D	42	43	5	6	7.950	7.994
86	11240	11.240	2,670.0		67	133-02-054B	42	43	5	6	7.950	7.994
87	11320	11.320	2,671.5		68	133-02-072	42	43	5	6	7.950	7.994
88	11400	11.400	2,674.0		69	133-02-074A	42	43	5	6	7.950	7.994
89	11480	11.480	2,675.5		70	133-02-053	42	43	5	6	7.950	7.994
90	11560	11.560	2,676.5		71	133-02-051	42	43	5	6	7.950	7.994
91	11640	11.640	2,678.6		72	133-02-065E	42	43	5	6	7.950	7.994
92	11700	11.700	2,680.0		73	133-02-071	42	43	5	6	7.950	7.994
93	11760	11.760	2,682.5		74	133-02-050E	42	43	5	6	7.950	7.994
94	11840	11.840	2,685.5		75	133-02-065G	42	43	5	6	7.950	7.994
95	11900	11.900	2,686.0		76	133-02-065H	42	43	5	6	7.950	7.994
96	11960	11.960	2,687.5		77	133-02-070	42	43	5	6	7.950	7.994
97	12020	12.020	2,689.0		78	205-52-058	42	43	5	6	7.950	7.994
98	12100	12.100	2,690.6		79	133-02-075	42	43	5	6	7.950	7.994
99	12180	12.180	2,692.2		80	205-52-059	42	43	5	6	7.950	7.994
100	12250	12.250	2,692.7		81	133-02-076	43	44	6	20.195	7.994	8.065
101	12300	12.300	2,692.7		82	133-02-065F	43	44	6	20.195	7.994	8.065
102	12380	12.380	2,694.6		83	133-02-069	43	44	6	20.195	7.994	8.065
103	12460	12.460	2,698.0		84	205-52-060C	43	44	6	20.195	7.994	8.065
104	12540	12.540	2,701.0		85	133-02-009	43	44	6	20.195	7.994	8.065
105	12620	12.620	2,703.0		86	133-02-077	43	44	6	20.195	7.994	8.065
106	12700	12.700	2,700.0		87	205-52-055A	43	44	6	20.195	7.994	8.065
107	12780	12.780	2,707.5		88	133-02-068	43	44	6	20.195	7.994	8.065
108	12840	12.840	2,709.0		89	133-02-066C	43	44	6	20.195	7.994	8.065

	BF	BH	BJ	BK	BL	BM	BN	BP	BR	BS
18		100					wse at	ffe		With
19	R. Mile	CWSEL		Parcel	ds Cwsel	us Cwsel	struc	(Repeat)	Actual	Levee
57	9.077	2,624.87	38	133-02-061	2,587.99	2,592.81	2,589.94	2,594.20	--	--
58	9.195	2,626.67	39	133-01-055A	2,587.99	2,592.81	2,590.23	2,589.00	1.23	1.23
59	9.338	2,630.44	40	133-02-062C	2,587.99	2,592.81	2,590.60	2,597.00	--	--
60	9.414	2,631.88	41	133-02-060B	2,587.99	2,592.81	2,590.70	--	--	--
61	9.498	2,635.27	42	133-01-054	2,587.99	2,592.81	2,591.66	--	--	--
62	9.577	2,637.55	43	133-02-060A	2,587.99	2,592.81	2,591.74	2,594.00	--	--
63	9.660	2,638.82	44	133-01-048	2,587.99	2,592.81	2,592.12	2,591.00	1.12	1.12
64	9.750	2,639.58	45	133-02-062D	2,587.99	2,592.81	2,592.30	2,597.00	--	--
65	9.795	2,641.26	46	133-02-059H	2,587.99	2,592.81	2,592.67	2,591.00	1.67	1.67
66	9.842	2,643.23	47	133-02-059G	2,592.81	2,594.52	2,592.81	--	--	--
67	9.917	2,644.18	48	133-02-059D	2,592.81	2,594.52	2,593.12	2,594.00	--	--
68	9.995	2,645.72	49	133-02-059F	2,592.81	2,594.52	2,593.37	2,593.00	0.37	0.37
69	10.065	2,646.55	50	133-01-049	2,592.81	2,594.52	2,593.92	2,592.00	1.92	1.92
70	10.145	2,648.39	51	133-02-059B	2,594.52	2,596.45	2,594.91	--	--	--
71	10.208	2,649.95	52	133-02-058	2,594.52	2,596.45	2,595.22	2,592.70	2.52	2.52
72	10.243	2,650.36	53	133-01-050	2,594.52	2,596.45	2,595.94	2,593.10	2.84	2.84
73	10.324	2,652.34	54	133-02-057	2,596.45	2,599.67	2,597.28	2,594.00	3.28	3.28
74	10.381	2,653.47	55	133-02-063C	2,596.45	2,599.67	2,597.50	2,595.00	2.50	2.50
75	10.461	2,654.91	56	133-02-056	2,596.45	2,599.67	2,598.71	2,595.00	3.71	3.71
76	10.540	2,656.91	57	133-01-056F	2,596.45	2,599.67	2,599.29	--	--	--
77	10.580	2,659.88	58	133-01-053	2,599.67	2,600.42	2,599.68	--	--	--
78	10.640	2,660.88	59	133-02-054C	2,599.67	2,600.42	2,599.69	2,596.80	2.89	2.89
79	10.700	2,661.83	60	133-01-051	2,599.67	2,600.42	2,599.72	2,597.00	2.72	2.72
80	10.780	2,663.35	61	133-02-064	2,599.67	2,600.42	2,599.85	2,595.00	4.85	4.85
81	10.860	2,665.78	62	133-02-065B	2,599.67	2,600.42	2,600.12	2,595.60	4.52	4.52
82	10.940	2,667.59	63	133-02-054D	2,599.67	2,600.42	2,600.18	--	--	--
83	11.020	2,669.33	64	133-02-073A	2,599.67	2,600.42	2,600.20	2,594.00	6.20	6.20
84	11.100	2,671.13	65	133-01-052	2,599.67	2,600.42	2,600.28	2,595.00	5.28	5.28
85	11.160	2,672.26	66	133-02-065D	2,600.42	2,602.44	2,600.52	2,596.00	4.52	4.52
86	11.240	2,674.70	67	133-02-054B	2,600.42	2,602.44	2,600.58	2,597.00	3.58	3.58
87	11.320	2,677.59	68	133-02-072	2,600.42	2,602.44	2,600.72	2,595.00	5.72	5.72
88	11.400	2,679.15	69	133-02-074A	2,600.42	2,602.44	2,600.75	2,594.10	6.65	6.65
89	11.480	2,681.13	70	133-02-053	2,600.42	2,602.44	2,601.08	2,598.00	3.08	3.08
90	11.560	2,683.31	71	133-02-051	2,600.42	2,602.44	2,601.18	2,597.00	4.18	4.18
91	11.640	2,686.31	72	133-02-065E	2,600.42	2,602.44	2,601.30	2,596.20	5.10	5.10
92	11.700	2,688.02	73	133-02-071	2,600.42	2,602.44	2,601.42	2,597.00	4.42	4.42
93	11.760	2,689.18	74	133-02-050E	2,600.42	2,602.44	2,601.54	2,597.00	4.54	4.54
94	11.840	2,692.13	75	133-02-065G	2,600.42	2,602.44	2,601.74	--	--	--
95	11.900	2,693.66	76	133-02-065H	2,600.42	2,602.44	2,601.86	2,596.80	5.06	5.06
96	11.960	2,695.88	77	133-02-070	2,600.42	2,602.44	2,602.00	2,597.40	4.60	4.60
97	12.020	2,696.84	78	205-52-058	2,600.42	2,602.44	2,602.05	--	--	--
98	12.100	2,698.31	79	133-02-075	2,600.42	2,602.44	2,602.07	2,596.00	6.07	6.07
99	12.180	2,699.18	80	205-52-059	2,600.42	2,602.44	2,602.22	--	--	--
100	12.250	2,702.94	81	133-02-076	2,602.44	2,604.28	2,602.54	2,596.50	6.04	6.04
101	12.300	2,705.10	82	133-02-065F	2,602.44	2,604.28	2,602.54	--	--	--
102	12.380	2,706.08	83	133-02-069	2,602.44	2,604.28	2,602.54	2,597.50	5.04	5.04
103	12.460	2,709.06	84	205-52-060C	2,602.44	2,604.28	2,602.60	2,597.00	5.60	5.60
104	12.540	2,713.56	85	133-02-009	2,602.44	2,604.28	2,602.67	2,597.00	5.67	5.67
105	12.620	2,716.54	86	133-02-077	2,602.44	2,604.28	2,602.77	2,597.00	5.77	5.77
106	12.700	2,716.93	87	205-52-055A	2,602.44	2,604.28	2,602.83	2,598.00	4.83	4.83
107	12.780	2,717.10	88	133-02-068	2,602.44	2,604.28	2,602.85	2,598.50	4.35	4.35
108	12.840	2,720.84	89	133-02-066C	2,602.44	2,604.28	2,602.89	2,597.00	5.89	5.89

	BV	BX	BY	BZ	CB	CC	CD	CE
18		Structure	Damage		Value of Damage			
19		(Repeat)	Struc	Cont	Struc	Content	Total	
57	38	105,504	--	--	--	--	--	
58	39	67,916	.150	.205	12,702	5,227	17,930	
59	40	173,830	--	--	--	--	--	
60	41	--	--	--	--	--	--	
61	42	--	--	--	--	--	--	
62	43	177,877	--	--	--	--	--	
63	44	19,405	.142	.188	3,442	1,371	4,813	
64	45	178,351	--	--	--	--	--	
65	46	107,694	.180	.271	24,214	10,959	35,173	
66	47	--	--	--	--	--	--	
67	48	42,318	--	--	--	--	--	
68	49	90,744	.098	.137	11,154	4,678	15,832	
69	50	35,671	.197	.308	8,764	4,118	12,882	
70	51	--	--	--	--	--	--	
71	52	92,049	.235	.334	27,017	11,529	38,546	
72	53	88,665	.255	.342	28,260	11,386	39,647	
73	54	32,894	.271	.353	11,139	4,351	15,490	
74	55	118,527	.234	.333	34,601	14,822	49,423	
75	56	40,453	.280	.362	14,171	5,497	19,668	
76	57	--	--	--	--	--	--	
77	58	--	--	--	--	--	--	
78	59	35,390	.258	.344	11,417	4,562	15,979	
79	60	500	.247	.339	155	64	218	
80	61	51,674	.297	.400	19,164	7,761	26,925	
81	62	96,615	.293	.388	35,354	14,066	49,420	
82	63	--	--	--	--	--	--	
83	64	103,182	.411	.459	52,995	17,756	70,751	
84	65	14,058	.328	.418	5,770	2,203	7,973	
85	66	80,565	.293	.388	29,483	11,732	41,215	
86	67	65,401	.277	.359	22,677	8,815	31,492	
87	68	113,886	.376	.437	53,542	18,662	72,205	
88	69	79,143	.421	.481	41,617	14,283	55,899	
89	70	56,543	.267	.348	18,851	7,389	26,240	
90	71	10,971	.289	.376	3,959	1,545	5,504	
91	72	110,590	.310	.411	42,797	17,025	59,822	
92	73	61,593	.292	.385	22,447	8,882	31,330	
93	74	2,174	.293	.389	796	317	1,114	
94	75	--	--	--	--	--	--	
95	76	109,437	.305	.409	41,762	16,777	58,539	
96	77	97,113	.294	.391	35,646	14,241	49,887	
97	78	--	--	--	--	--	--	
98	79	98,619	.408	.453	50,309	16,736	67,045	
99	80	--	--	--	--	--	--	
100	81	112,676	.407	.451	57,382	19,054	76,436	
101	82	--	--	--	--	--	--	
102	83	103,775	.303	.408	39,262	15,868	55,130	
103	84	85,433	.363	.432	38,770	13,833	52,603	
104	85	96,933	.371	.435	44,930	15,808	60,738	
105	86	118,154	.382	.439	56,359	19,458	75,817	
106	87	31,293	.296	.400	11,595	4,690	16,286	
107	88	101,323	.291	.382	36,813	14,506	51,319	
108	89	42,814	.395	.444	21,128	7,135	28,263	

	CG	CH	CI	CJ	CK	CL	CM	CN	CO	CP
18				2	10	25	50	100	cba	
19			SECNO	CWSEL	CWSEL	CWSEL	CWSEL	CWSEL	CWSEL	
57			21.207	2,619.59	2,621.32	2,622.64	2,623.70	2,624.87	2,625.61	
58			21.325	2,621.99	2,623.63	2,624.64	2,625.54	2,626.67	2,627.44	
59			21.468	2,626.01	2,627.67	2,628.66	2,629.43	2,630.44	2,631.20	
60			21.544	2,627.41	2,629.21	2,630.21	2,630.95	2,631.88	2,632.58	
61			21.628	2,629.34	2,632.01	2,632.98	2,634.02	2,635.27	2,636.11	
62			21.707	2,632.03	2,634.35	2,635.57	2,636.43	2,637.55	2,638.35	
63			21.790	2,633.17	2,635.45	2,636.73	2,637.66	2,638.82	2,639.62	
64			21.880	2,634.77	2,636.98	2,637.94	2,638.75	2,639.58	2,640.31	
65			21.925	2,635.44	2,637.71	2,639.39	2,640.28	2,641.26	2,641.92	
66			21.972	2,637.14	2,639.72	2,641.04	2,642.00	2,643.23	2,644.09	
67			22.047	2,638.49	2,640.71	2,642.09	2,643.03	2,644.18	2,645.00	
68			22.125	2,640.03	2,641.92	2,643.35	2,644.42	2,645.72	2,646.59	
69			22.195	2,642.27	2,643.99	2,644.77	2,645.53	2,646.55	2,647.27	
70			22.275	2,643.90	2,645.62	2,646.64	2,647.42	2,648.39	2,649.08	
71			22.338	2,645.65	2,647.16	2,648.10	2,648.90	2,649.95	2,650.71	
72			22.373	2,646.76	2,647.81	2,648.63	2,649.32	2,650.36	2,651.08	
73			22.454	2,647.97	2,649.56	2,650.60	2,651.44	2,652.34	2,652.86	
74			22.511	2,649.11	2,650.55	2,651.64	2,652.50	2,653.47	2,654.08	
75			22.591	2,650.81	2,652.25	2,653.16	2,653.93	2,654.91	2,655.51	
76			22.670	2,653.22	2,654.65	2,655.46	2,656.10	2,656.91	2,657.41	
77			10.580	2,655.84	2,657.51	2,658.44	2,659.10	2,659.88	2,660.29	
78			10.640	2,656.83	2,658.36	2,659.31	2,660.03	2,660.88	2,661.14	
79			10.700	2,657.95	2,659.30	2,660.24	2,660.97	2,661.83	2,662.04	
80			10.780	2,659.63	2,660.94	2,661.80	2,662.49	2,663.35	2,663.51	
81			10.860	2,662.46	2,663.68	2,664.40	2,665.00	2,665.78	2,665.93	
82			10.940	2,664.08	2,665.43	2,666.21	2,666.82	2,667.59	2,667.73	
83			11.020	2,665.90	2,667.18	2,667.97	2,668.58	2,669.33	2,669.47	
84			11.100	2,668.38	2,669.29	2,669.96	2,670.47	2,671.13	2,671.25	
85			11.160	2,669.46	2,670.41	2,671.06	2,671.60	2,672.26	2,672.38	
86			11.240	2,671.65	2,672.89	2,673.44	2,674.01	2,674.70	2,674.82	
87			11.320	2,673.87	2,675.26	2,676.18	2,676.81	2,677.59	2,677.73	
88			11.400	2,675.41	2,676.68	2,677.59	2,678.29	2,679.15	2,679.30	
89			11.480	2,677.74	2,678.94	2,679.70	2,680.33	2,681.13	2,681.28	
90			11.560	2,679.55	2,681.01	2,681.82	2,682.49	2,683.31	2,683.47	
91			11.640	2,683.25	2,684.54	2,685.11	2,685.63	2,686.31	2,686.44	
92			11.700	2,684.41	2,685.83	2,686.63	2,687.26	2,688.02	2,688.16	
93			11.760	2,685.39	2,686.79	2,687.64	2,688.32	2,689.18	2,689.33	
94			11.840	2,688.13	2,689.34	2,690.34	2,691.15	2,692.13	2,692.31	
95			11.900	2,689.96	2,691.42	2,692.16	2,692.80	2,693.66	2,693.82	
96			11.960	2,690.91	2,692.79	2,693.96	2,694.83	2,695.88	2,696.07	
97			12.020	2,692.63	2,694.50	2,695.25	2,695.91	2,696.84	2,697.02	
98			12.100	2,693.97	2,695.65	2,696.64	2,697.40	2,698.31	2,698.48	
99			12.180	2,694.41	2,696.16	2,697.33	2,698.17	2,699.18	2,699.37	
100			12.250	2,696.78	2,698.66	2,700.83	2,701.79	2,702.94	2,702.88	
101			12.300	2,697.90	2,701.38	2,702.90	2,703.93	2,705.10	2,705.40	
102			12.380	2,699.69	2,702.63	2,703.96	2,704.92	2,706.08	2,706.33	
103			12.460	2,701.02	2,704.33	2,706.43	2,707.84	2,709.06	2,709.26	
104			12.540	2,705.02	2,707.78	2,710.69	2,712.24	2,713.56	2,713.79	
105			12.620	2,708.29	2,711.92	2,713.79	2,715.08	2,716.54	2,716.81	
106			12.700	2,708.78	2,712.34	2,714.17	2,715.46	2,716.93	2,717.34	
107			12.780	2,709.91	2,712.32	2,713.91	2,715.28	2,717.10	2,719.75	
108			12.840	2,713.00	2,715.43	2,717.24	2,718.81	2,720.84	2,723.85	

	CQ	CR	CS	CT	CU	CV	CW	CX	CY
18				2	10	25	50	100	
19			SECNO	CWSEL	CWSEL	CWSEL	CWSEL	CWSEL	
57			21.207	2,619.59	2,621.30	2,622.47	2,623.35	2,624.31	
58			21.325	2,621.98	2,623.59	2,624.58	2,625.42	2,626.39	
59			21.468	2,626.01	2,627.50	2,628.36	2,629.05	2,630.00	
60			21.544	2,627.41	2,629.20	2,630.18	2,631.05	2,631.91	
61			21.628	2,629.36	2,631.88	2,632.94	2,633.76	2,634.74	
62			21.707	2,631.99	2,634.10	2,635.02	2,635.68	2,636.46	
63			21.790	2,633.12	2,635.29	2,636.40	2,637.16	2,638.03	
64			21.880	2,634.67	2,636.83	2,637.80	2,638.49	2,639.18	
65			21.925	2,635.42	2,637.45	2,639.21	2,640.10	2,640.94	
66			21.972	2,636.99	2,639.51	2,640.72	2,641.46	2,642.39	
67			22.047	2,638.42	2,640.61	2,641.93	2,642.83	2,643.84	
68			22.125	2,639.94	2,641.60	2,642.86	2,643.73	2,644.74	
69			22.195	2,642.31	2,644.15	2,644.91	2,645.50	2,646.24	
70			22.275	2,643.89	2,645.63	2,646.62	2,647.39	2,648.28	
71			22.338	2,645.66	2,647.17	2,648.09	2,648.83	2,649.64	
72			22.373	2,646.75	2,647.83	2,648.63	2,649.34	2,650.36	
73			22.454	2,647.98	2,649.55	2,650.60	2,651.43	2,652.34	
74			22.511	2,649.10	2,650.55	2,651.64	2,652.50	2,653.47	
75			22.591	2,650.81	2,652.25	2,653.16	2,653.93	2,654.91	
76			22.670	2,653.22	2,654.65	2,655.46	2,656.10	2,656.91	
77			10.580	2,655.84	2,657.51	2,658.44	2,659.10	2,659.88	
78			10.640	2,656.83	2,658.36	2,659.31	2,660.03	2,660.88	
79			10.700	2,657.95	2,659.30	2,660.24	2,660.97	2,661.83	
80			10.780	2,659.63	2,660.94	2,661.80	2,662.49	2,663.35	
81			10.860	2,662.46	2,663.68	2,664.40	2,665.00	2,665.78	
82			10.940	2,664.07	2,665.43	2,666.21	2,666.82	2,667.59	
83			11.020	2,665.90	2,667.18	2,667.97	2,668.58	2,669.33	
84			11.100	2,668.38	2,669.29	2,669.96	2,670.47	2,671.13	
85			11.160	2,669.46	2,670.41	2,671.06	2,671.60	2,672.26	
86			11.240	2,671.65	2,672.89	2,673.44	2,674.01	2,674.70	
87			11.320	2,673.87	2,675.26	2,676.18	2,676.81	2,677.59	
88			11.400	2,675.40	2,676.68	2,677.59	2,678.29	2,679.15	
89			11.480	2,677.74	2,678.94	2,679.70	2,680.33	2,681.13	
90			11.560	2,679.55	2,681.01	2,681.82	2,682.49	2,683.31	
91			11.640	2,683.24	2,684.54	2,685.11	2,685.63	2,686.31	
92			11.700	2,684.41	2,685.83	2,686.64	2,687.26	2,688.02	
93			11.760	2,685.39	2,686.79	2,687.64	2,688.32	2,689.18	
94			11.840	2,688.13	2,689.34	2,690.34	2,691.15	2,692.13	
95			11.900	2,689.96	2,691.42	2,692.16	2,692.80	2,693.66	
96			11.960	2,690.91	2,692.79	2,693.96	2,694.83	2,695.88	
97			12.020	2,692.63	2,694.50	2,695.25	2,695.91	2,696.84	
98			12.100	2,693.97	2,695.65	2,696.64	2,697.40	2,698.31	
99			12.180	2,694.41	2,696.16	2,697.33	2,698.17	2,699.18	
100			12.250	2,696.78	2,698.66	2,700.83	2,701.79	2,702.94	
101			12.300	2,697.90	2,701.38	2,702.90	2,703.93	2,705.10	
102			12.380	2,699.69	2,702.63	2,703.96	2,704.92	2,706.08	
103			12.460	2,701.02	2,704.33	2,706.43	2,707.84	2,709.06	
104			12.540	2,705.02	2,707.78	2,710.69	2,712.24	2,713.56	
105			12.620	2,708.29	2,711.92	2,713.79	2,715.08	2,716.54	
106			12.700	2,708.78	2,712.34	2,714.17	2,715.46	2,716.93	
107			12.780	2,709.91	2,712.32	2,713.91	2,715.28	2,717.10	
108			12.840	2,713.00	2,715.43	2,717.24	2,718.81	2,720.84	

	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI
18				of flood damage					of ffe's	
19			Parcel	x	y	Amount		x	y	ffe
57		38	133-02-061	857,003	454,306			857,003	454,306	2,594
58		39	133-01-055A	857,277	453,397	17,930		857,277	453,397	2,589
59		40	133-02-062C	856,957	455,005			856,957	455,005	2,597
60		41	133-02-060B	857,150	454,308			857,150	454,308	
61		42	133-01-054	857,657	453,179			857,657	453,179	
62		43	133-02-060A	857,344	454,334			857,344	454,334	2,594
63		44	133-01-048	857,594	453,747	4,813		857,594	453,747	2,591
64		45	133-02-062D	857,252	455,006			857,252	455,006	2,597
65		46	133-02-059H	857,626	454,026	35,173		857,626	454,026	2,591
66		47	133-02-059G	857,591	454,225			857,591	454,225	
67		48	133-02-059D	857,503	454,592			857,503	454,592	2,594
68		49	133-02-059F	857,592	454,392	15,832		857,592	454,392	2,593
69		50	133-01-049	857,899	453,622	12,882		857,899	453,622	2,592
70		51	133-02-059B	857,673	454,576			857,673	454,576	
71		52	133-02-058	857,971	453,991	38,546		857,971	453,991	2,593
72		53	133-01-050	858,230	453,816	39,647		858,230	453,816	2,593
73		54	133-02-057	857,944	454,510	15,490		857,944	454,510	2,594
74		55	133-02-063C	857,592	455,007	49,423		857,592	455,007	2,595
75		56	133-02-056	858,112	454,473	19,668		858,112	454,473	2,595
76		57	133-01-056F	858,997	452,930			858,997	452,930	
77		58	133-01-053	858,892	453,615			858,892	453,615	
78		59	133-02-054C	858,420	454,222	15,979		858,420	454,222	2,597
79		60	133-01-051	858,786	453,779	218		858,786	453,779	2,597
80		61	133-02-064	857,922	454,928	26,925		857,922	454,928	2,595
81		62	133-02-065B	858,088	454,865	49,420		858,088	454,865	2,596
82		63	133-02-054D	858,442	454,451			858,442	454,451	
83		64	133-02-073A	858,690	454,151	70,751		858,690	454,151	2,594
84		65	133-01-052	859,076	453,667	7,973		859,076	453,667	2,595
85		66	133-02-065D	858,195	454,920	41,215		858,195	454,920	2,596
86		67	133-02-054B	858,466	454,596	31,492		858,466	454,596	2,597
87		68	133-02-072	858,718	454,320	72,205		858,718	454,320	2,595
88		69	133-02-074A	858,876	454,129	55,899		858,876	454,129	2,594
89		70	133-02-053	858,568	454,613	26,240		858,568	454,613	2,598
90		71	133-02-051	859,055	453,999	5,504		859,055	453,999	2,597
91		72	133-02-065E	858,294	455,018	59,822		858,294	455,018	2,596
92		73	133-02-071	858,744	454,487	31,330		858,744	454,487	2,597
93		74	133-02-050E	859,048	454,142	1,114		859,048	454,142	2,597
94		75	133-02-065G	858,379	455,035			858,379	455,035	
95		76	133-02-065H	858,508	454,908	58,539		858,508	454,908	2,597
96		77	133-02-070	858,748	454,646	49,887		858,748	454,646	2,597
97		78	205-52-058	859,225	453,940			859,225	453,940	
98		79	133-02-075	859,035	454,308	67,045		859,035	454,308	2,596
99		80	205-52-059	859,247	453,940			859,247	453,940	
100		81	133-02-076	859,010	454,489	76,436		859,010	454,489	2,597
101		82	133-02-065F	858,521	455,128			858,521	455,128	
102		83	133-02-069	858,708	454,884	55,130		858,708	454,884	2,598
103		84	205-52-060C	859,388	453,701	52,603		859,388	453,701	2,597
104		85	133-02-009	858,411	455,377	60,738		858,411	455,377	2,597
105		86	133-02-077	858,969	454,666	75,817		858,969	454,666	2,597
106		87	205-52-055A	859,344	454,017	16,286		859,344	454,017	2,598
107		88	133-02-068	858,856	454,879	51,319		858,856	454,879	2,599
108		89	133-02-066C	858,688	455,163	28,263		858,688	455,163	2,597

	A	B	C	D	E	F	G	H	I	J	K
18											
19											
421											
422											
423											
424											
425											
426											
427											
428											
429											
430											
431											
432											
433											
434											

	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
18									Full Cash Values			Coordinates		
19				Parcel	ds	ratio	us		Struc	Land		x	y	
421		402		205-45-046	11.240	.533	11.400		--	137,500		875,432	452,593	
422		403		205-45-048	11.560	.150	11.640		--	231,000		876,543	453,057	
423		404		205-45-049	11.640	.619	11.700		129,713	179,300		876,836	453,625	
424		405		205-45-004A	11.840	.604	11.960		385,767	947,072		878,441	453,301	
425		406		205-45-063	11.840	.935	11.960		182,044	124,500		878,100	454,606	
426		407	#	205-45-064A	11.960	.672	12.020		--	120,000		878,394	454,526	
427		408		205-45-065	12.020	.654	12.100		--	500		878,777	454,622	
428		409		205-45-067	12.100	.197	12.250		104,234	65,000		879,121	454,523	
429		410		205-45-068	12.100	.510	12.250		--	65,000		879,395	454,442	
430		411		205-45-071	12.380	.056	12.540		--	103,500		880,174	454,414	
431														
432					Total FCV of structures:					$26,615,163				
433						Total FCV of land:				$17,649,620				
434							Total:			$44,264,783				

	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN
18								High						Behind	
19				Parcel		fge		Pad?		dh		ffe		Levee?	
421		402		205-45-046		--				1.0		--			
422		403		205-45-048		--				1.0		--			
423		404		205-45-049		2,688.00				1.0		2,689.00			
424		405		205-45-004A		2,704.00				1.0		2,705.00			
425		406		205-45-063		--				1.0		--			
426		407		205-45-064A		--				1.0		--			
427		408		205-45-065		--				1.0		--			
428		409		205-45-067		2,706.00				1.0		2,707.00			
429		410		205-45-068		--				1.0		--			
430		411		205-45-071		--		x		1.0		--			
431															
432															
433															
434															

	AP	AQ	AR	AT	AU	AV	AW	AY	AZ	BB	BC
18		River						Section No		River Mile	
19	SECNO	Mile	ELMIN		Parcel	ds	us	ds	us	ds	us
421				402	205-45-046	86	88	11240	11400	11.240	11.400
422				403	205-45-048	90	91	11560	11640	11.560	11.640
423				404	205-45-049	91	92	11640	11700	11.640	11.700
424				405	205-45-004A	94	96	11840	11960	11.840	11.960
425				406	205-45-063	94	96	11840	11960	11.840	11.960
426				407	205-45-064A	96	97	11960	12020	11.960	12.020
427				408	205-45-065	97	98	12020	12100	12.020	12.100
428				409	205-45-067	98	100	12100	12250	12.100	12.250
429				410	205-45-068	98	100	12100	12250	12.100	12.250
430	X	X		411	205-45-071	102	104	12380	12540	12.380	12.540
431											
432											
433											
434											

	BE	BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT
18				100						wse at		ffe			With	
19		R. Mile		CWSEL			Parcel	ds Cwsel	us Cwsel	struc		(Repeat)		Actual	Levee	
421						402	205-45-046	2,674.70	2,679.15	2,677.07		--		--	--	
422						403	205-45-048	2,683.31	2,686.31	2,683.76		--		--	--	
423						404	205-45-049	2,686.31	2,688.02	2,687.37		2,689.00		--	--	
424						405	205-45-004A	2,692.13	2,695.38	2,694.39		2,705.00		--	--	
425						406	205-45-063	2,692.13	2,695.38	2,695.64		--		--	--	
426						407	205-45-064A	2,695.88	2,696.34	2,696.53		--		--	--	
427						408	205-45-065	2,696.84	2,698.31	2,697.80		--		--	--	
428						409	205-45-067	2,698.31	2,702.94	2,699.22		2,707.00		--	--	
429						410	205-45-068	2,698.31	2,702.94	2,700.67		--		--	--	
430		X				411	205-45-071	2,706.08	2,713.56	2,706.50		--		--	--	
431																
432																
433																
434																

	BU	BV	BW	BX	BY	BZ	C	CB	CC	CD	CE	CF
18				Structure	Damage				Value of Damage			
19				(Repeat)	Struc	Cont		Struc	Content	Total		
421		402		--	--	--		--	--	--		
422		403		--	--	--		--	--	--		
423		404		129,713	--	--		--	--	--		
424		405		385,767	--	--		--	--	--		
425		406		182,044	--	--		--	--	--		
426		407		--	--	--		--	--	--		
427		408		--	--	--		--	--	--		
428		409		104,234	--	--		--	--	--		
429		410		--	--	--		--	--	--		
430		411		--	--	--		--	--	--		
431								$1,628,329	$646,346	2,274,675		
432												
433												
434												

	CG	CH	CI	CJ	CK	CL	CM	CN	CO	CP
18				2	10	25	50	100	cba	
19			SECNO	CWSEL	CWSEL	CWSEL	CWSEL	CWSEL	CWSEL	
421										
422										
423										
424										
425										
426										
427										
428										
429										
430										
431										
432										
433										
434										

	CQ	CR	CS	CT	CU	CV	CW	CX	CY
18				2	10	25	50	100	
19			SECNO	CWSEL	CWSEL	CWSEL	CWSEL	CWSEL	
421									
422									
423									
424									
425									
426									
427									
428									
429									
430									
431									
432									
433									
434									

	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI
18				of flood damage				of ffe's		
19			Parcel	x	y	Amount		x	y	ffe
421		402	205-45-046	875,432	452,593			875,432	452,593	
422		403	205-45-048	876,543	453,057			876,543	453,057	
423		404	205-45-049	876,836	453,625			876,836	453,625	2,689
424		405	205-45-004A	878,441	453,301			878,441	453,301	2,705
425		406	205-45-063	878,100	454,606			878,100	454,606	
426		407	205-45-064A	878,394	454,526			878,394	454,526	
427		408	205-45-065	878,777	454,622			878,777	454,622	
428		409	205-45-067	879,121	454,523			879,121	454,523	2,707
429		410	205-45-068	879,395	454,442			879,395	454,442	
430		411	205-45-071	880,174	454,414			880,174	454,414	
431						2,274,675				
432										
433										
434										

DISK #4

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Full cash to market value multiplier: 1.25

ASSESSOR DATA

	Tax ID	Full Cash Value (Struc)	(Land)
	-1-	-2-	-3-
1	133-01-025	$81,059	$405,132
2	133-01-026B	0	500
3	133-01-026C	0	244,200
4	133-01-027A	0	166,850
5	133-01-028	0	56,160
6	133-01-029	51,250	48,750
7	133-01-030	12,743	48,750
8	133-01-031	99,261	36,431
9	133-01-032	94,198	37,519
10	133-01-033	0	11,528
11	133-01-034	115,121	11,528
12	133-01-035	44,945	15,334
13	133-01-036	75,915	42,304
14	133-01-037	80,574	19,358
15	133-01-038	56,150	17,291
16	133-01-039A	0	19,901
17	133-01-039B	72,310	19,684
18	133-01-040	87,397	35,453
19	133-01-041A	57,433	32,625
20	133-01-043A	0	343,545
21	133-01-044	61,254	39,694
22	133-01-045	82,556	39,694
23	133-01-046	64,113	46,871
24	133-01-047	0	9,135
25	133-01-048	19,405	24,795
26	133-01-049	35,671	46,219
27	133-01-050	88,665	66,300
28	133-01-051	500	39,150

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Area 9.

Total area (acres):	89.91	
Structures Value:	$196,106	$49,027 per structure
Land Value:	638,913	$7,106 per acre
Total Value:	$835,019	$9,287 per acre
Number of Affected Parcels:	8	
Number of Parcels With Structures:	4	
Value of Developed Parcels:	$356,241	$89,060 per home
Value of Undeveloped Parcels:	478,778	
	$835,019	
	1.25	

	133-01-039B	45	72,310	19,684	1	91,994		0

	Tax ID	Index	(Struc)	(Land)		Developed	Undeveloped
	-4-	-5-	-6-	-7-		Parcels	Parcels
1	133-01-062B	70	12,575	10,984	1	23,559	0
2	133-01-063	72	0	23,164	0	0	23,164
3	133-01-064E	75	0	2,719	0	0	2,719
4	133-01-064C	73	500	37,736	1	38,236	0
5	133-01-064D	74	0	13,594	0	0	13,594
6	133-01-043A	48	0	343,545	0	0	343,545
7	133-01-045	50	82,556	39,694	1	122,250	0
8	133-01-044	49	61,254	39,694	1	100,948	0
	a9·						
8			$156,885	$511,130	4	$284,993	$383,022
			Total:	$668,015			$668,015

	X	Y	Z	AA	AB	A	AD	A	AF	AG	A	AI	A	AK	A
1				C:\EXCEL\FILES\TANQUE\WORKING\EROSION\NB_AREAS.XLS								Jul 29, 1993 (4:47 pm)			
2															
3				Area 10.											
4															
5								Total area (acres):	43.26						
6															
7								Structures Value:	$362,910			$51,844		per structure	
8								Land Value:	510,916			$11,810		per acre	
9								Total Value:	$873,826			$20,199		per acre	
10															
11								Number of Affected Parcels:	11						
12								Number of Parcels With Structures:	7						
13															
14								Value of Developed Parcels:	$744,033			$106,290		per home	
15								Value of Undeveloped Parcels:	129,794						
16									$873,826						
17															
18															
19															
20															
21															
22				133-01-039B	45		72,310		19,684	1		91,994		0	
23															
24															
25															
26															
27				Tax ID	Index		(Struc)		(Land)			Developed		Undeveloped	
28				-4-	-5-		-6-		-7-			Parcels		Parcels	
29		1		133-01-052	57		14,058		32,625	1		46,683		0	
30		2		133-01-053	58		0		500	0		0		500	
31		3		133-01-051	56		500		39,150	1		39,650		0	
32		4		133-01-050	55		88,665		66,300	1		154,965		0	
33		5		133-01-049	54		35,671		46,219	1		81,890		0	
34		6		133-01-054	59		0		50,700	0		0		50,700	
35		7		133-01-048	53		19,405		24,795	1		44,200		0	
36		8		133-01-055B	61		0		43,500	0		0		43,500	
37		9		133-01-055A	60		67,916		48,938	1		116,854		0	
38		10		133-01-046	51		64,113		46,871	1		110,984		0	
39		11		133-01-047	52		0		9,135	0		0		9,135	
40				a10·											
41															
42		11					$290,328		$408,733	7		$595,226		$103,835	
43															
44							Total:		$699,061			Total:		$699,061	
45															
46															
47															
48															
49															
50															
51															
52															
53															
54															
55															
56															

	AM	AN	A	AP	AQ	A	AS	A	AU	AV	A	AX	A	AZ	BA
1	C:\EXCEL\FILES\TANQUE\WORKING\EROSION\NB_AREAS.XLS											Jul 29, 1993 (4:47 pm)			
2															
3	Area 11.														
4															
5								Total area (acres):	57.99						
6															
7								Structures Value:	$646,033			$40,377		per structure	
8								Land Value:	925,306			$15,956		per acre	
9								Total Value:	$1,571,339			$27,097		per acre	
10															
11							Number of Affected Parcels:		25						
12							Number of Parcels With Structures:		16						
13															
14							Value of Developed Parcels:		$1,507,183			$94,199		per home	
15							Value of Undeveloped Parcels:		64,156						
16									$1,571,339						
17															
18									0.00						
19															
20															
21															
22				133-01-039B	45		72,310		19,684	1		91,994		0	
23															
24															
25															
26															
27				Tax ID	Index		(Struc)		(Land)			Developed		Undeveloped	
28				-4-	-5-		-6-		-7-			Parcels		Parcels	
29		1		205-52-032	999		0		16,875	0		0		16,875	
30		2		205-52-060C	1030		85,433		65,880	1		151,313		0	
31		3		205-52-038A	1003		6,623		11,745	1		18,368		0	
32		4		205-52-040	1005		8,295		11,550	1		19,845		0	
33		5		205-52-060B	1029		0		1,875	0		0		1,875	
34		6		205-52-039A	1004		102,815		65,205	1		168,020		0	
35		7		205-52-055A	1024		31,293		32,700	1		63,993		0	
36		8		205-52-054A	1022		0		500	0		0		500	
37		9		205-52-054B	1023		34,350		12,150	1		46,500		0	
38		10		205-52-059	1028		0		500	0		0		500	
39		11		205-52-058	1027		0		500	0		0		500	
40		12		205-52-057	1026		17,027		10,650	1		27,677		0	
41		13		205-52-029A	993		500		86,190	1		86,690		0	
42		14		205-52-028	992		0		500	0		0		500	
43		15		205-52-029B	994		895		60,000	1		60,895		0	
44		16		205-52-033A	1000		500		31,500	1		32,000		0	
45		17		205-52-031	998		0		20,475	0		0		20,475	
46		18		205-52-030B	995		40,112		38,400	1		78,512		0	
47		19		205-52-030D	997		0		9,600	0		0		9,600	
48		20		205-52-030C	996		46,820		57,450	1		104,270		0	
49		21		205-52-056	1025		0		500	0		0		500	
50		22		205-52-041C	1007		70,013		65,700	1		135,713		0	
51		23		205-52-041A	1006		20,025		38,550	1		58,575		0	
52		24		205-52-053	1021		36,375		71,250	1		107,625		0	
53		25		205-52-052A	1020		15,750		30,000	1		45,750		0	
54				all											
55															
56		25					$516,826		$740,245	16		$1,205,746		$51,325	

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Area 12. (In front of levee)

Total area (acres):	21.21	
Structures Value:	$95,220	$47,610 per structure
Land Value:	96,375	$4,544 per acre
Total Value:	$191,595	$9,033 per acre
Number of Affected Parcels:	9	
Number of Parcels With Structures:	2	
Value of Developed Parcels:	$104,095	$52,048 per home
Vualue of Undeveloped Parcels:	87,500	
	$191,595	

133-01-039B	45	72,310	19,684	1	91,994	0		

	Tax ID	Index	(Struc)	(Land)		Developed	Undeveloped
	-4-	-5-	-6-	-7-		Parcels	Parcels
1	205-48-090	588	0	10,000	0	0	10,000
2	205-48-111	609	38,088	4,300	1	42,388	0
3	205-48-110	608	38,088	2,800	1	40,888	0
4	205-48-092	590	0	10,000	0	0	10,000
5	205-48-091	589	0	10,000	0	0	10,000
6	205-48-089	587	0	10,000	0	0	10,000
7	205-48-088	586	0	10,000	0	0	10,000
8	205-48-087	585	0	10,000	0	0	10,000
9	205-48-086	584	0	10,000	0	0	10,000
	a12·						
9			$76,176	$77,100	2	$83,276	$70,000
			Total:	$153,276			$153,276

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Area 13. (In front of levee)

Total area (acres):	38.44	
Structures Value:	$142,830	$47,610 per structure
Land Value:	16,938	$441 per acre
Total Value:	$159,768	$4,156 per acre
Number of Affected Parcels:	7	
Number of Parcels With Structures:	3	
Value of Developed Parcels:	$157,268	$52,423 per home
Vualue of Undeveloped Parcels:	2,500	
	$159,768	

		133-01-039B	45	72,310	19,684	1	91,994		0

		Tax ID	Index	(Struc)	(Land)		Developed	Undeveloped
		-4-	-5-	-6-	-7-		Parcels	Parcels
	1	205-50-163	895	38,088	5,800	1	43,888	0
	2	205-50-161	893	38,088	5,250	1	43,338	0
	3	205-50-160A	890	38,088	500	1	38,588	0
	4	205-50-093	823	0	500	0	0	500
	5	205-50-091	821	0	500	0	0	500
	6	205-50-092	822	0	500	0	0	500
	7	205-47-002	401	0	500	0	0	500
		a13·						
	7			$114,264	$13,550	3	$125,814	$2,000
				Total:	$127,814			$127,814

	CF	CG	C	CI	CJ	C	CL	C	CN	CO	C	CQ	C	CS	C
1		C:\EXCEL\FILES\TANQUE\WORKING\EROSION\NB_AREAS.XLS												Jul 29, 1993 (4:47 pm)	
2															
3		Area 14.													
4															
5								Total area (acres):	108.34						
6															
7								Structures Value:	$1,554,018			$259,003		per structure	
8								Land Value:	1,569,175			$14,484		per acre	
9								Total Value:	$3,123,193			$28,828		per acre	
10															
11								Number of Affected Parcels:	7						
12								Number of Parcels With Structures:	6						
13															
14								Value of Developed Parcels:	$2,875,693			$479,282		per home	
15								Vualue of Undeveloped Parcels:	247,500						
16									$3,123,193						
17															
18									0.00						
19															
20															
21															
22				133-01-039B	45		72,310		19,684	1		91,994		0	
23															
24															
25															
26															
27				Tax ID	Index		(Struc)		(Land)			Developed		Undeveloped	
28				-4-	-5-		-6-		-7-			Parcels		Parcels	
29		1		205-45-043	250		277,048		180,400	1		457,448		0	
30		2		205-45-042	249		0		198,000	0		0		198,000	
31		3		205-45-041	248		211,293		298,100	1		509,393		0	
32		4		205-45-040	247		293,854		138,000	1		431,854		0	
33		5		205-45-039	246		150,325		65,000	1		215,325		0	
34		6		205-46-011	383		101,920		187,740	1		289,660		0	
35		7		205-45-044	251		208,774		188,100	1		396,874		0	
36				a14·											
37															
38		7					$1,243,214		$1,255,340	6		$2,300,554		$198,000	
39															
40								Total:	$2,498,554					$2,498,554	
41															
42															
43															
44															
45															
46															
47															
48															
49															
50															
51															
52															
53															
54															
55															
56															

	CU	CV	C	CX	CY	C	DA	D	DC	DD	D	DF	D	DH	D
1	C:\EXCEL\FILES\TANQUE\WORKING\EROSION\NB_AREAS.XLS												Jul 29, 1993 (4:47 pm)		
2															
3	Area 15.														
4															
5								Total area (acres):	89.67						
6															
7								Structures Value:	$1,835,915			$305,986		per structure	
8								Land Value:	1,664,375			$18,561		per acre	
9								Total Value:	$3,500,290			$39,035		per acre	
10															
11								Number of Affected Parcels:	8						
12								Number of Parcels With Structures:	6						
13															
14								Value of Developed Parcels:	$3,039,665			$506,611		per home	
15								Vualue of Undeveloped Parcels:	460,625						
16									$3,500,290						
17															
18									0.00						
19															
20															
21															
22				133-01-039B	45		72,310		19,684	1		91,994		0	
23															
24															
25															
26															
27				Tax ID	Index		(Struc)		(Land)			Developed		Undeveloped	
28				-4-	-5-		-6-		-7-			Parcels		Parcels	
29		1		205-45-050	257		172,348		141,000	1		313,348		0	
30		2		205-45-049	256		129,713		179,300	1		309,013		0	
31		3		205-45-048	255		0		231,000	0		0		231,000	
32		4		205-45-047	254		334,643		201,300	1		535,943		0	
33		5		205-45-046	253		0		137,500	0		0		137,500	
34		6		205-45-045	252		247,394		268,400	1		515,794		0	
35		7		205-45-052	259		127,836		65,000	1		192,836		0	
36		8		205-45-051	258		456,798		108,000	1		564,798		0	
37				a15·											
38															
39		8					$1,468,732		$1,331,500	6		$2,431,732		$368,500	
40															
41								Total:	$2,800,232					$2,800,232	
42															
43															
44															
45															
46															
47															
48															
49															
50															
51															
52															
53															
54															
55															
56															

	DJ	DK	DM	DN	DP	DR	DS	DU	DW
1		C:\EXCEL\FILES\TANQUE\WORKING\EROSION\NB_AREAS.XLS						Jul 29,	1993 (4:47 pm)
2									
3		Area 16.							
4									
5					Total area (acres):	48.52			
6									
7					Structures Value:	$896,929		$179,386	per structure
8					Land Value:	932,500		$19,219	per acre
9					Total Value:	$1,829,429		$37,705	per acre
10									
11					Number of Affected Parcels:	11			
12					Number of Parcels With Structures:	5			
13									
14					Value of Developed Parcels:	$1,386,304		$277,261	per home
15					Vualue of Undeveloped Parcels:	443,125			
16						$1,829,429			
17									
18						0.00			
19									
20									
21									
22			133-01-039B	45	72,310	19,684	1	91,994	0
23									
24									
25									
26									
27			Tax ID	Index	(Struc)	(Land)		Developed	Undeveloped
28			-4-	-5-	-6-	-7-		Parcels	Parcels
29		1	205-45-068	276	0	65,000	0	0	65,000
30		2	205-45-072	280	0	500	0	0	500
31		3	205-45-071	279	0	103,500	0	0	103,500
32		4	205-45-070	278	142,654	65,000	1	207,654	0
33		5	205-45-069	277	140,312	72,000	1	212,312	0
34		6	205-45-067	275	104,234	65,000	1	169,234	0
35		7	205-45-066	274	148,299	65,000	1	213,299	0
36		8	205-45-065	273	0	500	0	0	500
37		9	205-45-064A	271	0	120,000	0	0	120,000
38		10	205-45-063	270	182,044	124,500	1	306,544	0
39		11	205-45-062	269	0	65,000	0	0	65,000
40			a16·						
41									
42		11			$717,543	$746,000	5	$1,109,043	$354,500
43									
44					Total:	$1,463,543			$1,463,543
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									

	A	B	C	D	E	F	G	H
26					Full Cash Value			
27			Tax ID		(Struc)		(Land)	
28			-1-		-2-		-3-	
57	29		133-01-052		14,058		32,625	
58	30		133-01-053		0		500	
59	31		133-01-054		0		50,700	
60	32		133-01-055A		67,916		48,938	
61	33		133-01-055B		0		43,500	
62	34		133-01-056D		437,978		475,310	
63	35		133-01-056E		0		89,250	
64	36		133-01-056F		0		61,880	
65	37		133-01-057		46,730		59,740	
66	38		133-01-058		30,441		41,651	
67	39		133-01-059		69,807		77,760	
68	40		133-01-060		128,611		20,155	
69	41		133-01-061		69,035		62,919	
70	42		133-01-062B		12,575		10,984	
71	43		133-01-062C		0		500	
72	44		133-01-063		0		23,164	
73	45		133-01-064C		500		37,736	
74	46		133-01-064D		0		13,594	
75	47		133-01-064E		0		2,719	
76	48		133-01-066E		254,311		70,180	
77	49		133-01-066F		0		85,030	
78	50		133-02-002A		80,442		8,100	
79	51		133-02-002B		25,171		6,900	
80	52		133-02-003		9,952		16,500	
81	53		133-02-004		7,487		16,350	
82	54		133-02-005		9,390		16,350	
83	55		133-02-006B		0		500	
84	56		133-02-006D		0		13,500	
85	57		133-02-006E		0		13,500	
86	58		133-02-006F		66,398		13,500	
87	59		133-02-007A		11,785		30,000	
88	60		133-02-009		96,933		15,000	
89	61		133-02-010		9,438		15,000	
90	62		133-02-011		6,235		15,000	
91	63		133-02-012		2,566		3,750	
92	64		133-02-013		45,364		11,250	
93	65		133-02-014		20,900		7,500	
94	66		133-02-015D		45,924		19,050	
95	67		133-02-015H		24,941		16,500	
96	68		133-02-015J		19,775		8,100	
97	69		133-02-015K		17,457		6,900	
98	70		133-02-015L		0		7,650	
99	71		133-02-015M		23,833		12,450	
100	72		133-02-015N		0		13,650	
101	73		133-02-017A		22,785		16,800	
102	74		133-02-017B		70,525		25,950	
103	75		133-02-019C		33,785		29,850	
104	76		133-02-021B		37,372		9,900	
105	77		133-02-022		0		15,000	
106	78		133-02-023		144,911		15,000	
107	79		133-02-024		15,006		7,500	
108	80		133-02-025		733		7,500	
109	81		133-02-026A		6,270		12,150	

	A	B	C	D	E	F	G	H
26					Full Cash Value			
27			Tax ID		(Struc)		(Land)	
28			-1-		-2-		-3-	
1010	982		205-52-044		44,226		13,500	
1011	983		205-52-045		0		13,500	
1012	984		205-52-046		0		13,500	
1013	985		205-52-047A		108,867		26,850	
1014	986		205-52-048C		46,938		13,650	
1015	987		205-52-048E		7,575		13,650	
1016	988		205-52-048F		500		46,500	
1017	989		205-52-049		15,750		30,000	
1018	990		205-52-050A		22,200		42,900	
1019	991		205-52-051		0		500	
1020	992		205-52-052A		15,750		30,000	
1021	993		205-52-053		36,375		71,250	
1022	994		205-52-054A		0		500	
1023	995		205-52-054B		34,350		12,150	
1024	996		205-52-055A		31,293		32,700	
1025	997		205-52-056		0		500	
1026	998		205-52-057		17,027		10,650	
1027	999		205-52-058		0		500	
1028	1000		205-52-059		0		500	
1029	1001		205-52-060B		0		1,875	
1030	1002		205-52-060C		85,433		65,880	
1031	1003		205-58-002		0		1,200,000	

	DJ	DK	D	DM	DN	D	DP	D	DR	DS	D	DU	D	DW	D
26															
27				Tax ID	Index		(Struc)		(Land)			Developed		Undeveloped	
28				-4-	-5-		-6-		-7-			Parcels		Parcels	
1010															
1011															
1012															
1013															
1014															
1015															
1016															
1017															
1018															
1019															
1020															
1021															
1022															
1023															
1024															
1025															
1026															
1027															
1028															
1029															
1030															
1031															

DISK #5

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1	C:\EXCEL\FILES\TANQUE\WORKING\CHANNELS\CHNLDATA.XLS																							
2																								
3						Channel Bottom Set at Existing ELMIN																			
4						BW = 100'				BW = 150'				BW = 200'				BW = 250'				BW = 300'		
5			"Given" Condition			temp1				temp2				temp3				temp4				temp5		
6	SECNO		CWSEL	ELMIN		CWSEL	dh	depth		CWSEL	dh	depth		CWSEL	dh	depth		CWSEL	dh	depth		CWSEL	dh	depth
7	1.000		2,554.67	2,548.7		2,554.67	0.00	5.97		2,554.67	0.00	5.97		2,554.67	0.00	5.97		2,554.67	0.00	5.97		2,554.67	0.00	5.97
8	101.000		2,558.25	2,552.0		2,558.19	-0.06	6.19		2,558.15	-0.10	6.15		2,558.10	-0.15	6.10		2,558.04	-0.21	6.04		2,558.02	-0.23	6.02
9	102.000		2,563.07	2,556.0		2,563.01	-0.06	7.01		2,562.95	-0.12	6.95		2,563.03	-0.04	7.03		2,562.86	-0.21	6.86		2,562.67	-0.40	6.67
10	103.000		2,564.99	2,558.0		2,564.99	0.00	6.99		2,564.97	-0.02	6.97		2,564.82	-0.17	6.82		2,564.68	-0.31	6.68		2,564.55	-0.44	6.55
11	104.000		2,567.25	2,560.0		2,567.11	-0.14	7.11		2,567.04	-0.21	7.04		2,567.17	-0.08	7.17		2,566.90	-0.35	6.90		2,566.77	-0.48	6.77
12	105.000		2,569.77	2,563.0		2,569.66	-0.11	6.66		2,569.60	-0.17	6.60		2,569.41	-0.36	6.41		2,568.93	-0.84	5.93		2,568.79	-0.98	5.79
13	106.000		2,572.02	2,564.4		2,571.99	-0.03	7.59		2,571.80	-0.22	7.40		2,571.45	-0.57	7.05		2,571.36	-0.66	6.96		2,571.18	-0.84	6.78
14	107.000		2,574.02	2,566.0		2,573.94	-0.08	7.94		2,573.91	-0.11	7.91		2,574.24	0.22	8.24		2,573.61	-0.41	7.61		2,573.35	-0.67	7.35
15	108.000		2,576.44	2,570.0		2,576.47	0.03	6.47		2,576.28	-0.16	6.28		2,576.01	-0.43	6.01		2,575.74	-0.70	5.74		2,575.43	-1.01	5.43
16	108.100		2,577.18	2,570.0		2,576.59	-0.59	6.59		2,576.37	-0.81	6.37		2,576.07	-1.11	6.07		2,575.75	-1.43	5.75		2,575.46	-1.72	5.46
17	108.200		2,577.64	2,570.0		2,577.71	0.07	7.71		2,577.47	-0.17	7.47		2,577.23	-0.41	7.23		2,576.92	-0.72	6.92		2,576.60	-1.04	6.60
18	108.300		2,577.76	2,570.0		2,578.07	0.31	8.07		2,577.73	-0.03	7.73		2,577.48	-0.28	7.48		2,577.10	-0.66	7.10		2,576.76	-1.00	6.76
19	109.000		2,578.99	2,572.0		2,579.04	0.05	7.04		2,578.71	-0.28	6.71		2,578.52	-0.47	6.52		2,578.18	-0.81	6.18		2,577.95	-1.04	5.95
20	110.000		2,581.04	2,574.0		2,581.05	0.01	7.05		2,580.97	-0.07	6.97		2,580.84	-0.20	6.84		2,580.57	-0.47	6.57		2,580.38	-0.66	6.38
21	111.000		2,581.92	2,576.0		2,581.92	0.00	5.92		2,581.79	-0.13	5.79		2,581.88	-0.04	5.88		2,581.55	-0.37	5.55		2,581.37	-0.55	5.37
22	112.000		2,584.64	2,578.0		2,584.58	-0.06	6.58		2,584.69	0.05	6.69		2,584.49	-0.15	6.49		2,584.62	-0.02	6.62		2,584.30	-0.34	6.30
23	113.000		2,586.12	2,580.0		2,586.05	-0.07	6.05		2,586.01	-0.11	6.01		2,585.91	-0.21	5.91		2,585.91	-0.21	5.91		2,585.78	-0.34	5.78
24	114.000		2,587.99	2,582.0		2,587.90	-0.09	5.90		2,587.90	-0.09	5.90		2,587.83	-0.16	5.83		2,587.75	-0.24	5.75		2,587.70	-0.29	5.70
25	1.000		2,592.81	2,585.5		2,592.84	0.03	7.34		2,592.67	-0.14	7.17		2,592.48	-0.33	6.98		2,592.38	-0.43	6.88		2,592.26	-0.55	6.76
26	2.000		2,594.52	2,586.4		2,594.39	-0.13	7.99		2,594.26	-0.26	7.86		2,593.91	-0.61	7.51		2,593.50	-1.02	7.10		2,593.18	-1.34	6.78
27	3.000		2,596.45	2,589.0		2,596.51	0.06	7.51		2,596.30	-0.15	7.30		2,595.90	-0.55	6.90		2,595.51	-0.94	6.51		2,595.22	-1.23	6.22
28	4.000		2,599.67	2,590.4		2,599.50	-0.17	9.10		2,599.34	-0.33	8.94		2,599.01	-0.66	8.61		2,598.82	-0.85	8.42		2,597.39	-2.28	6.99
29	5.000		2,600.42	2,590.8		2,600.45	0.03	9.65		2,600.40	-0.02	9.60		2,600.36	-0.06	9.56		2,600.25	-0.17	9.45		2,600.54	0.12	9.74
30	6.000		2,602.44	2,591.4		2,602.46	0.02	11.06		2,602.12	-0.32	10.72		2,598.94	-3.50	7.54		2,599.39	-3.05	7.99		2,599.97	-2.47	8.57
31	20.195		2,604.28	2,593.0		2,604.16	-0.12	11.16		2,604.03	-0.25	11.03		2,603.64	-0.64	10.64		2,602.88	-1.40	9.88		2,602.53	-1.75	9.53
32	20.361		2,605.52	2,595.0		2,604.75	-0.77	9.75		2,604.27	-1.25	9.27		2,603.67	-1.85	8.67		2,603.27	-2.25	8.27		2,603.18	-2.34	8.18
33	20.442		2,607.53	2,598.0		2,607.53	0.00	9.53		2,607.15	-0.38	9.15		2,606.41	-1.12	8.41		2,604.78	-2.75	6.78		2,604.40	-3.13	6.40
34	20.520		2,609.65	2,602.0		2,609.41	-0.24	7.41		2,609.27	-0.38	7.27		2,608.94	-0.71	6.94		2,608.72	-0.93	6.72		2,608.40	-1.25	6.40
35	20.604		2,610.83	2,604.0		2,610.59	-0.24	6.59		2,610.45	-0.38	6.45		2,610.39	-0.44	6.39		2,610.28	-0.55	6.28		2,610.18	-0.65	6.18
36	20.660		2,611.76	2,606.0		2,611.62	-0.14	5.62		2,611.54	-0.22	5.54		2,611.48	-0.28	5.48		2,611.26	-0.50	5.26		2,611.14	-0.62	5.14
37	20.722		2,612.96	2,607.0		2,612.97	0.01	5.97		2,612.97	0.01	5.97		2,612.82	-0.14	5.82		2,612.66	-0.30	5.66		2,612.65	-0.31	5.65
38	20.780		2,614.46	2,608.0		2,614.42	-0.04	6.42		2,614.41	-0.05	6.41		2,614.13	-0.33	6.13		2,613.77	-0.69	5.77		2,613.68	-0.78	5.68
39	20.840		2,616.45	2,609.0		2,616.41	-0.04	7.41		2,616.37	-0.08	7.37		2,616.17	-0.28	7.17		2,616.07	-0.38	7.07		2,615.64	-0.81	6.64
40	20.902		2,617.90	2,611.0		2,617.90	0.00	6.90		2,617.86	-0.04	6.86		2,617.38	-0.52	6.38		2,616.87	-1.03	5.87		2,616.46	-1.44	5.46
41	20.983		2,620.75	2,613.0		2,620.75	0.00	7.75		2,620.70	-0.05	7.70		2,620.57	-0.18	7.57		2,620.13	-0.62	7.13		2,620.04	-0.71	7.04
42	21.066		2,623.01	2,614.0		2,623.01	0.00	9.01		2,623.00	-0.01	9.00		2,622.69	-0.32	8.69		2,622.27	-0.74	8.27		2,621.84	-1.17	7.84
43	21.125		2,623.55	2,615.0		2,623.54	-0.01	8.54		2,623.52	-0.03	8.52		2,623.33	-0.22	8.33		2,623.21	-0.34	8.21		2,622.88	-0.67	7.88
44	21.207		2,624.87	2,617.0		2,624.80	-0.07	7.80		2,624.73	-0.14	7.73		2,624.49	-0.38	7.49		2,624.42	-0.45	7.42		2,623.99	-0.88	6.99

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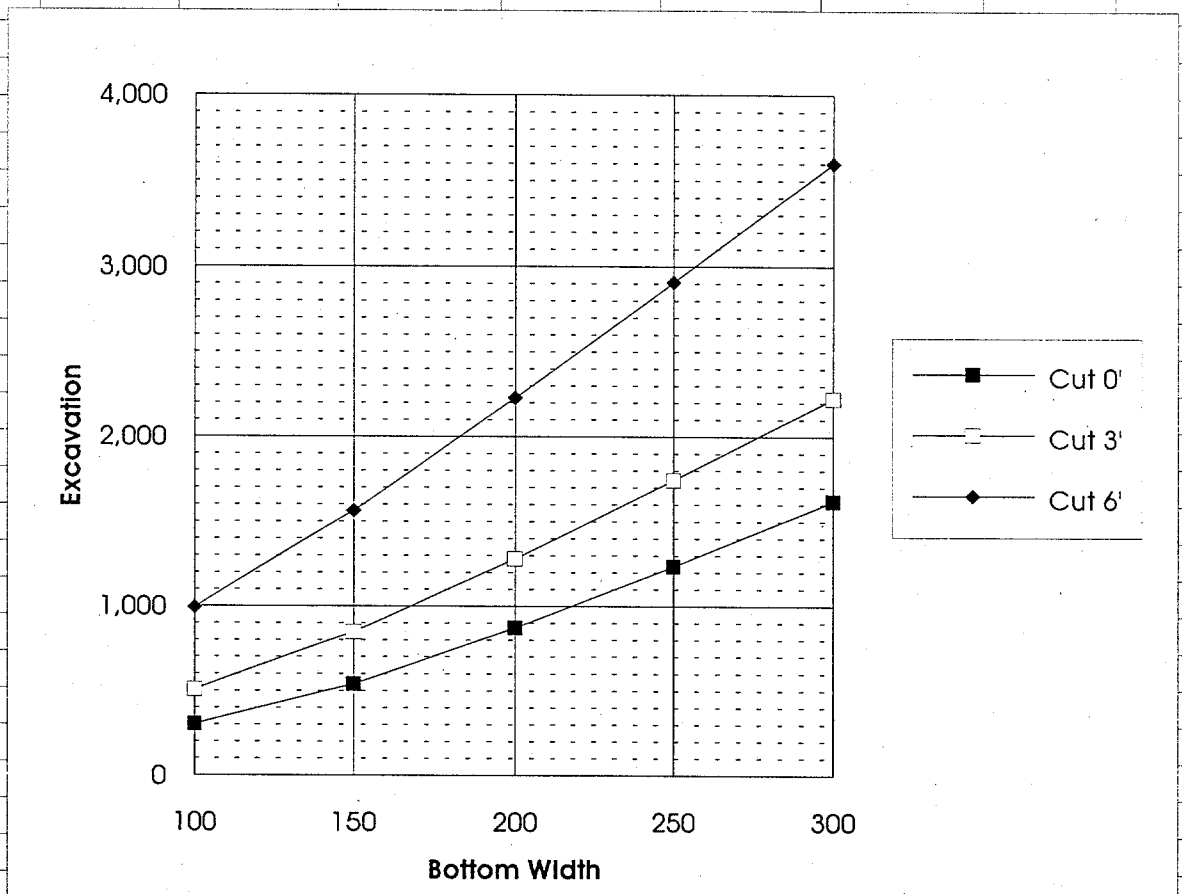
Volume of Earthwork for Various Channelization Options as Determined by HEC-2

	run1	run2	run3	run4	run5	run6	run7	run8	run9	run10	run11	run12	run13	run14	run15
SECNO	VEXT	VEXT	VEXT	VEXT	VEXT	VEXT	VEXT	VEXT	VEXT	VEXT	VEXT	VEXT	VEXT	VEXT	VEXT
1.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
101.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
102.000	1	2	3	6	9	12	19	26	34	43	24	36	48	61	76
103.000	1	2	4	9	16	19	29	41	54	70	38	56	77	99	124
104.000	1	4	9	19	32	28	42	60	82	108	56	83	115	150	188
105.000	2	7	15	29	46	34	52	75	104	136	68	102	142	186	234
106.000	3	9	20	36	57	39	61	89	122	160	78	118	166	218	273
107.000	4	10	24	44	69	44	69	102	142	186	90	135	191	252	317
108.000	4	12	28	51	79	51	80	119	164	213	102	154	218	287	360
108.100	4	12	28	51	79	51	80	119	164	214	102	155	219	287	361
108.200	5	13	29	52	80	52	81	121	166	217	103	157	222	291	365
108.300	5	13	29	52	80	52	81	121	167	217	103	157	222	291	366
109.000	5	14	32	58	88	60	93	138	189	245	116	177	249	326	408
110.000	5	15	36	66	101	71	112	166	227	293	137	209	295	386	482
111.000	6	16	40	73	111	79	124	185	253	326	152	231	327	427	533
112.000	6	19	45	81	123	88	139	206	280	361	168	256	361	472	589
113.000	7	22	51	91	136	96	152	226	307	393	182	279	395	514	640
114.000	8	27	59	102	150	103	166	246	333	426	196	303	427	556	691
1.000	11	34	74	125	180	117	190	283	383	489	224	346	490	637	791
2.000	11	36	77	129	186	119	194	289	392	500	228	354	501	651	809
3.000	12	39	84	140	202	125	206	308	417	532	241	375	531	692	859
4.000	12	42	90	150	215	131	217	325	440	562	253	395	560	729	906
5.000	13	43	94	156	223	133	221	332	450	575	257	403	573	746	926
6.000	13	44	98	163	234	135	225	340	462	591	262	411	586	765	950
20.195	14	51	114	188	267	140	237	363	496	634	275	436	626	818	1018
20.361	24	67	140	226	318	151	254	390	535	687	296	468	674	883	1100
20.442	29	75	154	246	345	155	262	404	555	714	305	483	697	915	1142
20.520	32	82	167	265	372	160	272	420	578	745	316	501	724	952	1189
20.604	39	93	182	285	399	168	284	438	601	776	330	522	753	989	1237
20.660	43	99	191	298	415	173	291	449	617	795	339	535	771	1013	1267
20.722	46	104	199	310	431	178	298	459	631	813	347	547	789	1037	1296
20.840	52	113	214	331	458	185	310	477	656	846	362	571	823	1081	1351
20.902	55	118	221	341	472	189	316	487	669	863	370	583	840	1104	1379
20.983	60	125	233	358	494	195	325	501	689	888	381	600	864	1136	1420
21.066	64	131	243	373	514	200	333	514	707	913	392	615	888	1167	1460
21.125	66	134	249	382	527	203	338	521	719	928	399	626	903	1188	1486
21.207	69	139	257	395	544	208	345	532	734	949	408	641	924	1216	1522
21.325	73	146	268	412	569	214	354	547	757	980	422	661	953	1257	1575
21.468	79	155	285	437	603	221	367	568	787	1020	438	687	993	1309	1641
21.544	81	160	295	452	622	225	374	580	804	1043	447	702	1015	1339	1678
21.628	85	168	308	471	648	230	383	596	827	1072	458	719	1041	1374	1723
21.707	90	175	320	488	671	237	393	611	847	1099	469	736	1066	1407	1765
21.880	98	189	343	520	713	248	410	639	886	1149	491	770	1116	1473	1847
21.925	100	192	349	529	725	250	415	646	897	1163	496	779	1129	1490	1869
21.972	103	196	355	539	738	254	420	654	908	1178	503	788	1143	1509	1893
22.047	107	202	363	550	754	259	427	665	923	1198	512	802	1163	1535	1926

22.125	112	210	373	563	769	265	437	677	938	1216	524	819	1185	1563	1959
22.195	118	219	385	576	784	272	447	691	954	1235	536	837	1207	1589	1990
22.275	125	229	397	591	800	281	459	705	971	1254	549	855	1230	1617	2086
22.338	132	239	410	605	816	289	471	720	989	1273	562	874	1255	1645	2113
22.373	135	243	416	612	824	292	476	727	997	1283	568	883	1266	1660	2150
22.454	138	247	421	619	832	296	481	734	1005	1292	573	891	1277	1673	2188
22.511	143	255	431	630	845	302	490	745	1019	1308	583	905	1295	1695	2235
22.591	149	263	442	645	864	309	500	759	1037	1331	595	923	1319	1725	2259
22.670	155	272	455	662	884	316	511	774	1056	1354	608	941	1344	1757	2281
10580	163	284	471	682	907	326	526	793	1080	1382	625	966	1376	1797	2308
10640	166	288	477	689	917	330	531	801	1090	1395	632	977	1392	1816	2337
10700	168	292	482	696	925	333	536	808	1099	1405	640	988	1406	1834	2364
10780	171	296	488	703	934	337	542	816	1109	1419	649	1001	1425	1857	2391
10860	174	301	494	711	944	341	548	825	1121	1433	658	1015	1443	1880	2422
10940	176	305	499	719	953	345	554	833	1131	1445	667	1028	1461	1903	2444
11020	179	308	504	725	962	349	560	841	1141	1458	676	1041	1478	1925	2472
11100	183	314	512	735	975	354	567	850	1153	1474	686	1056	1498	1950	2503
11160	185	318	517	742	983	357	573	858	1162	1485	693	1067	1513	1968	2535
11240	188	323	523	750	993	362	579	866	1173	1498	703	1081	1531	1991	2564
11320	192	327	530	759	1005	366	586	876	1186	1515	712	1095	1551	2016	2595
11400	196	334	539	770	1019	372	594	887	1200	1532	723	1111	1572	2043	2634
11480	200	339	546	779	1029	377	602	897	1212	1546	733	1126	1592	2067	2663
11560	204	346	555	790	1042	382	610	908	1226	1563	744	1142	1613	2093	2686
11640	212	357	570	808	1063	391	623	925	1247	1587	759	1163	1640	2127	2719
11700	216	364	579	820	1078	397	632	937	1262	1605	768	1177	1659	2150	2747
11760	218	367	584	828	1088	400	636	944	1271	1617	774	1187	1674	2169	2774
11840	221	373	593	839	1103	404	643	954	1286	1636	784	1202	1694	2196	2801
11900	224	378	600	849	1116	408	650	964	1298	1652	792	1214	1712	2218	2832
11960	227	382	607	859	1128	412	656	973	1311	1667	800	1226	1728	2240	2940
12020	229	386	614	870	1142	415	661	982	1323	1683	807	1237	1745	2262	2979
12100	232	391	621	879	1154	419	668	991	1336	1700	816	1251	1764	2287	3027
12180	233	392	624	882	1159	420	670	995	1341	1706	820	1257	1772	2298	3078
12250	235	396	631	893	1174	423	676	1004	1354	1724	827	1270	1791	2322	3132
12300	238	401	638	904	1188	427	682	1013	1367	1740	834	1280	1806	2342	3189
12380	243	408	647	918	1207	434	690	1024	1383	1763	846	1295	1827	2372	3227
12460	245	412	656	932	1228	437	696	1035	1401	1787	854	1310	1849	2402	3263
12540	248	421	672	955	1258	441	707	1054	1426	1821	864	1328	1877	2440	3307
12620	254	432	690	979	1290	448	720	1074	1453	1856	876	1349	1908	2480	3348
12700	259	443	708	1004	1324	455	733	1095	1482	1895	889	1371	1940	2521	3382
12780	262	454	728	1034	1362	459	746	1118	1516	1936	899	1392	1974	2568	3382
12840	263	459	740	1053	1386	461	752	1131	1536	1963	905	1404	1995	2599	
12900	264	463	749	1069	1408	463	757	1142	1555	1988	910	1415	2015	2627	
12980	268	471	763	1090	1434	467	766	1158	1578	2017	919	1432	2041	2663	
13060	271	478	774	1106	1458	471	775	1171	1598	2044	928	1447	2063	2694	
13140	272	482	782	1119	1476	473	780	1181	1613	2065	933	1458	2081	2720	
13200	273	485	788	1128	1487	475	784	1189	1623	2079	938	1468	2096	2739	
13280	276	490	797	1142	1506	478	791	1200	1640	2101	946	1482	2117	2768	
13360	281	502	814	1162	1531	484	804	1219	1663	2129	957	1503	2146	2802	
13440	291	520	840	1194	1569	495	824	1248	1698	2171	974	1531	2185	2850	
13520	302	539	871	1236	1619	507	846	1281	1743	2224	992	1561	2229	2908	
13600	302	539	871	1236	1619	507	846	1281	1743	2224	992	1561	2229	2908	3600

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	100	150	200	250	300
Cut 0'	302	539	871	1,236	1,619
Cut 3'	507	846	1,281	1,743	2,224
Cut 6'	992	1,561	2,229	2,908	3,600



La Cebadilla Detention Cost Estimate

Land Acquisition. Assume total take of significantly affected parcels, cost = 1.5 * Full Cash Value

		Struc	Land	Total
1	205-45-003B	164,800	64,000	228,800
2	205-45-003C	145,886	85,320	231,206
3	205-45-003D	0	64,000	64,000
4	205-45-004A	385,767	947,072	1,332,839
5	205-45-062	0	65,000	65,000
6	205-45-063	182,044	124,500	306,544
7	205-45-064A	0	120,000	120,000
8	205-45-065	0	500	500
9	205-45-066	148,299	65,000	213,299
10	205-45-067	104,234	65,000	169,234
11	205-45-068	0	65,000	65,000
12	205-45-069	140,312	72,000	212,312
13	205-45-070	142,654	65,000	207,654
14	205-45-071	0	103,500	103,500
15	205-45-072	0	500	500
				3,320,388
				1.50
				5,000,000

Item	Quantity	Unit	Unit Cost	Item Cost
Land Acquisition (see above)	--	--	--	$5,000,000
Imported material for berm 100' wide, 350' effective length, 3:1 sideslopes	1,200,000	C.Y.	$1.00	1,200,000
2-10' x 4' c 350' RCBC (3.21 CY per LF @ $350/CY)	1, 2, 3, or 4	Each	$400,000	400,000
Spillway		Each	500,000	500,000
Landscaping		Each	500,000	500,000
Misc (10%)				760,000
				$8,360,000

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TANQUE VERDE CREEK - - Existing condition using "patchwork" data. Reach 1 is Houghton Road bridge by Cella Barr as modified by John Wallace. Reach 2 is Tanque Verde Loop Road analysis by John Walllace. Reach 3 is 49ers existing condition analysis by PCFCD for levee design. Reach 4 (remainder) is from U.S. Army Corps of Engineers' original (1975) analysis of entire river.

THIS RUN EXECUTED 09DEC92 09:30:51

SECNO	River Mile	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
1	5.898	0	2,548.7	23,000	2,554.67	2550	2550	10.3	2.4	2.6	2,555.72
101	6.059	850	2,552.0	23,000	2,558.25	2554	2554	11.8	2.8	3.1	2,559.99
102	6.239	950	2,556.0	23,000	2,563.07	2556	2558	10.2	2.3	3.4	2,564.07
103	6.348	575	2,558.0	23,000	2,564.99	2560	2560	8.8	1.7	3.6	2,565.73
104	6.494	770	2,560.0	23,000	2,567.25	2564	2564	11.4	2.1	4.0	2,568.50
105	6.589	500	2,563.0	23,000	2,569.77	2568	2566	12.7	1.4	3.8	2,571.19
106	6.670	430	2,564.4	23,000	2,572.02	2568	2568	10.9	2.1	2.7	2,573.28
107	6.765	500	2,566.0	23,000	2,574.02	2570	2570	10.0	2.2	3.0	2,574.91
108	6.850	450	2,570.0	23,000	2,576.44	2572	2572	14.8	3.2	5.3	2,577.96
108.1	6.851	5	2,570.0	23,000	2,577.18	2572	2572	12.2	2.9	4.8	2,578.16
108.2	6.852	40	2,570.0	23,000	2,577.64	2572	2572	11.0	2.6	4.4	2,578.42
108.3	6.853	5	2,570.0	23,000	2,577.76	2572	2572	10.5	2.5	4.0	2,578.46
109	6.937	410	2,572.0	23,000	2,578.99	2576	2574	10.2	2.8	4.0	2,579.95
110	7.075	730	2,574.0	23,000	2,581.04	2579	2577	5.6	1.6	2.3	2,581.23
111	7.176	530	2,576.0	23,000	2,581.92	2580	2579	11.1	2.1	2.9	2,582.96
112	2.288	590	2,578.0	23,000	2,584.64	2580	2581	8.6	2.7	1.9	2,585.06
113	7.390	540	2,580.0	23,000	2,586.12	2584	2583	8.4	2.9	1.8	2,586.44
114	7.488	520	2,582.0	23,000	2,587.99	2586	10000	10.9	4.5	0.0	2,588.47
1	7.688	1,056	2,585.5	23,000	2,592.81	2590	2590	10.8	2.9	2.1	2,593.73
2	7.723	180	2,586.4	23,000	2,594.52	2592	2590	11.8	2.6	1.9	2,595.68
3	7.820	517	2,589.0	23,000	2,596.45	2592	2592	9.2	2.6	1.5	2,597.07
4	7.912	484	2,590.4	23,000	2,599.67	2594	2598	10.8	3.2	1.2	2,600.68
5	7.950	200	2,590.8	23,000	2,600.42	2591	2596	9.0	1.6	1.5	2,601.10
6	7.994	234	2,591.4	23,000	2,602.44	2598	2594	10.5	2.2	1.0	2,603.68
20.195	8.065	675	2,593.0	23,000	2,604.28	2598	2602	5.4	1.8	1.7	2,604.46
20.361	8.231	850	2,595.0	23,000	2,605.52	2602	2606	10.5	2.9	3.2	2,606.69
20.442	8.312	410	2,598.0	23,000	2,607.53	2606	2606	11.2	1.5	2.8	2,608.67
20.520	8.390	450	2,602.0	23,000	2,609.65	2606	2610	6.8	2.4	2.6	2,610.03
20.604	8.474	470	2,604.0	23,000	2,610.83	2608	2609	8.0	3.2	3.6	2,611.27
20.660	8.530	300	2,606.0	23,000	2,611.76	2610	2610	9.3	3.4	3.4	2,612.44
20.722	8.592	320	2,607.0	23,000	2,612.96	2610	2609	9.4	3.4	3.8	2,613.64
20.780	8.650	315	2,608.0	23,000	2,614.14	2612	2611	11.9	3.9	3.3	2,615.40
20.840	8.710	315	2,609.0	23,000	2,616.09	2613	2612	8.4	3.2	2.8	2,616.72
20.902	8.772	325	2,611.0	23,000	2,617.81	2614	2614	12.5	4.5	2.0	2,619.29
20.983	8.853	425	2,613.0	23,000	2,620.31	2616	2619	11.5	4.3	1.3	2,621.71
21.066	8.936	440	2,614.0	23,000	2,622.60	2620	2621	7.8	2.2	1.1	2,623.37
21.125	8.995	315	2,615.0	23,000	2,623.37	2621	2618	8.6	1.4	2.5	2,624.13
21.207	9.077	425	2,617.0	23,000	2,624.31	2623	2620	9.9	1.3	2.6	2,625.35
21.325	9.195	615	2,619.0	23,000	2,626.39	2623	2623	10.6	2.4	5.1	2,627.47
21.468	9.338	755	2,623.0	23,000	2,630.00	2626	2626	10.2	3.2	5.8	2,631.02
21.544	9.414	390	2,624.0	23,000	2,631.91	2628	2628	12.5	2.6	3.3	2,633.35
21.628	9.498	440	2,626.0	23,000	2,634.74	2632	2631	8.8	1.5	3.3	2,635.37
21.707	9.577	410	2,628.0	23,000	2,636.46	2634	2633	7.8	2.2	2.9	2,637.03
21.790	9.660	430	2,630.0	23,000	2,638.03	2634	2635	8.3	2.4	2.3	2,638.58
21.880	9.750	470	2,631.0	23,000	2,639.18	2636	2636	11.1	2.4	2.0	2,640.46
21.925	9.795	240	2,632.0	23,000	2,640.94	2638	2638	12.0	3.6	2.1	2,642.44
21.972	9.842	245	2,634.0	23,000	2,642.39	2639	2639	9.6	2.5	1.5	2,643.44

	A	B	C	D	E	F	G	H	I	J	K	L
1	C:\EXCEL\FILES\TANQUE\WORKING\HEC-2\H2_GIVEN.XLS											
2												
3	TANQUE VERDE CREEK - - "Given" condition assuming 49ers levee in place. Uses "existing condition"											
4	data except 49ers (reach 3) replaced with data provided by PCFCD reflecting proposed levee.											
5												
6												
7												
8	THIS RUN EXECUTED 09DEC92		10:01:18									
9												
10		River										
11	SECNO	Mile	XLCH	ELMIN	Q	CWSEL	XLBEL	RBEL	VCH	VLOB	VROB	EG
12	1	5.898	0	2,548.7	23,000	2555	2550	2,550.0	10.3	2.4	2.6	2,555.72
13	101	6.059	850	2,552.0	23,000	2558	2554	2,554.0	11.8	2.8	3.1	2,559.99
14	102	6.239	950	2,556.0	23,000	2563	2556	2,558.0	10.2	2.3	3.4	2,564.07
15	103	6.348	575	2,558.0	23,000	2565	2560	2,560.0	8.8	1.7	3.6	2,565.73
16	104	6.494	770	2,560.0	23,000	2567	2564	2,564.0	11.4	2.1	4.0	2,568.50
17	105	6.589	500	2,563.0	23,000	2570	2568	2,566.0	12.7	1.4	3.8	2,571.19
18	106	6.670	430	2,564.4	23,000	2572	2568	2,568.0	10.9	2.1	2.7	2,573.28
19	107	6.765	500	2,566.0	23,000	2574	2570	2,570.0	10.0	2.2	3.0	2,574.91
20	108	6.850	450	2,570.0	23,000	2576	2572	2,572.0	14.8	3.2	5.3	2,577.96
21	108.1	6.851	5	2,570.0	23,000	2577	2572	2,572.0	12.2	2.9	4.8	2,578.16
22	108.2	6.852	40	2,570.0	23,000	2578	2572	2,572.0	11.0	2.6	4.4	2,578.42
23	108.3	6.853	5	2,570.0	23,000	2578	2572	2,572.0	10.5	2.5	4.0	2,578.46
24	109	6.937	410	2,572.0	23,000	2579	2576	2,574.0	10.2	2.8	4.0	2,579.95
25	110	7.075	730	2,574.0	23,000	2581	2579	2,576.5	5.6	1.6	2.3	2,581.23
26	111	7.176	530	2,576.0	23,000	2582	2580	2,579.0	11.1	2.1	2.9	2,582.96
27	112	2.288	590	2,578.0	23,000	2585	2580	2,581.0	8.6	2.7	1.9	2,585.06
28	113	7.390	540	2,580.0	23,000	2586	2584	2,583.3	8.4	2.9	1.8	2,586.44
29	114	7.488	520	2,582.0	23,000	2588	2586	10000	10.9	4.5	0.0	2,588.47
30	1	7.688	1,056	2,585.5	23,000	2593	2590	2,590.0	10.8	2.9	2.1	2,593.73
31	2	7.723	180	2,586.4	23,000	2595	2592	2,590.0	11.8	2.6	1.9	2,595.68
32	3	7.820	517	2,589.0	23,000	2596	2592	2,592.0	9.2	2.6	1.5	2,597.07
33	4	7.912	484	2,590.4	23,000	2600	2594	2,598.0	10.8	3.2	1.2	2,600.68
34	5	7.950	200	2,590.8	23,000	2600	2591	2,596.4	9.0	1.6	1.5	2,601.10
35	6	7.994	234	2,591.4	23,000	2602	2598	2,594.0	10.5	2.2	1.0	2,603.68
36	20.195	8.065	675	2,593.0	23,000	2604	2598	2,602.0	5.4	1.8	1.7	2,604.46
37	20.361	8.231	850	2,595.0	23,000	2606	2602	2,606.0	10.5	2.9	3.2	2,606.69
38	20.442	8.312	410	2,598.0	23,000	2608	2606	2,606.0	11.2	1.5	2.8	2,608.67
39	20.520	8.390	450	2,602.0	23,000	2610	2606	2,610.0	6.8	2.4	2.6	2,610.03
40	20.604	8.474	470	2,604.0	23,000	2611	2608	2,609.0	8.0	3.2	3.6	2,611.27
41	20.660	8.530	300	2,606.0	23,000	2612	2610	2,610.0	9.3	3.4	3.4	2,612.44
42	20.722	8.592	320	2,607.0	23,000	2613	2610	2,609.0	9.4	3.4	3.8	2,613.64
43	20.780	8.650	315	2,608.0	23,000	2614	2612	2,611.0	12.2	4.0	4.2	2,615.89
44	20.840	8.710	315	2,609.0	23,000	2616	2613	2,612.0	8.1	3.1	5.0	2,617.12
45	20.902	8.772	325	2,611.0	23,000	2618	2614	2,614.0	13.6	5.0	3.8	2,619.83
46	20.983	8.853	425	2,613.0	23,000	2621	2616	2,619.0	11.5	4.4	2.0	2,622.27
47	21.066	8.936	440	2,614.0	23,000	2623	2620	2,621.0	7.7	2.3	3.1	2,623.81
48	21.125	8.995	315	2,615.0	23,000	2624	2621	2,618.0	9.8	1.7	5.0	2,624.73
49	21.207	9.077	425	2,617.0	23,000	2625	2623	2,620.0	9.6	1.6	3.8	2,625.93
50	21.325	9.195	615	2,619.0	23,000	2627	2623	2,623.0	11.4	2.6	5.8	2,628.04
51	21.468	9.338	755	2,623.0	23,000	2630	2626	2,626.0	9.6	3.0	6.6	2,631.45
52	21.544	9.414	390	2,624.0	23,000	2632	2628	2,628.0	13.8	2.8	6.1	2,633.94
53	21.628	9.498	440	2,626.0	23,000	2635	2632	2,631.0	10.4	2.2	6.2	2,636.47
54	21.707	9.577	410	2,628.0	23,000	2638	2634	2,633.0	7.4	2.4	4.3	2,638.17
55	21.790	9.660	430	2,630.0	23,000	2639	2634	2,635.0	7.5	2.4	4.1	2,639.34
56	21.880	9.750	470	2,631.0	23,000	2640	2636	2,636.0	11.2	2.6	3.8	2,640.97
57	21.925	9.795	240	2,632.0	23,000	2641	2638	2,638.0	13.0	4.0	5.1	2,643.30

	A	B	C	D	E	F	G	H	I	J	K	L
58	21.972	9.842	245	2,634.0	23,000	2643	2639	2,639.0	9.2	2.6	3.3	2,644.28
59	22.047	9.917	395	2,636.0	23,000	2644	2642	2,642.0	8.8	1.3	2.4	2,645.32
60	22.125	9.995	410	2,638.0	23,000	2646	2642	2,642.0	7.1	1.3	3.6	2,646.35
61	22.195	10.065	365	2,639.0	23,000	2647	2649	2,645.0	8.8	0.0	3.6	2,647.63
62	22.275	10.145	370	2,641.0	23,000	2648	2645	2,645.0	7.9	2.3	3.5	2,649.27
63	22.338	10.208	395	2,643.0	23,000	2650	2647	2,647.0	4.8	1.3	1.6	2,650.22
64	22.373	10.243	200	2,644.0	23,000	2650	2651	2,650.0	10.2	0.0	2.2	2,651.92
65	22.454	10.324	170	2,645.0	23,000	2652	2651	2,651.0	6.9	1.2	1.6	2,653.05
66	22.511	10.381	300	2,647.0	23,000	2653	2652	2,652.0	6.5	1.2	1.5	2,654.10
67	22.591	10.461	420	2,648.0	23,000	2655	2656	2,653.0	6.7	0.0	2.1	2,655.55
68	22.670	10.540	420	2,650.0	23,000	2657	2655	2,655.0	8.4	2.6	3.0	2,657.84
69	10580	10.580	544	2,653.5	23,000	2660	2656	2,653.5	6.5	1.9	3.3	2,660.22
70	10640	10.640	320	2,655.0	23,000	2661	2656	2,655.0	6.3	2.8	3.3	2,661.19
71	10700	10.700	330	2,655.9	23,000	2662	2656	2,656.0	6.1	2.7	3.3	2,662.15
72	10780	10.780	425	2,658.0	23,000	2663	2660	2,658.0	8.7	3.0	4.4	2,663.93
73	10860	10.860	420	2,660.0	23,000	2666	2660	2,660.0	8.6	3.9	3.9	2,666.16
74	10940	10.940	430	2,662.0	23,000	2668	2662	2,662.0	7.2	3.1	3.0	2,667.99
75	11020	11.020	425	2,664.0	23,000	2669	2664	2,664.0	8.0	3.8	3.3	2,669.83
76	11100	11.100	420	2,667.3	23,000	2671	2668	2,668.0	5.1	2.5	2.8	2,671.48
77	11160	11.160	315	2,667.0	23,000	2672	2668	2,668.3	6.9	3.5	3.0	2,672.76
78	11240	11.240	425	2,670.0	23,000	2675	2672	2,672.0	9.6	4.3	3.7	2,675.60
79	11320	11.320	425	2,671.5	23,000	2678	2672	2,676.0	6.6	3.9	1.2	2,677.97
80	11400	11.400	435	2,674.0	23,000	2679	2676	2,676.0	7.2	3.3	2.2	2,679.80
81	11480	11.480	425	2,675.5	23,000	2681	2676	2,676.0	7.3	4.1	2.6	2,681.68
82	11560	11.560	420	2,676.5	23,000	2683	2680	2,680.0	7.3	2.5	2.5	2,684.11
83	11640	11.640	420	2,678.6	23,000	2686	2684	2,680.0	7.9	4.0	3.5	2,687.06
84	11700	11.700	315	2,680.0	23,000	2688	2684	2,684.0	9.2	3.8	3.3	2,688.93
85	11760	11.760	315	2,682.5	23,000	2689	2684	2,684.0	12.1	4.1	3.8	2,690.69
86	11840	11.840	420	2,685.5	23,000	2692	2688	2,688.0	10.0	3.8	4.0	2,692.92
87	11900	11.900	330	2,686.0	23,000	2694	2688	2,686.0	12.5	4.4	5.1	2,694.92
88	11960	11.960	320	2,687.5	23,000	2696	2688	2,688.1	9.1	3.3	2.9	2,696.41
89	12020	12.020	310	2,689.0	23,000	2697	2692	2,689.0	10.2	3.5	3.8	2,697.45
90	12100	12.100	430	2,690.6	23,000	2698	2691	2,690.6	11.1	4.3	4.4	2,699.33
91	12180	12.180	200	2,692.2	23,000	2699	2692	2,692.2	14.0	5.9	5.5	2,700.66
92	12250	12.250	370	2,692.7	23,000	2703	2693	2,692.7	14.2	4.5	3.8	2,704.61
93	12300	12.300	270	2,692.7	23,000	2705	2693	2,696.0	9.4	3.8	3.6	2,705.88
94	12380	12.380	425	2,694.6	23,000	2706	2696	2,700.0	9.1	3.2	3.2	2,706.95
95	12460	12.460	425	2,698.0	23,000	2709	2698	2,698.0	15.5	3.9	4.8	2,711.15
96	12540	12.540	410	2,701.0	23,000	2714	2701	2,701.0	16.8	4.6	6.6	2,715.79
97	12620	12.620	425	2,703.0	19,000	2717	2703	2,708.0	7.6	3.1	3.5	2,716.85
98	12700	12.700	425	2,700.0	16,000	2717	2707	2,707.0	5.7	2.6	1.7	2,717.20
99	12780	12.780	435	2,707.5	16,000	2717	2712	2,707.5	16.9	3.7	7.0	2,720.75
100	12840	12.840	335	2,709.0	16,000	2721	2709	2,709.0	16.3	6.6	6.6	2,722.96
101	12900	12.900	340	2,711.9	16,000	2723	2712	2,712.0	20.7	8.4	8.5	2,725.19
102	12980	12.980	425	2,720.0	16,000	2729	2720	2,720.0	18.9	7.5	7.1	2,731.22
103	13060	13.060	430	2,722.0	16,000	2735	2722	2,722.0	18.1	5.3	6.0	2,737.91
104	13140	13.140	420	2,731.0	16,000	2742	2732	2,732.0	18.8	6.7	6.7	2,744.68
105	13200	13.200	313	2,738.0	16,000	2748	2740	2,744.0	17.2	7.4	6.0	2,749.68
106	13280	13.280	425	2,744.0	16,000	2754	2752	2,748.0	16.3	2.5	7.2	2,756.10
107	13360	13.360	415	2,752.0	16,000	2760	2756	2,756.0	14.0	3.4	7.3	2,760.75
108	13440	13.440	430	2,757.0	16,000	2766	2764	2,757.0	17.3	2.7	8.5	2,768.54
109	13520	13.520	420	2,758.0	16,000	2771	2760	2,760.0	20.7	6.5	8.0	2,773.69
110	13600	13.600	420	2,760.0	16,000	2777	2764	2,760.0	22.4	6.8	8.6	2,780.56

		2-year Q = 2,300		10-year Q = 6,900		25-year Q = 11,500		50-yr Q = 16100		100-yr Q = 23000		cba Q = 28,500	
SECNO	ELMIN	CWSEL	depth	CWSEL	depth	CWSEL	depth	CWSEL	depth	CWSEL	depth	CWSEL	depth
1	2,548.7	2,550.71	2.01	2,552.37	3.67	2,553.28	4.58	2,553.93	5.23	2,554.67	5.97	2,555.16	6.46
101	2,552.0	2,554.41	2.41	2,555.94	3.94	2,556.84	4.84	2,557.51	5.51	2,558.25	6.25	2,558.85	6.85
102	2,556.0	2,558.49	2.49	2,560.02	4.02	2,561.08	5.08	2,561.95	5.95	2,563.07	7.07	2,563.76	7.76
103	2,558.0	2,560.58	2.58	2,562.27	4.27	2,563.24	5.24	2,564.01	6.01	2,564.99	6.99	2,565.66	7.66
104	2,560.0	2,563.34	3.34	2,565.05	5.05	2,565.84	5.84	2,566.46	6.46	2,567.25	7.25	2,567.81	7.81
105	2,563.0	2,566.06	3.06	2,567.84	4.84	2,568.57	5.57	2,569.12	6.12	2,569.77	6.77	2,570.24	7.24
106	2,564.4	2,568.04	3.64	2,569.55	5.15	2,570.40	6.00	2,571.10	6.70	2,572.02	7.62	2,572.65	8.25
107	2,566.0	2,569.06	3.06	2,571.04	5.04	2,572.22	6.22	2,573.06	7.06	2,574.02	8.02	2,574.70	8.70
108	2,570.0	2,573.24	3.24	2,574.55	4.55	2,575.31	5.31	2,575.77	5.77	2,576.44	6.44	2,576.97	6.97
108.1	2,570.0	2,573.63	3.63	2,575.03	5.03	2,575.71	5.71	2,576.40	6.40	2,577.18	7.18	2,577.50	7.50
108.2	2,570.0	2,573.89	3.89	2,575.31	5.31	2,576.14	6.14	2,576.83	6.83	2,577.64	7.64	2,578.14	8.14
108.3	2,570.0	2,573.90	3.90	2,575.34	5.34	2,576.17	6.17	2,576.88	6.88	2,577.76	7.76	2,578.40	8.40
109	2,572.0	2,574.75	2.75	2,576.31	4.31	2,577.27	5.27	2,578.04	6.04	2,578.99	6.99	2,579.65	7.65
110	2,574.0	2,576.58	2.58	2,578.16	4.16	2,579.14	5.14	2,579.96	5.96	2,581.04	7.04	2,581.82	7.82
111	2,576.0	2,578.39	2.39	2,580.33	4.33	2,581.02	5.02	2,581.41	5.41	2,581.92	5.92	2,582.25	6.25
112	2,578.0	2,581.22	3.22	2,582.55	4.55	2,583.24	5.24	2,583.87	5.87	2,584.64	6.64	2,585.18	7.18
113	2,580.0	2,582.77	2.77	2,584.06	4.06	2,584.81	4.81	2,585.38	5.38	2,586.12	6.12	2,586.65	6.65
114	2,582.0	2,585.27	3.27	2,586.18	4.18	2,586.79	4.79	2,587.31	5.31	2,587.99	5.99	2,588.47	6.47
1	2,585.5	2,589.10	3.60	2,590.93	5.43			2,592.09	6.59	2,592.81	7.31	2,593.31	7.81
2	2,586.4	2,589.67	3.27	2,591.52	5.12	2,593.37	6.97	2,593.88	7.48	2,594.52	8.12	2,594.88	8.48
3	2,589.0	2,592.06	3.06	2,594.77	5.77	2,594.95	5.95	2,595.66	6.66	2,596.45	7.45	2,597.03	8.03
4	2,590.4	2,593.84	3.44	2,595.95	5.55	2,597.30	6.90	2,598.98	8.58	2,599.67	9.27	2,599.87	9.47
5	2,590.8	2,594.54	3.74	2,597.22	6.42	2,598.98	8.18	2,599.73	8.93	2,600.42	9.62	2,600.95	10.15
6	2,591.4	2,594.83	3.43	2,597.38	5.98	2,597.92	6.52	2,599.91	8.51	2,602.44	11.04	2,602.85	11.45
20.195	2,593.0	2,597.25	4.25	2,599.97	6.97	2,602.06	9.06	2,603.45	10.45	2,604.28	11.28	2,604.91	11.91
20.361	2,595.0	2,601.49	6.49	2,603.01	8.01	2,603.80	8.80	2,604.59	9.59	2,605.52	10.52	2,606.03	11.03
20.442	2,598.0	2,602.77	4.77	2,604.68	6.68	2,605.79	7.79	2,607.05	9.05	2,607.53	9.53	2,607.96	9.96
20.520	2,602.0	2,604.59	2.59	2,606.97	4.97	2,608.36	6.36	2,608.84	6.84	2,609.65	7.65	2,610.12	8.12
20.604	2,604.0	2,607.61	3.61	2,608.73	4.73			2,610.13	6.13	2,610.83	6.83	2,611.30	7.30
20.660	2,606.0	2,608.43	2.43	2,609.71	3.71	2,610.47	4.47	2,611.05	5.05	2,611.76	5.76	2,612.26	6.26
20.722	2,607.0	2,609.44	2.44	2,610.76	3.76	2,611.60	4.60	2,612.23	5.23	2,612.96	5.96	2,613.44	6.44
20.780	2,608.0	2,610.69	2.69	2,612.09	4.09	2,612.93	4.93	2,613.61	5.61	2,614.46	6.46	2,615.01	7.01
20.840	2,609.0	2,612.00	3.00	2,613.79	4.79	2,614.81	5.81	2,615.58	6.58	2,616.45	7.45	2,617.01	8.01
20.902	2,611.0	2,613.12	2.12	2,615.27	4.27			2,616.93	5.93	2,617.90	6.90	2,618.57	7.57
20.983	2,613.0	2,615.85	2.85	2,617.60	4.60	2,618.79	5.79	2,619.67	6.67	2,620.75	7.75	2,621.53	8.53
21.066	2,614.0	2,617.05	3.05	2,619.37	5.37	2,620.79	6.79	2,621.88	7.88	2,623.01	9.01	2,623.72	9.72
21.125	2,615.0	2,617.84	2.84	2,620.05	5.05	2,621.48	6.48	2,622.48	7.48	2,623.55	8.55	2,624.25	9.25
21.207	2,617.0	2,619.59	2.59	2,621.32	4.32	2,622.64	5.64	2,623.70	6.70	2,624.87	7.87	2,625.61	8.61

		2-year Q = 2,300		10-year Q = 6,900		25-year Q = 11,500		50-yr Q = 16100		100-yr Q = 23000		cba Q = 28,500	
SECNO	ELMIN	CWSEL	depth	CWSEL	depth	CWSEL	depth	CWSEL	depth	CWSEL	depth	CWSEL	depth
21.325	2,619.0	2,621.99	2.99	2,623.63	4.63	2,624.64	5.64	2,625.54	6.54	2,626.67	7.67	2,627.44	8.44
21.468	2,623.0	2,626.01	3.01	2,627.67	4.67	2,628.66	5.66	2,629.43	6.43	2,630.44	7.44	2,631.20	8.20
21.544	2,624.0	2,627.41	3.41	2,629.21	5.21	2,630.21	6.21	2,630.95	6.95	2,631.88	7.88	2,632.58	8.58
21.628	2,626.0	2,629.34	3.34	2,632.01	6.01	2,632.98	6.98	2,634.02	8.02	2,635.27	9.27	2,636.11	10.11
21.707	2,628.0	2,632.03	4.03	2,634.35	6.35	2,635.57	7.57	2,636.43	8.43	2,637.55	9.55	2,638.35	10.35
21.790	2,630.0	2,633.17	3.17	2,635.45	5.45	2,636.73	6.73	2,637.66	7.66	2,638.82	8.82	2,639.62	9.62
21.880	2,631.0	2,634.77	3.77	2,636.98	5.98	2,637.94	6.94	2,638.75	7.75	2,639.58	8.58	2,640.31	9.31
21.925	2,632.0	2,635.44	3.44	2,637.71	5.71	2,639.39	7.39	2,640.28	8.28	2,641.26	9.26	2,641.92	9.92
21.972	2,634.0	2,637.14	3.14	2,639.72	5.72	2,641.04	7.04	2,642.00	8.00	2,643.23	9.23	2,644.09	10.09
22.047	2,636.0	2,638.49	2.49	2,640.71	4.71	2,642.09	6.09	2,643.03	7.03	2,644.18	8.18	2,645.00	9.00
22.125	2,638.0	2,640.03	2.03	2,641.92	3.92	2,643.35	5.35	2,644.42	6.42	2,645.72	7.72	2,646.59	8.59
22.195	2,639.0	2,642.27	3.27	2,643.99	4.99	2,644.77	5.77	2,645.53	6.53	2,646.55	7.55	2,647.27	8.27
22.275	2,641.0	2,643.90	2.90	2,645.62	4.62	2,646.64	5.64	2,647.42	6.42	2,648.39	7.39	2,649.08	8.08
22.338	2,643.0	2,645.65	2.65	2,647.16	4.16	2,648.10	5.10	2,648.90	5.90	2,649.95	6.95	2,650.71	7.71
22.454	2,645.0	2,647.97	2.97	2,649.56	4.56	2,650.60	5.60	2,651.44	6.44	2,652.34	7.34	2,652.86	7.86
22.511	2,647.0	2,649.11	2.11	2,650.55	3.55	2,651.64	4.64	2,652.50	5.50	2,653.47	6.47	2,654.08	7.08
22.591	2,648.0	2,650.81	2.81	2,652.25	4.25	2,653.16	5.16	2,653.93	5.93	2,654.91	6.91	2,655.51	7.51
22.670	2,650.0	2,653.22	3.22	2,654.65	4.65	2,655.46	5.46	2,656.10	6.10	2,656.91	6.91	2,657.41	7.41
10.580	2,653.5	2,655.84	2.34	2,657.51	4.01	2,658.44	4.94	2,659.10	5.60	2,659.88	6.38	2,660.29	6.79
10.640	2,655.0	2,656.83	1.83	2,658.36	3.36	2,659.31	4.31	2,660.03	5.03	2,660.88	5.88	2,661.14	6.14
10.700	2,655.9	2,657.95	2.05	2,659.30	3.40	2,660.24	4.34	2,660.97	5.07	2,661.83	5.93	2,662.04	6.14
10.780	2,658.0	2,659.63	1.63	2,660.94	2.94	2,661.80	3.80	2,662.49	4.49	2,663.35	5.35	2,663.51	5.51
10.860	2,660.0	2,662.46	2.46	2,663.68	3.68	2,664.40	4.40	2,665.00	5.00	2,665.78	5.78	2,665.93	5.93
10.940	2,662.0	2,664.08	2.08	2,665.43	3.43	2,666.21	4.21	2,666.82	4.82	2,667.59	5.59	2,667.73	5.73
11.020	2,664.0	2,665.90	1.90	2,667.18	3.18	2,667.97	3.97	2,668.58	4.58	2,669.33	5.33	2,669.47	5.47
11.100	2,667.3	2,668.38	1.08	2,669.29	1.99	2,669.96	2.66	2,670.47	3.17	2,671.13	3.83	2,671.25	3.95
11.160	2,667.0	2,669.46	2.46	2,670.41	3.41	2,671.06	4.06	2,671.60	4.60	2,672.26	5.26	2,672.38	5.38
11.240	2,670.0	2,671.65	1.65	2,672.89	2.89	2,673.44	3.44	2,674.01	4.01	2,674.70	4.70	2,674.82	4.82
11.320	2,671.5	2,673.87	2.37	2,675.26	3.76	2,676.18	4.68	2,676.81	5.31	2,677.59	6.09	2,677.73	6.23
11.400	2,674.0	2,675.41	1.41	2,676.68	2.68	2,677.59	3.59	2,678.29	4.29	2,679.15	5.15	2,679.30	5.30
11.480	2,675.5	2,677.74	2.24	2,678.94	3.44	2,679.70	4.20	2,680.33	4.83	2,681.13	5.63	2,681.28	5.78
11.560	2,676.5	2,679.55	3.05	2,681.01	4.51	2,681.82	5.32	2,682.49	5.99	2,683.31	6.81	2,683.47	6.97
11.640	2,678.6	2,683.25	4.65	2,684.54	5.94	2,685.11	6.51	2,685.63	7.03	2,686.31	7.71	2,686.44	7.84
11.700	2,680.0	2,684.41	4.41	2,685.83	5.83	2,686.63	6.63	2,687.26	7.26	2,688.02	8.02	2,688.16	8.16
11.760	2,682.5	2,685.39	2.89	2,686.79	4.29	2,687.64	5.14	2,688.32	5.82	2,689.18	6.68	2,689.33	6.83
11.840	2,685.5	2,688.13	2.63	2,689.34	3.84	2,690.34	4.84	2,691.15	5.65	2,692.13	6.63	2,692.31	6.81
11.900	2,686.0	2,689.96	3.96	2,691.42	5.42	2,692.16	6.16	2,692.80	6.80	2,693.66	7.66	2,693.82	7.82
11.960	2,687.5	2,690.91	3.41	2,692.79	5.29	2,693.96	6.46	2,694.83	7.33	2,695.88	8.38	2,696.07	8.57

		2-year Q = 2,300		10-year Q = 6,900		25-year Q = 11,500		50-yr Q = 16100		100-yr Q = 23000		cba Q = 28,500	
SECNO	ELMIN	CWSEL	depth	CWSEL	depth	CWSEL	depth	CWSEL	depth	CWSEL	depth	CWSEL	depth
12.020	2,689.0	2,692.63	3.63	2,694.50	5.50	2,695.25	6.25	2,695.91	6.91	2,696.84	7.84	2,697.02	8.02
12.100	2,690.6	2,693.97	3.37	2,695.65	5.05	2,696.64	6.04	2,697.40	6.80	2,698.31	7.71	2,698.48	7.88
12.180	2,692.2	2,694.41	2.21	2,696.16	3.96	2,697.33	5.13	2,698.17	5.97	2,699.18	6.98	2,699.37	7.17
12.250	2,692.7	2,696.78	4.08	2,698.66	5.96	2,700.83	8.13	2,701.79	9.09	2,702.94	10.24	2,702.88	10.18
12.300	2,692.7	2,697.90	5.20	2,701.38	8.68	2,702.90	10.20	2,703.93	11.23	2,705.10	12.40	2,705.40	12.70
12.380	2,694.6	2,699.69	5.09	2,702.63	8.03	2,703.96	9.36	2,704.92	10.32	2,706.08	11.48	2,706.33	11.73
12.460	2,698.0	2,701.02	3.02	2,704.33	6.33	2,706.43	8.43	2,707.84	9.84	2,709.06	11.06	2,709.26	11.26
12.540	2,701.0	2,705.02	4.02	2,707.78	6.78	2,710.69	9.69	2,712.24	11.24	2,713.56	12.56	2,713.79	12.79
12.620	2,703.0	2,708.29	5.29	2,711.92	8.92	2,713.79	10.79	2,715.08	12.08	2,716.54	13.54	2,716.81	13.81
12.700	2,700.0	2,708.78	8.78	2,712.34	12.34	2,714.17	14.17	2,715.46	15.46	2,716.93	16.93	2,717.34	17.34
12.780	2,707.5	2,709.91	2.41	2,712.32	4.82	2,713.91	6.41	2,715.28	7.78	2,717.10	9.60	2,719.75	12.25
12.840	2,709.0	2,713.00	4.00	2,715.43	6.43	2,717.24	8.24	2,718.81	9.81	2,720.84	11.84	2,723.85	14.85
12.900	2,711.9	2,715.96	4.06	2,718.33	6.43	2,719.86	7.96	2,721.14	9.24	2,722.91	11.01	2,725.83	13.93
12.980	2,720.0	2,723.26	3.26	2,725.50	5.50	2,726.70	6.70	2,727.67	7.67	2,728.89	8.89	2,730.55	10.55
13.060	2,722.0	2,726.61	4.61	2,729.66	7.66	2,731.66	9.66	2,733.47	11.47	2,735.02	13.02	2,737.21	15.21
13.140	2,731.0	2,735.55	4.55	2,738.49	7.49	2,739.95	8.95	2,740.93	9.93	2,742.18	11.18	2,744.03	13.03
13.200	2,738.0	2,742.65	4.65	2,744.71	6.71	2,745.75	7.75	2,746.57	8.57	2,747.55	9.55	2,749.05	11.05
13.280	2,744.0	2,748.67	4.67	2,750.74	6.74	2,752.06	8.06	2,752.87	8.87	2,753.94	9.94	2,755.45	11.45
13.360	2,752.0	2,755.81	3.81	2,757.17	5.17	2,757.97	5.97	2,758.68	6.68	2,759.57	7.57	2,760.88	8.88
13.440	2,757.0	2,761.10	4.10	2,762.98	5.98	2,764.06	7.06	2,764.77	7.77	2,765.98	8.98	2,767.79	10.79
13.520	2,758.0	2,763.70	5.70	2,766.23	8.23	2,767.93	9.93	2,769.11	11.11	2,770.59	12.59	2,772.79	14.79
13.600	2,760.0	2,766.61	6.61	2,769.78	9.78	2,772.27	12.27	2,774.64	14.64	2,776.74	16.74	2,779.49	19.49
			3.26		5.11		6.04		7.05		8.04		8.69
													19.49
													3.95

C:\EXCEL\FILES\TANQUE\WORKING\HEC-2\H2_MULTI.XLS

C:\EXCEL\FILES\TANQUE\WORKING\LEVEE\BENECALC.XLS

Flood Damage for Given Condition 100-year Storm
49ers levee in place but that doesn't matter
Borrowed from flooddmg.xls
Borrowed from flooddmg.xls

Total 100-year damage: $1,838,444
newlev.txt (Parcels to be protected by new levee) Captured using c:sp and c:eros in lc.lsp

	Parcel	Depth With Levee	Value of Damage Struc	Content	Total	Parcel	Index of Parcel in Damage Table	Total Damage in 100-year Storm
1	133-01-064D	0.00	0	0	0	133-02-059H	46	35,173
2	133-01-064C	5.37	212	79	291	133-02-058	52	38,546
3	133-01-064E	0.00	0	0	0	133-02-051	71	5,504
4	133-01-066F	0.00	0	0	0	133-02-050E	74	1,114
5	133-01-063	0.00	0	0	0	133-02-074A	69	55,899
6	133-01-066E	2.09	66,174	30,790	96,964	133-02-073A	64	70,751
7	133-01-027A	0.00	0	0	0	133-01-051	60	218
8	133-01-026C	0.00	0	0	0	133-01-050	53	39,647
9	133-01-061	0.59	9,549	3,894	13,443	133-01-049	50	12,882
10	133-01-060	0.78	19,457	7,684	27,141	133-01-048	44	4,813
11	133-01-043A	0.00	0	0	0	133-01-055A	39	17,930
12	133-01-030	0.00	0	0	0	133-01-046	37	12,872
13	133-01-029	0.00	0	0	0	133-01-047	36	0
29	133-01-034	0.00	0	0	0	133-02-059G	47	0
30	133-01-033	0.00	0	0	0	133-02-059F	49	15,832
31	133-01-044	0.59	8,488	3,459	11,947	133-02-059B	51	0
32	133-01-038	0.00	0	0	0	133-02-059D	48	0
33	133-01-037	0.00	0	0	0	133-02-057	54	15,490
34	133-01-036	0.00	0	0	0	133-02-060A	43	0
35	133-01-055B	0.00	0	0	0	133-02-060B	41	0
36	133-01-047	0.00	0	0	0	133-02-061	38	0
37	133-01-046	0.66	9,176	3,696	12,872	133-02-056	56	19,668
38	133-02-061	0.00	0	0	0	133-02-053	70	26,240
39	133-01-055A	1.23	12,702	5,227	17,930	133-02-054B	67	31,492
40	133-02-062C	0.00	0	0	0	133-02-054C	59	15,979
41	133-02-060B	0.00	0	0	0	133-02-054D	63	0
42	133-01-054	0.00	0	0	0	133-02-077	86	75,817
43	133-02-060A	0.00	0	0	0	133-02-076	81	76,436
44	133-01-048	1.12	3,442	1,371	4,813	133-02-075	79	67,045
45	133-02-062D	0.00	0	0	0	133-02-072	68	72,205
46	133-02-059H	1.67	24,214	10,959	35,173	133-02-071	73	31,330
47	133-02-059G	0.00	0	0	0	133-02-070	77	49,887
48	133-02-059D	0.00	0	0	0	133-02-067	91	44,904
49	133-02-059F	0.37	11,154	4,678	15,832	133-02-068	88	51,319
50	133-01-049	1.92	8,764	4,118	12,882	133-02-069	83	55,130
51	133-02-059B	0.00	0	0	0	133-02-066D	95	51,108
52	133-02-058	2.52	27,017	11,529	38,546	133-02-066B	92	32,322
53	133-01-050	2.84	28,260	11,386	39,647	133-02-066C	89	28,263
54	133-02-057	3.28	11,139	4,351	15,490	133-02-065H	76	58,539
55	133-02-063C	2.50	34,601	14,822	49,423	133-02-065F	82	0

56	133-02-056	3.71	14,171	5,497	19,668	133-02-065G	75	0
57	133-01-056F	0.00	0	0	0	133-02-065E	72	59,822
58	133-01-053	0.00	0	0	0	133-02-065D	66	41,215
59	133-02-054C	2.89	11,417	4,562	15,979	133-02-065B	62	49,420
60	133-01-051	2.72	155	64	218	133-02-064	61	26,925
61	133-02-064	4.85	19,164	7,761	26,925	133-02-063C	55	49,423
62	133-02-065B	4.52	35,354	14,066	49,420	133-02-062D	45	0
63	133-02-054D	0.00	0	0	0	133-02-062C	40	0
64	133-02-073A	6.20	52,995	17,756	70,751	133-02-009	85	60,738
65	133-01-052	5.28	5,770	2,203	7,973	133-02-006D	98	0
66	133-02-065D	4.52	29,483	11,732	41,215	133-02-006F	99	23,841
67	133-02-054B	3.58	22,677	8,815	31,492	133-02-006E	96	0
68	133-02-072	5.72	53,542	18,662	72,205	133-01-037	33	0
69	133-02-074A	6.65	41,617	14,283	55,899	133-01-036	34	0
70	133-02-053	3.08	18,851	7,389	26,240	133-01-035	27	0
71	133-02-051	4.18	3,959	1,545	5,504	133-01-034	29	0
72	133-02-065E	5.10	42,797	17,025	59,822	133-01-033	30	0
73	133-02-071	4.42	22,447	8,882	31,330	205-52-033A	127	144
74	133-02-050E	4.54	796	317	1,114	205-52-030B	130	13,097
75	133-02-065G	0.00	0	0	0	205-52-030D	132	0
76	133-02-065H	5.06	41,762	16,777	58,539	205-52-030C	129	22,003
77	133-02-070	4.60	35,646	14,241	49,887	205-52-056	97	0
78	205-52-058	0.00	0	0	0	205-52-041C	118	27,075
79	133-02-075	6.07	50,309	16,736	67,045	205-52-041A	110	8,787
80	205-52-059	0.00	0	0	0	205-52-053	100	16,661
81	133-02-076	6.04	57,382	19,054	76,436	205-52-051	94	0
82	133-02-065F	0.00	0	0	0	205-52-052A	93	7,700
83	133-02-069	5.04	39,262	15,868	55,130	205-52-035	123	7,455
84	205-52-060C	5.60	38,770	13,833	52,603	205-52-044	113	15,672
85	133-02-009	5.67	44,930	15,808	60,738	205-52-042	119	12,061
86	133-02-077	5.77	56,359	19,458	75,817	205-52-045	120	0
87	205-52-055A	4.83	11,595	4,690	16,286	205-52-046	121	0
88	133-02-068	4.35	36,813	14,506	51,319	205-52-047A	115	39,365
89	133-02-066C	5.89	21,128	7,135	28,263	205-52-049	108	5,057
90	205-52-057	4.13	6,131	2,386	8,518	205-52-050A	102	10,366
91	133-02-067	3.19	32,277	12,628	44,904	205-52-048C	111	16,021
92	133-02-066B	4.21	23,239	9,083	32,322	205-52-048E	109	2,469
93	205-52-052A	3.79	5,550	2,150	7,700	205-52-048F	104	146
94	205-52-051	0.00	0	0	0	205-52-027	138	0
95	133-02-066D	3.55	36,796	14,311	51,108	205-52-026	143	13,788
96	133-02-006E	0.00	0	0	0	205-52-025	141	28,177
97	205-52-056	0.00	0	0	0	205-52-023	139	0
98	133-02-006D	0.00	0	0	0	205-52-024	134	11,686
99	133-02-006F	1.90	16,230	7,610	23,841	205-52-022	137	3,756
100	205-52-053	2.97	11,945	4,715	16,661	205-52-021	136	0
101	205-52-054A	0.00	0	0	0	205-52-020	131	22,894
102	205-52-050A	3.17	7,450	2,916	10,366	205-52-019	124	0
103	205-52-054B	3.26	11,613	4,538	16,151	205-52-017	112	0
104	205-52-048F	1.43	102	44	146	205-52-016E	105	0
105	205-52-016E	0.00	0	0	0	205-52-016D	107	0
106	205-52-039A	4.56	37,682	15,024	52,706			1,838,444
107	205-52-016D	0.00	0	0	0			

108	205-52-049	1.64	3,489	1,569	5,057		
109	205-52-048E	1.67	1,700	769	2,469		
110	205-52-041A	2.75	6,234	2,553	8,787		
111	205-52-048C	1.78	10,971	5,050	16,021		
112	205-52-017	0.00	0	0	0		
113	205-52-044	1.87	10,685	4,987	15,672		
114	205-52-043	0.00	0	0	0		
115	205-52-047A	1.92	26,778	12,587	39,365		
116	205-52-060B	0.00	0	0	0		
117	205-52-040	5.01	3,104	1,264	4,368		
118	205-52-041C	2.16	18,556	8,519	27,075		
119	205-52-042	1.67	8,305	3,756	12,061		
120	205-52-045	0.00	0	0	0		
121	205-52-046	0.00	0	0	0		
122	205-52-038A	3.34	2,254	880	3,134		
123	205-52-035	1.38	5,224	2,231	7,455		
124	205-52-019	0.00	0	0	0		
125	205-52-032	0.00	0	0	0		
126	205-52-034B	1.59	109	48	157		
127	205-52-033A	1.40	101	43	144		
128	205-52-031	0.00	0	0	0		
129	205-52-030C	3.25	15,820	6,183	22,003		
130	205-52-030B	1.67	9,016	4,080	13,097		
131	205-52-020	2.62	16,136	6,758	22,894		
132	205-52-030D	0.00	0	0	0		
133	205-51-009M	0.00	0	0	0		
134	205-52-024	2.42	8,145	3,541	11,686		
135	205-51-009V	0.00	0	0	0		
136	205-52-021	0.00	0	0	0		
137	205-52-022	0.70	2,683	1,073	3,756		
138	205-52-027	0.00	0	0	0		
139	205-52-023	0.00	0	0	0		
140	205-52-029B	1.36	177	75	253		
141	205-52-025	0.54	19,961	8,216	28,177		
142	205-52-029A	0.00	0	0	0		
143	205-52-026	0.33	9,704	4,084	13,788		
					2,080,912		

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Full cash to market value multiplier: 1.25

			ASSESSOR DATA		DAMAGE MODEL	
			Full Cash Value		100-year Condition	
	Tax ID		(Struc)	(Land)	"Given"	"Existing"
	Parcel		-2-	-3-	Flood Damage	Flood Damage
1	133-01-064D		--	13,594	--	--
2	133-01-064C		500	37,736	291	291
3	133-01-064E		--	2,719	--	--
4	133-01-066F		--	85,030	--	--
5	133-01-063		--	23,164	--	--
6	133-01-066E		254,311	70,180	96,964	96,964
7	133-01-027A		--	166,850	--	--
8	133-01-026C		--	244,200	--	--
9	133-01-061		69,035	62,919	13,443	13,443
10	133-01-060		128,611	20,155	27,141	27,141
11	133-01-043A		--	343,545	--	--
12	133-01-030		12,743	48,750	--	--
13	133-01-029		51,250	48,750	--	--
14	133-01-062B		12,575	10,984	5,377	5,377
15	133-01-059		69,807	77,760	10,506	10,506
16	133-01-041A		57,433	32,625	--	--
17	133-01-057		46,730	59,740	15,888	15,888
18	133-01-028		--	56,160	--	--
19	133-01-031		99,261	36,431	--	--
20	133-01-058		30,441	41,651	12,028	12,028
21	133-01-056E		--	89,250	--	--
22	133-01-040		87,397	35,453	--	--
23	133-01-039A		--	19,901	--	--
24	133-01-025		81,059	405,132	--	--
25	133-01-032		94,198	37,519	--	--

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Parcels in Floodway

Total area (acres):	600.00	
Structures Value:	$0.96	$63,891 per structure
Land Value:	$1.60	$2,673 per acre
Total Value:	$2.56	$4,271 per acre
Number of Affected Parcels:	32	
Number of Parcels With Structures:	15	
Value of Developed Parcels:	$1.77	$117,957 per home
Value of Undeveloped Parcels:	$0.79	
	$2.56	
100-year Flood Damage--		
"Existing":	$0.23	
"Given" :	$0.23	

	133-01-039B	54	72,310	19,684	1	91,994	0	0	0
										"Given"	"Existing"
	Tax ID	Index	(Struc)	(Land)		Developed	Undeveloped	Flood	Flood
	-4-	-5-	-6-	-7-		Parcels	Parcels	Damage	Damage
1	133-01-064D	29	0	13,594	0	0	13,594	0	0
2	133-01-064C	30	500	37,736	1	38,236	0	291	291
3	133-01-064E	31	0	2,719	0	0	2,719	0	0
4	133-01-063	33	0	23,164	0	0	23,164	0	0
5	133-01-062B	42	12,575	10,984	1	23,559	0	5,377	5,377
6	133-01-066F	32	0	85,030	0	0	85,030	0	0
7	133-01-066E	34	254,311	70,180	1	324,491	0	96,964	96,964
8	133-01-061	37	69,035	62,919	1	131,954	0	13,443	13,443
9	133-01-059	43	69,807	77,760	1	147,567	0	10,506	10,506
10	133-01-058	48	30,441	41,651	1	72,092	0	12,028	12,028
11	133-01-055B	63	0	43,500	0	0	43,500	0	0
12	133-01-054	70	0	50,700	0	0	50,700	0	0
13	133-01-052	93	14,058	32,625	1	46,683	0	7,973	7,973
14	133-01-053	86	0	500	0	0	500	0	0
15	205-52-060C	112	85,433	65,880	1	151,313	0	52,603	52,603
16	205-52-060B	144	0	1,875	0	0	1,875	0	0
17	205-52-032	153	0	16,875	0	0	16,875	0	0
18	205-52-031	156	0	20,475	0	0	20,475	0	0
19	205-52-029A	170	500	86,190	1	86,690	0	0	0
20	205-52-029B	168	895	60,000	1	60,895	0	253	253
21	205-52-028	172	0	500	0	0	500	0	0
22	205-48-086	174	0	10,000	0	0	10,000	0	0
23	205-48-087	177	0	10,000	0	0	10,000	0	0
24	205-48-088	185	0	10,000	0	0	10,000	0	0
25	205-48-089	192	0	10,000	0	0	10,000	0	0

	AD	AF	AG	AI	AK	AL	AN	AP	AR	AT
1	C:\EXCEL\FILES\TANQUE\WORKING\PURCHASE\PARCELS.XLS								Jul 30, 1993 (10:12 am)	
2										
3	b1.txt Parcels in 100-yr floodplain but which will be protected by 49ers levee									
4										
5			Total area (acres):		106.72					
6										
7			Structures Value:		$11.08		$110,788	per structure		
8			Land Value:		$4.36		$40,863	per acre		
9			Total Value:		$15.44		$144,675	per acre		
10										
11		Number of Affected Parcels:			103					
12		Number of Parcels With Structures:			100					
13										
14		Value of Developed Parcels:			$15.37		$153,747	per home		
15		Value of Undeveloped Parcels:			$0.07					
16					$15.44					
17										
18		100-year Flood Damage--								
19		"Existing":			$0.88					
20		"Given" :			$0.00					
21										
22		133-01-039B	54	72,310	19,684	1	91,994	0	0	0
23										
24										
25										
26									"Given"	"Existing"
27		Tax ID	Index	(Struc)	(Land)		Developed	Undeveloped	Flood	Flood
28		-4-	-5-	-6-	-7-		Parcels	Parcels	Damage	Damage
29	1	205-50-078	265	89,421	35,000	1	124,421	0	0	12,860
30	2	205-50-080	271	96,548	35,000	1	131,548	0	0	0
31	3	205-50-079	268	91,452	35,000	1	126,452	0	0	0
32	4	205-50-077	264	88,743	35,000	1	123,743	0	0	0
33	5	205-50-076	267	94,218	35,000	1	129,218	0	0	14,777
34	6	205-50-075	270	96,950	35,000	1	131,950	0	0	0
35	7	205-50-054	266	83,193	35,000	1	118,193	0	0	0
36	8	205-48-112	248	38,088	3,350	1	41,438	0	0	0
37	9	205-48-107	262	99,170	35,000	1	134,170	0	0	16,389
38	10	205-48-106	256	81,895	35,000	1	116,895	0	0	19,133
39	11	205-48-105	251	61,958	35,000	1	96,958	0	0	14,368
40	12	205-48-104	246	93,536	35,000	1	128,536	0	0	26,567
41	13	205-48-103	244	86,430	35,000	1	121,430	0	0	29,171
42	14	205-48-102	240	60,123	35,000	1	95,123	0	0	17,541
43	15	205-48-101	234	117,953	35,000	1	152,953	0	0	28,988
44	16	205-48-100	229	76,956	35,000	1	111,956	0	0	17,185
45	17	205-48-099	223	87,379	35,000	1	122,379	0	0	14,553
46	18	205-48-098	218	89,409	35,000	1	124,409	0	0	14,018
47	19	205-48-097	210	83,130	35,000	1	118,130	0	0	12,526
48	20	205-48-096	205	106,926	35,000	1	141,926	0	0	17,289
49	21	205-48-095	201	97,992	35,000	1	132,992	0	0	14,784
50	22	205-48-094	194	101,637	35,000	1	136,637	0	0	29,348
51	23	205-48-093	193	75,039	35,000	1	110,039	0	0	0
52	24	205-48-085	200	97,877	35,000	1	132,877	0	0	0
53	25	205-48-084	196	87,023	35,000	1	122,023	0	0	0

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	AV	AX	AY	BA	BC	BD	BF	BH	BJ	BL
1	C:\EXCEL\FILES\TANQUE\WORKING\PURCHASE\PARCELS.XLS Jul 30, 1993 (10:12 am)									
2										
3	b2.txt **Area remaining within the existing floodplain after 49ers levee is in place**									
4										
5		Total area (acres):		1,218.75						
6										
7		Structures Value:		$9.41			$87,089	per structure		
8		Land Value:		$9.55			$7,835	per acre		
9		Total Value:		$18.95			$15,552	per acre		
10										
11		Number of Affected Parcels:		171						
12		Number of Parcels With Structures:		108						
13										
14		Value of Developed Parcels:		$16.02			$148,376	per home		
15		Value of Undeveloped Parcels:		$2.93						
16				$18.95						
17										
18		100-year Flood Damage--								
19		"Existing":		$2.05						
20		"Given" :		$2.05						
21										
22	133-01-039B	54	72,310	19,684	1	91,994	0	0	0	
23										
24										
25										

		Tax ID	Index	(Struc)	(Land)		Developed	Undeveloped	"Given" Flood	"Existing" Flood
26										
27		Tax ID	Index	(Struc)	(Land)		Developed	Undeveloped	Flood	Flood
28		-4-	-5-	-6-	-7-		Parcels	Parcels	Damage	Damage
29	1	133-01-053	86	0	500	0	0	500	0	0
30	2	133-01-049	78	35,671	46,219	1	81,890	0	12,882	12,882
31	3	133-01-059	43	69,807	77,760	1	147,567	0	10,506	10,506
32	4	133-01-060	38	128,611	20,155	1	148,766	0	27,141	27,141
33	5	133-01-061	37	69,035	62,919	1	131,954	0	13,443	13,443
34	6	133-01-066E	34	254,311	70,180	1	324,491	0	96,964	96,964
35	7	133-01-066F	32	0	85,030	0	0	85,030	0	0
36	8	133-01-062B	42	12,575	10,984	1	23,559	0	5,377	5,377
37	9	133-01-063	33	0	23,164	0	0	23,164	0	0
38	10	133-01-064E	31	0	2,719	0	0	2,719	0	0
39	11	133-01-064C	30	500	37,736	1	38,236	0	291	291
40	12	133-01-064D	29	0	13,594	0	0	13,594	0	0
41	13	133-01-043A	39	0	343,545	0	0	343,545	0	0
42	14	133-01-054	70	0	50,700	0	0	50,700	0	0
43	15	133-01-055B	63	0	43,500	0	0	43,500	0	0
44	16	133-01-055A	67	67,916	48,938	1	116,854	0	17,930	17,930
45	17	133-01-056F	85	0	61,880	0	0	61,880	0	0
46	18	133-01-056E	49	0	89,250	0	0	89,250	0	0
47	19	133-01-058	48	30,441	41,651	1	72,092	0	12,028	12,028
48	20	133-01-057	45	46,730	59,740	1	106,470	0	15,888	15,888
49	21	133-01-045	56	82,556	39,694	1	122,250	0	15,060	15,060
50	22	133-01-044	59	61,254	39,694	1	100,948	0	11,947	11,947
51	23	133-01-039B	54	72,310	19,684	1	91,994	0	0	0
52	24	133-01-040	50	87,397	35,453	1	122,850	0	0	0
53	25	133-01-041A	44	57,433	32,625	1	90,058	0	0	0

	BN	BO	BP	BQ	BR	BS	BT	BU	BV	BW	BX	BY	BZ	CA	CB	CC	CD
1	C:\EXCEL\FILES\TANQUE\WORKING\PURCHASE\PARCELS.XLS Jul 30, 1993 (10:12 am)																
2																	
3	b3.txt Area in 100-yr floodplain behind proposed levee extention																
4																	
5						Total area (acres):		368.74										
6																	
7						Structures Value:		$6.63			$80,877		per structure				
8						Land Value:		$4.94			$13,399		per acre				
9						Total Value:		$11.57			$31,385		per acre				
10																	
11						Number of Affected Parcels:		106									
12						Number of Parcels With Structures:		82									
13																	
14						Value of Developed Parcels:		$10.75			$131,050		per home				
15						Value of Undeveloped Parcels:		$0.83									
16								$11.57									
17																	
18						100-year Flood Damage--											
19						"Existing":		$1.64									
20						"Given" :		$1.64									
21																	
22			133-01-039B	54		72,310		19,684	1		91,994		0		0		0
23																	
24																	
25																	
26															"Given"		"Existing"
27			Tax ID	Index		(Struc)		(Land)			Developed		Undeveloped		Flood		Flood
28			-4-	-5-		-6-		-7-			Parcels		Parcels		Damage		Damage
29	1		133-01-049	78		35,671		46,219	1		81,890		0		12,882		12,882
30	2		133-01-055A	67		67,916		48,938	1		116,854		0		17,930		17,930
31	3		133-01-045	56		82,556		39,694	1		122,250		0		15,060		15,060
32	4		133-01-044	59		61,254		39,694	1		100,948		0		11,947		11,947
33	5		133-01-039B	54		72,310		19,684	1		91,994		0		0		0
34	6		133-01-040	50		87,397		35,453	1		122,850		0		0		0
35	7		133-01-041A	44		57,433		32,625	1		90,058		0		0		0
36	8		133-01-032	53		94,198		37,519	1		131,717		0		0		0
37	9		133-01-031	47		99,261		36,431	1		135,692		0		0		0
38	10		133-01-030	40		12,743		48,750	1		61,493		0		0		0
39	11		133-01-029	41		51,250		48,750	1		100,000		0		0		0
40	12		133-01-028	46		0		56,160	0		0		56,160		0		0
41	13		133-01-027A	35		0		166,850	0		0		166,850		0		0
42	14		133-01-026C	36		0		244,200	0		0		244,200		0		0
43	15		133-01-025	52		81,059		405,132	1		486,191		0		0		0
44	16		133-01-039A	51		0		19,901	0		0		19,901		0		0
45	17		205-52-034B	154		500		65,100	1		65,600		0		157		157
46	18		205-52-043	142		0		13,500	0		0		13,500		0		0
47	19		133-02-059G	75		0		20,200	0		0		20,200		0		0
48	20		133-02-059F	77		90,744		20,000	1		110,744		0		15,832		15,832
49	21		133-02-059B	79		0		19,600	0		0		19,600		0		0
50	22		133-02-059D	76		42,318		19,000	1		61,318		0		0		0
51	23		133-02-057	82		32,894		57,552	1		90,446		0		15,490		15,490
52	24		133-02-060A	71		177,877		64,560	1		242,437		0		0		0
53	25		133-02-060B	69		0		500	0		0		500		0		0

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	A	B	C	D	E	F	G	H	I	J	K
26					Full Cash Value				100-year Condition		
27			Tax ID		(Struc)		(Land)		"Given"	"Existing"	
28			Parcel		-2-		-3-		Flood Damage	Flood Damage	
54	26		133-01-039B		72,310		19,684		--	--	
55	27		133-01-035		44,945		15,334		--	--	
56	28		133-01-045		82,556		39,694		15,060	15,060	
57	29		133-01-034		115,121		11,528		--	--	
58	30		133-01-033		--		11,528		--	--	
59	31		133-01-044		61,254		39,694		11,947	11,947	
60	32		133-01-038		56,150		17,291		--	--	
61	33		133-01-037		80,574		19,358		--	--	
62	34		133-01-036		75,915		42,304		--	--	
63	35		133-01-055B		--		43,500		--	--	
64	36		133-01-047		--		9,135		--	--	
65	37		133-01-046		64,113		46,871		12,872	12,872	
66	38		133-02-061		105,504		64,680		--	--	
67	39		133-01-055A		67,916		48,938		17,930	17,930	
68	40		133-02-062C		173,830		40,480		--	--	
69	41		133-02-060B		--		500		--	--	
70	42		133-01-054		--		50,700		--	--	
71	43		133-02-060A		177,877		64,560		--	--	
72	44		133-01-048		19,405		24,795		4,813	4,813	
73	45		133-02-062D		178,351		70,400		--	--	
74	46		133-02-059H		107,694		33,200		35,173	35,173	
75	47		133-02-059G		--		20,200		--	--	
76	48		133-02-059D		42,318		19,000		--	--	
77	49		133-02-059F		90,744		20,000		15,832	15,832	
78	50		133-01-049		35,671		46,219		12,882	12,882	
79	51		133-02-059B		--		19,600		--	--	
80	52		133-02-058		92,049		39,200		38,546	38,546	
81	53		133-01-050		88,665		66,300		39,647	39,647	
82	54		133-02-057		32,894		57,552		15,490	15,490	
83	55		133-02-063C		118,527		55,264		49,423	49,423	
84	56		133-02-056		40,453		62,760		19,668	19,668	
85	57		133-01-056F		--		61,880		--	--	
86	58		133-01-053		--		500		--	--	
87	59		133-02-054C		35,390		44,704		15,979	15,979	
88	60		133-01-051		500		39,150		218	218	
89	61		133-02-064		51,674		55,264		26,925	26,925	
90	62		133-02-065B		96,615		21,400		49,420	49,420	
91	63		133-02-054D		--		500		--	--	
92	64		133-02-073A		103,182		20,000		70,751	70,751	
93	65		133-01-052		14,058		32,625		7,973	7,973	
94	66		133-02-065D		80,565		21,400		41,215	41,215	
95	67		133-02-054B		65,401		22,200		31,492	31,492	
96	68		133-02-072		113,886		20,000		72,205	72,205	
97	69		133-02-074A		79,143		20,000		55,899	55,899	
98	70		133-02-053		56,543		30,600		26,240	26,240	
99	71		133-02-051		10,971		27,800		5,504	5,504	
100	72		133-02-065E		110,590		21,400		59,822	59,822	
101	73		133-02-071		61,593		20,000		31,330	31,330	
102	74		133-02-050E		2,174		19,600		1,114	1,114	
103	75		133-02-065G		--		21,200		--	--	

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	A	B	C	D	E	F	G	H	I	J	K
26					Full Cash Value				100-year Condition		
27			Tax ID		(Struc)		(Land)		"Given"	"Existing"	
28			Parcel		-2-		-3-		Flood Damage	Flood Damage	
403	375		205-50-112		--		500		--	--	
404	376		205-50-114		155,954		35,000		--	25,496	
405	377		205-47-006J		101,563		80,160		--	--	
406	378		205-50-150		--		35,000		--	--	
407	379		205-50-153		--		35,000		--	--	
408	380		205-50-113		99,046		35,000		--	17,891	
409	381		205-50-160A		38,088		500		--	--	
410	382		205-50-154		--		35,000		--	--	
411	383		205-50-151		--		35,000		--	--	
412	384		205-50-152		--		35,000		--	--	
413	385		205-50-155		--		35,000		--	--	
414	386		205-50-156		--		35,000		--	--	
415	387		205-50-157		--		35,000		--	--	
416	388		205-46-004		--		83,100		--	--	
417	389		205-46-011		101,920		187,740		--	--	
418	390		205-46-013		30,977		78,900		--	--	
419	391		205-46-016		40,199		94,050		--	--	
420	392		205-46-018A		189,649		77,910		--	--	
421	393		205-46-019D		76,790		89,460		32,024	32,024	
422	394		205-45-041		211,293		298,100		35,137	35,137	
423	395		205-45-042		--		198,000		--	--	
424	396		205-46-021G		20,392		149,268		--	--	
425	397		205-45-043		277,048		180,400		87,617	87,617	
426	398		205-46-021H		--		24,825		--	--	
427	399		205-46-021E		17,485		110,400		8,350	8,350	
428	400		205-45-045		247,394		268,400		--	--	
429	401		205-46-022		--		28,500		--	--	
430	402		205-45-046		--		137,500		--	--	
431	403		205-45-048		--		231,000		--	--	
432	404		205-45-049		129,713		179,300		--	--	
433	405		205-45-004A		385,767		947,072		--	--	
434	406		205-45-063		182,044		124,500		--	--	
435	407		205-45-064A		--		120,000		--	--	
436	408		205-45-065		--		500		--	--	
437	409		205-45-067		104,234		65,000		--	--	
438	410		205-45-068		--		65,000		--	--	
439	411		205-45-071		--		103,500		--	--	
440									2,274,675	4,836,904	

A CLASS I ARCHAEOLOGICAL OVERVIEW FOR THE TANQUE VERDE WASH FLOOD CONTROL PROJECT PIMA COUNTY, ARIZONA

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November 1992



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ABSTRACT

In November 1992, a Class I archaeological overview was conducted by Cultural & Environmental Systems, Inc., for Johnson-Brittain & Associates, Inc., as part of the planning process for the Tanque Verde Wash Flood Control Project in Pima County, Arizona. The purpose of the overview was to identify, locate, and ascertain the nature of previously recorded archaeological sites within and adjacent to (within 1 mile) the proposed project area.

Legally, the project area is located in Pima County, Arizona, in portions of four U.S.G.S. 7.5 Minute quadrangle maps: Tanque Verde Peak, Arizona (Rincon Peak 15 Minute), (T14S, R16-17E); Agua Caliente Hill, Arizona (T13-14S, R16E); Sabino Canyon, Arizona (T13S, R15E); and Tucson East, Arizona (T14S, R15E).

The results of the records and literature search at the Arizona State Museum and Arizona Historical Society in Tucson and the Bureau of Land Management Public Room in Phoenix were positive; 100 previously recorded sites and 7 areas where archaeological materials were reported (Remains Reported--RR) were located.

The cultural resources identified represent at least three cultures--Archaic, Hohokam, and Historic--and are the remains of varied land-use activities from the prehistoric to the historic (e.g., resource collection and processing, habitation, and ranch and mining operations). Minimally, these resources (previously recorded sites and remains reported) may be potentially eligible for listing on the National Register of Historic Places under criterion "d". Management recommendations are for a Class III (100% coverage) survey of the proposed project area prior to the implementation of any earth-moving activities as part of the planning process. Based upon results of the Class III survey, a cultural resource management plan could then be formulated.

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A CLASS I ARCHAEOLOGICAL OVERVIEW FOR THE TANQUE VERDE WASH FLOOD CONTROL PROJECT PIMA COUNTY, ARIZONA

A Class I archaeological overview (records and literature search) of the proposed area of the Tanque Verde Wash Flood Control Project was conducted by Cultural & Environmental Systems, Inc. (C&ES), for Johnson-Brittain & Associates, Inc., during November 1992 in order to identify, locate, and ascertain the nature of previously recorded archaeological sites within and adjacent to (within 1 mile) the proposed project area. This report presents the results of the research and is divided into six sections: project area location, culture history of the Tucson Basin, methodology, results, summary, and recommendations.

Project Area Location

The project area is located in Pima County on the eastern edge of Tucson and adjacent to Saguaro National Monument East. It lies within portions of four U.S.G.S. quadrangle maps:

1. Tanque Verde Peak, Arizona 7.5 Minute Series (Township 14 South, Range 16-17 East).

2. Agua Caliente Hill, Arizona 7.5 Minute Series (Township 13-14 South, Range 16 East)

3. Sabino Canyon, Arizona 7.5 Minute Series (Township 13 South, Range 15 East)

4. Tucson East, Arizona 7.5 Minute Series (Township 14 South, Range 15 East)

Culture History of the Tucson Basin

Following is a brief overview of the prehistory and history of the Tucson Basin, presented for the reader's orientation.

There is evidence of human occupation in southeastern Arizona for at least the past 12,000 years. The Clovis tradition (dating from about 12,000 to 10,000 years Before Present) represents a Paleo-Indian culture that subsisted by hunting now-extinct megafauna and gathering. Present evidence of this tradition in the Tucson Basin is limited to isolated Clovis projectile points, but this may be due to differential preservation or luck of discovery.

In response to a changing environment (warmer and dryer climate and the disappearance of the megafauna), the Archaic period followed the Paleo-Indian. The Archaic people apparently practiced a wider-based subsistence strategy, which included increasingly sophisticated hunting and gathering techniques and more dependence upon plant foods. The Archaic was primarily aceramic and nonagricultural, but its ground stone technology indicates an ancestral status vis-à-vis agrarian societies. The Early Archaic is dated from 9550 B.C. (following the end of Clovis) to 4850 B.C., the Middle Archaic from 4850 to 1550 B.C., and the Late Archaic from 1550 B.C. to about A.D. 300. The efficiency of the Archaic adaptation seems to have led to a population increase in the area. This increase may have spurred the development of agriculture and manifested itself in the more sedentary settlement patterns that were the hallmark of the Hohokam culture that flourished for the next thousand years.

The chronology of the Hohokam in the Tucson Basin generally matches that in the Salt-Gila Basin, with the exception of the Vahki (A.D. 300 to 550) and Estrella (A.D. 550 to 600) phases, which are not evident in the Tucson Basin. The pre-Classic Tucson Basin Hohokam is divided into the standard periods:

Pioneer Period A.D. 600 to 750
Sweetwater Phase
Snaketown Phase

Colonial Period A.D. 750 to 950
Cañada del Oro Phase
Rillito Phase

Sedentary Period A.D. 950 to 1150
Early, Middle, and Late Rincon Phases

These pre-Classic periods are followed by the Classic, which comprises the Tanque Verde (A.D. 1150 to 1300) and Tucson (A.D. 1300 to 1450) phases.

Pre-Classic Hohokam societies were highly organized and complex, and inhabited sedentary villages. Some of these settlements were apparently social, political, and economic centers containing plazas, ballcourts, and platform mounds. Seasonal settlements connected with cultivation and located near watercourses and floodplains, or specialized resource procurement and processing locales also were utilized. Extensive canal systems, like those in the Salt-Gila Basin, were not characteristic of the Tucson Basin Hohokam.

The Classic Period saw the areal distribution of sedentary settlements shrink. This constriction led to higher population densities in fewer, more integrated central communities, with a concomitant change in trade networks.

Most Hohokam sites were abandoned by about A.D. 1450, the result of a general collapse of the economic and social system. The Piman-speaking groups encountered by the Early Spanish and still living in the area may be the descendents of the Hohokam.

In 1751, the Presidio at Tubac was established after the Pima Revolt, when Mission San Xavier del Bac was ransacked. This was effectively the beginning of European colonization of the Tucson Basin. The first recorded European settlement in Arizona was

centered on the Tubac presidio. When the presidio was abandoned in 1848, most of its citizens moved to the Tucson area. At the same time, during the Mexican-American War, a contingent of federal troops supplemented the growing population of ranchers, irrigation farmers, and merchants who had been moving into Tucson since the establishment of its presidio in 1776.

The Treaty of Guadalupe Hidalgo, which ended the war, ceded lands north of the Gila River to the United States. In 1854, the Gadsden Purchase brought the rest of Southern Arizona into the Union. The coming of the railroad in the late 1870s increased the already growing stream of settlers into Arizona and the Tucson Basin.

Methodology

A literature search was conducted as the foundation for the Class I overview presented here. It included examining the site files and records at the Arizona State Museum (ASM) of previously recorded archaeological sites in the study area, as well as records of previous archaeological surveys. Other sources investigated were Arizona Historical Society records, General Land Office (GLO) maps from the Bureau of Land Management, and archaeological reports on individual sites in the area (Simpson et al. 1983; Sires et al. 1989)

Results

The record search revealed the existence of numerous prehistoric and historic archaeological sites within and adjacent to the project area. The ASM site files yielded records of the over 100 archaeological sites listed below. The GLO maps located such historic features as late nineteenth-century roads, the boundaries of the abandoned Camp Lowell Military reservation, mining activity, and several Hispanic and Anglo ranches in the area. Records also revealed 23 previous archaeological surveys in the area (*see* Table 1).

The information about the archaeological sites listed below is from the ASM files and is presented by U.S.G.S. Quadrangle (Township, Range) in the following order: (1) site number, (2) functional classification, (3) cultural affiliation, (4) site size, (5) condition, and (6) archival reference.

Table 1

PRIOR SURVEYS IN OR ADJACENT TO THE PROJECT AREA

Institution	ASM Survey #	Location (USGS Quad)	Results
ASM	1980-118	Tucson East 7.5'	Negative
ASM	1980-144	Tucson East 7.5'	Negative
ASM	1981-064	Tucson East 7.5'	Negative
ASM	1981-065	Tucson East 7.5'	Negative
ASM	1981-112	Tucson East 7.5'	1 Prehistoric Site
ASM	1981-167	Tucson East 7.5'	1 Prehistoric Site
ASM	1981-173	Tucson East 7.5'	Negative
ASM	1982-220	Tucson East 7.5'	Negative
ASM	1983-009	Tucson East 7.5'	Negative
NPS-WACC	1983-191	Tanque Verde Peak 7.5'	160 Sites and 401 Isolated Finds
ASM	1984-003	Tucson East 7.5'	Negative
PAST	1984-054	Tucson East 7.5'	Negative
PAST	1984-056	Tucson East 7.5'	Negative
NPS-WACC	1984-062	Tanque Verde Peak 7.5'	120 Sites and
		Mica Mountain 7.5'	211 Isolated Finds
	1985-143	Tucson East 7.5'	
IAR	1985-148	Tanque Verde Peak 7.5 (Rincon Valley 15')	Isolated Artifacts
ASM	1987-134	Tucson East 7.5'	Negative
IAR	1987-218	Tucson East 7.5'	Isolated Artifacts
SR	1989-82	Tucson East 7.5'	1 Prehistoric Site 1 Historic Site
B of R	1989-107	Agua Caliente Hill 7.5' & Tucson East 7.5'	Isolated Artifacts
SWCA	1989-200	Agua Caliente Hill 7.5'	2 Prehistoric Sites Isolated Artifacts
SR	1991-7	Tucson East 7.5'	Negative
		Sabino Canyon 7.5'	Negative
SR	1991-104	Tucson East 7.5'	Negative
		Sabino Canyon 7.5'	

NPS WACC = National Park Service Western Archeological and Conservation Center
IAR = Institute for Amercan Research
SR = Statistical Research
B of R = Bureau of Reclamation

Tanque Verde Peak 7.5 ' (Township 14S, R 16-17E)

1. AZ BB:14:8
2. Village
3. Hohokam
4. Unknown
5. Good (1965)
6. ASM site files

1. AZ BB:14:18
2. Vail railroad station
3. Anglo, Mexican, Chinese
4. 4,000 square feet
5. Disturbed (1989)
6. ASM site files

1. AZ BB:14:22
2. Village
3. Hohokam
4. Unknown
5. Unknown
6. ASM site files

1. AZ BB:14:46
2. Resource procurement
3. Archaic(?)
4. Less than 1 m^2
5. Unknown
6. ASM site files

1. AZ BB:14:48
2. Habitation
3. Archaic/Hohokam
4. 475,000 m^2
5. Disturbed
6. ASM site files

1. AZ BB:14:49
2. Habitation
3. Archaic/Hohokam
4. 12,600 m^2
5. Disturbed
6. ASM site files

1. AZ BB:14:50
2. Habitation
3. Hohokam
4. 23,950 m^2
5. Minimal disturbance (1983)
6. ASM site files

1. AZ BB:14:51
2. Habitation
3. Hohokam
4. Locus A, 104,400 m²; Locus B, 44,000 m²
5. Disturbed by erosion
6. ASM site files

1. AZ BB:14:52
2. Habitation
3. Archaic/Hohokam
4. 7,200 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:53
2. Habitation
3. Archaic/Hohokam
4. 15,700 m²
5. Minimal disturbance (1983)
6. ASM site files

1. Pima College #61

2-6. No information; ASM site files

1. AZ BB:14:61
2. Lithic scatter
3. Archaic(?)
4. 1/2 acre
5. Unknown
6. ASM site files

1. AZ BB:14:77
2. Scatter
3. Hohokam
4. 6,325 m²
5. Moderate disturbance
6. ASM site files

1. AZ BB:14:106
2. Scatter
3. Hohokam
4. 3,300 m²
5. Good (1983)
6. ASM site files

1. Pima College #108

2-6. No information; ASM site files

1. AZ BB:14:108
2. Lithic scatter
3. Unknown
4. 50 m²
5. Unknown
6. ASM site files

1. AZ BB:14:109
2. Habitation
3. Hohokam
4. 6,300 m²
5. Unknown
6. ASM site files

1. AZ BB:111
2. Sherd and lithic scatter
3. Hohokam
4. 4,250 m²
5. Unknown
6. ASM site files

1. AZ BB:14:113
2. Scatter
3. Hohokam
4. 870 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:116
2. Scatter
3. Hohokam
4. 2,600 m²
5. Moderate disturbance
6. ASM site files

1. AZ BB:14:117
2. Scatter
3. Hohokam
4. 2,250 m²
5. Moderate disturbance (1983)
6. ASM site files

1. AZ BB:14:118
2. Scatter
3. Archaic?/Hohokam
4. 10,900 m²
5. Moderate disturbance (1983)
6. ASM site files

1. AZ BB:14:120
2-6. No other information

1. AZ BB:14:121
2. Scatter
3. Hohokam
4. 10,800 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:158
2. Historic Ranch
3. Anglo
4. Unknown
5. Unknown
6. ASM site files

1. AZ BB:14:159
2. Camp
3. Papago
4. 1,250 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:196
2. Habitation
3. Hohokam
4. 15,750 m²
5. Good
6. ASM site files

1. AZ BB:14:197
2. Habitation
3. Archaic, Hohokam
4. 7,000 m²
5. Unknown
6. ASM site files

1. AZ BB:14:198
2. Scatter
3. Hohokam
4. 3,575 m²
5. Undisturbed (1983)
6. ASM site files

1. AZ BB:14:199
2. Scatter
3. Hohokam
4. 9,600 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:200
2. Scatter
3. Hohokam
4. 2,500 m²
5. Minor disturbance (1983)
6. ASM site files

1. AZ BB:14:201
2. Scatter
3. Hohokam
4. 3,350 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:212
2-6. No other information

1. AZ BB:14:213
2. Scatter
3. Hohokam
4. 1,200 m²
5. Eroded
6. ASM site files

1. AZ BB:14:214
2-6. No other information

1. AZ BB:14:215
2. Scatter
3. Archaic/Hohokam
4. 2,750 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:216
2. Habitation
3. Hohokam
4. 6,800 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:217
2. Scatter
3. Archaic/Hohokam
4. 625 m²
5. Minimal disturbance (1983)
6. ASM site files

1. AZ BB:14:218
2. Sherd and lithic scatter
3. Hohokam
4. 6,250 m²
5. Unknown
6. ASM site files

1. AZ BB:14:219
2. Habitation
3. Hohokam
4. 2,250 m²
5. Eroded
6. ASM site files

1. AZ BB:14:220
2. Scatter
3. Hohokam
4. 5,600 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:221
2. Habitation
3. Hohokam
4. 4,900 m²
5. Minor erosion
6. ASM site files

1. AZ BB:14:223
2. Scatter
3. Hohokam
4. 2,800 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:224
2. Habitation
3. Hohokam
4. 2,250 m²
5. Eroded
6. ASM site files

1. AZ BB:14:225
2. Sherd and lithic scatter
3. Hohokam
4. 1,400 m²
5. Erosion
6. ASM site files

1. AZ BB:14:226
2. Sherd and lithic scatter
3. Hohokam
4. 528 m²
5. Erosion
6. ASM site files

1. AZ BB:14:227
2. Scatter
3. Hohokam
4. 5,250 m²
5. No disturbance (1983)
6. ASM site files

1. AZ BB:14:228
2. Scatter
3. Hohokam
4. 2,025 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:229
2. Scatter
3. Hohokam/Historic
4. 4,800 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:230
2. Scatter
3. Hohokam
4. 2,250 m²
5. Minor disturbance (1983)
6. ASM site files

1. AZ BB:14:231
2. Habitation
3. Hohokam
4. 9,600 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:232
2. Scatter
3. Hohokam
4. 2,250 m²
5. Unknown
6. ASM site files

1. AZ BB:14:233
2. Scatter
3. Hohokam
4. 2,700 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:234
2. Scatter
3. Hohokam
4. 4,500 m²
5. Undisturbed (1983)
6. ASM site files

1. AZ BB:14:235
2. Scatter
3. Hohokam
4. 6,000 m²
5. Some disturbance
6. ASM site files

1. AZ BB:14:240
2. Scatter
3. Hohokam
4. 6,500 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:241
2. Scatter
3. Hohokam
4. 8,800 m²
5. Disturbed
6. ASM site file

1. AZ BB:14:242
2. Scatter
3. Hohokam
4. 1,800 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:243
2. Scatter
3. Hohokam/Historic
4. 1,225 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:244
2. Scatter
3. Hohokam
4. 1,800 m²
5. Minor disturbance
6. ASM site files

1. AZ BB:14:245
2. Scatter
3. Hohokam
4. 600 m²
5. Minor disturbance (1983)
6. ASM site files

1. AZ BB:14:246
2. Scatter
3. Archaic/Hohokam
4. 1,800 m²
5. Some disturbance
6. ASM site files

1. AZ BB:14:247
2. Scatter
3. Hohokam
4. 5,250 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:250
2. Scatter
3. Hohokam
4. 3,125 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:251
2. Dump
3. Historic
4. 31,000 ft.²
5. Disturbed
6. ASM site files

1. AZ BB:14:252
2. Scatter
3. Hohokam
4. 6,000 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:253
2. Habitation
3. Hohokam
4. 2,475 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:254
2. Scatter
3. Hohokam
4. 960 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:255
2. Scatter
3. Hohokam
4. 1,750 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:256
2. Scatter
3. Hohokam
4. 5,600 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:257
2. Scatter
3. Hohokam
4. 11,000 m²
5. Moderate disturbance (1983)
6. ASM site files

1. AZ BB:14:258
2. Scatter
3. Hohokam
4. 2,500 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:259
2. Habitation
3. Hohokam
4. 22,500 m²
5. Erosion along slopes
6. ASM site files

1. AZ BB:14:260
2. Scatter
3. Hohokam
4. 665 m²
5. Minor disturbance
6. ASM site files

1. AZ BB:14:261
2. Scatter
3. Hohokam
4. 4,500 m²
5. Unknown
6. ASM site files

1. AZ BB:14:262
2. Scatter
3. Archaic/Hohokam
4. 10,200 m²
5. Minor disturbance
6. ASM site files

1. AZ BB:14:263
2. Scatter
3. Hohokam
4. 3,850 m²
5. Minor disturbance
6. ASM site files

1. AZ BB:14:265
2. Scatter
3. Hohokam
4. 2,475 m²
5. Minor disturbance
6. ASM site files

1. AZ BB:14:266
2. Resource procurement and processing
3. Archaic
4. 25 m²
5. Good (1983)
6. ASM site files

1. AZ BB:14:268
2. Scatter
3. Hohokam
4. 2,400 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:269
2. Habitation and trash dump
3. Hohokam, Historic
4. 5,600 m²
5. Minor erosion
6. ASM site files

1. AZ BB:14:270
2. Scatter
3. Archaic/Hohokam
4. 7,000 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:271
2. Scatter
3. Hohokam
4. 3,850 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:272
2. Habitation
3. Hohokam
4. 3,600 m²
5. Erosion
6. ASM site files

1. AZ BB:14:369
2. Scatter
3. Hohokam
4. 1,575 m²
5. Minor disturbance (1984)
6. ASM site files

1. AZ BB:14:370
2. Scatter
3. Hohokam
4. 2,400 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:381
2. Scatter/Quarry
3. Hohokam
4. 3,000 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:382
2. Scatter
3. Archaic/Hohokam
4. 1,800 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:383
2. Resource processing area
3. Archaic
4. 1,500 m²
5. Disturbed
6. ASM site files

1. AZ BB:14:384
2. Scatter
3. Hohokam
4. 2,125 m²
5. Disturbed
6. ASM site files

Other Remains Recorded (RR)--sites observed but not recorded or on file--are located in Sections 3, 4, 7, and 12 (one each).

Agua Caliente Hill 7.5' Quadrangle (T13-14S, R16E)

1. AZ BB:10:46
2. Habitation
3. Archaic
4. 11,700 m²
5. Possibly destroyed
6. ASM site files

1. AZ BB:10:47
2. Scatter
3. Hohokam
4. 1,050 m²
5. Disturbed
6. ASM site files

1. AZ BB:10:48
2. Resource exploitation
3. Hohokam
4. 1,050 m²
5. Generally good (1989)
6. ASM site files

Sabino Canyon 7.5' Quadrangle (T13S, R15E)

1. AZ BB:9:108
2. Artifact scatter
3. Hohokam
4. 60 m²
5. Undisturbed
6. ASM site files

1. AZ BB:13:123
2. Habitation
3. Hohokam
4. >25 acres
5. Disturbed
6. ASM site files

Tucson East 7.5' Quadrangle (T14S, R15E)

1. AZ BB:13:68
2. Village
3. Hohokam
4. 160 acres
5. Possibly destroyed (1983)
6. ASM site files

1. AZ BB:13:130
2. Artifact scatter
3. Hohokam
4. 150 m²
5. Disturbed
6. ASM site files

1. AZ BB:13:144

2-6. No other information

1. AZ BB:13:146

2-6. This site is part of AZ BB:13:68

1. AZ BB:13:153
2. Scatter
3. Hohokam/Historic
4. Unknown
5. Unknown
6. ASM site files

1. AZ BB:13:155
2. Historic Ranch
3. Anglo
4. Unknown
5. Good (1986)
6. ASM site files

1. Pima College #157
2-6. No other information

1. AZ BB:13:321
2. Habitation
3. Hohokam
4. 3,760 m^2
5. Good (1986)
6. ASM site files

1. AZ BB:13:398
2. Habitation
3. Hohokam
4. 300 meter diameter
5. Moderate disturbance
6. ASM site files

Summary

Research of site file records, GLO maps, and archaeological reports revealed at least 100 prehistoric and historic archaeological sites within or adjacent to the project area. The majority of the prehistoric sites are Hohokam, although Archaic examples do occur. The historic sites consist of ranches and the remnants of nineteenth century mining activity. Although some of the sites have been disturbed or completely destroyed, many remain intact and may provide extensive information about prehistoric and historic land use in the eastern Tucson Basin.

The importance of the sites in and around the study area is that they indicate extensive and continued use of the Tanque Verde floodplain since prehistoric times. This use varied prehistorically from hunting and gathering camps (Archaic) to large pit house villages (Hohokam). Historically, the area was the headquarters for a cattle ranch, the location of United States Cavalry camps, mining operations, and a resort.

The cultural resources identified by the Class I overview may be potentially eligible for inclusion on the National Register of Historic Places, which is an official list of prehistoric and historic cultural resources that are considered worthy of preservation. Properties listed on the National Register must be 50 years old. The National Register provides recognition and protection for districts, sites, buildings, structures, and objects that are significant in American history, architecture, archaeology, engineering, or culture (Lerner 1988:6). In addition to the 50-year limit, there are four criteria for determining the significance of a property, of which only one is necessary for eligibility:

a. Association with events that have made a significant contribution to the broad pattern of history;

b. Association with the lives of persons significant in our past;

c. Presence of distinctive characteristics of a type, period, or method of construction that represent the work of a master, or that possess high artistic values; and

d. Has yielded, or may be likely to yield, information important in prehistory or history.

Minimally, the cultural resources within the project area may be potentially eligible under criterion "d".

Recommendations

Based upon the results of the Class I survey and the known diversity of cultural resources within and adjacent to the project area (Tanque Verde Wash), a Class III (100% coverage) survey is recommended for the proposed project area prior to the implementation of any earth-moving activities, as part of the planning process. Based upon the results of the Class III survey, a cultural resource management plan could then be formulated.

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TANQUE VERDE CREEK RIVER MANAGEMENT STUDY--PHASE I

REVIEW OF EXISTING NATURAL RESOURCE INFORMATION

Submitted to
JOHNSON-BRITTAIN & ASSOCIATES for
PIMA COUNTY DEPARTMENT OF TRANSPORTATION AND FLOOD CONTROL DISTRICT

By
Wheat-Gallaher & Associates

July 20, 1993

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INTRODUCTION

Tanque Verde Creek has been a valuable resource to the area residents and community at-large for as long as the Tucson valley has been inhabited. The abundance of runoff that is provided by the watershed has created a resource gem abounding with rare vegetation, wildlife and scenic viewsheds rarely found elsewhere in the valley.

The vegetation adjacent to the creek is classified as Class I habitat, which is the most sensitive and rare habitat in the valley. All Class I Habitats are critical for wildlife survival and movement. The most valuable habitats for wildlife are also the most scenic areas for humans. Much of the most valuable habitat in the Tucson basin has been lost or degraded due to dropping water tables, flood control measures (bank stabilization, channelization), wood cutting, grazing, and conversion of land to urban uses. The Tanque Verde Creek is unique in it's connection to public lands and its relatively undamaged existing condition.

This report will discuss the habitat, visual and recreational value of the Tanque Verde Creek from Houghton Road to the Coronado National Forest boundary. It will outline the status of those resources and present some recommendations for merging the concerns about flooding damage with resource preservation to produce a solution that is addresses all the issues and is responsive to public concerns.

EXISTING CONDITIONS AND RECOMMENDATIONS

HABITAT STATUS

The DECIDUOUS RIPARIAN WOODLANDS have been reduced to less than 10 percent of their original abundance in the Tucson valley. These Woodlands once lined all the major washes in the valley. The stands found along the Tanque Verde Creek represent 20 percent of the existing stands left in the valley and are ranked along with Cienega Creek as the only two extensive and continuous existing Deciduous Riparian Woodlands left in the valley. Deciduous Riparian Woodlands consist of large mature cottonwoods along the banks of rivers which may be in association with mesquites, large trees associated with an understory of young trees and other shrubs and grasses. These are found where groundwater tables are high throughout the year.

The Woodlands along Tanque Verde Creek are sparse and intermixed with Mesquite Bosque but contribute significantly to the quality of the natural habitat, natural resources, visual quality and bank stabilization. There are both large and mature cottonwoods mixed with many young specimens, indicating that conditions are conducive to regeneration of the habitat. The sparseness of the stands is partially due to development which has destroyed some original stands and created conditions not conducive to regeneration and by the lowering of the water table by pumping. The Tanque Verde Creek Riparian Woodlands are especially important to migrating birds for nesting and feeding. Indigenous bird species, including the gray hawk which is designated as threatened by the Arizona Game and Fish Department, also depend on this area for nesting and reproduction. Mule deer and javalina also frequent these habitats on either a seasonal or permanent basis [Shaw].

The MESQUITE BOSQUES also are less abundant than historically found in the valley, with the reasons for their decline being similar to that of the Deciduous Riparian Woodlands. These remaining Bosques along Tanque Verde Creek represent about 5 percent of the remaining Bosques in the valley. Mesquite Bosques consist of large mesquite trees (often over 6 inches in diameter) that form a nearly continuous canopy. Blue paloverde, cat claw acacia, burrobush and wolfberry may also be present. The understory is open and contains several species of perennial and annual grasses and forbs [Shaw]. Bosques are found on floodplains and those along the Tanque Verde Creek coincide fairly closely with the designated 100 year floodplain.

The majority of the Class I Habitat along the Tanque Verde Creek is classified as Mesquite Bosque. Most of the Mesquite Bosques are highly developed with dense canopies and abundant grass and forb species dominating the understory. Some areas adjacent to the river transition quickly from Mesquite Bosque to the Paloverde - Saguaro Community.

The Mesquite Bosques are habitats for other birds such as dove and quail. The bosques provide dense cover for ground and low bird nesters and small mammals. The mammals use the area for escape, resting, feeding, and reproduction.

The LAKES, PONDS AND WETLANDS WITH ADJACENT PLANT COVER are the most valuable wetlands for wildlife in the Tucson valley due to their year round water source and adjacent cover. These habitats are defined as bodies of water with escape and nesting cover. Escape cover may include emergent aquatic vegetation and many of the same trees and shrubs associated with Riparian Deciduous Woodlands [Shaw].

These are not abundant but there are several identified adjacent to the river that contribute to the habitat value. All of these are manmade but are in a natural setting.

These bodies of water provide resting and feeding habitat for waterfowl. All mammals and reptiles in adjacent habitats will frequent these watering holes on a regular basis particularly when the river is dry. Amphibians and fish will establish in these manmade water bodies from eggs being brought in on the feet of birds from nearby water bodies.

The IMPORTANT WILDLIFE MOVEMENT CORRIDORS are defined as isolated patches of habitat through which wildlife moves. Much wildlife movement in the urban areas of the valley is in these isolated patches due to destruction of larger continuous habitats [Shaw].

The Tanque Verde Creek is unique in the lack of extensive development encroachment into the river itself leaving most of the original habitat in tact. However, there are several areas where clearing for agricultural, school or residential purposes has occurred, breaking up the continuity of the habitat. These interruptions reduce the quality of the original habitat but do not severely inhibit movement.

Large mammals like mule deer, javalina, bobcat, raccoon and ringtail will use the Wildlife Movement Corridors to traverse the valley. These corridors also allow interbreeding of species which sustains the genetic viability for future species diversity.

MAJOR EXTENSIONS OF DESERT RIPARIAN HABITAT extend along feeder washes or streams linking the Class I habitat with larger reserves of public lands surrounding Tucson. Much of this classification has been lost due to urban growth but there are still some interconnected networks of riparian habitat associated with the major washes and rivers [Shaw].

There are Major Extensions of habitat extending from the Tanque Verde Creek along feeder washes through both developed and undeveloped properties. These provide a unique and valuable link between the Catalina National Forest, the Saguaro National Monument and the Tanque Verde Creek. This vegetation and associated wildlife is an important amenity to the surrounding neighborhoods and community.

The Major Extensions are exceptionally diverse and productive. The Major Extensions that connect the Tanque Verde Creek to public lands are the most valuable because the public lands provide such rich and diverse protected habitats. These definitely should remain uninterrupted corridors for movement.

The PALOVERDE - SAGUARO COMMUNITY is the characteristic upland plant community in the Sonoran Desert. It contains a healthy and distinct plant community and is common in the foothills of the Tucson area. This community supports a tremendous diversity of wildlife. This is a Class II habitat because it is relatively common but it is still an extremely valuable habitat [Shaw].

This habitat along the Tanque Verde Creek is of excellent quality with a variety of plant types and little damage due to development. This community is not typically found next to

the most important and impacting them the least is critical to the success of this approach.

ENHANCEMENT AND RESTORATION

If drainageway improvements damage existing valuable habitats (primarily Class I), a management plan should be established to regenerate the habitats to assure that they are restored to their former value. Habitat areas that are not specifically impacted by drainageway improvements should also be improved and enhanced to enrich the overall creek habitat.

INCENTIVES FOR PRIVATE CONSERVATION

Pima County could provide economic incentives for private homeowners to create conservation easements along the river. Conservation easements are a mechanism whereby landowners give up development rights for areas that are especially valuable for wildlife or recreation and in return receive favorable tax treatment and may benefit from a charitable contribution of the easement. This approach has been used successfully by the Nature Conservancy along the San Pedro River. Pima County may have notable success with this approach along the Tanque Verde because much of the land adjacent to the river is currently undeveloped, in the 100 year floodplain so may be undevelopable, and privately held. Politically this would be viewed as a sincere attempt to help the community preserve the integrity of the river and may off set some temporary reduction in habitat due to drainage improvement construction.

VISUAL STATUS AND RECOMMENDATIONS

The visual quality along the Tanque Verde Creek is high throughout. The dense habitat and natural setting create unique and breath-taking foreground views and middleground vistas. Walking along the trails as they approach the river and along the river bottom, the surroundings appear generally undisturbed and they impart a sense of seclusion.

The foreground views are that which can be perceived while walking in or along the river. Generally this includes views of the vegetation and wildlife of the Class I habitat. Areas where the habitat has been damaged or altered have less visual value. These include segments by Tanque Verde Loop Road and Houghton Road. The middleground views include elements within approximately 5 miles of the creek. The Rincon Mountains are the dominant middleground element and views of them are extremely high quality. The best middleground views are east of Wentworth, due to the proximity of the mountains. Middleground views to the east are generally high overall. Middleground views to the north are of high quality but less available due to the orientation of the river. Other middleground views are average due to the flat surrounding terrain to the south and west. The view of the Houghton Road bridge is poor but it is partially obstructed from the river by trees.

Background views are generally blocked or non-existent from the site.

The overall high visual quality of the Tanque Verde Creek also enhances the recreational value and open space value.

The visual status of the creek can best be preserved through preservation of existing habitat. Proper access to the creek and along the creek bottom should be maintained so that the public can continue to experience the unique visual quality of the area.

RECREATION STATUS AND RECOMMENDATIONS

The Tanque Verde Creek provides significant trail corridors and access to the Catalina Mountains, Rincon Mountains and Saguaro National Forest. The creek bottom is defined as a primary trail by the Eastern Pima County Trail System Master Plan, giving it priority status as an essential component of the comprehensive trail system. The creek is also defined as a major national forest boundary access point. According to the master plan, trails in washes should consist of natural pathways within the channel, the river bottom satisfies that criteria.

Other connector and local trails accessing the creek are defined and accessible to the public. These trails go through private property or along public roads and are used by hikers and equestrians. They are ranked first, second and third priority. Private property owners and organized equestrian trail rides from the Tanque Verde Guest Ranch and Reddington Ranch primarily use the local trails. The collector first priority Freeman/Del Este (Reyes Wash) trail connecting from the south to the river is used as a major link to the river. Pima County is looking into public acquisition of this trail.

Access to the Tanque Verde River via these identified collector and local trails should not be obstructed. The river bottom should remain navigable as a pedestrian and equestrian trail.

Other private recreation along the Tanque Verde River includes a golf course and ball fields. These facilities contribute to the open space/buffer component and should be well integrated into the surrounding Class I habitat.

PUBLIC INPUT STATUS AND RECOMMENDATIONS

According to the Pima County Department of Transportation and Flood Control District and Parks and Recreation Division no formal public opinion surveys have been performed for this section of the creek. However, general impressions are that the residents along the creek are concerned about the protection of the natural resources and their privacy, do not mind well defined trails and do not want development of the river.

The public review process approach, outlined in the Pima County Community Participation and Mitigation Ordinance, applicable to major roadway projects, should be followed to insure that interested parties are afforded an opportunity to express their views early enough in the study process to influence the design process and that decisions are made in the overall public interest. The public in this area is vocal and Pima County will benefit from gaining further understanding of the concerns and attitudes of adjacent land owners, local residents, as well as community trails, recreation and natural resource advocates.

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