Trimble Access TSC2/TSC3 Auxiliary Spillway Stakeout

Overview: The Roading Stakeout tools inside Trimble Access Software on the TSC3/TSC3 can be used to stakeout an auxiliary spillway that has a curved or straight inlet section, a straight control section, and a straight outlet section which can include a curve at the end of it. Control points can be directly entered into the project or uploaded to Trimble Access as a text file (e.g. *Stakeout.txt)*

Items needed for Horizontal Alignment:
- Coordinates of starting point of inlet curve
- Radius and angular dimension of inlet curve
- Azimuth and length of straight section
- Radius and angular dimension outlet curve

Items needed for Vertical Alignment
- Starting elevation at beginning of inlet curve
- Grade & Distances between changes in grade

Items needed for Template Positioning
- Bottom width and side slopes of Spillway

Trimble Access Data Entry

Start a New Job
1. When you open Trimble Access Click *Roads*
2. Click on *Jobs... New Job*
3. Input the new *Job name*, *Units = **International Feet***, {Optional: *Linked Files = **Stakeout.txt***} & *Cogo = **Ground***. Note that the settings from the most recent job are used in the new job.
4. Tab down to type in the *operator name* & any other *notes*
5. Click Accept.

Create the "Template" that represents the Auxiliary Spillway bottom width
6. From the main Trimble Access Menu, Click *Roads...Define*
7. Click *New* on the bottom of the screen and give your new Spillway a name, Click *Enter*
8. Click *Template*
9. Input the new *Template name* (e.g. 20bw)
10. Click Enter.
11. Click New.
12. Pulldown *Element = **Delta Elevation and offset***.
13. Input the *Delta Elevation* (e.g. 0) and the *Offset* (½ of the BW e.g. 10) for the edge of the bottom width.
14. Input the *Code* (e.g. AS)
15. Click Store to store this segment of the template cross section.
16. Click New.
17. Pulldown *Element = **Side slope***.
18. Click Options
19. Pulldown *Grade = **Ratio – Run:Rise***.

20. Click Accept.
21. Input the *Cut Slope* (e.g. 3) and the *Fill slope* (e.g. 3).
22. Input the *Code* (e.g. Toe). Leave *Cut Ditch Width* = 0
23. Click Enter to store this segment of the template cross section.
24. Click Store to store this template cross section.
25. Click Accept
26. Click Accept

Create the Horizontal Alignment
27. Click *Horizontal Alignment*
28. Click New.
29. Input the *Start Stationing* of the alignment (e.g. 0)
30. Input the *Start north (e.g. -520.42)* and the *Start east (e.g. -157.84)* of the beginning point of the auxiliary spillway inlet.
31. Input the *Station Interval* that you want to have available for staking (e.g. 10)
32. Click Store to store the first element of the alignment.
33. Click New.
34. Entry Method: ***Length/Coordinates***
35. Click OK
36. Pulldown *Element = **Arc***.
37. Pulldown *Method = **Delta Angle and Radius***.
38. Input the *Start azimuth* of the arc. Calculate this by subtracting the angle of the inlet curve from the azimuth of the CL of the control section. (e.g. 352º20'13" - 63º00'00" = 289º20'13") (Enter this using **Units…** from the flyout)
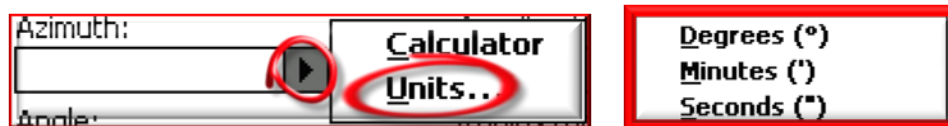
39. Pulldown *Direction* to Right or Left.
40. Input the *Angle* of the inlet curve (e.g. 63 00 00), and the *Radius* (e.g. 50)
41. Tab down to review the *End north* & *End east* coordinates of the inlet curve.
42. Click Store to store this element of the alignment.
43. Click New.
44. Pulldown *Element = **Line***. The *Amizuth* will be based on the tangent to the end of the arc. Verify that it matches the alignment of the CL of the control section.
45. Input the *Length* of the level section plus the straight outlet section. (e.g. 70)
46. Review the *End north* & *End east* coordinates of the straight outlet section.
47. Click Store to store this element of the alignment.
48. Click New.
49. Pulldown *Element = **Arc***.
50. Pulldown *Method = **Delta Angle and radius***.
51. Pulldown *Direction* to Right or Left.
52. Input the *Angle* of the outlet curve (e.g. 90 00 00), and the *Radius* (e.g. 50)
53. Tab down to review the *End north* & *End east* of the outlet curve.
54. Click Store to store this element of the alignment.
55. Verify the *End Station* of each item
56. Click Accept to store the alignment.

Create the Vetical Alignment
57. Click *Vertical Alignment*
58. Click New.
59. Input the *Station (VPI)* of the beginning point of the auxiliary spillway inlet curve. (e.g. 0)
60. Input the *Elevation (VPI)* of the profile (e.g. 46.9)
61. Click Store to store the first element of the profile.
62. Click New.
63. Pulldown *Element = **Point***.
64. Input the *Station (VPI)* of the beginning point of the upstream edge of the level section. (e.g. 55.0)
65. Input the *Elevation (VPI)* of the profile (e.g. 48.0)
66. Verify that the *Slope In* appears to be as planned. (e.g. 2.0%)
67. Click Store to store this element of the profile.
68. Click New.
69. Pulldown *Element = **Point***.
70. Input the *Station (VPI)* of the beginning point of the downstream edge of the level section. (e.g. 85.0)
71. Input the *Elevation (VPI)* of the profile (e.g. 48.0)
72. Verify that the *Slope In* appears to be as planned. (e.g. 0%)
73. Click Store to store this element of the profile.
74. Click New.
75. Pulldown *Element = **Point***.
76. Input the *Station (VPI)* of the beginning point of the downstream edge of the straight outlet section. (e.g. 125.0)
77. Input the *Elevation (VPI)* of the profile (e.g. 46.4)
78. Verify that the *Slope In* appears to be as planned. (e.g. -4.0%)
79. Click Store to store this element of the profile.
80. Click New.
81. Pulldown *Element = **Point***.
82. Input the *Station (VPI)* of the end point of the auxiliary spillway outlet curve. (e.g. 203.5)
83. Input the *Elevation (VPI)* of the profile (e.g. 43.26)
84. Verify that the *Slope In* appears to be as planned. (e.g. -4.0%)
85. Click Store to store this element of the profile.
86. Click Accept to store the Vertical alignment profile data.

Assign the Template to the Spillway
87. Click *Template positioning*
88. Click New.
89. Input the *Start Stationing* of the template (e.g. 0)
90. Right Arrow Click on the *Left Template* to select the Template name in the list.
91. Right Arrow Click on the *Right Template* to select the Template name in the list.
92. Click Store to store this.
93. Click Accept to store the Template positioning data.
94. Click Store to save the data for the entire "Road" definition
95. Click ESC

Setting up & Stakeout

Set up Instrument
1. Set up total station or GPS for surveying as normal.

Open the Job (From Roads Program)
2. Click on *Files... Open Job*
3. Highlight the job
4. Click Select.

Backsight for Orientation of Survey (From Roads Program)
5. Click on *Survey...*
    a. For total station click *VX & S Series...*
    b. For GPS click *IaRTN...*
6. Continue with normal setup of survey.

Stakeout Auxiliary Spillway Road
7. Click the Spillway you've created.
8. Pulldown *Stake* = **Station & offset**. (This option directs you to specific offsets and stations on the road template.)
9. Right Arrow Click on the *Station* to select stationing that you are wanting to stake from the **List** option.
10. Set the *Target height* or *Antenna Height*
11. Click the icon to proceed to the second page.
12. Right Arrow Click on the *Offset* to select the position across the cross section that you want to stake.
13. Click Start Move the target to the correct staking location
14. Once Target is at acceptable location click accept.
15. Input As-staked Name E.g {*SO1004* } for StakeOut and a Code (e.g. AS).
16. Click Enter
17. Click Store
18. Select next station or offset from list and repeat. You can use the Sta-, Sta+, or Offs> screen keys as well.
19. Additional Options
    a. *Stakeout* = **Position on Road** (Provides cut/fill at any location on the road)
    b. *Stakeout* = **Nearest Offset** (Directs you to the nearest template point or catchpoint without setting a specific stationing)
20. When done with Stakeout Press ESC.

Quit out of Survey
21. Take another topo shot on a known benchmark or turning point as a final check.
22. When survey is completed, Escape to main menu, & click *Survey... End Survey*
23. Click Yes to Powerdown Instrument. Click Ok & Disconnect the power.
24. Click Exit. Click Yes to Power Off.

Information needed to input Horizontal Alignment for Auxiliary Spillway

R50.0

90.0°

N AZ 35°22'01.3"

40.0

30.0

63.0°

AS13
Aux Splwy
0.00

R50.0

N = −520.10
E = −157.84