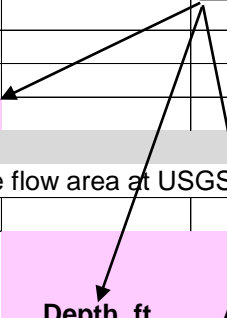


**ATTACHMENT 7**  
**Spreadsheet Calculations**

COWLITZ TIMBER TRAILS ASSOCIATION						
Shoreline Permitting Support						
100-year Base Flood Elevation Estimation						
<b>Step 1</b>	Estimate 100-year Base Flood Elevation at USGS 14238000					
	See separate Technical Bulletin 17 analysis					
Elevation:	<b>256.43</b>	NAVD88				
<b>Step 2</b>	Estimate bank-to-bank widths for 3 project sections and USGS 1423800					
	Use Lewis County GIS slope mapping and USGS quadrangle maps					
<b>Loction</b>	<b>Bank to Bank Width, ft</b>	<b>Elevation, NAVD88</b>				
Section1	492	202				
Section 2	417	202				
Section 3	507	210				
USGS 1423800	293	240				
<b>Step 3</b>	Estimate 100-year flood plain width using FEMA FIRMs					
<b>Location</b>	<b>Width</b>					
Section 1	616					
Section 2	626					
Section 3	590					
USGS 1423800	592					
<b>Step 4</b>	Estimate flow area between bank-to-bank elevation and 100-year floodplain elevaiton at USGS 1423800					
Bank-to-bank width	ft	<b>293</b>				
Bank-to-bank elevation	NAVD88	<b>240</b>				
Floodplain width	ft	<b>592</b>				
Floodplain elevation	NAVD88	<b>256.43</b>				
Depth	ft	<b>16.43</b>				
Area	sq ft	<b>7,270.28</b>				
<b>Step 5</b>	Estimate flood elevation at project area matching the flow area at USGS 1423800					
<b>Loction</b>	<b>Bank-to-bank width, ft</b>	<b>Bank-to-bank elevation, NAVD88</b>	<b>Floodplain width, ft</b>	<b>Depth, ft</b>	<b>Area, sq ft</b>	<b>Floodplain elevation, NAVD88</b>
Section 1	<b>492</b>	<b>202</b>	<b>616</b>	13.12	<b>7,270.28</b>	<b>215.12</b>
Section 2	<b>417</b>	<b>202</b>	<b>626</b>	13.94	<b>7,270.28</b>	<b>215.94</b>
Section 3	<b>507</b>	<b>210</b>	<b>590</b>	13.25	<b>7,270.28</b>	<b>223.25</b>

**GOAL SEEK**



Step 6		Estimate loss of volume in floodplain																			
Location	Type of fill	Approximate Average Ground Elevation, ft	Approximate Percentage	Approximate Average Ground Elevation, ft	Approximate Percentage	Approximate Average Ground Elevation, ft	Approximate Percentage	Approximate Existing Average Ground Elevation	BFE for structures; 2" depth for gravel pads	Potential Fill Area, sq ft	Potential Fill Volume, cu ft	Approximate Floodplain Area, sq ft	Approximate Bank-to-bank area, sq ft	Approximate Floodplain Depth, ft	Floodplain area per foot of depth, sq ft/ft	Approximate Current Floodplain volume, cu ft	Approximate Revised floodplain volume, cu ft	Revised floodplain area, sq ft	Depth to obtain approximate current floodplain volume, ft	Revised floodplain volume (= approximate current floodplain volume)	Approximate Rise, ft
Area A	Structure	220.2	0.9			212.3	0.1	219.41	223.25	8,232	31,651	872,224	686,718	13.25	13,995	10,331,764	10,297,313	863,992	13.33	10,331,764	0.07
	Gravel pad	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.17	16,800	2,800										
Area B	Structure	220.2	0.1	212.6	0.4	212.3	0.5	213.21	219.60	19,992	127,708	1,382,560	1,061,340	13.60	23,623	16,616,035	16,481,527	1,362,568	13.71	16,616,035	0.11
	Gravel pad	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.17	40,800	6,800										
Area C	Structure			212.6	0.4	212.3	0.6	212.42	215.53	25,480	79,298	1,135,520	974,852	13.53	11,873	14,278,957	14,190,993	1,110,040	13.70	14,278,957	0.17
	Gravel pad	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.17	52,000	8,667										
Area D	Structure			212.6	0.5	212.3	0.5	212.45	215.12	10,584	28,294	519,312	373,076	13.12	11,143	5,855,515	5,823,621	508,728	13.28	5,855,515	0.16
	Gravel pad	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.17	21,600	3,600										