



Subject Sunrise Mountain-

Hydrologic Parameters

Made by JDP

Checked by AFN

Approved by RW

Job No 093-97436

Date 02/22/11

Sheet No 1 of 2

## **OBJECTIVE:**

Determine hydrologic parameters (subbasin size, curve number, rainfall depth and rainfall distribution) and design criteria to be used to design and evaluate the surface water control system.

## **DESIGN CRITERIA AND ASSUMPTIONS:**

1. Subbasins were delineated using the final contours as provided in Appendix D, Attachment 4.
2. Curve numbers were calculated using the SCS methodology. The curve numbers were determined by evaluating the USDA Natural Resources Conservation Service Web Soil Survey (Appendix D, Attachment 1).
3. Times of concentration were computed by HEC-HMS in accordance with Standard Form 4 of the Manual.
4. HEC-HMS was used to calculate the peak flow and into the diversion berms, channels, sizing the detention basins and computing peak surface water discharge from the Facility.
5. HEC-RAS was used to model the hydraulics of the channels and box culverts, HydroCAD was used to model the hydraulics for the diversion berms and pipe culverts.
6. The antecedent moisture condition specifies the moisture level in the ground immediately prior to the storm. A value of "2" for normal conditions is used in the analyses as required by the Manual.

## **CALCULATIONS:**

### **Subbasin Delineations**

Non-developed subareas were delineated based on their natural topographic divides shown on a photogrammetric survey of the Site completed in June 2007. Developed subbasins were delineated using the design contours of the Site. Subbasin delineations are provided in Appendix D, Attachment 4.

### **Curve Numbers**

The site is located in an area of hydrologic soils A, B, and D. The soil data was obtained from the United States Department of Agriculture (USDA) SCS Web Soil Survey as provided in Appendix D, Attachment 1. Soils with hydrologic soil group D are associated with higher runoff coefficients and lower for soil group B. The flow calculations used hydrologic soil group D. Field survey and analysis of aerial photography indicated that the current condition of the site consists mainly of non-vegetative rocky soils. A CN of 88 was used for all the subbasins within the site. A CN of 98 was used for impermeable areas such as detention basins. See Table 2.2b from TR-55 in



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Appendix D, Attachment 3.

### **Rainfall Depth**

As required in the SOW, the rainfall depth used in the analyses for the 200-year, 6-hour design storm event is 4.20 inches. This was previously calculated by Exponent, Inc.

As required by Clark County, an additional analysis was conducted for the 100-year, 6-hour storm event of 3.15 inches as calculated in accordance with the CCDDM.

### **CONCLUSIONS:**

The CN for the subbasins is assumed to be 88. A value of 88 is the most conservative value available for use as stipulated in the Manual. The rainfall depth for the design storm event is 4.20 inches. These hydrologic parameters will be used to design the surface water control system for the Site.

