GENERAL INPUT PARAMETERS

This section summarizes the general input parameters that were used in the scour analysis. Additional input parameters (if applicable) are provided on the individual computation sheets.


Hydraulic Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Q_{total}$</td>
<td>3797</td>
<td>total discharge</td>
</tr>
<tr>
<td>$Q_{ch}$</td>
<td>1210</td>
<td>cfs channel discharge</td>
</tr>
<tr>
<td>$A_{ch}$</td>
<td>131.10</td>
<td>sq ft channel area of flow</td>
</tr>
<tr>
<td>$T_{ch}$</td>
<td>55.77</td>
<td>feet channel topwidth of flow</td>
</tr>
<tr>
<td>$Y_{max}$</td>
<td>5.03</td>
<td>feet maximum depth of flow</td>
</tr>
<tr>
<td>$S_e$</td>
<td>0.0181</td>
<td>ft/ft energy slope or channel bed slope</td>
</tr>
<tr>
<td>TW</td>
<td>0.00</td>
<td>feet tailwater depth (if different than $Y_{max}$; otherwise 0)</td>
</tr>
<tr>
<td>n-value</td>
<td>0.040</td>
<td>Manning's n-value for channel</td>
</tr>
</tbody>
</table>

Note: The energy slope is typically used when the basic hydraulic data is obtained from a HEC-2 or HEC-RAS analysis of the watercourse, and the channel bed slope is typically used when the data is obtained from a normal-depth analysis of the channel section.

For a straight reach, the radius of curvature ($r_c$) should be equal to or greater than: 557.66 feet

Applied $r_c$ = 350 feet radius of curvature of channel centerline

DESIGN SCOUR DEPTH

Per COT Drainage Design Manual, Equation 6.3:

<table>
<thead>
<tr>
<th>Scour Type</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Z_{gs}$</td>
<td>0.00</td>
<td>feet (general scour)</td>
</tr>
<tr>
<td>$Z_a$</td>
<td>1.16</td>
<td>feet (anti-dune trough)</td>
</tr>
<tr>
<td>$Z_{ls}$</td>
<td>0.00</td>
<td>feet (controlling drop scour not applicable)</td>
</tr>
<tr>
<td>$Z_{bs}$</td>
<td>0.49</td>
<td>feet (bend scour)</td>
</tr>
<tr>
<td>$Z_{lft}$</td>
<td>1.00</td>
<td>feet (low-flow thalweg)</td>
</tr>
<tr>
<td>$Z_{t}$</td>
<td>2.66</td>
<td>feet</td>
</tr>
<tr>
<td>$Z_{t}$</td>
<td>1.30</td>
<td>feet (safety factor)</td>
</tr>
<tr>
<td>$Z_{t}$</td>
<td>3.45</td>
<td>feet (minimum recommended design scour depth)</td>
</tr>
</tbody>
</table>
**Depth of Scour**

*Flecha Caida Ranch Estates #1 and #2 and Las Lomas de Catalina (Sections .01-0.10)*

---

**GENERAL SCOUR**

Per COT Drainage Design Manual, Equation 6.4:

\[
\begin{align*}
V_m &= 9.23 \text{ fps} \\
Y_{max} &= 5.03 \text{ feet} \\
Y_h &= 2.35 \text{ feet} \\
S_e &= 0.0181 \text{ ft/ft} \\
Z_{gs} &= 0.00 \text{ feet} \quad \text{(if a negative value is calculated, result appears as 0)}
\end{align*}
\]

---

**ANTI-DUNE TROUGH DEPTH**

Per COT Drainage Design Manual, Equation 6.5:

\[
\begin{align*}
V_m &= 9.23 \text{ fps} \\
g &= 32.20 \text{ acceleration due to gravity in ft/s}^2 \\
Z_a &= 1.16 \text{ feet}
\end{align*}
\]

---

**LOW-FLOW THALWEG**

Per COT Drainage Design Manual:

Assume thalweg depth (Z_{th}) is 2.0 feet for regional watercourses and 1.0 feet for all other watercourses, unless field observations dictate otherwise.

\[
Z_{th} = 1.00 \text{ feet}
\]

---

**BEND SCOUR**

Per COT Drainage Design Manual, Equation 6.6:

\[
\begin{align*}
V_m &= 9.23 \text{ fps} \\
Y_{max} &= 5.03 \text{ feet} \\
Y_h &= 2.35 \text{ feet} \\
S_e &= 0.0181 \text{ ft/ft} \\
r_c &= 350.00 \text{ feet} \\
T &= 55.77 \text{ feet} \\
r_c/T &= 6.28 \quad \text{(calculated } r_c/T \text{ is limited to } 0.5 < r_c/T < 10) \\
Z_{bs} &= 0.49 \text{ feet} \quad \text{(using } r_c/T \text{ and substituting Eqn. 6.7 into Eqn. 6.6)}
\end{align*}
\]

---

JE Fuller Hydrology and Geomorphology, Inc.
GENERAL INPUT PARAMETERS

This section summarizes the general input parameters that were used in the scour analysis. Additional input parameters (if applicable) are provided on the individual computation sheets.


Hydraulic Data

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Q_{total}$</td>
<td>3219</td>
<td>total discharge</td>
</tr>
<tr>
<td>$Q_{ch}$</td>
<td>1600 cfs</td>
<td>channel discharge</td>
</tr>
<tr>
<td>$A_{ch}$</td>
<td>200.29 sq ft</td>
<td>channel area of flow</td>
</tr>
<tr>
<td>$T_{ch}$</td>
<td>97.25 feet</td>
<td>channel topwidth of flow</td>
</tr>
<tr>
<td>$Y_{max}$</td>
<td>3.13 feet</td>
<td>maximum depth of flow</td>
</tr>
<tr>
<td>$S_{e}$</td>
<td>0.0180 ft/ft</td>
<td>energy slope or channel bed slope</td>
</tr>
<tr>
<td>$TW$</td>
<td>0.00 feet</td>
<td>tailwater depth (if different than $Y_{max}$; otherwise 0)</td>
</tr>
<tr>
<td>$n$-value</td>
<td>0.040</td>
<td>Manning's $n$-value for channel</td>
</tr>
</tbody>
</table>

Note: The energy slope is typically used when the basic hydraulic data is obtained from a HEC-2 or HEC-RAS analysis of the watercourse, and the channel bed slope is typically used when the data is obtained from a normal-depth analysis of the channel section.

For a straight reach, the radius of curvature ($rc$) should be equal to or greater than: 972.47273 feet

Applied $rc$ = 350 feet radius of curvature of channel centerline

DESIGN SCOUR DEPTH

Per COT Drainage Design Manual, Equation 6.3:

<table>
<thead>
<tr>
<th>Scour Component</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Z_{gs}$</td>
<td>0.00</td>
</tr>
<tr>
<td>$Z_{a}$</td>
<td>0.87</td>
</tr>
<tr>
<td>$Z_{ls}$</td>
<td>0.00</td>
</tr>
<tr>
<td>$Z_{bs}$</td>
<td>0.66</td>
</tr>
<tr>
<td>$Z_{lft}$</td>
<td>1.00</td>
</tr>
<tr>
<td>$Z_{t}$</td>
<td>2.53</td>
</tr>
<tr>
<td>$Z_{t}$</td>
<td>1.30</td>
</tr>
<tr>
<td>$Z_{t}$</td>
<td>3.29</td>
</tr>
</tbody>
</table>

JE Fuller Hydrology and Geomorphology, Inc.
**Depth of Scour**

*Flecha Caida Ranch Estates # 1 and #2 and Las Lomas de Catalina  (Sections 0.11-0.21)*

---

**GENERAL SCOUR**

Per COT Drainage Design Manual, Equation 6.4:

\[
V_m = 7.99 \text{ fps}  \\
Y_{\text{max}} = 3.13 \text{ feet}  \\
Y_h = 2.06 \text{ feet}  \\
S_e = 0.0180 \text{ ft/ft}  \\
Z_{gs} = 0.00 \text{ feet} \quad \text{(if a negative value is calculated, result appears as 0)}
\]

---

**ANTI-DUNE TROUGH DEPTH**

Per COT Drainage Design Manual, Equation 6.5:

\[
V_m = 7.99 \text{ fps}  \\
g = 32.20 \text{ acceleration due to gravity in ft/s}^2  \\
Z_a = 0.87 \text{ feet}
\]

---

**LOW-FLOW THALWEG**

Per COT Drainage Design Manual:

Assume thalweg depth \(Z_{th}\) is 2.0 feet for regional watercourses and 1.0 feet for all other watercourses, unless field observations dictate otherwise.

\[
Z_{th} = 1.00 \text{ feet}
\]

---

**BEND SCOUR**

Per COT Drainage Design Manual, Equation 6.6:

\[
V_m = 7.99 \text{ fps}  \\
Y_{\text{max}} = 3.13 \text{ feet}  \\
Y_h = 2.06 \text{ feet}  \\
S_e = 0.0180 \text{ ft/ft}  \\
r_c = 350.00 \text{ feet}  \\
T = 97.25 \text{ feet}  \\
r_c/T = 3.60 \quad \text{(calculated } r_c/T \text{ is limited to } 0.5 < r_c/T < 10)  \\
Z_{bs} = 0.66 \text{ feet} \quad \text{(using } r_c/T \text{ and substituting Eqn. 6.7 into Eqn. 6.6)}
\]

---

JE Fuller Hydrology and Geomorphology, Inc.