

### **III. HYDROLOGIC AND HYDRAULIC ANALYSES**

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At the onset of this assignment, SCDWR requested an evaluation of the need for Basin E20. The analysis of Basin E20 is summarized in a Memorandum to file prepared by Borcalli & Associates, dated December 15, 2001, which is included as Appendix B. From the analysis, it was determined that Basin E20 was not needed to mitigate downstream impacts from development of the NVSSP area. Basin E20, therefore, is not included in the models developed to update the Drainage Master Plan and to develop a plan for phasing the drainage facilities.

#### **A. HYDROLOGIC AND HYDRAULIC CRITERIA**

The basis for Wood Rodgers' modeling and analyses is the result of the hydrologic and hydraulic analyses performed by Mr. Doug Hamilton for Sacramento County, cited in the Background section of this report, and as refined by MacKay & Soms Civil Engineers, Inc., in formulating the Preferred Drainage Plan.

Wood Rodgers' analyses are consistent with hydrologic criteria established in the report entitled, "Volume 2: Hydrology Standards," of the "Drainage Manual," prepared by Sacramento City/County, dated December 1996. The analysis of all hydraulic structures is based upon the Sacramento County Improvement Standards, 1999, as modified by Board Resolution 2001-0265 (March 13, 2001), which provides that the design of storm drains will be based upon a 10-year hydraulic grade line (HGL) in downstream receiving waters.

#### **B. SUPPORTING DOCUMENTATION**

As development progresses through the NVSSP area, Letters of Map Revision (LOMRs) will be submitted to the Federal Emergency Management Agency (FEMA) to request modifying the existing floodplain, as delineated on current Flood Insurance Rate Maps (FIRMs). FEMA reviews the accuracy of all hydrologic and hydraulic analyses used to determine such changes. With respect to submittals to FEMA, Wood Rodgers was informed by SCDWR

that all necessary supporting analyses and documentation regarding drainage and flooding related to the NVSSP will be based upon the HEC-1 and UNET modeling performed and accepted by SCDWR.

### **C. SCDWR's MODELS FOR NVSSP AREA**

SCDWR developed models for the NVSSP area for three conditions: Existing, Ultimate, and Stand-Alone. For the Elder Creek and Gerber Creek system, the short duration storm was determined to result in the worst-case flooding. Accordingly, the design storms have a 12-hour duration. The three conditions are described below:

#### **1. Existing Conditions**

The Existing Conditions models represent conditions in 1997. SCDWR's UNET models of 10-year and 100-year storm events for the Existing Conditions show a broad floodplain within the NVSSP area. During the 100-year event, runoff in Laguna Creek basins upstream of the Central California Traction Railroad (CCTR) spills 1,050 cfs into the Gerber Creek Basin east of the CCTR. Immediately west of the CCTR, approximately 400 cfs spills from Gerber Creek over Gerber Road and into the Unionhouse Creek Basin. In the 10-year event, a peak flow of approximately 90 cfs enters Gerber Creek from Laguna Creek, however, flow does not spill into Unionhouse Creek from Gerber Creek. Presented on Figure 2 is the Existing Conditions Subbasin Map.

#### **2. Ultimate Conditions**

SCDWR's UNET models of the 10-year and 100-year storm events for the Ultimate Conditions represent full build out of the Elder Creek Basin, which includes all of the Gerber Creek Basin. Under the Ultimate Conditions, the interbasin spill from Laguna

**Creek to Gerber Creek does not occur. It is likely to be 10 to 25 years before facilities will be in place to eliminate this spill from Laguna Creek.**

**Presented on Figure 3 is the Ultimate Land Use Plan for the NVSSP area. Presented on Figure 4 is the Preferred Drainage Plan. The Preferred Drainage Plan includes Basin E20 along Elder Creek downstream of the NVSSP area. Included in Appendix B is the evaluation of the need for Basin E20. The results of the evaluation indicate that Basin E20 is not required for the Ultimate Conditions or Stand-Alone Conditions. Wood Rodgers modified the Ultimate Conditions model to include flood storage within Storm Water Detention Basin E24B. Also, the size of the box culverts were increased at Gerber Road Crossing No. 4.**

### **3. Stand-Alone Conditions**

**In the Stand-Alone Conditions, the spill from Laguna Creek to Gerber Creek is the same as in the Existing Conditions model. SCDWR's UNET model for the 100-year storm event for the Stand-Alone Conditions represents Existing Conditions within the Elder Creek and Laguna Creek basins with full build out of the NVSSP area.**

**In the Stand-Alone Condition presented in the report entitled, "Elder and Gerber Creeks Technical Appendix: UNET Analysis," the weir elevations for the basins are at the elevations included in the Ultimate Conditions model. With the weirs at these elevations, the basins fill in advance of the peak flow, occurring from the Laguna Creek spill. A minimum of one foot of freeboard for the creeks is not achieved for this Stand-Alone Condition. SCDWR did not develop a Stand-Alone Conditions model for the 10-year storm event.**

**As part of the NVSSP DMP, the Stand-Alone Conditions model was modified to include higher weir elevations to allow the basins to function more effectively with the higher**

**flow that occurs in the Stand-Alone Conditions model. The weir crests would need to be lowered under Ultimate Conditions.**

**The increase in the size of the box culverts is required to eliminate increases to peak stages in the creeks for the Stand-Alone Conditions. Upon review of the Gerber Road Crossing No. 4 improvements identified in the NVSSP DMP and CIP, it appears the model and documents are now consistent.**