

Drainage Summary

Camden Rt 1 18283.00

Cross pipe Data

| Area | Station | Drainage Area (acres) | Rational Flow (cfs) | USGS (Lombard) Flow (cfs) | Pipe Diameter (inches) |
|------|-----------|--------------------------|------------------------|------------------------------|---------------------------|
| 1 | 79+80 | 59 | 67 | 33.5 | 42RCP ✓ |
| 2 | 87+75 | 171 | 148 | 81 | 60RCP ✓ |
| 2.5 | 93+45Lt | 2.8 | 2.9 | 2.8 | 18 (driveway) |
| 3 | 95+45 | 23.3 | 27 | 16 | 30RCP ✓ |
| 4 | 103+00Lt | 9.2 | 14.4 | 7.4 | 30 (driveway) |
| 4.5 | 105+00Lt | 24 | 30 | 16.3 | 36RCP ✓ |
| 5A | 115+25Lt | 26.7 | 45 | 17.7 | 42RCP ✓ |
| 5 | 119+10Lt | 20.7 | 35 | 14.3 | 30 (driveway) |
| | 122+00 Lt | 17+/- | 33+/- | 12+/- | 24 (driveway) |
| 5.5 | 124+05Lt | 13.4 | 30 | 10.1 | 24 (driveway) |
| 6 | 127+70Lt | 6.1 | 10.2 | 5.3 | 18 (driveway) |
| 6.5 | 129+95 | 10.2 | 17.7 | 8.1 | 24 RCP |
| 7 | 134+05 | 7.5 | 13 | 6.3 | 24RCP ✓ |
| 8 | 137+02 | 7.9 | 16.6 | 6.6 | 24RCP ✓ |
| 9 | 139+99 | 17 | 23 | 7.8 | 30RCP ✓ |
| 10 | 146+07 | 28 | 36 | 8.1 | 30RCP ✓ |
| 11 | 155+45 | 77 | 58 | 37 | 48RCP ✓ |

Catch Basin Data

| Area | Station | Drainage Area (acres) | Rational Q10 Flow (cfs) | Spread (ft) | Outlet Pipe Diameter (inches) |
|------------|--------------|--------------------------|----------------------------|------------------------|----------------------------------|
| CB1 | 88+80Lt | 0.1 | 0.19 | 2.4 | 18 |
| CB2 | 90+50Lt | 0.01 | 0.03 | 4.2 | 18 |
| Stub2 | 90+50Lt | 0.59 | 0.97 | | 18 |
| CB3 | 91+75Rt | 0.05 | 0.23 | 2.3 | 12 |
| CB4 | 91+75Rt | 0.04 | 0.07 | Swale – Depth – 0.13ft | 12 |
| CB5 | 95+40Lt | 23.3 | 27 | Swale – Depth – 1.1ft | 30 |
| CB6 | 95+50Rt | NA Junction | | | 36 |
| | 103+25Rt | | | | 36 driveway |
| CB7 | 104+98Lt | 24 | 21 | Swale – Depth – 1.6ft | 36RCP |
| CB8 | 105+45Lt | 1.26 | 2 | Swale – Depth – 0.54ft | 24 driveway |
| CB9 | 111+50Rt | NA Junction | | | 54 |
| CB10 | 114+50Rt | NA Junction | | | 54 |
| | See 5A above | | | | 42 |
| Drive Pipe | 115+25Rt | 0.46 | 1.16 | | 18 |
| CB11 | 134+10Lt | 0.10 | 0.42 | 2.7 | 24RCP |
| CB12 | 134+10Lt | 7.4 | 11.7 | Swale – Depth – 0.8ft | 18 option III |
| CB13 | 140+00Rt | NA Junction | | | 36 |

| | | | | |
|--------------------|-------------|------|------------------------|-------------|
| Drivepipe 140+45Rt | 0.26 | 0.92 | | 18 driveway |
| CB14 147+20Lt | 0.53 | 1.0 | 4 | 18 |
| CB15 148+80Lt | 0.09 | 0.27 | 2.8 | 12 |
| CB16 148+80Lt | 0.39 | 0.62 | Swale – Depth – 0.33ft | 12 |
| CB17 150+52Rt | 0.04 | 0.18 | 2.4 | 12 |
| CB18 150+55Lt | 0.11 | 0.20 | 2.5 | 18 |
| CB19 152+50Lt | 0.02 | 0.07 | 1.3 | 18 |
| CB20 154+45Rt | 0.15 | 1.3 | 3.9 | 18 |
| CB21 155+00Lt | NA Junction | | | 18 |

Additional Notes:

- CB 1 it might be helpful to start the curb just after the CB at about 88+85. I modified the driveway and curb around CB 1. ✓
- The Pipe between CB's 1 and 2 can be an 18" pipe, (Station 88+75 to 90+50) ✓
- The pipe out letting under the drive from CB1 can also be an 18" pipe (Station 88+00 to 88+75) ✓
- The pipe connecting CB12 with CB11 needs to be an 18" pipe (Station 134+05) ✓
- The pipe outlet at 147+00 Lt needs to be lower (we talked about this one) Outlet pipe lowered to 162.75' elevation. ✓
- The pipe between CB 18 and CB 19 can be an 18" pipe (instead of a 24") (Station 150+55 to 152+50) ✓
- The pipe between CB 19 and CB 21 can be an 18" pipe (instead of the 30") (Station 152+50 to 155+00) ✓
- The outlet pipe from CB21 can be an 18" (instead of a 36") (Station 155+00 to 155+25) ✓
- CB5 and CB6 are reversed on the sections relative to the plan view modified notes ✓
- CB 5- will it be possible to make the top any lower? The basin has been lowered by 0.5', that's all that is possible without affecting the pipe invert elevations and then that would domino into affecting the offset ditch that has been design around the outlet elevation. ✓
- Neenah foundry R-4349-D grates @ basins # 5,7,8, 12 – all of the basin listed have been modified to item no. 604.09, type B1 instead of the Cascade grate they will be outfitted with this Neenah Foundry grate. A special provision has been drafted to specify the use of this grate. ✓
- CB 12 has been modified to a standard B1 basin from its original Type F4. ✓

| | | | | | Rational | | | Regression | | | | | | | | | | | | | | |
|----------|--------------|----------------------|---------|------|----------|------------------|----------------|------------|------------------|----------------|-------|------------------|----------------|------|------------------|----------------|------|------------------|----------------|------|------------------|----------------|
| Sta | Asset ID | A _{ws} (ac) | NWI (%) | C | T = | 25 | | T = | 50 | | T = | 100 | | T = | 25 | | T = | 50 | | T = | 100 | |
| | | | | | Q | D _{1.5} | D ₁ | Q | D _{1.5} | D ₁ | Q | D _{1.5} | D ₁ | Q | D _{1.5} | D ₁ | Q | D _{1.5} | D ₁ | Q | D _{1.5} | D ₁ |
| 79+75 | | 34.33 | 0.00 | 0.2 | 9.3 | 19 | 23 | 10.6 | 20 | 24 | 12.0 | 21 | 25 | 15.3 | 23 | 28 | 18.1 | 25 | 29 | 21.1 | 26 | 31 |
| 87+65 | | 171 | 0.00 | 0.2 | 31.8 | 31 | 37 | 36.6 | 33 | 39 | 41.5 | 34 | 41 | 58.7 | 39 | 47 | 69.5 | 42 | 50 | 81.2 | 45 | 53 |
| 95+48Lt | CB | 10.35 | | 0.2 | 4.1 | 14 | 16 | 4.7 | 15 | 17 | 5.3 | 15 | 18 | 6.0 | 16 | 19 | 7.1 | 17 | 20 | 8.2 | 18 | 22 |
| 103+25Rt | Drive Pipe | 11.37 | 0.00 | 0.2 | 4.4 | 14 | 17 | 5.0 | 15 | 18 | 5.7 | 16 | 19 | 6.5 | 16 | 20 | 7.6 | 18 | 21 | 8.9 | 19 | 22 |
| 105+00 | CB&CP | 43.07 | 0.00 | 0.2 | 11.2 | 20 | 24 | 12.8 | 22 | 26 | 14.4 | 23 | 27 | 19.1 | 25 | 30 | 22.6 | 27 | 32 | 26.3 | 29 | 34 |
| 105+45LT | B&Drive Pipe | 1.52 | 0.00 | 0.2 | 1.0 | 8 | 10 | 1.2 | 9 | 10 | 1.3 | 9 | 11 | 1.3 | 9 | 10 | 1.5 | 9 | 11 | 1.7 | 10 | 12 |
| 105+75Rt | Ditch | 54.44 | 0.00 | 0.2 | 13.7 | 22 | 26 | 15.7 | 23 | 28 | 17.7 | 24 | 29 | 23.1 | 27 | 32 | 27.3 | 29 | 35 | 31.9 | 31 | 37 |
| 115+20Lt | Drive Pipe | 26.49 | 0.00 | 0.2 | 7.6 | 18 | 21 | 8.7 | 19 | 22 | 9.9 | 19 | 23 | 12.9 | 22 | 26 | 15.2 | 23 | 27 | 17.7 | 24 | 29 |
| 119+00Lt | Drive Pipe | 23.16 | | 0.2 | 6.9 | 17 | 20 | 8.0 | 18 | 21 | 9.1 | 19 | 22 | 11.5 | 21 | 25 | 13.6 | 22 | 26 | 15.9 | 23 | 28 |
| 124+00Lt | Drive Pipe | 15.98 | 0.00 | 0.2 | 5.5 | 15 | 18 | 6.3 | 16 | 19 | 7.2 | 17 | 20 | 8.5 | 18 | 22 | 10.1 | 20 | 23 | 11.7 | 21 | 25 |
| 126+50Lt | Drive Pipe | 10.77 | 0.00 | 0.2 | 4.2 | 14 | 17 | 4.8 | 15 | 18 | 5.5 | 15 | 18 | 6.2 | 16 | 19 | 7.3 | 17 | 21 | 8.5 | 18 | 22 |
| 129+95 | Crosspipe | 6.33 | 0.00 | 0.2 | 2.9 | 12 | 14 | 3.3 | 13 | 15 | 3.8 | 13 | 16 | 4.0 | 14 | 16 | 4.7 | 15 | 17 | 5.5 | 15 | 18 |
| 134+10 | CB&CP | 6.05 | | 0.2 | 2.8 | 12 | 14 | 3.2 | 13 | 15 | 3.7 | 13 | 16 | 3.9 | 14 | 16 | 4.6 | 14 | 17 | 5.3 | 15 | 18 |
| 137+00 | Crosspipe | 10.71 | 0.00 | 0.2 | 4.2 | 14 | 17 | 4.8 | 15 | 18 | 5.5 | 15 | 18 | 6.2 | 16 | 19 | 7.3 | 17 | 21 | 8.4 | 18 | 22 |
| 140+00 | Crosspipe | 28.78 | 0.00 | 0.2 | 8.1 | 18 | 21 | 9.3 | 19 | 23 | 10.5 | 20 | 24 | 13.8 | 22 | 26 | 16.2 | 24 | 28 | 18.9 | 25 | 30 |
| 140+45Rt | Stub-DP | 0.3 | 0.00 | 0.2 | 0.3 | 5 | 6 | 0.3 | 5 | 6 | 0.4 | 6 | 7 | 0.3 | 5 | 6 | 0.3 | 5 | 6 | 0.4 | 6 | 7 |
| 146+10 | Crosspipe | 15.73 | 0.00 | 0.2 | 5.4 | 15 | 18 | 6.3 | 16 | 19 | 7.2 | 17 | 20 | 8.4 | 18 | 22 | 9.9 | 19 | 23 | 11.6 | 21 | 25 |
| | | 0 | 0.00 | 0.2 | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! | ##### | #NUM! | #NUM! | ##### | 0.0 | 0 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0 |
| 88+80Lt | CB | 0.24 | 0.00 | 0.3 | 0.4 | 6 | 7 | 0.5 | 6 | 7 | 0.5 | 6 | 8 | 0.3 | 5 | 6 | 0.3 | 5 | 6 | 0.4 | 6 | 7 |
| 90+50Lt | CB | 0.95 | 0.00 | 0.85 | 3.1 | 12 | 15 | 3.6 | 13 | 16 | 4.1 | 14 | 16 | 0.9 | 8 | 9 | 1.0 | 8 | 10 | 1.2 | 9 | 10 |
| 90+50Lt | Stub | 9.84 | 0.00 | 0.3 | 5.9 | 16 | 19 | 6.8 | 17 | 20 | 7.7 | 18 | 21 | 5.7 | 16 | 19 | 6.8 | 17 | 20 | 7.9 | 18 | 21 |
| | | | 0.00 | 0.2 | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! | ##### | #NUM! | #NUM! | ##### | 0.0 | 0 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0 |
| 147+20Lt | CB | 0.529 | 0.00 | 0.3 | 0.7 | 7 | 8 | 0.8 | 8 | 9 | 1.0 | 8 | 9 | 0.5 | 6 | 8 | 0.6 | 7 | 8 | 0.7 | 7 | 8 |
| 148+80Lt | CB | 0.088 | 0.00 | 0.7 | 0.4 | 6 | 7 | #NUM! | #NUM! | ##### | #NUM! | #NUM! | ##### | 0.1 | 4 | 4 | 0.1 | 4 | 5 | 0.2 | 4 | 5 |
| 148+80Lt | F-Basin | 0.39 | 0.00 | 0.3 | 0.6 | 7 | 8 | 0.7 | 7 | 8 | 0.8 | 7 | 9 | 0.4 | 6 | 7 | 0.5 | 6 | 7 | 0.6 | 7 | 8 |
| 150+55Lt | CB | 0.107 | 0.00 | 0.3 | 0.2 | 5 | 5 | 0.3 | 5 | 6 | 0.3 | 5 | 6 | 0.1 | 4 | 5 | 0.2 | 4 | 5 | 0.2 | 4 | 5 |
| 150+60Lt | Stub | 3.33 | 0.00 | 0.25 | 2.4 | 11 | 13 | 2.7 | 12 | 14 | 3.1 | 12 | 15 | 2.4 | 11 | 13 | 2.8 | 12 | 14 | 3.3 | 13 | 15 |
| 150+55Rt | CB | 0.041 | 0.00 | 0.85 | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! | ##### | #NUM! | #NUM! | ##### | 0.1 | 3 | 4 | 0.1 | 3 | 4 | 0.1 | 3 | 4 |
| 152+50Lt | CB | 0.022 | 0.00 | 0.85 | #NUM! | #NUM! | #NUM! | #NUM! | #NUM! | ##### | #NUM! | #NUM! | ##### | 0.0 | 3 | 3 | 0.0 | 3 | 3 | 0.1 | 3 | 3 |
| 154+48Rt | CB | 0.391 | 0.00 | 0.85 | 1.7 | 10 | 12 | 1.9 | 10 | 12 | 2.2 | 11 | 13 | 0.4 | 6 | 7 | 0.5 | 6 | 7 | 0.6 | 7 | 8 |
| 154+50LT | Swale | 1.103 | 0.00 | 0.2 | 0.8 | 7 | 9 | 0.9 | 8 | 9 | 1.1 | 8 | 10 | 1.0 | 8 | 9 | 1.1 | 8 | 10 | 1.3 | 9 | 11 |
| 00+00 | 999 | 1 | 0.00 | 0.2 | 0.8 | 7 | 9 | 0.9 | 8 | 9 | 1.0 | 8 | 10 | 0.9 | 8 | 9 | 1.0 | 8 | 10 | 1.2 | 9 | 10 |
| 100+50Lt | sub-basin | 1.9 | 0.00 | 0.3 | 1.8 | 10 | 12 | 2.1 | 11 | 13 | 2.4 | 11 | 13 | 1.5 | 9 | 11 | 1.8 | 10 | 12 | 2.1 | 11 | 13 |
| 100+80Lt | old pipe | 24.1 | 0.00 | 0.2 | 7.1 | 17 | 20 | 8.2 | 18 | 21 | 9.3 | 19 | 23 | 11.9 | 21 | 25 | 14.1 | 22 | 27 | 16.4 | 24 | 28 |
| 103+90Lt | sub-basin | 14.1 | 0.00 | 0.2 | 5.1 | 15 | 18 | 5.9 | 16 | 19 | 6.7 | 17 | 20 | 7.7 | 18 | 21 | 9.1 | 19 | 22 | 10.6 | 20 | 24 |
| 104+95 | CB-crosspipe | 43.07 | 0.00 | 0.2 | 11.2 | 20 | 24 | 12.8 | 22 | 26 | 14.4 | 23 | 27 | 19.1 | 25 | 30 | 22.6 | 27 | 32 | 26.3 | 29 | 34 |

| T = 25 | | | | | | | | | | T = 50 | | | | | | | | | | T = 100 | | | | | | | | | |
|----------|--------------|----------------------|---------|------|----------------------|------------------------|---------------------|----------------------|------------------------|--------|------------------|----------------|------------------------|---------------------|----------------------|------------------------|-------|------------------|----------------|------------------------|---------------------|----------------------|------------------------|-------|------------------|----------------|--|--|--|
| Sta | Asset ID | A _{ws} (ac) | NWI (%) | C | A (mi ²) | P _{15 T} (in) | T _r (hr) | T _c (min) | i _r (in/hr) | Q | D _{1.5} | D ₁ | P _{15 T} (in) | T _r (hr) | T _c (min) | i _r (in/hr) | Q | D _{1.5} | D ₁ | P _{15 T} (in) | T _r (hr) | T _c (min) | i _r (in/hr) | Q | D _{1.5} | D ₁ | | | |
| 79+75 | 0 | 34.33 | 0.00 | 0.2 | 0.05364 | 0.999 | 0.89 | 88.6 | 1.35 | 9.3 | 19 | 23 | 1.14 | 0.86 | 86.5 | 1.54 | 10.6 | 20 | 24 | 1.27 | 0.85 | 84.7 | 1.74 | 12.0 | 21 | 25 | | | |
| 87+65 | 0 | 171 | 0.00 | 0.2 | 0.26719 | 0.999 | 1.92 | 192.0 | 0.93 | 31.8 | 31 | 37 | 1.14 | 1.87 | 187.4 | 1.07 | 36.6 | 33 | 39 | 1.27 | 1.84 | 183.7 | 1.21 | 41.5 | 34 | 41 | | | |
| 95+48Lt | CB | 10.35 | 0.00 | 0.2 | 0.01617 | 0.999 | 0.50 | 49.7 | 1.98 | 4.1 | 14 | 16 | 1.14 | 0.49 | 48.5 | 2.27 | 4.7 | 15 | 17 | 1.27 | 0.48 | 47.6 | 2.57 | 5.3 | 15 | 18 | | | |
| 103+25Rt | Drive Pipe | 11.37 | 0.00 | 0.2 | 0.01777 | 0.999 | 0.52 | 52.0 | 1.93 | 4.4 | 14 | 17 | 1.14 | 0.51 | 50.8 | 2.22 | 5.0 | 15 | 18 | 1.27 | 0.50 | 49.8 | 2.51 | 5.7 | 16 | 19 | | | |
| 105+00 | CB&CP | 43.07 | 0.00 | 0.2 | 0.06730 | 0.999 | 0.99 | 98.8 | 1.30 | 11.2 | 20 | 24 | 1.14 | 0.96 | 96.4 | 1.49 | 12.8 | 22 | 26 | 1.27 | 0.95 | 94.5 | 1.67 | 14.4 | 23 | 27 | | | |
| 105+45LT | B&Drive Pipe | 1.52 | 0.00 | 0.2 | 0.00238 | 0.999 | 0.20 | 19.7 | 3.36 | 1.0 | 8 | 10 | 1.14 | 0.19 | 19.3 | 3.87 | 1.2 | 9 | 10 | 1.27 | 0.19 | 18.9 | 4.38 | 1.3 | 9 | 11 | | | |
| 105+75Rt | Ditch | 54.44 | 0.00 | 0.2 | 0.08506 | 0.999 | 1.11 | 110.6 | 1.26 | 13.7 | 22 | 26 | 1.14 | 1.08 | 108.0 | 1.44 | 15.7 | 23 | 28 | 1.27 | 1.06 | 105.8 | 1.62 | 17.7 | 24 | 29 | | | |
| 115+20Lt | Drive Pipe | 26.49 | 0.00 | 0.2 | 0.04139 | 0.999 | 0.78 | 78.2 | 1.43 | 7.6 | 18 | 21 | 1.14 | 0.76 | 76.3 | 1.65 | 8.7 | 19 | 22 | 1.27 | 0.75 | 74.8 | 1.87 | 9.9 | 19 | 23 | | | |
| 119+00Lt | Drive Pipe | 23.16 | 0.00 | 0.2 | 0.03619 | 0.999 | 0.73 | 73.3 | 1.49 | 6.9 | 17 | 20 | 1.14 | 0.72 | 71.5 | 1.72 | 8.0 | 18 | 21 | 1.27 | 0.70 | 70.1 | 1.96 | 9.1 | 19 | 22 | | | |
| 124+00Lt | Drive Pipe | 15.98 | 0.00 | 0.2 | 0.02497 | 0.999 | 0.61 | 61.3 | 1.72 | 5.5 | 15 | 18 | 1.14 | 0.60 | 59.8 | 1.99 | 6.3 | 16 | 19 | 1.27 | 0.59 | 58.6 | 2.26 | 7.2 | 17 | 20 | | | |
| 126+50Lt | Drive Pipe | 10.77 | 0.00 | 0.2 | 0.01683 | 0.999 | 0.51 | 50.7 | 1.96 | 4.2 | 14 | 17 | 1.14 | 0.49 | 49.5 | 2.25 | 4.8 | 15 | 18 | 1.27 | 0.48 | 48.5 | 2.55 | 5.5 | 15 | 18 | | | |
| 129+95 | Crosspipe | 6.33 | 0.00 | 0.2 | 0.00989 | 0.999 | 0.39 | 39.2 | 2.28 | 2.9 | 12 | 14 | 1.14 | 0.38 | 38.3 | 2.63 | 3.3 | 13 | 15 | 1.27 | 0.38 | 37.5 | 2.98 | 3.8 | 13 | 16 | | | |
| 134+10 | CB&CP | 6.05 | 0.00 | 0.2 | 0.00945 | 0.999 | 0.38 | 38.4 | 2.31 | 2.8 | 12 | 14 | 1.14 | 0.37 | 37.5 | 2.66 | 3.2 | 13 | 15 | 1.27 | 0.37 | 36.7 | 3.02 | 3.7 | 13 | 16 | | | |
| 137+00 | Crosspipe | 10.71 | 0.00 | 0.2 | 0.01673 | 0.999 | 0.51 | 50.6 | 1.96 | 4.2 | 14 | 17 | 1.14 | 0.49 | 49.3 | 2.25 | 4.8 | 15 | 18 | 1.27 | 0.48 | 48.3 | 2.55 | 5.5 | 15 | 18 | | | |
| 140+00 | Crosspipe | 28.78 | 0.00 | 0.2 | 0.04497 | 0.999 | 0.81 | 81.4 | 1.40 | 8.1 | 18 | 21 | 1.14 | 0.79 | 79.4 | 1.61 | 9.3 | 19 | 23 | 1.27 | 0.78 | 77.8 | 1.82 | 10.5 | 20 | 24 | | | |
| 140+45Rt | Stub-DP | 0.26 | 0.00 | 0.2 | 0.00041 | 0.999 | 0.08 | 8.4 | 5.64 | 0.3 | 5 | 6 | 1.14 | 0.08 | 8.2 | 6.50 | 0.3 | 5 | 6 | 1.27 | 0.08 | 8.1 | 7.36 | 0.4 | 6 | 7 | | | |
| 146+10 | Crosspipe | 15.73 | 0.00 | 0.2 | 0.02458 | 0.999 | 0.61 | 60.8 | 1.73 | 5.4 | 15 | 18 | 1.14 | 0.59 | 59.4 | 2.00 | 6.3 | 16 | 19 | 1.27 | 0.58 | 58.2 | 2.28 | 7.2 | 17 | 20 | | | |
| 0 | 0 | 0 | 0.00 | 0.2 | 0.00000 | 0.999 | 0.00 | 0.0 | #NUM! | #NUM! | ##### | ##### | 1.14 | 0.00 | 0.0 | #NUM! | #NUM! | #### | ##### | 1.27 | 0.00 | 0.0 | #NUM! | #NUM! | #### | #### | | | |
| 88+80Lt | CB | 0.24 | 0.00 | 0.3 | 0.00038 | 0.999 | 0.08 | 8.1 | 5.76 | 0.4 | 6 | 7 | 1.14 | 0.08 | 7.9 | 6.64 | 0.5 | 6 | 7 | 1.27 | 0.08 | 7.8 | 7.52 | 0.5 | 6 | 8 | | | |
| 90+50Lt | CB | 0.95 | 0.00 | 0.85 | 0.00148 | 0.999 | 0.16 | 15.7 | 3.87 | 3.1 | 12 | 15 | 1.14 | 0.15 | 15.4 | 4.47 | 3.6 | 13 | 16 | 1.27 | 0.15 | 15.1 | 5.07 | 4.1 | 14 | 16 | | | |
| 90+50Lt | Stub | 9.84 | 0.00 | 0.3 | 0.01538 | 0.999 | 0.49 | 48.5 | 2.01 | 5.9 | 16 | 19 | 1.14 | 0.47 | 47.4 | 2.30 | 6.8 | 17 | 20 | 1.27 | 0.46 | 46.4 | 2.61 | 7.7 | 18 | 21 | | | |
| 0 | 0 | 0 | 0.00 | 0.2 | 0.00000 | 0.999 | 0.00 | 0.0 | #NUM! | #NUM! | ##### | ##### | 1.14 | 0.00 | 0.0 | #NUM! | #NUM! | #### | ##### | 1.27 | 0.00 | 0.0 | #NUM! | #NUM! | #### | #### | | | |
| 147+20Lt | CB | 0.529 | 0.00 | 0.3 | 0.00083 | 0.999 | 0.12 | 11.9 | 4.59 | 0.7 | 7 | 8 | 1.14 | 0.12 | 11.6 | 5.29 | 0.8 | 8 | 9 | 1.27 | 0.11 | 11.4 | 6.00 | 1.0 | 8 | 9 | | | |
| 148+80Lt | CB | 0.088 | 0.00 | 0.7 | 0.00014 | 0.999 | 0.05 | 5.0 | 7.19 | 0.4 | 6 | 7 | 1.14 | 0.05 | 4.9 | #NUM! | #NUM! | #### | ##### | 1.27 | 0.05 | 4.8 | #NUM! | #NUM! | #### | #### | | | |
| 148+80Lt | F-Basin | 0.39 | 0.00 | 0.3 | 0.00061 | 0.999 | 0.10 | 10.2 | 5.01 | 0.6 | 7 | 8 | 1.14 | 0.10 | 10.0 | 5.78 | 0.7 | 7 | 8 | 1.27 | 0.10 | 9.8 | 6.56 | 0.8 | 7 | 9 | | | |
| 150+55Lt | CB | 0.107 | 0.00 | 0.3 | 0.00017 | 0.999 | 0.05 | 5.5 | 6.94 | 0.2 | 5 | 5 | 1.14 | 0.05 | 5.4 | 7.96 | 0.3 | 5 | 6 | 1.27 | 0.05 | 5.3 | 8.97 | 0.3 | 5 | 6 | | | |
| 150+60Lt | Stub | 3.33 | 0.00 | 0.25 | 0.00520 | 0.999 | 0.29 | 28.8 | 2.82 | 2.4 | 11 | 13 | 1.14 | 0.28 | 28.1 | 3.25 | 2.7 | 12 | 14 | 1.27 | 0.28 | 27.5 | 3.67 | 3.1 | 12 | 15 | | | |
| 150+55Rt | CB | 0.041 | 0.00 | 0.85 | 0.00006 | 0.999 | 0.03 | 3.5 | #NUM! | #NUM! | ##### | ##### | 1.14 | 0.03 | 3.4 | #NUM! | #NUM! | #### | ##### | 1.27 | 0.03 | 3.3 | #NUM! | #NUM! | #### | #### | | | |
| 152+50Lt | CB | 0.022 | 0.00 | 0.85 | 0.00003 | 0.999 | 0.03 | 2.6 | #NUM! | #NUM! | ##### | ##### | 1.14 | 0.03 | 2.5 | #NUM! | #NUM! | #### | ##### | 1.27 | 0.02 | 2.5 | #NUM! | #NUM! | #### | #### | | | |
| 154+48Rt | CB | 0.391 | 0.00 | 0.85 | 0.00061 | 0.999 | 0.10 | 10.3 | 5.01 | 1.7 | 10 | 12 | 1.14 | 0.10 | 10.0 | 5.78 | 1.9 | 10 | 12 | 1.27 | 0.10 | 9.8 | 6.56 | 2.2 | 11 | 13 | | | |
| 154+50LT | Swale | 1.103 | 0.00 | 0.2 | 0.00172 | 0.999 | 0.17 | 16.9 | 3.69 | 0.8 | 7 | 9 | 1.14 | 0.17 | 16.5 | 4.26 | 0.9 | 8 | 9 | 1.27 | 0.16 | 16.2 | 4.82 | 1.1 | 8 | 10 | | | |
| 00+00 | 999 | 1 | 0.00 | 0.2 | 0.00156 | 0.999 | 0.16 | 16.1 | 3.81 | 0.8 | 7 | 9 | 1.14 | 0.16 | 15.7 | 4.39 | 0.9 | 8 | 9 | 1.27 | 0.15 | 15.4 | 4.98 | 1.0 | 8 | 10 | | | |
| 100+50Lt | sub-basin | 1.9 | 0.00 | 0.3 | 0.00297 | 0.999 | 0.22 | 22.0 | 3.19 | 1.8 | 10 | 12 | 1.14 | 0.21 | 21.4 | 3.66 | 2.1 | 11 | 13 | 1.27 | 0.21 | 21.0 | 4.13 | 2.4 | 11 | 13 | | | |
| 100+80Lt | old pipe | 24.1 | 0.00 | 0.2 | 0.03766 | 0.999 | 0.75 | 74.7 | 1.47 | 7.1 | 17 | 20 | 1.14 | 0.73 | 72.9 | 1.70 | 8.2 | 18 | 21 | 1.27 | 0.71 | 71.5 | 1.93 | 9.3 | 19 | 23 | | | |
| 103+90Lt | sub-basin | 14.1 | 0.00 | 0.2 | 0.02203 | 0.999 | 0.58 | 57.7 | 1.81 | 5.1 | 15 | 18 | 1.14 | 0.56 | 56.3 | 2.08 | 5.9 | 16 | 19 | 1.27 | 0.55 | 55.2 | 2.36 | 6.7 | 17 | 20 | | | |
| 104+95 | B-crosspipe | 43.07 | 0.00 | 0.2 | 0.06730 | 0.999 | 0.99 | 98.8 | 1.30 | 11.2 | 20 | 24 | 1.14 | 0.96 | 96.4 | 1.49 | 12.8 | 22 | 26 | 1.27 | 0.95 | 94.5 | 1.67 | 14.4 | 23 | 27 | | | |

Closed System Worksheet - Preliminary Design of Simple Systems

Start data entry from bottom; enter data in blue cells only.

Units: **US** (US or metric)

Portland Rainfall IDF Curve

Design Event: 10-Year

| Project: | Camden Rtl 1 | Pin # | 18283.00 | 1/25/2018 | Design of Closed System | | | | | | | | | | | | | | | | | | | | | |
|----------|--------------|-------|----------|-----------|-------------------------|--------------------------------------|--------------------|--------|--------|--------|-------|--------|--------|---------|-----------|--------|--------|--------|-------|--------|--------|-------|--------|--------|--------|--------|
| | | | | | Partial Flow | | | | | | | | | | Full Flow | | | | | | | | | | | |
| | | | | | 30 | Time in Pipe Section | min | 0.1 | 1.2 | 0.3 | | 0.0 | 1.6 | 0.0 | | 0.0 | 0.7 | 0.1 | | 1.9 | 0.1 | | 0.1 | 0.7 | 0.8 | 0.1 |
| | | | | | 29 | Velocity (design) =V | ft/s | 8.8 | 2.4 | 4.3 | | 4.2 | 3.8 | 7.2 | | 4.3 | 3.9 | 5.6 | | 3.4 | 7.7 | | 9.0 | 4.8 | 5.3 | 8.2 |
| | | | | | 28 | Flow Depth (design) | in | 2 | 6 | 4 | | 1 | 2 | 26 | | 3 | 4 | 5 | | 1 | 2 | | 1 | 3 | 3 | 2 |
| | | | | | 27 | Flow Depth Fraction (design) | | 0.20 | 0.51 | 0.36 | | 0.05 | 0.15 | 0.79 | | 0.24 | 0.33 | 0.44 | | 0.12 | 0.16 | | 0.11 | 0.22 | 0.21 | 0.15 |
| | | | | | 26 | Percent of Capacity Q _f | | 8 | 51 | 27 | | 1 | 5 | 96 | | 12 | 24 | 39 | | 3 | 5 | | 2 | 10 | 10 | 5 |
| | | | | | 25 | Pipe-Full Capacity Q _F | ft ³ /s | 11.4 | 1.9 | 3.99 | | 12.60 | 5.69 | 37.40 | | 5.04 | 3.74 | 4.66 | | 5.98 | 11.22 | | 16.94 | 5.79 | 6.52 | 12.28 |
| | | | | | 24 | Pipe-Full Velocity V _F | ft/s | 14.5 | 2.4 | 5.1 | | 16.0 | 7.2 | 6.3 | | 6.4 | 4.8 | 5.9 | | 7.6 | 14.3 | | 21.6 | 7.4 | 8.3 | 15.6 |
| | | | | | 23 | Hydraulic Radius | ft | 0.25 | 0.25 | 0.25 | | 0.25 | 0.25 | 0.69 | | 0.25 | 0.25 | 0.25 | | 0.25 | 0.25 | | 0.25 | 0.25 | 0.25 | 0.25 |
| | | | | | 22 | Pipe Area | ft ² | 0.79 | 0.79 | 0.79 | | 0.79 | 0.79 | 5.94 | | 0.79 | 0.79 | 0.79 | | 0.79 | 0.79 | | 0.79 | 0.79 | 0.79 | 0.79 |
| | | | | | 21 | Pipe Diam (design) | in | 12 | 12 | 12 | | 12 | 12 | 33 | | 12 | 12 | 12 | | 12 | 12 | | 12 | 12 | 12 | 12 |
| | | | | | 20 | Pipe Diam (exact) | in | 5 | 9 | 7 | | 2 | 4 | 32 | | 5 | 7 | 8 | | 3 | 4 | | 3 | 5 | 5 | 4 |
| | | | | | 19 | Flow Depth Fraction (nom) | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | | | | 18 | Manning Roughness Coeff = n | | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 |
| | | | | | 17 | Runoff Total (design) Q _T | ft ³ /s | 1.0 | 1.0 | 1.1 | | 0.063 | 0.287 | 35.882 | | 0.616 | 0.890 | 1.831 | | 0.179 | 0.617 | | 0.403 | 0.608 | 0.658 | 0.634 |
| | | | | | 16 | Runoff Offsite = Q _{off} | ft ³ /s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| | | | | | 15 | Runoff Direct Q = μCIA | ft ³ /s | 1.0 | 1.0 | 1.1 | | 0.063 | 0.287 | 35.882 | | 0.616 | 0.890 | 1.831 | | 0.179 | 0.617 | | 0.403 | 0.608 | 0.658 | 0.634 |
| | | | | | 14 | Rainfall Rate I | in/hr | 5.3 | 5.2 | 4.9 | | 5.3 | 5.3 | 4.8 | | 5.3 | 5.3 | 5.1 | | 5.3 | 4.8 | | 5.3 | 5.2 | 5.1 | 4.9 |
| | | | | | 13 | Cum W't'ed C | | 0.31 | 0.31 | 0.32 | | 0.30 | 0.61 | 0.32 | | 0.30 | 0.35 | 0.36 | | 0.85 | 0.68 | | 0.30 | 0.32 | 0.34 | 0.34 |
| | | | | | 12 | Total Area =A _f | ac | 0.6 | 0.6 | 0.69 | | 0.0400 | 0.0900 | 23.3800 | | 0.3900 | 0.4800 | 1.0100 | | 0.0400 | 0.1900 | | 0.2550 | 0.3650 | 0.3870 | 0.3871 |
| | | | | | 11 | Total T _c (min) | min | 5.00 | 5.15 | 6.33 | | 5.00 | 5.03 | 7.00 | | 5.00 | 5.02 | 5.69 | | 5.00 | 6.90 | | 5.00 | 5.11 | 5.78 | 6.57 |
| | | | | | 10 | Incremental Rational Coeff=C | | 0.31 | 0.85 | 0.36 | | 0.30 | 0.85 | 0.32 | | 0.30 | 0.58 | 0.36 | | 0.85 | 0.63 | | 0.30 | 0.36 | 0.63 | 0.85 |
| | | | | | 9 | Incremental Area A _f | ac | 0.6 | 0.0 | 0.10 | | 0.0400 | 0.0500 | 23.2900 | | 0.3900 | 0.1 | 0.5300 | | 0.0400 | 0.1500 | | 0.2550 | 0.1100 | 0.0220 | 0.0001 |
| | | | | | 8 | Time of Conc T _c | min | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | 7.0 | | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | 5.0 | 5.0 |
| | | | | | 7 | slope S | ft/ft | 0.1026 | 0.0028 | 0.0126 | | 0.1250 | 0.0255 | 0.0050 | | 0.0200 | 0.0110 | 0.0171 | | 0.0282 | 0.0992 | | 0.2260 | 0.0264 | 0.0335 | 0.1189 |
| | | | | | 6 | Inv Elev Lower End | ft | 197.00 | 196.53 | 195.45 | | 0.00 | 181.29 | 180.51 | | 0.00 | 163.48 | 162.75 | | 154.03 | 147.83 | | 165.62 | 160.49 | 151.92 | 145.00 |
| | | | | | 5 | Inv Elev Upper End | ft | 205.00 | 197.00 | 196.53 | | 1.00 | 190.79 | 180.60 | | 0.10 | 165.22 | 163.23 | | 164.96 | 153.78 | | 178.73 | 165.62 | 160.37 | 151.42 |
| | | | | | 4 | Length (m) | ft | 78.00 | 170.00 | 86.00 | 0.00 | 8.00 | 372.00 | 18.00 | 0.00 | 5.00 | 158.00 | 28.00 | 0.00 | 388.00 | 60.00 | 0.00 | 58.00 | 194.00 | 252.00 | 54.00 |
| | | | | | 3 | To Station (lower) | ft | 78 | 170 | 86 | | 8 | 372 | 18 | | 5 | 158 | 28 | | 388 | 60 | | 58 | 194 | 252 | 54 |
| | | | | | 2 | From Station (upper) | ft | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | 0 |
| | | | | | 1 | Route/Street/Watershed | | Stub2 | 2 | 1 | | 4 | 3 | 5 & 6 | | 16 | 15 | 14 | | 17 | 20 | | Stub18 | 18 | 19 | 21 |

| | | |
|---------------------------|----|---|
| Rainfall IDF Station | 1 | (Portland-1/Eastport-2/Rangely-3/ |
| Event Return Period (yrs) | 10 | Presque Isle-4/Newport-5/Millinocket-6) |

| | | |
|-------|----|----------------|
| Units | US | (US or metric) |
|-------|----|----------------|

Hydraulic Analysis Report

Project Data

Project Title:

Designer:

Project Date: Tuesday, January 23, 2018

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: CB1Spread

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0100 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0400 ft/ft

Manning's n: 0.0150

Gutter Width: 5.0000 ft

Width of Spread: 2.4474 ft

Gutter Result Parameters

Design Flow: 0.1900 cfs

Gutter Depression: 1.2000 in

Area of Flow: 0.3099 ft²

Eo (Gutter Flow to Total Flow): 1.0000

Gutter Depth at Curb: 1.7874 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Grate

Grate Type: P - 1-7/8

Grate Width: 2.0000 ft

Grate Length: 2.0000 ft

Local Depression: 0.5000 in

Inlet Result Parameters

Intercepted Flow: 0.1897 cfs

Bypass Flow: 0.0003 cfs

Approach Velocity: 0.6131 ft/s

Splash-over Velocity: 8.1290 ft/s

Efficiency: 0.9983

Hydraulic Analysis Report

Project Data

Project Title:

Designer:

Project Date: Tuesday, January 23, 2018

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: CB2Spread

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0150 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0400 ft/ft

Manning's n: 0.0150

Gutter Width: 5.0000 ft

Width of Spread: 4.1802 ft

Gutter Result Parameters

Design Flow: 0.9700 cfs

Gutter Depression: 1.2000 in

Area of Flow: 0.4247 ft²

E_o (Gutter Flow to Total Flow): 1.0000

Gutter Depth at Curb: 2.2033 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Grate

Grate Type: P - 1-7/8

Grate Width: 2.0000 ft

Grate Length: 2.0000 ft

Local Depression: 0.5000 in

Inlet Result Parameters

Intercepted Flow: 0.8715 cfs

Bypass Flow: 0.0985 cfs

Approach Velocity: 2.2837 ft/s

Splash-over Velocity: 8.1290 ft/s

Efficiency: 0.8985

Hydraulic Analysis Report

Project Data

Project Title:

Designer:

Project Date: Tuesday, January 23, 2018

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: CB3

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0200 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0400 ft/ft

Manning's n: 0.0150

Gutter Width: 5.0000 ft

Width of Spread: 2.3088 ft

Gutter Result Parameters

Design Flow: 0.2300 cfs

Gutter Depression: 1.2000 in

Area of Flow: 0.3033 ft²

Eo (Gutter Flow to Total Flow): 1.0000

Gutter Depth at Curb: 1.7541 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Grate

Grate Type: P - 1-7/8

Grate Width: 2.0000 ft

Grate Length: 2.0000 ft

Local Depression: 0.5000 in

Inlet Result Parameters

Intercepted Flow: 0.2298 cfs

Bypass Flow: 0.0002 cfs

Approach Velocity: 0.7583 ft/s

Splash-over Velocity: 8.1290 ft/s

Efficiency: 0.9992

Hydraulic Analysis Report

Project Data

Project Title:

Designer:

Project Date: Tuesday, January 23, 2018

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: CB11Curb and Gutter Analysis

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0280 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0400 ft/ft

Manning's n: 0.0150

Gutter Width: 5.0000 ft

Design Flow: 0.4200 cfs

Gutter Result Parameters

Width of Spread: 2.7168 ft

Gutter Depression: 1.2000 in

Area of Flow: 0.3238 ft²

E_o (Gutter Flow to Total Flow): 1.0000

Gutter Depth at Curb: 1.8520 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Grate

Grate Type: P - 1-7/8

Grate Width: 2.0000 ft

Grate Length: 2.0000 ft

Local Depression: 0.5000 in

Inlet Result Parameters

Intercepted Flow: 0.4161 cfs

Bypass Flow: 0.0039 cfs

Approach Velocity: 1.2971 ft/s

Splash-over Velocity: 8.1290 ft/s

Efficiency: 0.9908

Hydraulic Analysis Report

Project Data

Project Title:

Designer:

Project Date: Tuesday, January 23, 2018

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: CB14Curb and Gutter Analysis

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0200 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0400 ft/ft

Manning's n: 0.0150

Gutter Width: 5.0000 ft

Width of Spread: 3.9911 ft

Gutter Result Parameters

Design Flow: 0.9900 cfs

Gutter Depression: 1.2000 in

Area of Flow: 0.4093 ft²

E_o (Gutter Flow to Total Flow): 1.0000

Gutter Depth at Curb: 2.1579 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Grate

Grate Type: P - 1-7/8

Grate Width: 2.0000 ft

Grate Length: 2.0000 ft

Local Depression: 0.5000 in

Inlet Result Parameters

Intercepted Flow: 0.9024 cfs

Bypass Flow: 0.0876 cfs

Approach Velocity: 2.4188 ft/s

Splash-over Velocity: 8.1290 ft/s

Efficiency: 0.9115

Hydraulic Analysis Report

Project Data

Project Title:

Designer:

Project Date: Tuesday, January 23, 2018

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: CB15Curb and Gutter Analysis

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0100 ft/ft

Cross-Slope of Pavement: 0.0010 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0400 ft/ft

Manning's n: 0.0150

Gutter Width: 5.0000 ft

Width of Spread: 2.7921 ft

Gutter Result Parameters

Design Flow: 0.2700 cfs

Gutter Depression: 2.3400 in

Area of Flow: 0.4914 ft²

Eo (Gutter Flow to Total Flow): 1.0000

Gutter Depth at Curb: 2.3735 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Grate

Grate Type: P - 1-7/8

Grate Width: 2.0000 ft

Grate Length: 2.0000 ft

Local Depression: 0.5000 in

Inlet Result Parameters

Intercepted Flow: 0.2700 cfs

Bypass Flow: 0.0000 cfs

Approach Velocity: 0.5495 ft/s

Splash-over Velocity: 8.1290 ft/s

Efficiency: 0.9998

Hydraulic Analysis Report

Project Data

Project Title:

Designer:

Project Date: Tuesday, January 23, 2018

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: CB17Curb and Gutter Analysis

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0100 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0400 ft/ft

Manning's n: 0.0150

Gutter Width: 5.0000 ft

Width of Spread: 2.3983 ft

Gutter Result Parameters

Design Flow: 0.1800 cfs

Gutter Depression: 1.2000 in

Area of Flow: 0.3075 ft²

E_o (Gutter Flow to Total Flow): 1.0000

Gutter Depth at Curb: 1.7756 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Grate

Grate Type: P - 1-7/8

Grate Width: 2.0000 ft

Grate Length: 2.0000 ft

Local Depression: 0.5000 in

Inlet Result Parameters

Intercepted Flow: 0.1798 cfs

Bypass Flow: 0.0002 cfs

Approach Velocity: 0.5853 ft/s

Splash-over Velocity: 8.1290 ft/s

Efficiency: 0.9988

Curb and Gutter Analysis: CB18Curb and Gutter Analysis

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0100 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0400 ft/ft

Manning's n: 0.0150

Gutter Width: 5.0000 ft

Width of Spread: 2.4950 ft

Gutter Result Parameters

Design Flow: 0.2000 cfs

Gutter Depression: 1.2000 in

Area of Flow: 0.3122 ft²

E_o (Gutter Flow to Total Flow): 1.0000

Gutter Depth at Curb: 1.7988 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Grate

Grate Type: P - 1-7/8

Grate Width: 2.0000 ft

Grate Length: 2.0000 ft

Local Depression: 0.5000 in

Inlet Result Parameters

Intercepted Flow: 0.1996 cfs

Bypass Flow: 0.0004 cfs

Approach Velocity: 0.6405 ft/s

Splash-over Velocity: 8.1290 ft/s

Efficiency: 0.9978

Curb and Gutter Analysis: CB19Curb and Gutter Analysis

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0350 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0400 ft/ft

Manning's n: 0.0150

Gutter Width: 5.0000 ft

Width of Spread: 1.3307 ft

Gutter Result Parameters

Design Flow: 0.0700 cfs

Gutter Depression: 1.2000 in

Area of Flow: 0.2677 ft²

E_o (Gutter Flow to Total Flow): 1.0000

Gutter Depth at Curb: 1.5194 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Grate

Grate Type: P - 1-7/8

Grate Width: 2.0000 ft

Grate Length: 2.0000 ft

Local Depression: 0.5000 in

Inlet Result Parameters

Intercepted Flow: 0.0700 cfs

Bypass Flow: 0.0000 cfs

Approach Velocity: 0.2615 ft/s

Splash-over Velocity: 8.1290 ft/s

Efficiency: 1.0000

Curb and Gutter Analysis: CB20Curb and Gutter Analysis

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0378 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0400 ft/ft

Manning's n: 0.0150

Gutter Width: 5.0000 ft

Width of Spread: 3.9231 ft

Gutter Result Parameters

Design Flow: 1.3000 cfs

Gutter Depression: 1.2000 in

Area of Flow: 0.4039 ft²

E_o (Gutter Flow to Total Flow): 1.0000

Gutter Depth at Curb: 2.1415 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Grate

Grate Type: P - 1-7/8

Grate Width: 2.0000 ft

Grate Length: 2.0000 ft

Local Depression: 0.5000 in

Inlet Result Parameters

Intercepted Flow: 1.1862 cfs

Bypass Flow: 0.1138 cfs

Approach Velocity: 3.2186 ft/s

Splash-over Velocity: 8.1290 ft/s

Efficiency: 0.9125

Curb and Gutter Analysis: Gutter149Curb and Gutter Analysis

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0378 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0400 ft/ft

Manning's n: 0.0150

Gutter Width: 5.0000 ft

Width of Spread: 4.6109 ft

Gutter Result Parameters

Design Flow: 2.0000 cfs

Gutter Depression: 1.2000 in

Area of Flow: 0.4626 ft²

E_o (Gutter Flow to Total Flow): 1.0000

Gutter Depth at Curb: 2.3066 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Grate

Grate Type: P - 1-7/8

Grate Width: 2.0000 ft

Grate Length: 2.0000 ft

Local Depression: 1.0000 in

Inlet Result Parameters

Intercepted Flow: 1.7049 cfs

Bypass Flow: 0.2951 cfs

Approach Velocity: 4.3234 ft/s

Splash-over Velocity: 8.1290 ft/s

Efficiency: 0.8525

Curb and Gutter Analysis: Gutter15350Curb and Gutter Analysis

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0378 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0400 ft/ft

Manning's n: 0.0150

Gutter Width: 5.0000 ft

Width of Spread: 2.2637 ft

Gutter Result Parameters

Design Flow: 0.3000 cfs

Gutter Depression: 1.2000 in

Area of Flow: 0.3012 ft²

E_o (Gutter Flow to Total Flow): 1.0000

Gutter Depth at Curb: 1.7433 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Grate

Grate Type: P - 1-7/8

Grate Width: 2.0000 ft

Grate Length: 2.0000 ft

Local Depression: 0.0000 in

Inlet Result Parameters

Intercepted Flow: 0.2998 cfs

Bypass Flow: 0.0002 cfs

Approach Velocity: 0.9959 ft/s

Splash-over Velocity: 8.1290 ft/s

Efficiency: 0.9993

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 4 cfs

Design Flow: 5.3 cfs

Maximum Flow: 8 cfs

Table 1 - Summary of Culvert Flows at Crossing: Crossing 1

| Headwater Elevation (ft) | Total Discharge (cfs) | Drive 127+70Lt Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|-----------------------------|-----------------------|-----------------------------------|----------------------------|-------------|
| 136.54 | 4.00 | 4.00 | 0.00 | 1 |
| 136.62 | 4.40 | 4.40 | 0.00 | 1 |
| 136.69 | 4.80 | 4.80 | 0.00 | 1 |
| 136.76 | 5.20 | 5.20 | 0.00 | 1 |
| 136.78 | 5.30 | 5.30 | 0.00 | 1 |
| 136.91 | 6.00 | 6.00 | 0.00 | 1 |
| 136.99 | 6.40 | 6.40 | 0.00 | 1 |
| 137.07 | 6.80 | 6.80 | 0.00 | 1 |
| 137.15 | 7.20 | 7.20 | 0.00 | 1 |
| 137.25 | 7.60 | 7.60 | 0.00 | 1 |
| 137.36 | 8.00 | 8.00 | 0.00 | 1 |
| 138.00 | 9.82 | 9.82 | 0.00 | Overtopping |

Rating Curve Plot for Crossing: Crossing 1

Total Rating Curve

Crossing: Crossing 1

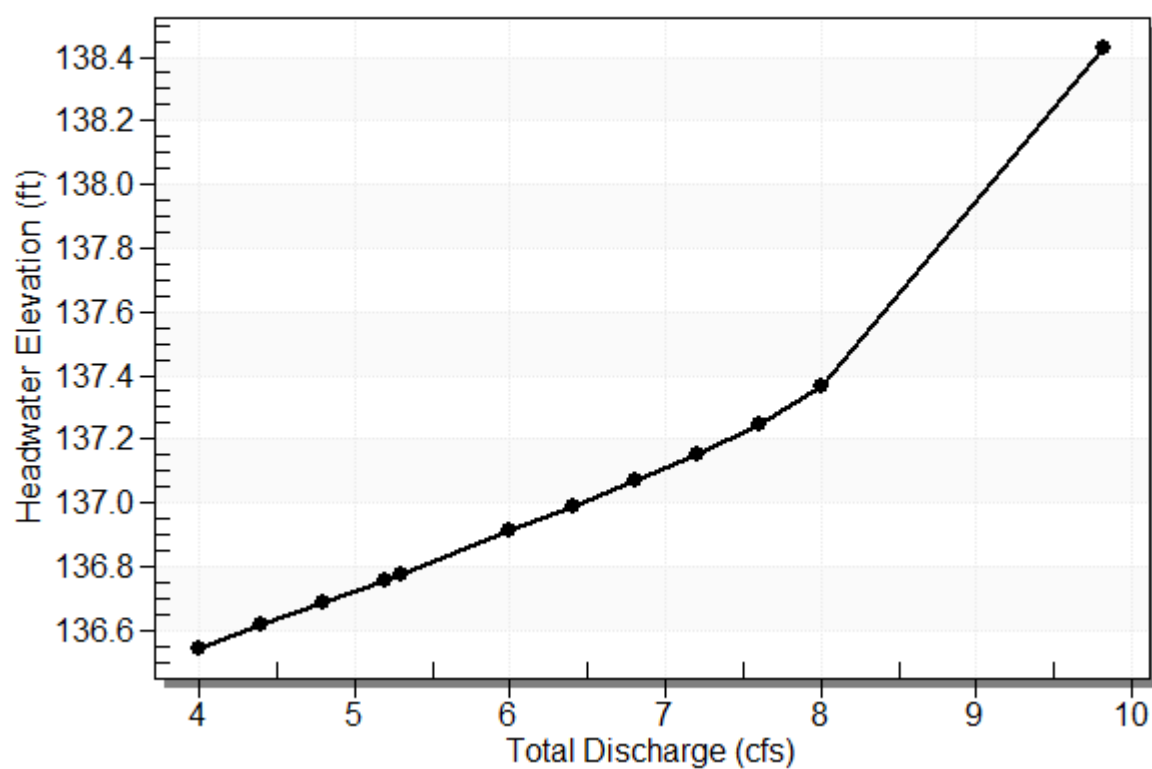


Table 2 - Culvert Summary Table: Drive 127+70Lt

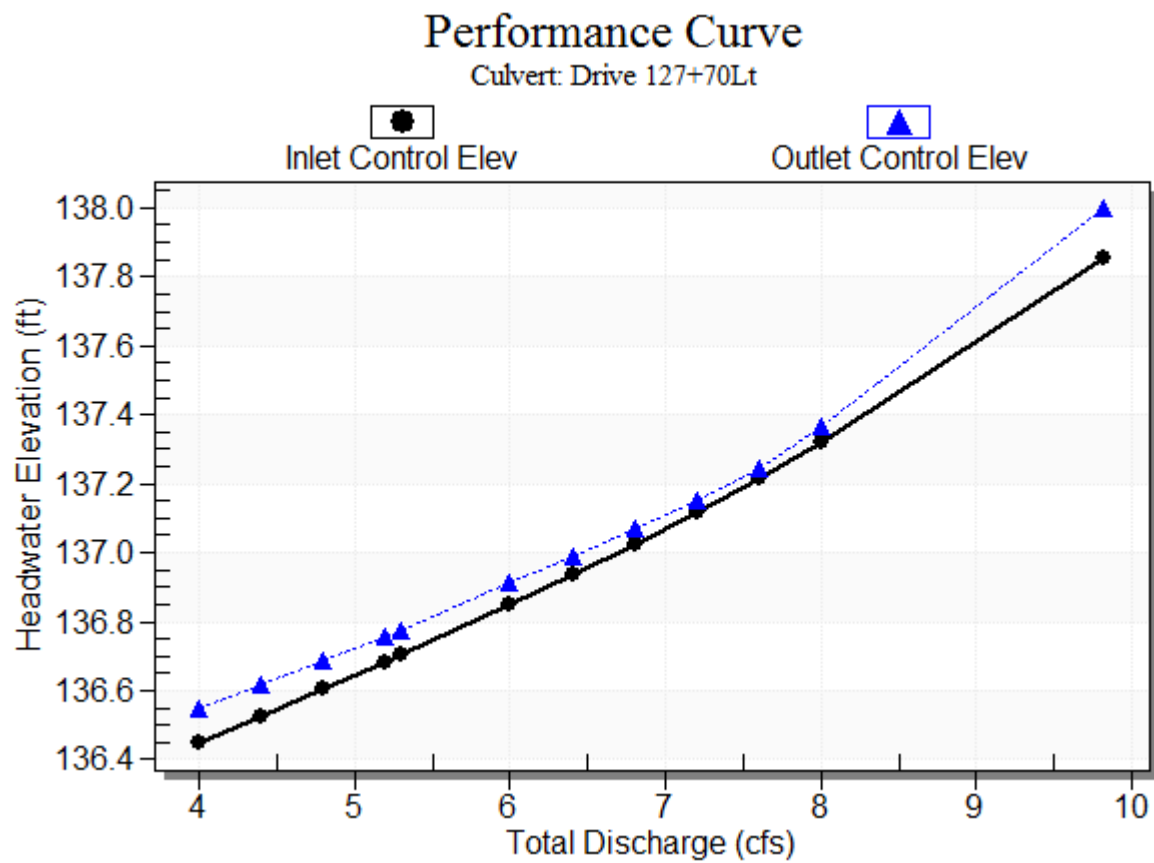
| Total Discharge (cfs) | Culvert Discharge (cfs) | Headwater Elevation (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tailwater Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|-----------------------|-------------------------|--------------------------|--------------------------|---------------------------|-----------|-------------------|---------------------|-------------------|----------------------|------------------------|---------------------------|
| 4.00 | 4.00 | 136.54 | 1.198 | 1.295 | 2-M2c | 0.843 | 0.765 | 0.765 | 0.401 | 4.414 | 2.376 |
| 4.40 | 4.40 | 136.62 | 1.275 | 1.366 | 2-M2c | 0.901 | 0.803 | 0.803 | 0.422 | 4.569 | 2.445 |
| 4.80 | 4.80 | 136.69 | 1.353 | 1.437 | 2-M2c | 0.959 | 0.839 | 0.839 | 0.442 | 4.724 | 2.509 |
| 5.20 | 5.20 | 136.76 | 1.433 | 1.507 | 7-M2c | 1.027 | 0.876 | 0.876 | 0.462 | 4.853 | 2.569 |
| 5.30 | 5.30 | 136.78 | 1.453 | 1.525 | 7-M2c | 1.044 | 0.884 | 0.884 | 0.466 | 4.889 | 2.584 |
| 6.00 | 6.00 | 136.91 | 1.597 | 1.661 | 7-M2c | 1.500 | 0.942 | 0.942 | 0.498 | 5.138 | 2.679 |
| 6.40 | 6.40 | 136.99 | 1.684 | 1.738 | 7-M2c | 1.500 | 0.972 | 0.972 | 0.516 | 5.280 | 2.730 |
| 6.80 | 6.80 | 137.07 | 1.774 | 1.818 | 7-M2c | 1.500 | 1.007 | 1.007 | 0.532 | 5.393 | 2.778 |
| 7.20 | 7.20 | 137.15 | 1.868 | 1.903 | 7-M2c | 1.500 | 1.036 | 1.036 | 0.549 | 5.530 | 2.824 |
| 7.60 | 7.60 | 137.25 | 1.966 | 1.995 | 7-M2c | 1.500 | 1.064 | 1.064 | 0.565 | 5.667 | 2.868 |
| 8.00 | 8.00 | 137.36 | 2.069 | 2.114 | 7-M2c | 1.500 | 1.092 | 1.092 | 0.580 | 5.805 | 2.910 |

Straight Culvert

Inlet Elevation (invert): 135.25 ft, Outlet Elevation (invert): 135.00 ft

Culvert Length: 25.00 ft, Culvert Slope: 0.0100

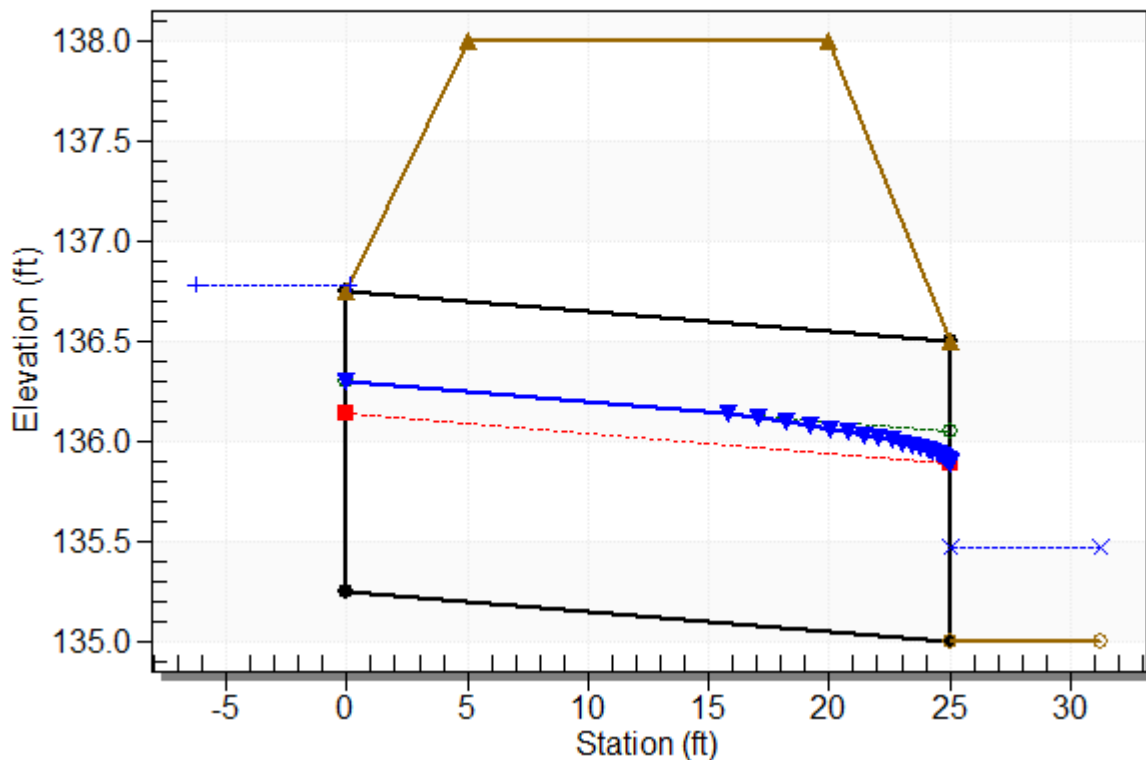
Culvert Performance Curve Plot: Drive 127+70Lt



Water Surface Profile Plot for Culvert: Drive 127+70Lt

Crossing - Crossing 1, Design Discharge - 5.3 cfs

Culvert - Drive 127+70Lt, Culvert Discharge - 5.3 cfs



Site Data - Drive 127+70Lt

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 135.25 ft

Outlet Station: 25.00 ft

Outlet Elevation: 135.00 ft

Number of Barrels: 1

Culvert Data Summary - Drive 127+70Lt

Barrel Shape: Circular

Barrel Diameter: 1.50 ft

Barrel Material: Corrugated Steel

Embedment: 0.00 in

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 1)

| Flow (cfs) | Water Surface Elev (ft) | Depth (ft) | Velocity (ft/s) | Shear (psf) | Froude Number |
|------------|-------------------------|------------|-----------------|-------------|---------------|
| 4.00 | 135.40 | 0.40 | 2.38 | 0.50 | 0.75 |
| 4.40 | 135.42 | 0.42 | 2.44 | 0.53 | 0.76 |
| 4.80 | 135.44 | 0.44 | 2.51 | 0.55 | 0.76 |
| 5.20 | 135.46 | 0.46 | 2.57 | 0.58 | 0.76 |
| 5.30 | 135.47 | 0.47 | 2.58 | 0.58 | 0.77 |
| 6.00 | 135.50 | 0.50 | 2.68 | 0.62 | 0.77 |
| 6.40 | 135.52 | 0.52 | 2.73 | 0.64 | 0.78 |
| 6.80 | 135.53 | 0.53 | 2.78 | 0.66 | 0.78 |
| 7.20 | 135.55 | 0.55 | 2.82 | 0.68 | 0.78 |
| 7.60 | 135.56 | 0.56 | 2.87 | 0.70 | 0.78 |
| 8.00 | 135.58 | 0.58 | 2.91 | 0.72 | 0.79 |

Tailwater Channel Data - Crossing 1

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 3.00 ft

Side Slope (H:V): 3.00 (1:1)

Channel Slope: 0.0200

Channel Manning's n: 0.0400

Channel Invert Elevation: 135.00 ft

Roadway Data for Crossing: Crossing 1

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 30.00 ft

Crest Elevation: 138.00 ft

Roadway Surface: Paved

Roadway Top Width: 15.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 8 cfs

Design Flow: 10.1 cfs

Maximum Flow: 15 cfs

Table 4 - Summary of Culvert Flows at Crossing: Crossing 2

| Headwater Elevation (ft) | Total Discharge (cfs) | 124+00Lt Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|-----------------------------|-----------------------|-----------------------------|----------------------------|-------------|
| 126.97 | 8.00 | 8.00 | 0.00 | 1 |
| 127.05 | 8.70 | 8.70 | 0.00 | 1 |
| 127.13 | 9.40 | 9.40 | 0.00 | 1 |
| 127.20 | 10.10 | 10.10 | 0.00 | 1 |
| 127.28 | 10.80 | 10.80 | 0.00 | 1 |
| 127.36 | 11.50 | 11.50 | 0.00 | 1 |
| 127.44 | 12.20 | 12.20 | 0.00 | 1 |
| 127.52 | 12.90 | 12.90 | 0.00 | 1 |
| 127.61 | 13.60 | 13.60 | 0.00 | 1 |
| 127.69 | 14.30 | 14.30 | 0.00 | 1 |
| 127.78 | 15.00 | 15.00 | 0.00 | 1 |
| 128.00 | 16.37 | 16.37 | 0.00 | Overtopping |

Rating Curve Plot for Crossing: Crossing 2

Total Rating Curve

Crossing: Crossing 2

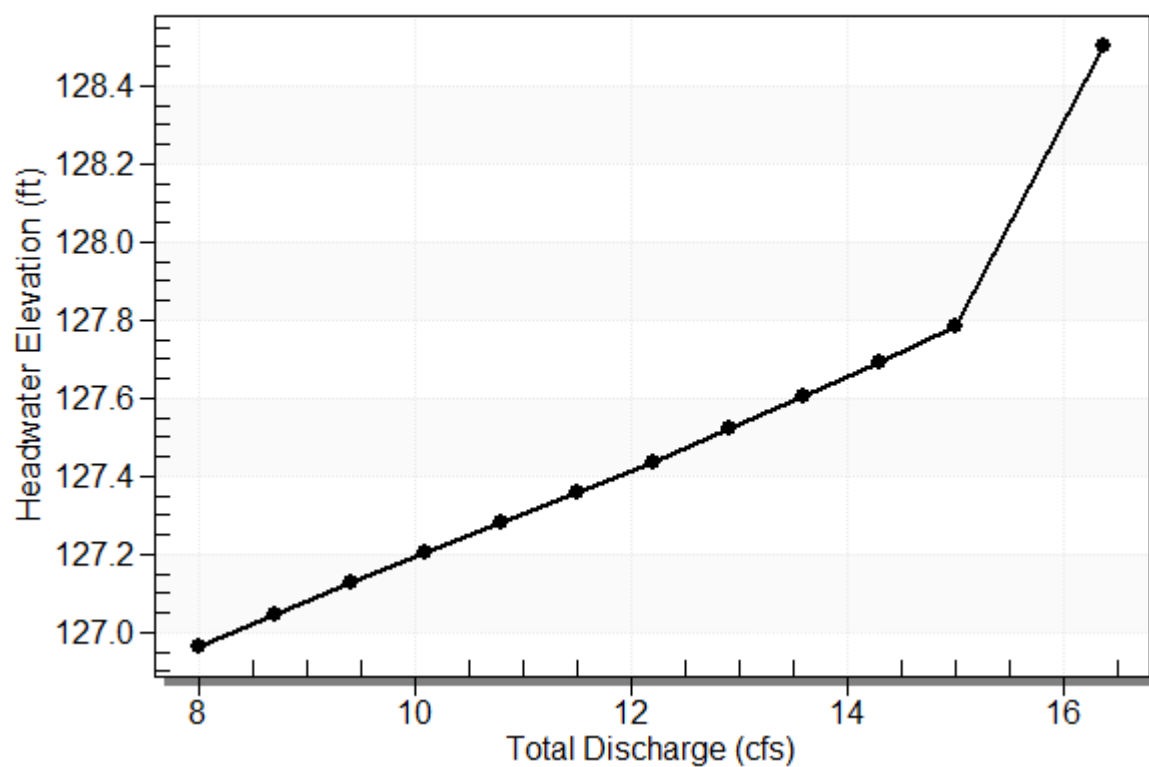


Table 5 - Culvert Summary Table: 124+00Lt

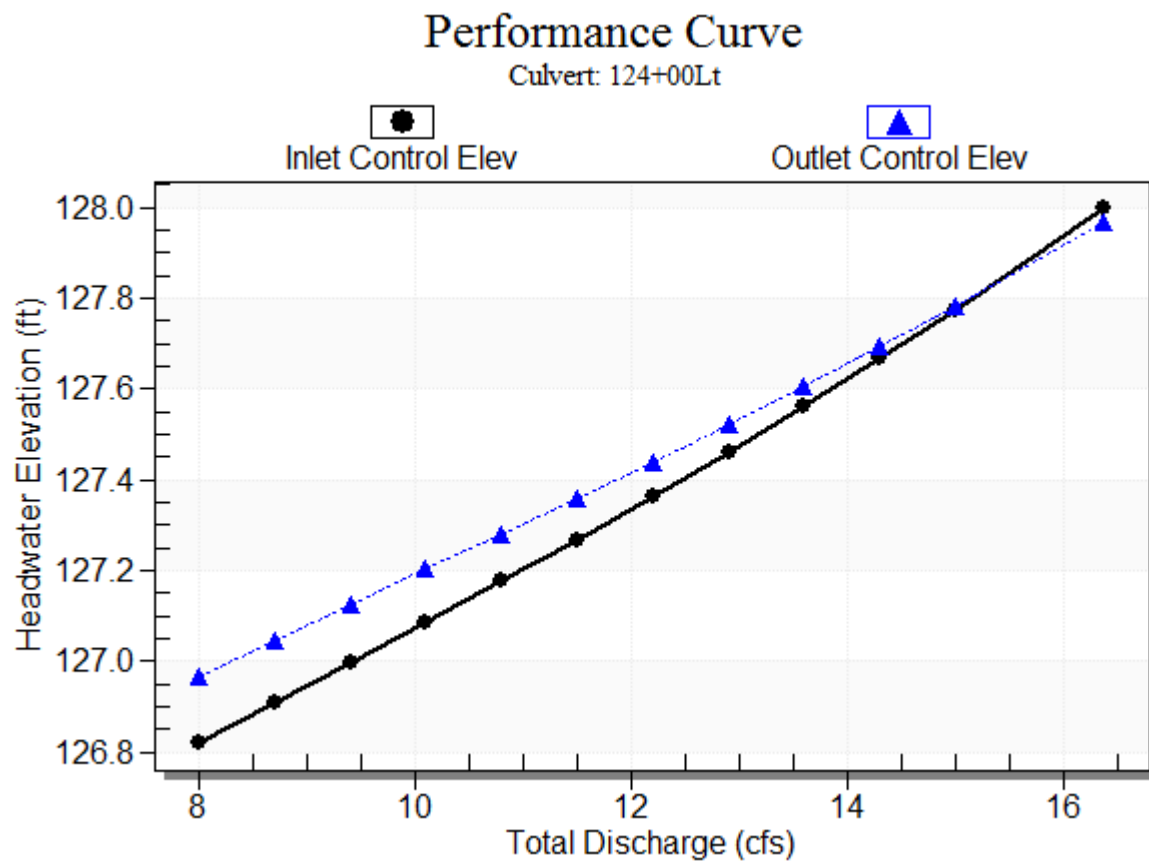
| Total Discharge (cfs) | Culvert Discharge (cfs) | Headwater Elevation (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tailwater Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|-----------------------|-------------------------|--------------------------|--------------------------|---------------------------|-----------|-------------------|---------------------|-------------------|----------------------|------------------------|---------------------------|
| 8.00 | 8.00 | 126.97 | 1.571 | 1.716 | 2-M2c | 1.069 | 1.006 | 1.006 | 0.521 | 5.052 | 3.363 |
| 8.70 | 8.70 | 127.05 | 1.659 | 1.797 | 2-M2c | 1.131 | 1.051 | 1.051 | 0.545 | 5.204 | 3.445 |
| 9.40 | 9.40 | 127.13 | 1.747 | 1.876 | 2-M2c | 1.194 | 1.092 | 1.092 | 0.567 | 5.356 | 3.522 |
| 10.10 | 10.10 | 127.20 | 1.836 | 1.954 | 2-M2c | 1.257 | 1.132 | 1.132 | 0.589 | 5.508 | 3.596 |
| 10.80 | 10.80 | 127.28 | 1.927 | 2.030 | 7-M2c | 1.328 | 1.175 | 1.175 | 0.610 | 5.629 | 3.664 |
| 11.50 | 11.50 | 127.36 | 2.019 | 2.108 | 7-M2c | 1.402 | 1.213 | 1.213 | 0.630 | 5.770 | 3.730 |
| 12.20 | 12.20 | 127.44 | 2.114 | 2.187 | 7-M2c | 1.488 | 1.249 | 1.249 | 0.650 | 5.910 | 3.792 |
| 12.90 | 12.90 | 127.52 | 2.211 | 2.272 | 7-M2c | 2.000 | 1.289 | 1.289 | 0.669 | 6.024 | 3.852 |
| 13.60 | 13.60 | 127.61 | 2.312 | 2.357 | 7-M2c | 2.000 | 1.325 | 1.325 | 0.687 | 6.159 | 3.910 |
| 14.30 | 14.30 | 127.69 | 2.416 | 2.443 | 7-M2c | 2.000 | 1.359 | 1.359 | 0.705 | 6.293 | 3.964 |
| 15.00 | 15.00 | 127.78 | 2.525 | 2.532 | 7-M2c | 2.000 | 1.392 | 1.392 | 0.723 | 6.428 | 4.017 |

Straight Culvert

Inlet Elevation (invert): 125.25 ft, Outlet Elevation (invert): 125.00 ft

Culvert Length: 25.00 ft, Culvert Slope: 0.0100

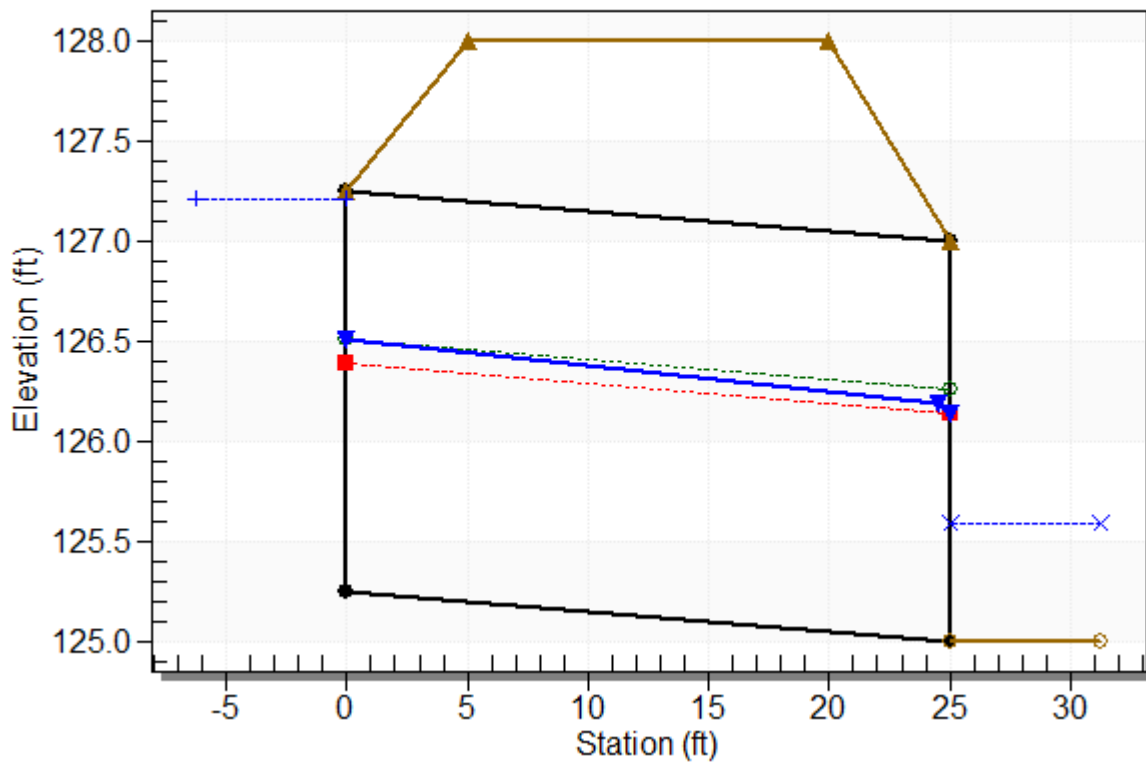
Culvert Performance Curve Plot: 124+00Lt



Water Surface Profile Plot for Culvert: 124+00Lt

Crossing - Crossing 2, Design Discharge - 10.1 cfs

Culvert - 124+00Lt, Culvert Discharge - 10.1 cfs



Site Data - 124+00Lt

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 125.25 ft

Outlet Station: 25.00 ft

Outlet Elevation: 125.00 ft

Number of Barrels: 1

Culvert Data Summary - 124+00Lt

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Corrugated Steel

Embedment: 0.00 in

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: NONE

Table 6 - Downstream Channel Rating Curve (Crossing: Crossing 2)

| Flow (cfs) | Water Surface Elev (ft) | Depth (ft) | Velocity (ft/s) | Shear (psf) | Froude Number |
|------------|-------------------------|------------|-----------------|-------------|---------------|
| 8.00 | 125.52 | 0.52 | 3.36 | 0.98 | 0.95 |
| 8.70 | 125.54 | 0.54 | 3.45 | 1.02 | 0.96 |
| 9.40 | 125.57 | 0.57 | 3.52 | 1.06 | 0.96 |
| 10.10 | 125.59 | 0.59 | 3.60 | 1.10 | 0.97 |
| 10.80 | 125.61 | 0.61 | 3.66 | 1.14 | 0.97 |
| 11.50 | 125.63 | 0.63 | 3.73 | 1.18 | 0.97 |
| 12.20 | 125.65 | 0.65 | 3.79 | 1.22 | 0.98 |
| 12.90 | 125.67 | 0.67 | 3.85 | 1.25 | 0.98 |
| 13.60 | 125.69 | 0.69 | 3.91 | 1.29 | 0.99 |
| 14.30 | 125.71 | 0.71 | 3.96 | 1.32 | 0.99 |
| 15.00 | 125.72 | 0.72 | 4.02 | 1.35 | 0.99 |

Tailwater Channel Data - Crossing 2

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 3.00 ft

Side Slope (H:V): 3.00 (1:1)

Channel Slope: 0.0300

Channel Manning's n: 0.0400

Channel Invert Elevation: 125.00 ft

Roadway Data for Crossing: Crossing 2

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 30.00 ft

Crest Elevation: 128.00 ft

Roadway Surface: Paved

Roadway Top Width: 15.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 10 cfs

Design Flow: 14.3 cfs

Maximum Flow: 18 cfs

Table 7 - Summary of Culvert Flows at Crossing: Crossing 3

| Headwater Elevation (ft) | Total Discharge (cfs) | 119+15Lt Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|-----------------------------|-----------------------|-----------------------------|----------------------------|-------------|
| 109.70 | 10.00 | 10.00 | 0.00 | 1 |
| 109.81 | 10.80 | 10.80 | 0.00 | 1 |
| 109.91 | 11.60 | 11.60 | 0.00 | 1 |
| 110.02 | 12.40 | 12.40 | 0.00 | 1 |
| 110.13 | 13.20 | 13.20 | 0.00 | 1 |
| 110.25 | 14.00 | 14.00 | 0.00 | 1 |
| 110.30 | 14.30 | 14.30 | 0.00 | 1 |
| 110.50 | 15.60 | 15.60 | 0.00 | 1 |
| 110.63 | 16.40 | 16.40 | 0.00 | 1 |
| 110.78 | 17.20 | 17.20 | 0.00 | 1 |
| 110.92 | 18.00 | 18.00 | 0.00 | 1 |
| 111.00 | 18.41 | 18.41 | 0.00 | Overtopping |

Rating Curve Plot for Crossing: Crossing 3

Total Rating Curve

Crossing: Crossing 3

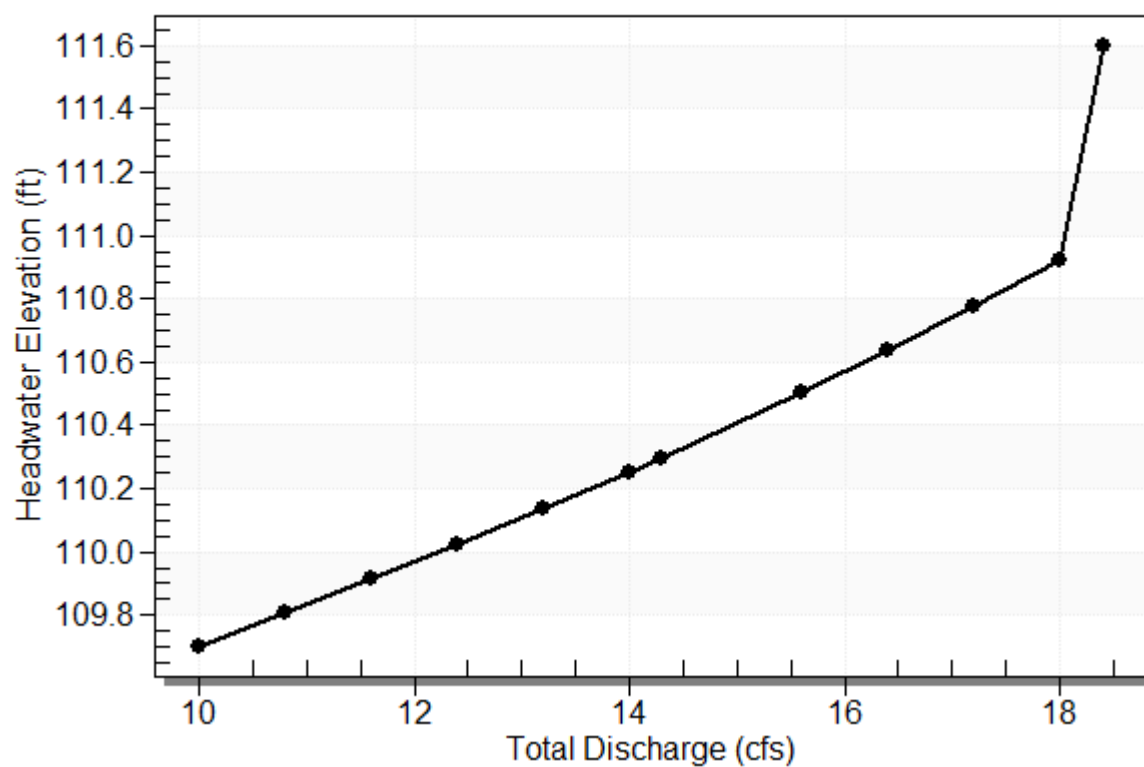
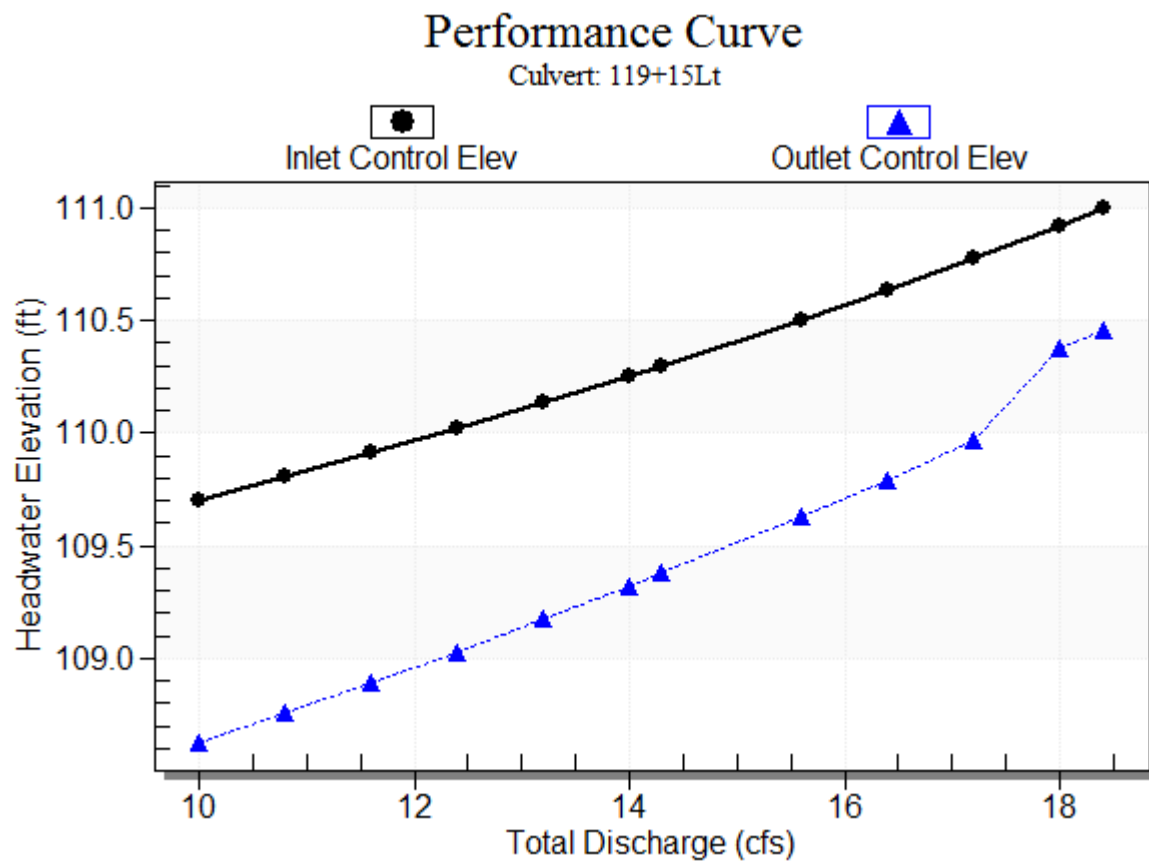


Table 8 - Culvert Summary Table: 119+15Lt

| Total Discharge (cfs) | Culvert Discharge (cfs) | Headwater Elevation (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tailwater Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|-----------------------|-------------------------|--------------------------|--------------------------|---------------------------|-----------|-------------------|---------------------|-------------------|----------------------|------------------------|---------------------------|
| 10.00 | 10.00 | 109.70 | 1.803 | 0.724 | 1-S2n | 0.876 | 1.126 | 0.960 | 0.544 | 5.942 | 3.973 |
| 10.80 | 10.80 | 109.81 | 1.907 | 0.855 | 1-S2n | 0.917 | 1.175 | 1.013 | 0.566 | 6.009 | 4.062 |
| 11.60 | 11.60 | 109.91 | 2.012 | 0.988 | 5-S2n | 0.957 | 1.218 | 1.058 | 0.588 | 6.119 | 4.145 |
| 12.40 | 12.40 | 110.02 | 2.121 | 1.129 | 5-S2n | 0.997 | 1.264 | 1.100 | 0.608 | 6.238 | 4.224 |
| 13.20 | 13.20 | 110.13 | 2.234 | 1.272 | 5-S2n | 1.037 | 1.305 | 1.146 | 0.628 | 6.334 | 4.299 |
| 14.00 | 14.00 | 110.25 | 2.351 | 1.420 | 5-S2n | 1.077 | 1.344 | 1.187 | 0.648 | 6.456 | 4.371 |
| 14.30 | 14.30 | 110.30 | 2.396 | 1.476 | 5-S2n | 1.092 | 1.359 | 1.205 | 0.655 | 6.479 | 4.397 |
| 15.60 | 15.60 | 110.50 | 2.601 | 1.730 | 5-S2n | 1.159 | 1.419 | 1.276 | 0.685 | 6.621 | 4.506 |
| 16.40 | 16.40 | 110.63 | 2.735 | 1.893 | 5-S2n | 1.200 | 1.455 | 1.321 | 0.703 | 6.695 | 4.569 |
| 17.20 | 17.20 | 110.78 | 2.875 | 2.065 | 5-S2n | 1.241 | 1.493 | 1.366 | 0.720 | 6.809 | 4.630 |
| 18.00 | 18.00 | 110.92 | 3.022 | 2.476 | 5-S2n | 1.285 | 1.526 | 1.409 | 0.737 | 6.901 | 4.688 |

Straight Culvert
Inlet Elevation (invert): 107.90 ft, Outlet Elevation (invert): 107.00 ft
Culvert Length: 30.01 ft, Culvert Slope: 0.0300

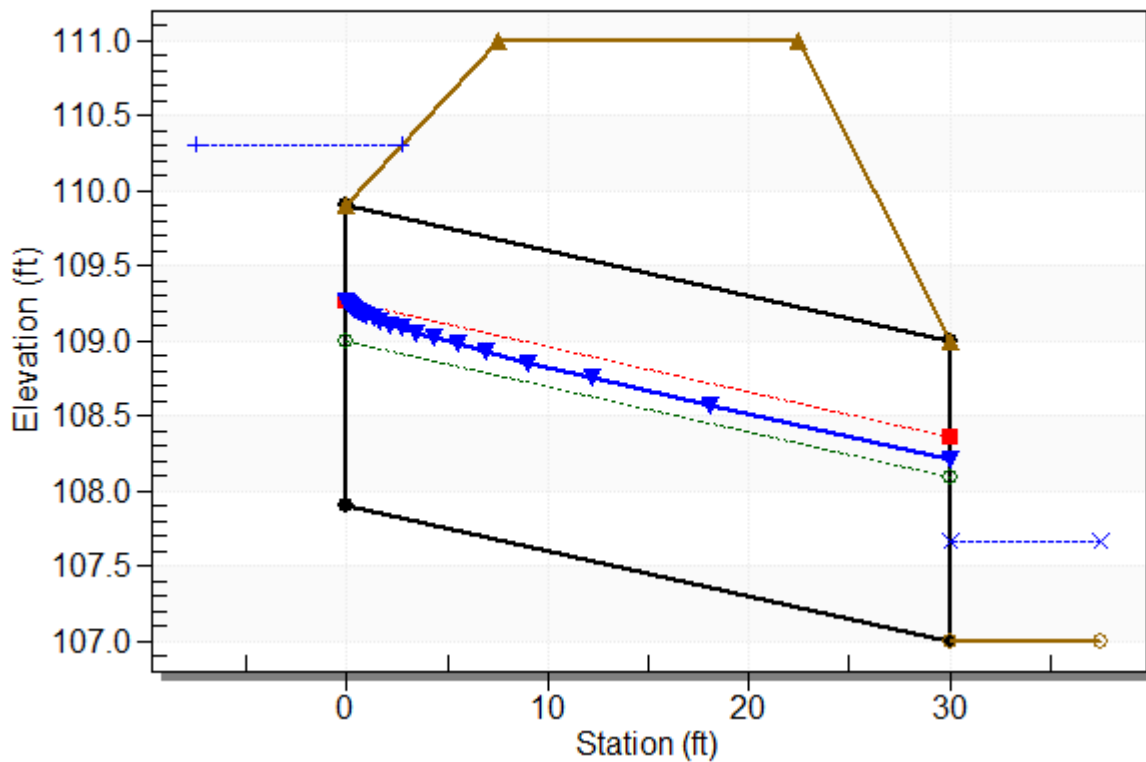
Culvert Performance Curve Plot: 119+15Lt



Water Surface Profile Plot for Culvert: 119+15Lt

Crossing - Crossing 3, Design Discharge - 14.3 cfs

Culvert - 119+15Lt, Culvert Discharge - 14.3 cfs



Site Data - 119+15Lt

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 107.90 ft

Outlet Station: 30.00 ft

Outlet Elevation: 107.00 ft

Number of Barrels: 1

Culvert Data Summary - 119+15Lt

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Corrugated Steel

Embedment: 0.00 in

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: NONE

Table 9 - Downstream Channel Rating Curve (Crossing: Crossing 3)

| Flow (cfs) | Water Surface Elev (ft) | Depth (ft) | Velocity (ft/s) | Shear (psf) | Froude Number |
|------------|-------------------------|------------|-----------------|-------------|---------------|
| 10.00 | 107.54 | 0.54 | 3.97 | 1.36 | 1.10 |
| 10.80 | 107.57 | 0.57 | 4.06 | 1.41 | 1.11 |
| 11.60 | 107.59 | 0.59 | 4.15 | 1.47 | 1.12 |
| 12.40 | 107.61 | 0.61 | 4.22 | 1.52 | 1.12 |
| 13.20 | 107.63 | 0.63 | 4.30 | 1.57 | 1.13 |
| 14.00 | 107.65 | 0.65 | 4.37 | 1.62 | 1.13 |
| 14.30 | 107.66 | 0.66 | 4.40 | 1.63 | 1.13 |
| 15.60 | 107.68 | 0.68 | 4.51 | 1.71 | 1.14 |
| 16.40 | 107.70 | 0.70 | 4.57 | 1.75 | 1.14 |
| 17.20 | 107.72 | 0.72 | 4.63 | 1.80 | 1.15 |
| 18.00 | 107.74 | 0.74 | 4.69 | 1.84 | 1.15 |

Tailwater Channel Data - Crossing 3

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 3.00 ft

Side Slope (H:V): 3.00 (1:1)

Channel Slope: 0.0400

Channel Manning's n: 0.0400

Channel Invert Elevation: 107.00 ft

Roadway Data for Crossing: Crossing 3

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 25.00 ft

Crest Elevation: 111.00 ft

Roadway Surface: Paved

Roadway Top Width: 15.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 14 cfs

Design Flow: 41 cfs

Maximum Flow: 50 cfs

Table 10 - Summary of Culvert Flows at Crossing: Crossing 4

| Headwater Elevation (ft) | Total Discharge (cfs) | 115+00Lt Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|-----------------------------|-----------------------|-----------------------------|----------------------------|-------------|
| 82.53 | 14.00 | 14.00 | 0.00 | 1 |
| 82.73 | 17.60 | 17.60 | 0.00 | 1 |
| 82.94 | 21.20 | 21.20 | 0.00 | 1 |
| 83.13 | 24.80 | 24.80 | 0.00 | 1 |
| 83.30 | 28.40 | 28.40 | 0.00 | 1 |
| 83.47 | 32.00 | 32.00 | 0.00 | 1 |
| 83.63 | 35.60 | 35.60 | 0.00 | 1 |
| 83.78 | 39.20 | 39.20 | 0.00 | 1 |
| 83.85 | 41.00 | 41.00 | 0.00 | 1 |
| 84.07 | 46.40 | 46.40 | 0.00 | 1 |
| 84.21 | 50.00 | 50.00 | 0.00 | 1 |
| 88.00 | 116.13 | 116.13 | 0.00 | Overtopping |

Rating Curve Plot for Crossing: Crossing 4

Total Rating Curve

Crossing: Crossing 4

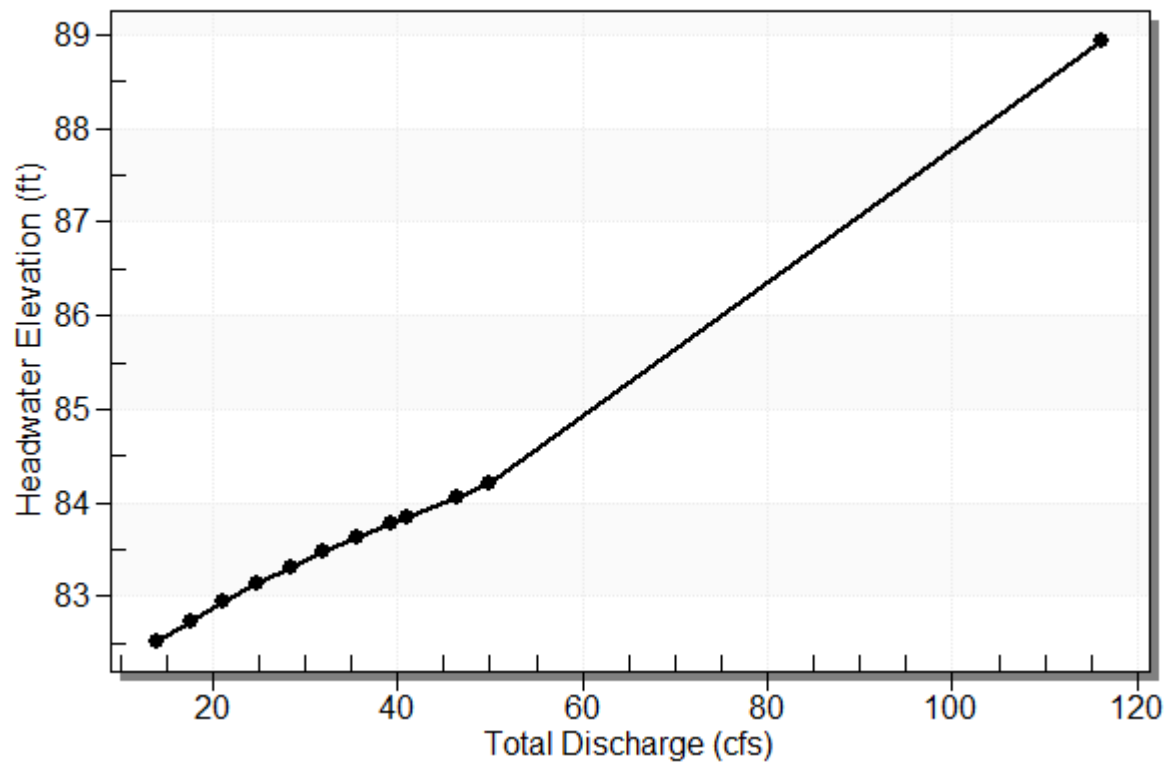
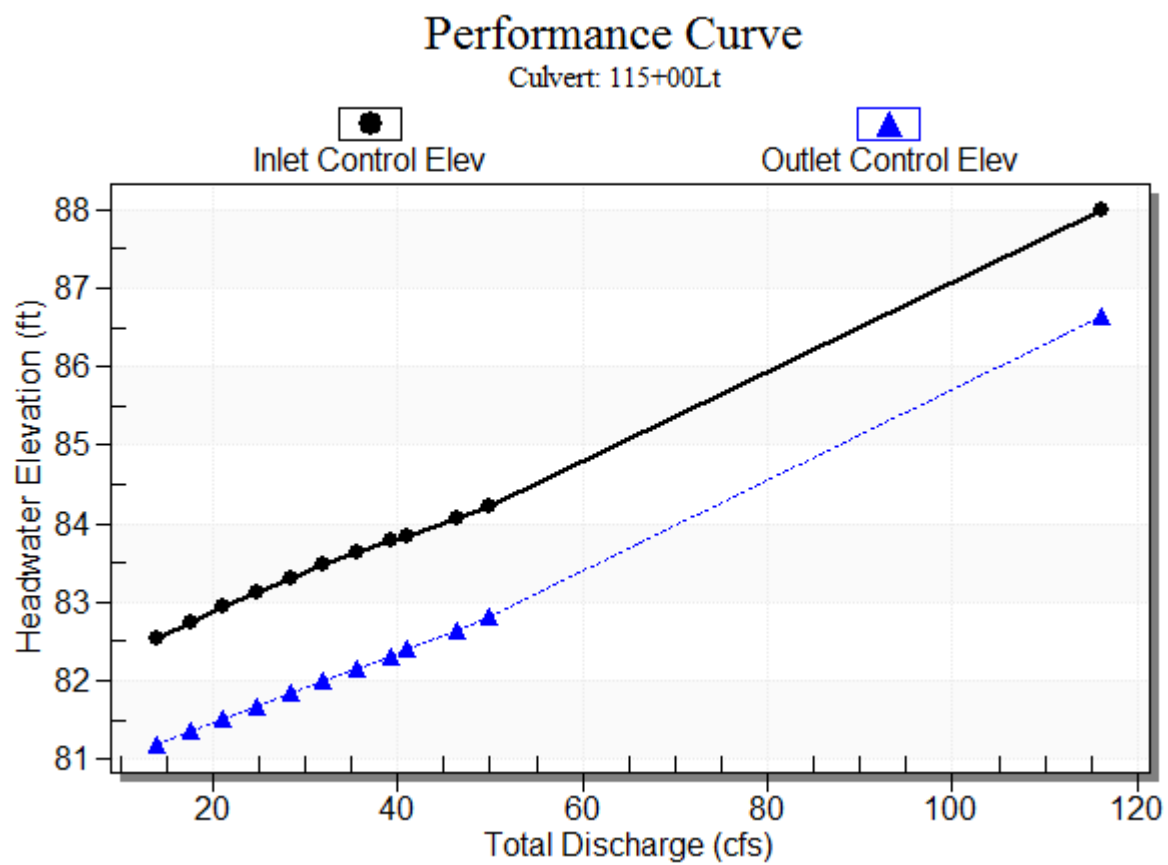


Table 11 - Culvert Summary Table: 115+00Lt

| Total Discharge (cfs) | Culvert Discharge (cfs) | Headwater Elevation (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tailwater Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|-----------------------|-------------------------|--------------------------|--------------------------|---------------------------|-----------|-------------------|---------------------|-------------------|----------------------|------------------------|---------------------------|
| 14.00 | 14.00 | 82.53 | 1.527 | 0.182 | 1-S2n | 0.645 | 1.134 | 0.768 | 0.529 | 7.752 | 5.233 |
| 17.60 | 17.60 | 82.73 | 1.731 | 0.351 | 1-S2n | 0.714 | 1.276 | 0.873 | 0.602 | 8.163 | 5.620 |
| 21.20 | 21.20 | 82.94 | 1.937 | 0.518 | 1-S2n | 0.782 | 1.409 | 0.970 | 0.668 | 8.548 | 5.951 |
| 24.80 | 24.80 | 83.13 | 2.128 | 0.680 | 1-S2n | 0.851 | 1.530 | 1.062 | 0.728 | 8.786 | 6.242 |
| 28.40 | 28.40 | 83.30 | 2.304 | 0.841 | 1-S2n | 0.919 | 1.645 | 1.145 | 0.785 | 9.086 | 6.499 |
| 32.00 | 32.00 | 83.47 | 2.469 | 0.999 | 1-S2n | 0.980 | 1.750 | 1.230 | 0.837 | 9.310 | 6.734 |
| 35.60 | 35.60 | 83.63 | 2.626 | 1.156 | 1-S2n | 1.033 | 1.848 | 1.308 | 0.887 | 9.567 | 6.947 |
| 39.20 | 39.20 | 83.78 | 2.776 | 1.317 | 1-S2n | 1.085 | 1.944 | 1.384 | 0.935 | 9.754 | 7.145 |
| 41.00 | 41.00 | 83.85 | 2.849 | 1.398 | 1-S2n | 1.111 | 1.989 | 1.422 | 0.958 | 9.849 | 7.238 |
| 46.40 | 46.40 | 84.07 | 3.065 | 1.646 | 1-S2n | 1.190 | 2.123 | 1.528 | 1.023 | 10.152 | 7.501 |
| 50.00 | 50.00 | 84.21 | 3.208 | 1.814 | 1-S2n | 1.243 | 2.206 | 1.598 | 1.065 | 10.334 | 7.661 |

Straight Culvert
Inlet Elevation (invert): 81.00 ft, Outlet Elevation (invert): 80.00 ft
Culvert Length: 50.01 ft, Culvert Slope: 0.0200

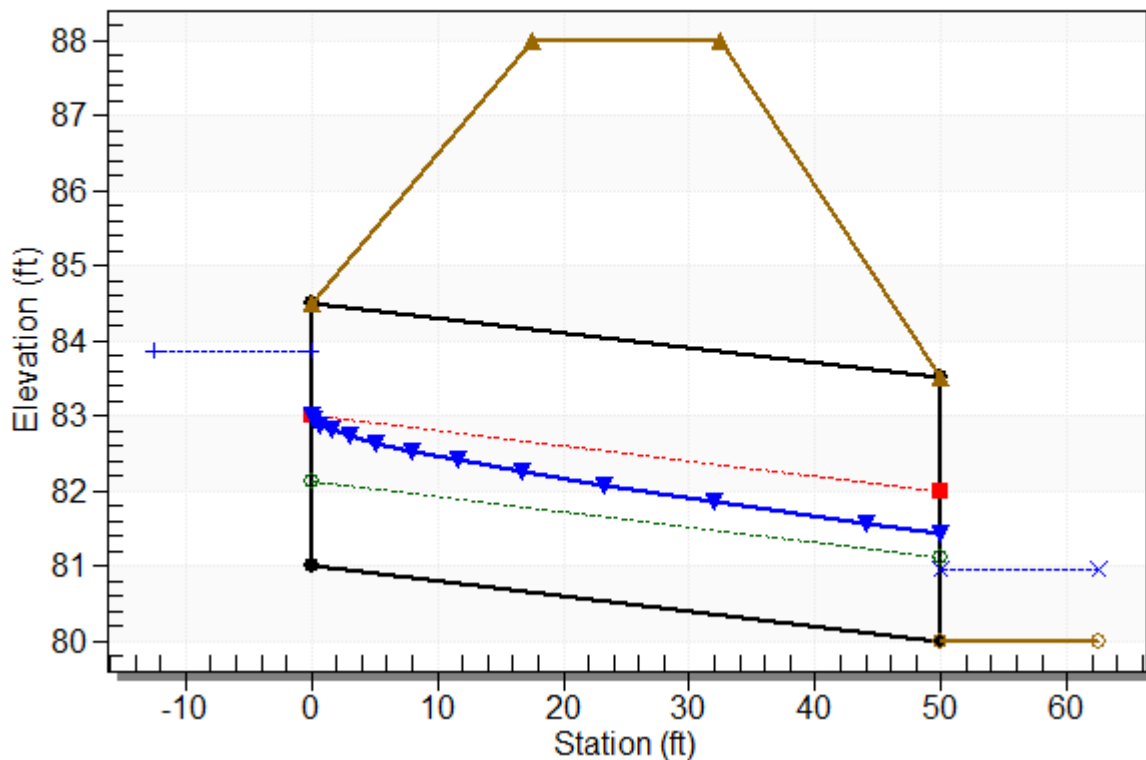
Culvert Performance Curve Plot: 115+00Lt



Water Surface Profile Plot for Culvert: 115+00Lt

Crossing - Crossing 4, Design Discharge - 41.0 cfs

Culvert - 115+00Lt, Culvert Discharge - 41.0 cfs



Site Data - 115+00Lt

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 81.00 ft

Outlet Station: 50.00 ft

Outlet Elevation: 80.00 ft

Number of Barrels: 1

Culvert Data Summary - 115+00Lt

Barrel Shape: Circular

Barrel Diameter: 3.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: NONE

Table 12 - Downstream Channel Rating Curve (Crossing: Crossing 4)

| Flow (cfs) | Water Surface Elev (ft) | Depth (ft) | Velocity (ft/s) | Shear (psf) | Froude Number |
|------------|-------------------------|------------|-----------------|-------------|---------------|
| 14.00 | 80.53 | 0.53 | 5.23 | 2.08 | 1.39 |
| 17.60 | 80.60 | 0.60 | 5.62 | 2.37 | 1.42 |
| 21.20 | 80.67 | 0.67 | 5.95 | 2.62 | 1.44 |
| 24.80 | 80.73 | 0.73 | 6.24 | 2.86 | 1.45 |
| 28.40 | 80.78 | 0.78 | 6.50 | 3.08 | 1.46 |
| 32.00 | 80.84 | 0.84 | 6.73 | 3.29 | 1.48 |
| 35.60 | 80.89 | 0.89 | 6.95 | 3.49 | 1.49 |
| 39.20 | 80.93 | 0.93 | 7.14 | 3.67 | 1.50 |
| 41.00 | 80.96 | 0.96 | 7.24 | 3.76 | 1.50 |
| 46.40 | 81.02 | 1.02 | 7.50 | 4.02 | 1.51 |
| 50.00 | 81.06 | 1.06 | 7.66 | 4.19 | 1.52 |

Tailwater Channel Data - Crossing 4

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 4.00 ft

Side Slope (H:V): 2.00 (2:1)

Channel Slope: 0.0630

Channel Manning's n: 0.0400

Channel Invert Elevation: 80.00 ft

Roadway Data for Crossing: Crossing 4

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 40.00 ft

Crest Elevation: 88.00 ft

Roadway Surface: Paved

Roadway Top Width: 15.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 12 cfs

Design Flow: 16 cfs

Maximum Flow: 20 cfs

Table 13 - Summary of Culvert Flows at Crossing: Crossing 5

| Headwater Elevation (ft) | Total Discharge (cfs) | 95+40Lt Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|-----------------------------|-----------------------|----------------------------|----------------------------|-------------|
| 186.64 | 12.00 | 12.00 | 0.00 | 1 |
| 186.70 | 12.80 | 12.80 | 0.00 | 1 |
| 186.76 | 13.60 | 13.60 | 0.00 | 1 |
| 186.82 | 14.40 | 14.40 | 0.00 | 1 |
| 186.88 | 15.20 | 15.20 | 0.00 | 1 |
| 186.93 | 16.00 | 16.00 | 0.00 | 1 |
| 186.99 | 16.80 | 16.80 | 0.00 | 1 |
| 187.04 | 17.60 | 17.60 | 0.00 | 1 |
| 187.10 | 18.40 | 18.40 | 0.00 | 1 |
| 187.15 | 19.20 | 19.20 | 0.00 | 1 |
| 187.20 | 20.00 | 20.00 | 0.00 | 1 |
| 189.00 | 41.79 | 41.79 | 0.00 | Overtopping |

Rating Curve Plot for Crossing: Crossing 5

Total Rating Curve

Crossing: Crossing 5

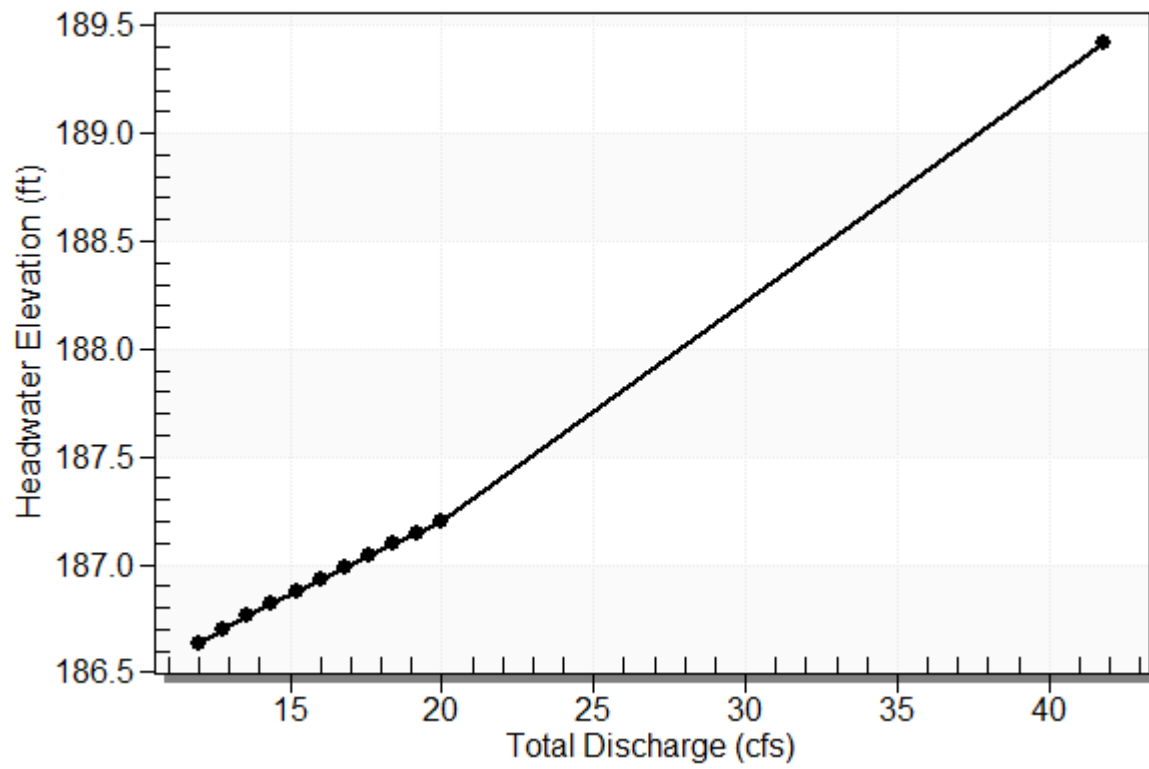


Table 14 - Culvert Summary Table: 95+40Lt

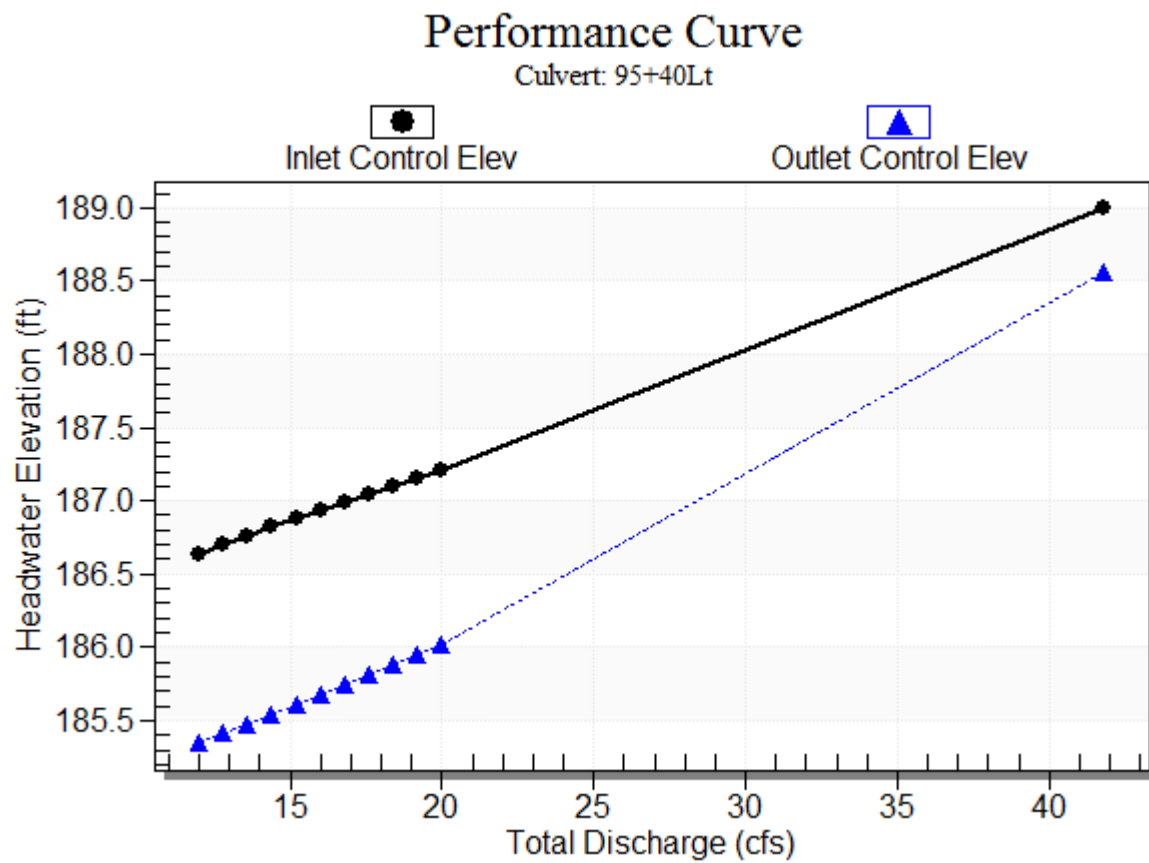
| Total Discharge (cfs) | Culvert Discharge (cfs) | Headwater Elevation (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tailwater Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|-----------------------|-------------------------|--------------------------|--------------------------|---------------------------|-----------|-------------------|---------------------|-------------------|----------------------|------------------------|---------------------------|
| 12.00 | 12.00 | 186.64 | 1.639 | 0.346 | 1-S2n | 0.800 | 1.162 | 0.898 | 0.453 | 6.649 | 5.402 |
| 12.80 | 12.80 | 186.70 | 1.701 | 0.411 | 1-S2n | 0.829 | 1.202 | 0.930 | 0.470 | 6.774 | 5.516 |
| 13.60 | 13.60 | 186.76 | 1.762 | 0.477 | 1-S2n | 0.858 | 1.241 | 0.962 | 0.486 | 6.871 | 5.624 |
| 14.40 | 14.40 | 186.82 | 1.820 | 0.542 | 1-S2n | 0.887 | 1.278 | 0.992 | 0.502 | 6.990 | 5.727 |
| 15.20 | 15.20 | 186.88 | 1.877 | 0.608 | 1-S2n | 0.915 | 1.313 | 1.024 | 0.518 | 7.079 | 5.827 |
| 16.00 | 16.00 | 186.93 | 1.933 | 0.675 | 1-S2n | 0.940 | 1.348 | 1.054 | 0.533 | 7.175 | 5.921 |
| 16.80 | 16.80 | 186.99 | 1.988 | 0.741 | 1-S2n | 0.965 | 1.381 | 1.084 | 0.548 | 7.267 | 6.014 |
| 17.60 | 17.60 | 187.04 | 2.042 | 0.813 | 1-S2n | 0.990 | 1.417 | 1.112 | 0.563 | 7.372 | 6.103 |
| 18.40 | 18.40 | 187.10 | 2.096 | 0.882 | 1-S2n | 1.015 | 1.450 | 1.141 | 0.577 | 7.460 | 6.187 |
| 19.20 | 19.20 | 187.15 | 2.149 | 0.952 | 1-S2n | 1.040 | 1.482 | 1.170 | 0.591 | 7.543 | 6.270 |
| 20.00 | 20.00 | 187.20 | 2.201 | 1.023 | 1-S2n | 1.066 | 1.513 | 1.198 | 0.605 | 7.626 | 6.351 |

Straight Culvert

Inlet Elevation (invert): 185.00 ft, Outlet Elevation (invert): 184.00 ft

Culvert Length: 100.00 ft, Culvert Slope: 0.0100

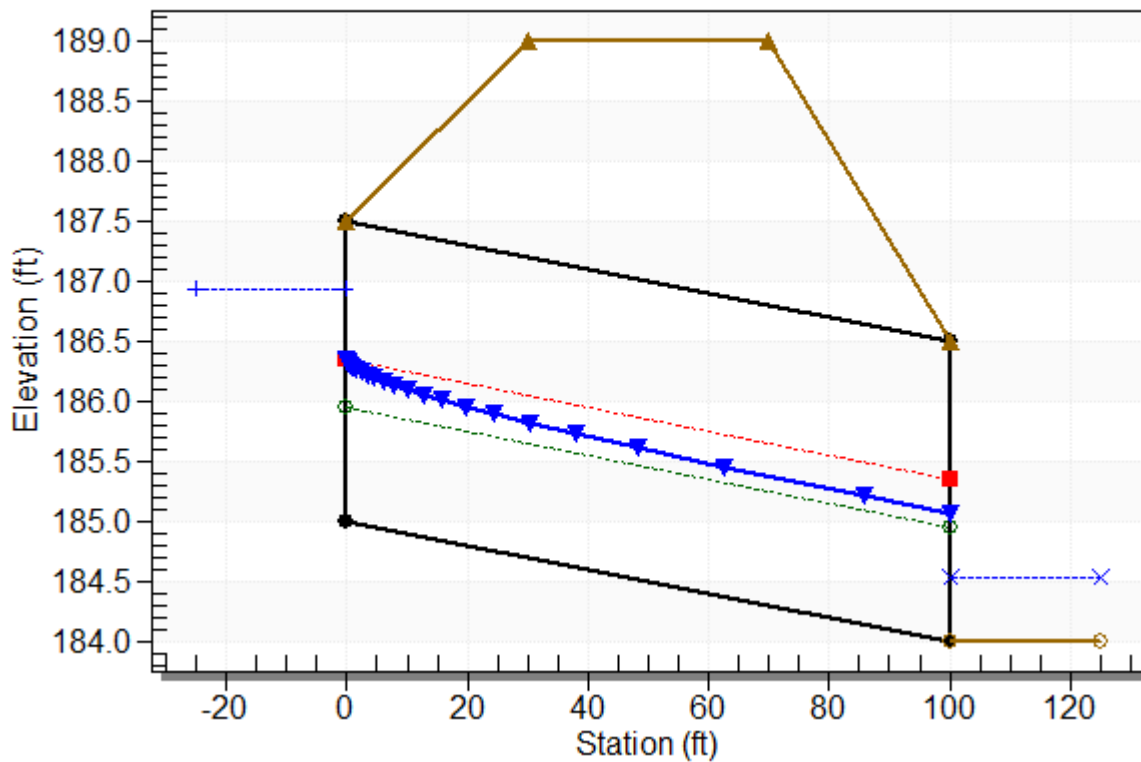
Culvert Performance Curve Plot: 95+40Lt



Water Surface Profile Plot for Culvert: 95+40Lt

Crossing - Crossing 5, Design Discharge - 16.0 cfs

Culvert - 95+40Lt, Culvert Discharge - 16.0 cfs



Site Data - 95+40Lt

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 185.00 ft

Outlet Station: 100.00 ft

Outlet Elevation: 184.00 ft

Number of Barrels: 1

Culvert Data Summary - 95+40Lt

Barrel Shape: Circular

Barrel Diameter: 2.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: NONE

Table 15 - Downstream Channel Rating Curve (Crossing: Crossing 5)

| Flow (cfs) | Water Surface Elev (ft) | Depth (ft) | Velocity (ft/s) | Shear (psf) | Froude Number |
|------------|-------------------------|------------|-----------------|-------------|---------------|
| 12.00 | 184.45 | 0.45 | 5.40 | 2.26 | 1.54 |
| 12.80 | 184.47 | 0.47 | 5.52 | 2.35 | 1.55 |
| 13.60 | 184.49 | 0.49 | 5.62 | 2.43 | 1.55 |
| 14.40 | 184.50 | 0.50 | 5.73 | 2.51 | 1.56 |
| 15.20 | 184.52 | 0.52 | 5.83 | 2.59 | 1.57 |
| 16.00 | 184.53 | 0.53 | 5.92 | 2.66 | 1.57 |
| 16.80 | 184.55 | 0.55 | 6.01 | 2.74 | 1.58 |
| 17.60 | 184.56 | 0.56 | 6.10 | 2.81 | 1.58 |
| 18.40 | 184.58 | 0.58 | 6.19 | 2.88 | 1.59 |
| 19.20 | 184.59 | 0.59 | 6.27 | 2.95 | 1.59 |
| 20.00 | 184.60 | 0.60 | 6.35 | 3.02 | 1.60 |

Tailwater Channel Data - Crossing 5

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 4.00 ft

Side Slope (H:V): 2.00 (2:1)

Channel Slope: 0.0800

Channel Manning's n: 0.0400

Channel Invert Elevation: 184.00 ft

Roadway Data for Crossing: Crossing 5

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 50.00 ft

Crest Elevation: 189.00 ft

Roadway Surface: Paved

Roadway Top Width: 40.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 13 cfs

Design Flow: 16.1 cfs

Maximum Flow: 20 cfs

Table 16 - Summary of Culvert Flows at Crossing: Crossing 6

| Headwater Elevation (ft) | Total Discharge (cfs) | 103+15Rt Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|-----------------------------|-----------------------|-----------------------------|----------------------------|-------------|
| 130.86 | 13.00 | 13.00 | 0.00 | 1 |
| 130.93 | 13.70 | 13.70 | 0.00 | 1 |
| 130.99 | 14.40 | 14.40 | 0.00 | 1 |
| 131.05 | 15.10 | 15.10 | 0.00 | 1 |
| 131.12 | 15.80 | 15.80 | 0.00 | 1 |
| 131.14 | 16.10 | 16.10 | 0.00 | 1 |
| 131.24 | 17.20 | 17.20 | 0.00 | 1 |
| 131.31 | 17.90 | 17.90 | 0.00 | 1 |
| 131.37 | 18.60 | 18.60 | 0.00 | 1 |
| 131.44 | 19.30 | 19.30 | 0.00 | 1 |
| 131.50 | 20.00 | 20.00 | 0.00 | 1 |
| 133.00 | 32.96 | 32.96 | 0.00 | Overtopping |

Rating Curve Plot for Crossing: Crossing 6

Total Rating Curve

Crossing: Crossing 6

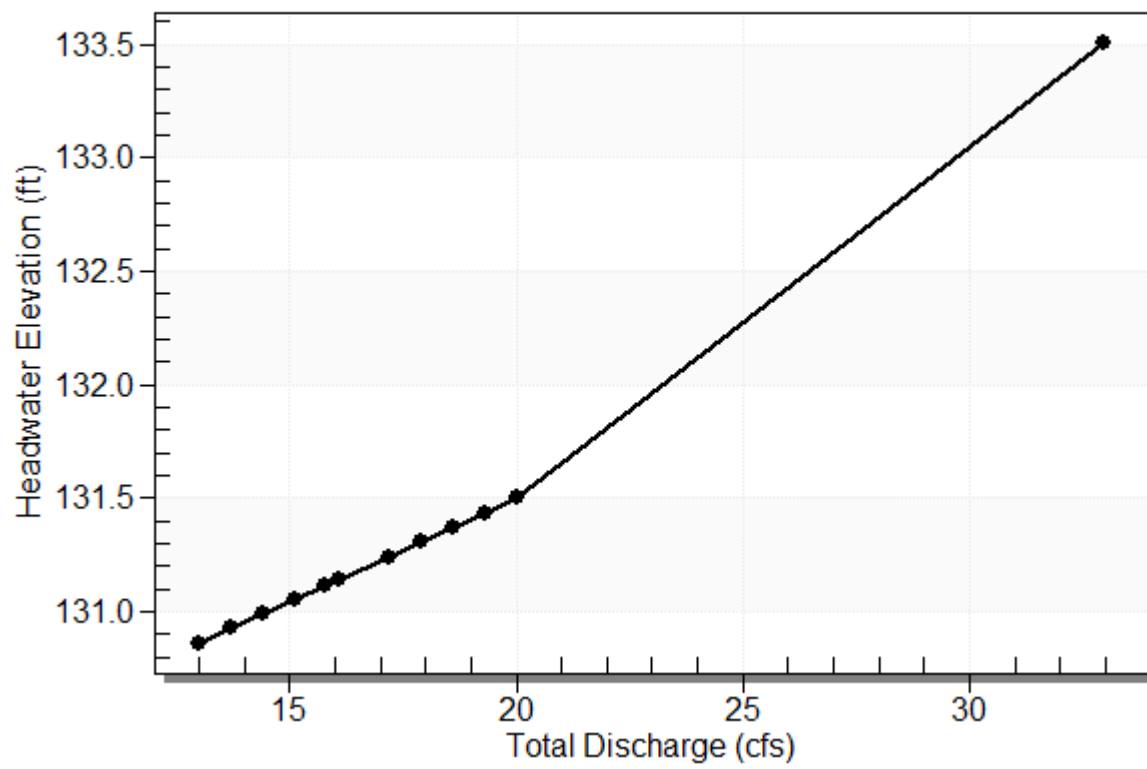


Table 17 - Culvert Summary Table: 103+15Rt

| Total Discharge (cfs) | Culvert Discharge (cfs) | Headwater Elevation (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tailwater Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|-----------------------|-------------------------|--------------------------|--------------------------|---------------------------|-----------|-------------------|---------------------|-------------------|----------------------|------------------------|---------------------------|
| 13.00 | 13.00 | 130.86 | 1.863 | 0.0* | 1-S2n | 1.015 | 1.212 | 1.015 | 0.547 | 6.124 | 5.808 |
| 13.70 | 13.70 | 130.93 | 1.926 | 0.0* | 1-S2n | 1.046 | 1.245 | 1.046 | 0.563 | 6.206 | 5.901 |
| 14.40 | 14.40 | 130.99 | 1.989 | 0.0* | 1-S2n | 1.077 | 1.278 | 1.182 | 0.578 | 5.581 | 5.990 |
| 15.10 | 15.10 | 131.05 | 2.052 | 0.047 | 1-S2n | 1.108 | 1.309 | 1.159 | 0.594 | 6.002 | 6.076 |
| 15.80 | 15.80 | 131.12 | 2.115 | 0.148 | 1-S2n | 1.139 | 1.339 | 1.244 | 0.608 | 5.749 | 6.158 |
| 16.10 | 16.10 | 131.14 | 2.142 | 0.191 | 1-S2n | 1.151 | 1.352 | 1.202 | 0.615 | 6.114 | 6.191 |
| 17.20 | 17.20 | 131.24 | 2.242 | 0.355 | 1-S2n | 1.198 | 1.397 | 1.318 | 0.637 | 5.828 | 6.313 |
| 17.90 | 17.90 | 131.31 | 2.306 | 0.467 | 1-S2n | 1.227 | 1.430 | 1.346 | 0.651 | 5.915 | 6.387 |
| 18.60 | 18.60 | 131.37 | 2.371 | 0.579 | 1-S2n | 1.256 | 1.458 | 1.380 | 0.665 | 5.963 | 6.459 |
| 19.30 | 19.30 | 131.44 | 2.436 | 0.692 | 1-S2n | 1.286 | 1.485 | 1.412 | 0.678 | 6.016 | 6.530 |
| 20.00 | 20.00 | 131.50 | 2.503 | 0.808 | 5-S2n | 1.315 | 1.513 | 1.444 | 0.692 | 6.086 | 6.598 |

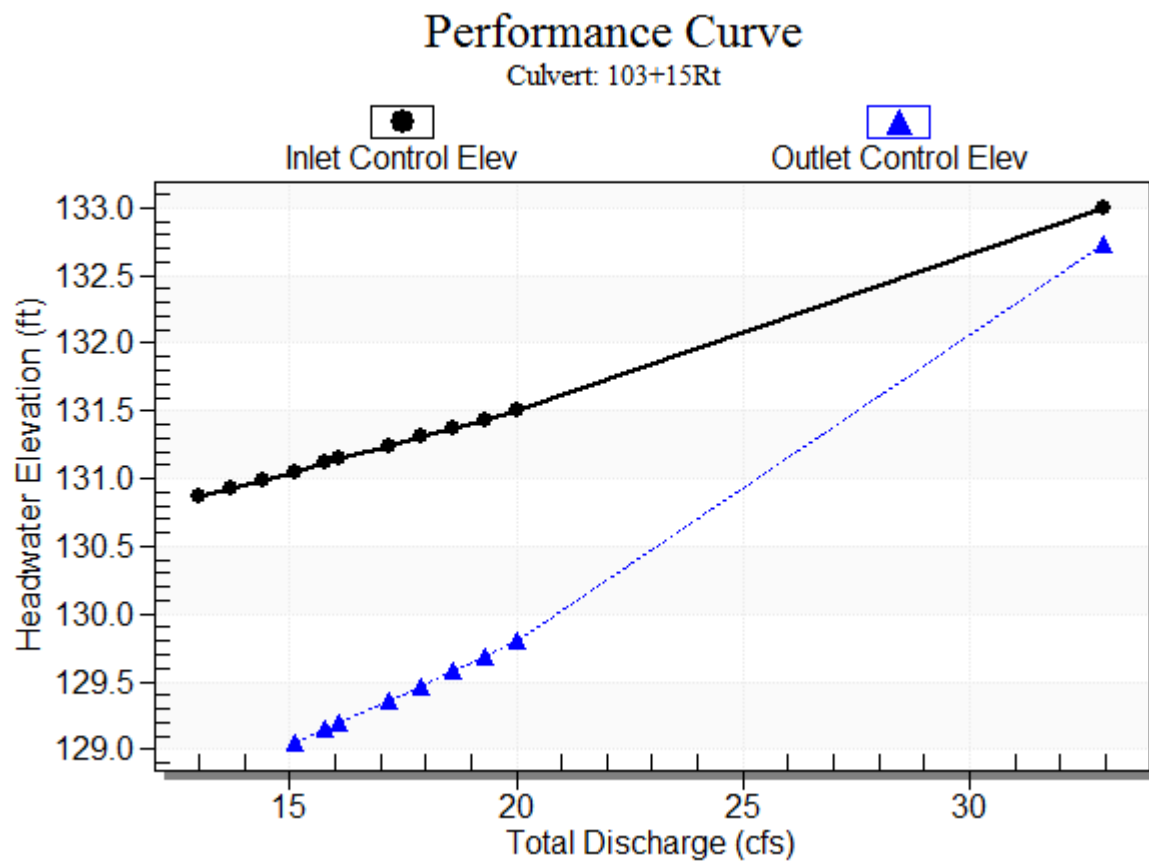
* Full Flow Headwater elevation is below inlet invert.

Straight Culvert

Inlet Elevation (invert): 129.00 ft, Outlet Elevation (invert): 127.00 ft

Culvert Length: 100.02 ft, Culvert Slope: 0.0200

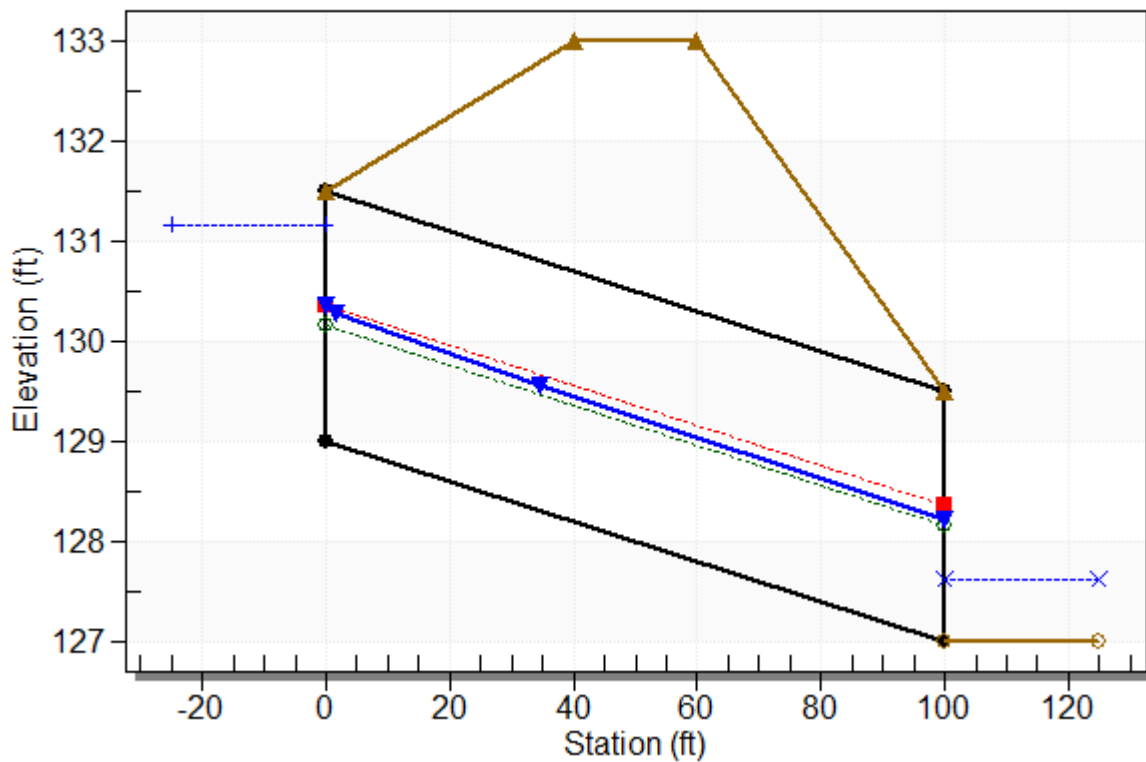
Culvert Performance Curve Plot: 103+15Rt



Water Surface Profile Plot for Culvert: 103+15Rt

Crossing - Crossing 6, Design Discharge - 16.1 cfs

Culvert - 103+15Rt, Culvert Discharge - 16.1 cfs



Site Data - 103+15Rt

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 129.00 ft

Outlet Station: 100.00 ft

Outlet Elevation: 127.00 ft

Number of Barrels: 1

Culvert Data Summary - 103+15Rt

Barrel Shape: Circular

Barrel Diameter: 2.50 ft

Barrel Material: Corrugated Steel

Embedment: 0.00 in

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: NONE

Table 18 - Downstream Channel Rating Curve (Crossing: Crossing 6)

| Flow (cfs) | Water Surface Elev (ft) | Depth (ft) | Velocity (ft/s) | Shear (psf) | Froude Number |
|------------|-------------------------|------------|-----------------|-------------|---------------|
| 13.00 | 127.55 | 0.55 | 5.81 | 2.73 | 1.56 |
| 13.70 | 127.56 | 0.56 | 5.90 | 2.81 | 1.56 |
| 14.40 | 127.58 | 0.58 | 5.99 | 2.89 | 1.57 |
| 15.10 | 127.59 | 0.59 | 6.08 | 2.96 | 1.57 |
| 15.80 | 127.61 | 0.61 | 6.16 | 3.04 | 1.58 |
| 16.10 | 127.61 | 0.61 | 6.19 | 3.07 | 1.58 |
| 17.20 | 127.64 | 0.64 | 6.31 | 3.18 | 1.59 |
| 17.90 | 127.65 | 0.65 | 6.39 | 3.25 | 1.59 |
| 18.60 | 127.67 | 0.67 | 6.46 | 3.32 | 1.60 |
| 19.30 | 127.68 | 0.68 | 6.53 | 3.39 | 1.60 |
| 20.00 | 127.69 | 0.69 | 6.60 | 3.45 | 1.60 |

Tailwater Channel Data - Crossing 6

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 3.00 ft

Side Slope (H:V): 2.00 (2:1)

Channel Slope: 0.0800

Channel Manning's n: 0.0400

Channel Invert Elevation: 127.00 ft

Roadway Data for Crossing: Crossing 6

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 50.00 ft

Crest Elevation: 133.00 ft

Roadway Surface: Paved

Roadway Top Width: 20.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 5 cfs

Design Flow: 7.4 cfs

Maximum Flow: 12 cfs

Table 19 - Summary of Culvert Flows at Crossing: Crossing 7

| Headwater Elevation (ft) | Total Discharge (cfs) | 103+00Lt Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|-----------------------------|-----------------------|-----------------------------|----------------------------|-------------|
| 135.14 | 5.00 | 5.00 | 0.00 | 1 |
| 135.24 | 5.70 | 5.70 | 0.00 | 1 |
| 135.33 | 6.40 | 6.40 | 0.00 | 1 |
| 135.42 | 7.10 | 7.10 | 0.00 | 1 |
| 135.45 | 7.40 | 7.40 | 0.00 | 1 |
| 135.59 | 8.50 | 8.50 | 0.00 | 1 |
| 135.68 | 9.20 | 9.20 | 0.00 | 1 |
| 135.77 | 9.90 | 9.90 | 0.00 | 1 |
| 135.86 | 10.60 | 10.60 | 0.00 | 1 |
| 135.95 | 11.30 | 11.30 | 0.00 | 1 |
| 136.05 | 12.00 | 12.00 | 0.00 | 1 |
| 137.00 | 17.99 | 17.99 | 0.00 | Overtopping |

Rating Curve Plot for Crossing: Crossing 7

Total Rating Curve

Crossing: Crossing 7

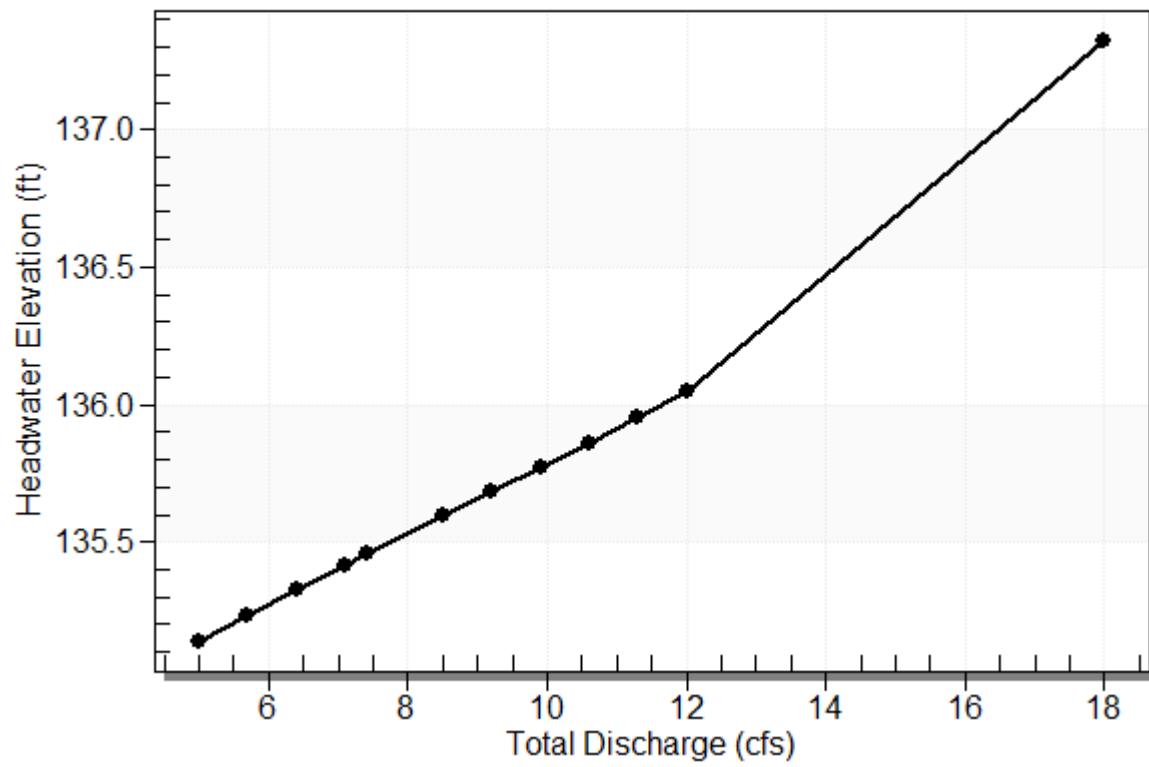


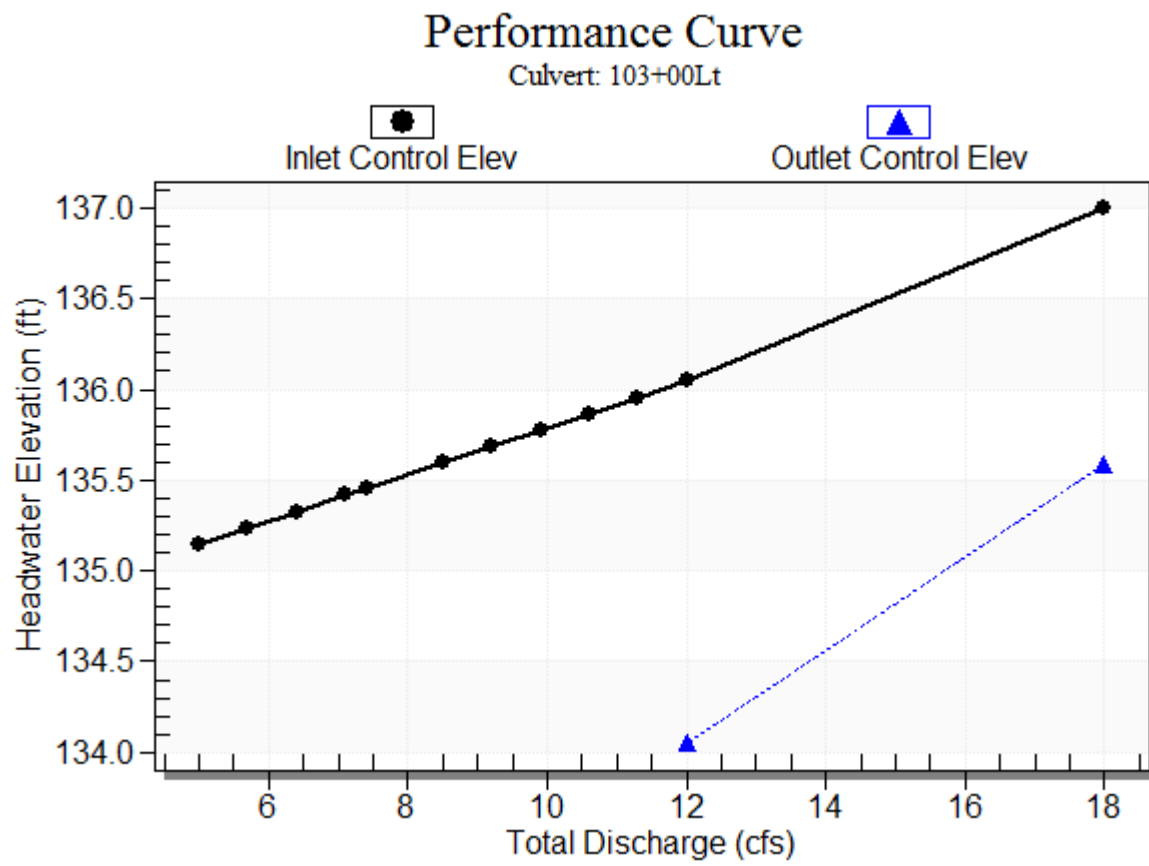
Table 20 - Culvert Summary Table: 103+00Lt

| Total Discharge (cfs) | Culvert Discharge (cfs) | Headwater Elevation (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tailwater Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|-----------------------|-------------------------|--------------------------|--------------------------|---------------------------|-----------|-------------------|---------------------|-------------------|----------------------|------------------------|---------------------------|
| 5.00 | 5.00 | 135.14 | 1.141 | 0.0* | 1-S2n | 0.522 | 0.783 | 0.522 | 0.281 | 6.676 | 6.933 |
| 5.70 | 5.70 | 135.24 | 1.235 | 0.0* | 1-S2n | 0.561 | 0.841 | 0.561 | 0.303 | 6.939 | 7.219 |
| 6.40 | 6.40 | 135.33 | 1.327 | 0.0* | 1-S2n | 0.593 | 0.896 | 0.658 | 0.323 | 6.224 | 7.484 |
| 7.10 | 7.10 | 135.42 | 1.417 | 0.0* | 1-S2n | 0.626 | 0.946 | 0.626 | 0.342 | 7.380 | 7.725 |
| 7.40 | 7.40 | 135.45 | 1.455 | 0.0* | 1-S2n | 0.640 | 0.967 | 0.640 | 0.350 | 7.464 | 7.821 |
| 8.50 | 8.50 | 135.59 | 1.594 | 0.0* | 1-S2n | 0.692 | 1.038 | 0.692 | 0.378 | 7.730 | 8.154 |
| 9.20 | 9.20 | 135.68 | 1.682 | 0.0* | 1-S2n | 0.725 | 1.081 | 0.802 | 0.395 | 6.880 | 8.348 |
| 9.90 | 9.90 | 135.77 | 1.771 | 0.0* | 1-S2n | 0.754 | 1.121 | 0.838 | 0.411 | 6.992 | 8.533 |
| 10.60 | 10.60 | 135.86 | 1.861 | 0.0* | 1-S2n | 0.782 | 1.164 | 0.866 | 0.427 | 7.180 | 8.705 |
| 11.30 | 11.30 | 135.95 | 1.952 | 0.0* | 1-S2n | 0.810 | 1.202 | 0.899 | 0.442 | 7.292 | 8.870 |
| 12.00 | 12.00 | 136.05 | 2.046 | 0.051 | 5-S2n | 0.839 | 1.239 | 0.915 | 0.456 | 7.580 | 9.026 |

* Full Flow Headwater elevation is below inlet invert.

Straight Culvert
Inlet Elevation (invert): 134.00 ft, Outlet Elevation (invert): 132.00 ft
Culvert Length: 40.05 ft, Culvert Slope: 0.0500

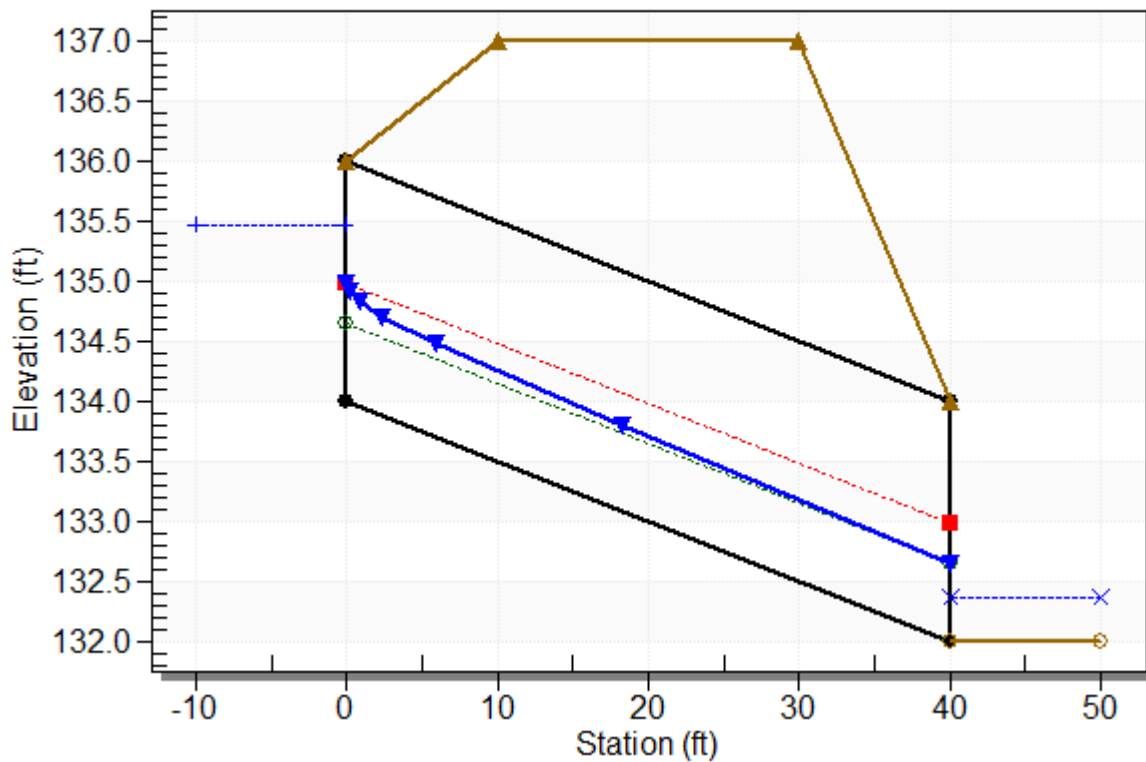
Culvert Performance Curve Plot: 103+00Lt



Water Surface Profile Plot for Culvert: 103+00Lt

Crossing - Crossing 7, Design Discharge - 7.4 cfs

Culvert - 103+00Lt, Culvert Discharge - 7.4 cfs



Site Data - 103+00Lt

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 134.00 ft

Outlet Station: 40.00 ft

Outlet Elevation: 132.00 ft

Number of Barrels: 1

Culvert Data Summary - 103+00Lt

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Corrugated Steel

Embedment: 0.00 in

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: NONE

Table 21 - Downstream Channel Rating Curve (Crossing: Crossing 7)

| Flow (cfs) | Water Surface Elev (ft) | Depth (ft) | Velocity (ft/s) | Shear (psf) | Froude Number |
|------------|-------------------------|------------|-----------------|-------------|---------------|
| 5.00 | 132.28 | 0.28 | 6.93 | 4.57 | 2.54 |
| 5.70 | 132.30 | 0.30 | 7.22 | 4.92 | 2.57 |
| 6.40 | 132.32 | 0.32 | 7.48 | 5.24 | 2.59 |
| 7.10 | 132.34 | 0.34 | 7.72 | 5.55 | 2.61 |
| 7.40 | 132.35 | 0.35 | 7.82 | 5.68 | 2.61 |
| 8.50 | 132.38 | 0.38 | 8.15 | 6.14 | 2.64 |
| 9.20 | 132.40 | 0.40 | 8.35 | 6.41 | 2.65 |
| 9.90 | 132.41 | 0.41 | 8.53 | 6.67 | 2.67 |
| 10.60 | 132.43 | 0.43 | 8.70 | 6.92 | 2.68 |
| 11.30 | 132.44 | 0.44 | 8.87 | 7.17 | 2.69 |
| 12.00 | 132.46 | 0.46 | 9.03 | 7.40 | 2.70 |

Tailwater Channel Data - Crossing 7

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 2.00 ft

Side Slope (H:V): 2.00 (1:1)

Channel Slope: 0.2600

Channel Manning's n: 0.0400

Channel Invert Elevation: 132.00 ft

Roadway Data for Crossing: Crossing 7

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 50.00 ft

Crest Elevation: 137.00 ft

Roadway Surface: Paved

Roadway Top Width: 20.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 24 cfs

Design Flow: 36 cfs

Maximum Flow: 40 cfs

Table 22 - Summary of Culvert Flows at Crossing: Crossing 8

| Headwater Elevation (ft) | Total Discharge (cfs) | 105+00Lt Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|-----------------------------|-----------------------|-----------------------------|----------------------------|-------------|
| 117.19 | 24.00 | 24.00 | 0.00 | 1 |
| 117.28 | 25.60 | 25.60 | 0.00 | 1 |
| 117.36 | 27.20 | 27.20 | 0.00 | 1 |
| 117.44 | 28.80 | 28.80 | 0.00 | 1 |
| 117.52 | 30.40 | 30.40 | 0.00 | 1 |
| 117.60 | 32.00 | 32.00 | 0.00 | 1 |
| 117.68 | 33.60 | 33.60 | 0.00 | 1 |
| 117.77 | 35.20 | 35.20 | 0.00 | 1 |
| 117.81 | 36.00 | 36.00 | 0.00 | 1 |
| 117.93 | 38.40 | 38.40 | 0.00 | 1 |
| 118.01 | 40.00 | 40.00 | 0.00 | 1 |
| 120.00 | 68.95 | 68.95 | 0.00 | Overtopping |

Rating Curve Plot for Crossing: Crossing 8

Total Rating Curve

Crossing: Crossing 8

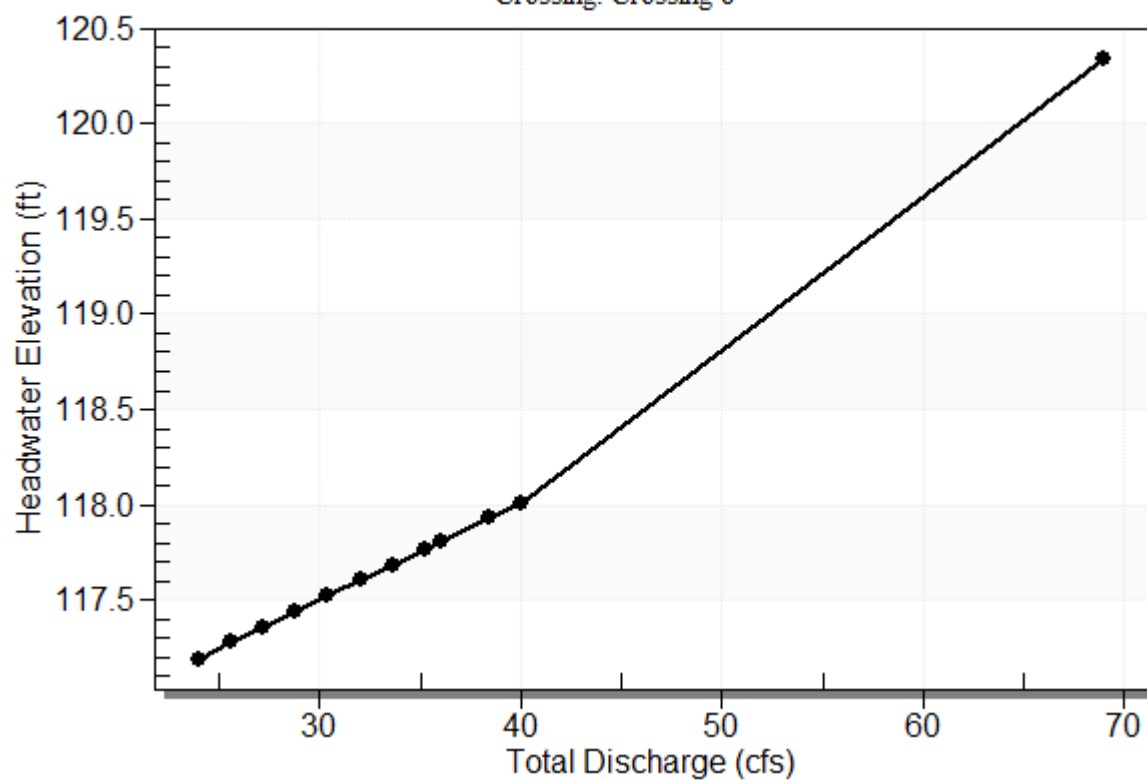


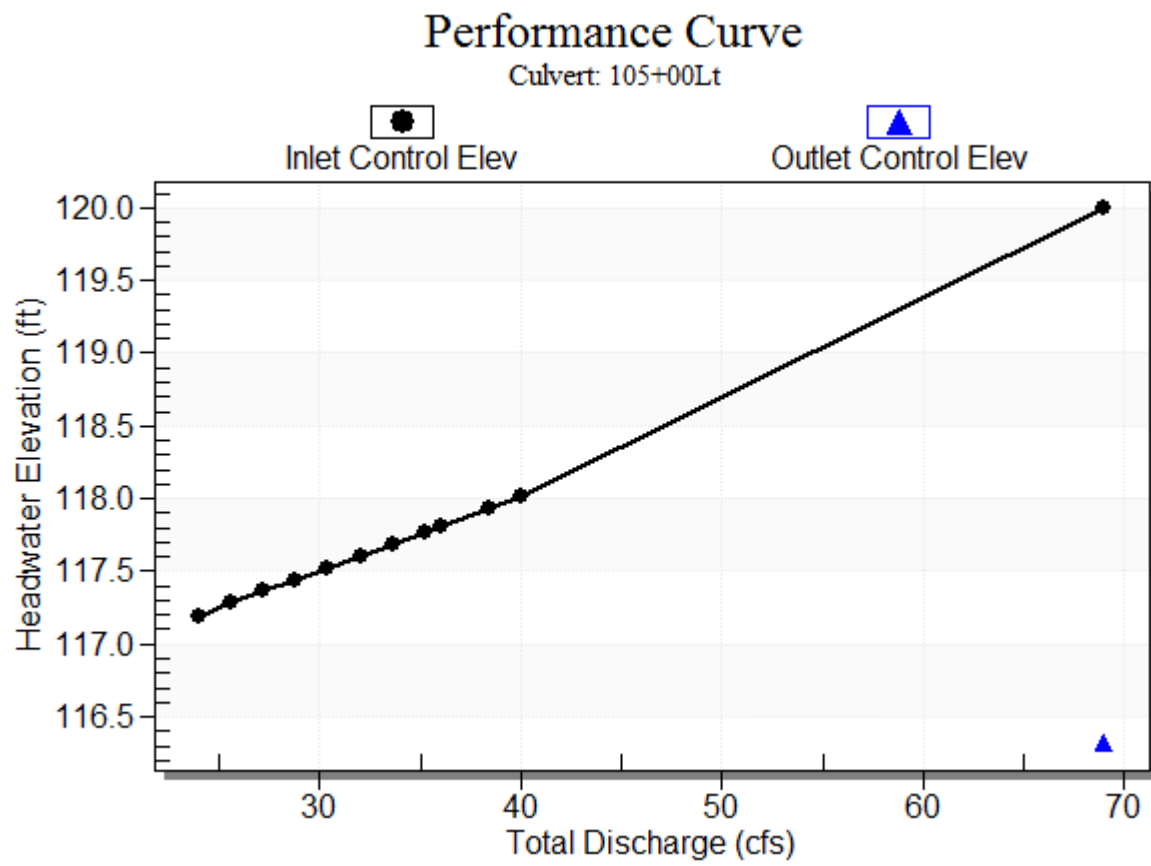
Table 23 - Culvert Summary Table: 105+00Lt

| Total Discharge (cfs) | Culvert Discharge (cfs) | Headwater Elevation (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tailwater Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|-----------------------|-------------------------|--------------------------|--------------------------|---------------------------|-----------|-------------------|---------------------|-------------------|----------------------|------------------------|---------------------------|
| 24.00 | 24.00 | 117.19 | 2.194 | 0.0* | 1-S2n | 0.698 | 1.577 | 0.844 | 0.461 | 12.925 | 10.573 |
| 25.60 | 25.60 | 117.28 | 2.279 | 0.0* | 1-S2n | 0.723 | 1.629 | 0.874 | 0.478 | 13.061 | 10.794 |
| 27.20 | 27.20 | 117.36 | 2.362 | 0.0* | 1-S2n | 0.748 | 1.683 | 0.908 | 0.495 | 13.173 | 11.004 |
| 28.80 | 28.80 | 117.44 | 2.443 | 0.0* | 1-S2n | 0.773 | 1.733 | 0.934 | 0.512 | 13.408 | 11.205 |
| 30.40 | 30.40 | 117.52 | 2.524 | 0.0* | 1-S2n | 0.798 | 1.781 | 0.968 | 0.528 | 13.485 | 11.398 |
| 32.00 | 32.00 | 117.60 | 2.604 | 0.0* | 1-S2n | 0.822 | 1.832 | 0.997 | 0.543 | 13.650 | 11.586 |
| 33.60 | 33.60 | 117.68 | 2.684 | 0.0* | 1-S2n | 0.841 | 1.879 | 1.025 | 0.558 | 13.812 | 11.765 |
| 35.20 | 35.20 | 117.77 | 2.765 | 0.0* | 1-S2n | 0.860 | 1.924 | 1.056 | 0.573 | 13.916 | 11.936 |
| 36.00 | 36.00 | 117.81 | 2.806 | 0.0* | 1-S2n | 0.869 | 1.947 | 1.070 | 0.580 | 13.988 | 12.020 |
| 38.40 | 38.40 | 117.93 | 2.929 | 0.0* | 1-S2n | 0.898 | 2.011 | 1.109 | 0.602 | 14.231 | 12.265 |
| 40.00 | 40.00 | 118.01 | 3.013 | 0.0* | 5-S2n | 0.917 | 2.057 | 1.139 | 0.616 | 14.323 | 12.421 |

* Full Flow Headwater elevation is below inlet invert.

Straight Culvert
Inlet Elevation (invert): 115.00 ft, Outlet Elevation (invert): 111.00 ft
Culvert Length: 80.10 ft, Culvert Slope: 0.0500

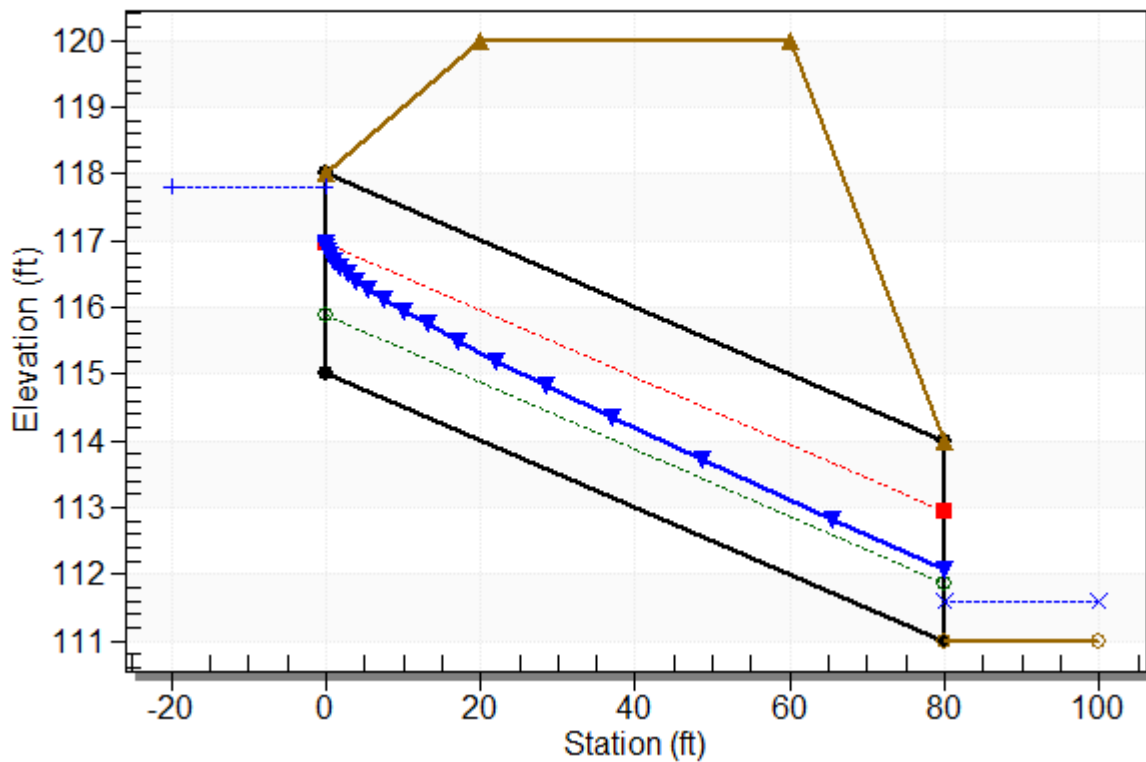
Culvert Performance Curve Plot: 105+00Lt



Water Surface Profile Plot for Culvert: 105+00Lt

Crossing - Crossing 8, Design Discharge - 36.0 cfs

Culvert - 105+00Lt, Culvert Discharge - 36.0 cfs



Site Data - 105+00Lt

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 115.00 ft

Outlet Station: 80.00 ft

Outlet Elevation: 111.00 ft

Number of Barrels: 1

Culvert Data Summary - 105+00Lt

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: NONE

Table 24 - Downstream Channel Rating Curve (Crossing: Crossing 8)

| Flow (cfs) | Water Surface Elev (ft) | Depth (ft) | Velocity (ft/s) | Shear (psf) | Froude Number |
|------------|-------------------------|------------|-----------------|-------------|---------------|
| 24.00 | 111.46 | 0.46 | 10.57 | 8.63 | 2.99 |
| 25.60 | 111.48 | 0.48 | 10.79 | 8.96 | 3.00 |
| 27.20 | 111.50 | 0.50 | 11.00 | 9.27 | 3.02 |
| 28.80 | 111.51 | 0.51 | 11.20 | 9.58 | 3.03 |
| 30.40 | 111.53 | 0.53 | 11.40 | 9.88 | 3.04 |
| 32.00 | 111.54 | 0.54 | 11.59 | 10.17 | 3.05 |
| 33.60 | 111.56 | 0.56 | 11.77 | 10.45 | 3.06 |
| 35.20 | 111.57 | 0.57 | 11.94 | 10.73 | 3.07 |
| 36.00 | 111.58 | 0.58 | 12.02 | 10.86 | 3.08 |
| 38.40 | 111.60 | 0.60 | 12.27 | 11.26 | 3.09 |
| 40.00 | 111.62 | 0.62 | 12.42 | 11.52 | 3.10 |

Tailwater Channel Data - Crossing 8

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 4.00 ft

Side Slope (H:V): 2.00 (2:1)

Channel Slope: 0.3000

Channel Manning's n: 0.0400

Channel Invert Elevation: 111.00 ft

Roadway Data for Crossing: Crossing 8

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 120.00 ft

Roadway Surface: Paved

Roadway Top Width: 40.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 15 cfs

Design Flow: 19.4 cfs

Maximum Flow: 25 cfs

Table 25 - Summary of Culvert Flows at Crossing: Crossing 9

| Headwater Elevation (ft) | Total Discharge (cfs) | 140+00 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|-----------------------------|-----------------------|---------------------------|----------------------------|-------------|
| 159.86 | 15.00 | 15.00 | 0.00 | 1 |
| 159.93 | 16.00 | 16.00 | 0.00 | 1 |
| 160.00 | 17.00 | 17.00 | 0.00 | 1 |
| 160.07 | 18.00 | 18.00 | 0.00 | 1 |
| 160.13 | 19.00 | 19.00 | 0.00 | 1 |
| 160.16 | 19.40 | 19.40 | 0.00 | 1 |
| 160.26 | 21.00 | 21.00 | 0.00 | 1 |
| 160.33 | 22.00 | 22.00 | 0.00 | 1 |
| 160.40 | 23.00 | 23.00 | 0.00 | 1 |
| 160.46 | 24.00 | 24.00 | 0.00 | 1 |
| 160.53 | 25.00 | 25.00 | 0.00 | 1 |
| 161.00 | 31.27 | 31.27 | 0.00 | Overtopping |

Rating Curve Plot for Crossing: Crossing 9

Total Rating Curve

Crossing: Crossing 9

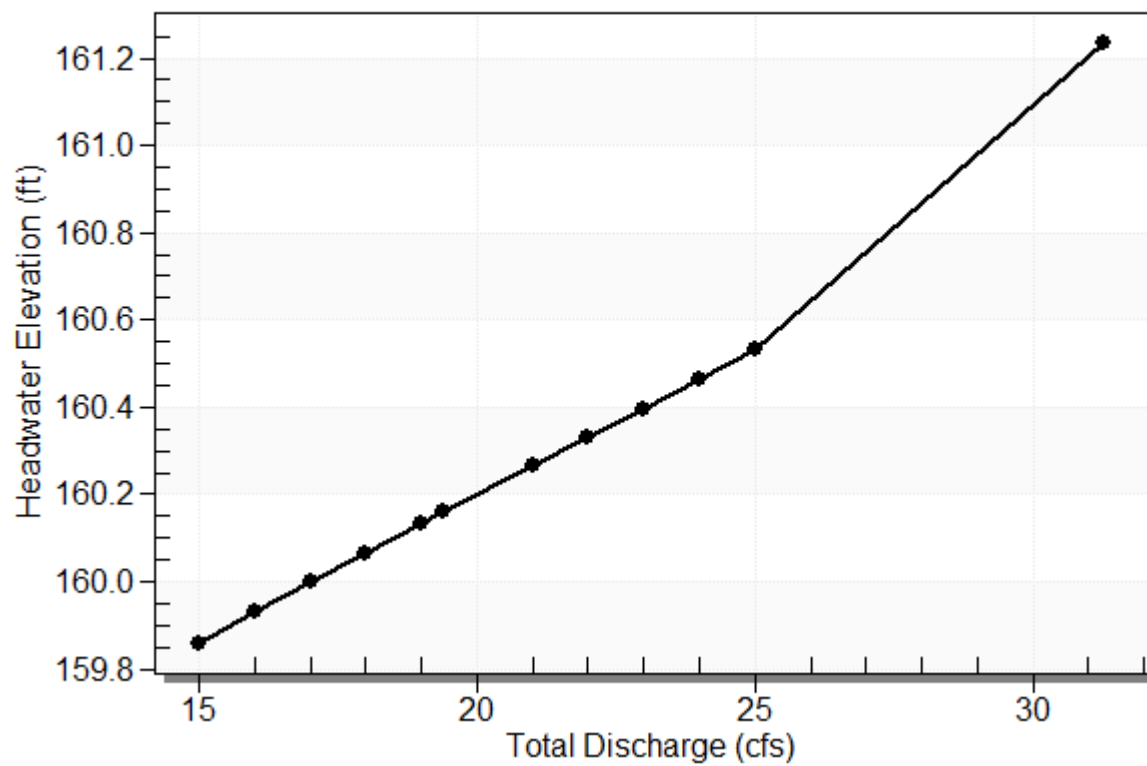
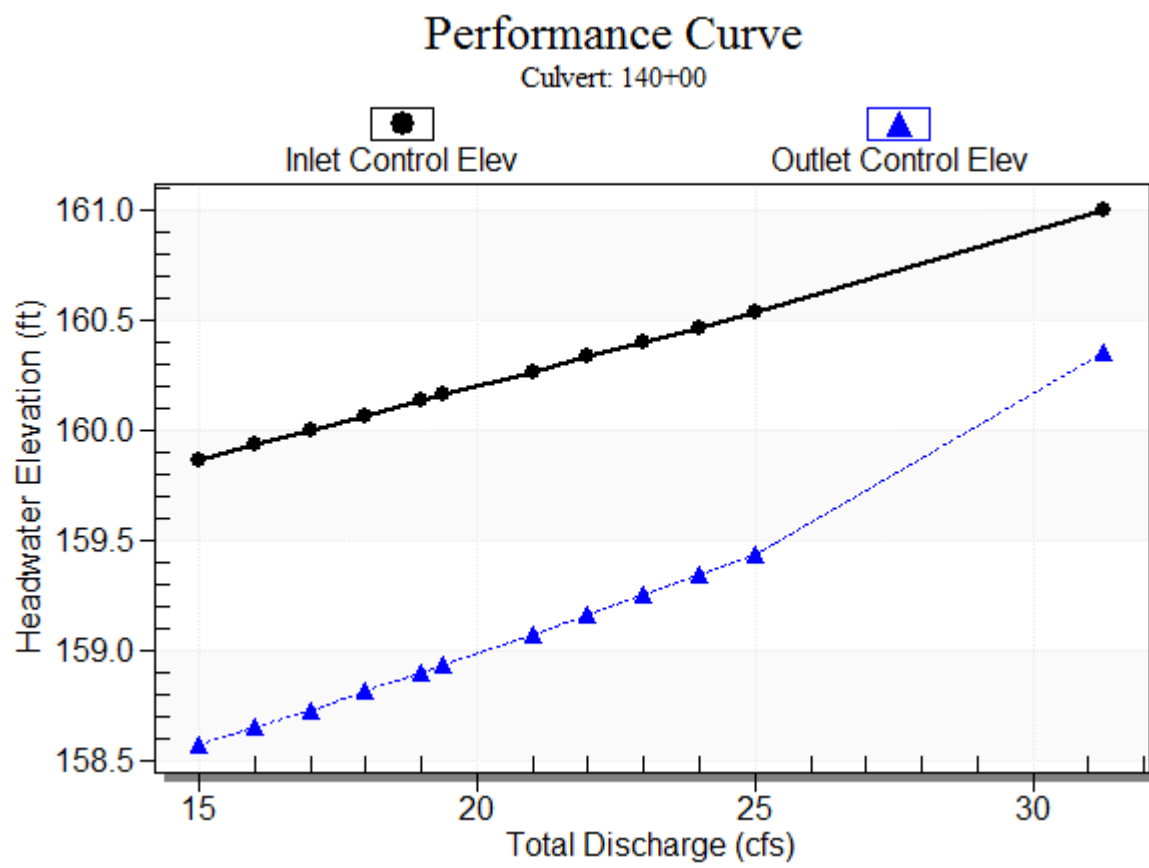


Table 26 - Culvert Summary Table: 140+00

| Total Discharge (cfs) | Culvert Discharge (cfs) | Headwater Elevation (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tailwater Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|-----------------------|-------------------------|--------------------------|--------------------------|---------------------------|-----------|-------------------|---------------------|-------------------|----------------------|------------------------|---------------------------|
| 15.00 | 15.00 | 159.86 | 1.860 | 0.569 | 1-S2n | 0.852 | 1.304 | 0.971 | 0.473 | 7.493 | 5.789 |
| 16.00 | 16.00 | 159.93 | 1.930 | 0.649 | 1-S2n | 0.884 | 1.348 | 1.007 | 0.492 | 7.611 | 5.921 |
| 17.00 | 17.00 | 160.00 | 1.999 | 0.729 | 1-S2n | 0.915 | 1.389 | 1.043 | 0.510 | 7.729 | 6.045 |
| 18.00 | 18.00 | 160.07 | 2.066 | 0.815 | 1-S2n | 0.943 | 1.434 | 1.078 | 0.528 | 7.846 | 6.166 |
| 19.00 | 19.00 | 160.13 | 2.132 | 0.898 | 1-S2n | 0.971 | 1.474 | 1.112 | 0.545 | 7.959 | 6.283 |
| 19.40 | 19.40 | 160.16 | 2.159 | 0.932 | 1-S2n | 0.983 | 1.489 | 1.125 | 0.552 | 8.002 | 6.326 |
| 21.00 | 21.00 | 160.26 | 2.264 | 1.073 | 1-S2n | 1.027 | 1.554 | 1.179 | 0.579 | 8.169 | 6.501 |
| 22.00 | 22.00 | 160.33 | 2.330 | 1.161 | 1-S2n | 1.055 | 1.592 | 1.212 | 0.595 | 8.268 | 6.606 |
| 23.00 | 23.00 | 160.40 | 2.397 | 1.251 | 1-S2n | 1.083 | 1.629 | 1.245 | 0.611 | 8.363 | 6.706 |
| 24.00 | 24.00 | 160.46 | 2.464 | 1.342 | 1-S2n | 1.111 | 1.664 | 1.277 | 0.627 | 8.456 | 6.801 |
| 25.00 | 25.00 | 160.53 | 2.533 | 1.434 | 5-S2n | 1.139 | 1.699 | 1.309 | 0.643 | 8.545 | 6.896 |

Straight Culvert
Inlet Elevation (invert): 158.00 ft, Outlet Elevation (invert): 157.00 ft
Culvert Length: 80.01 ft, Culvert Slope: 0.0125

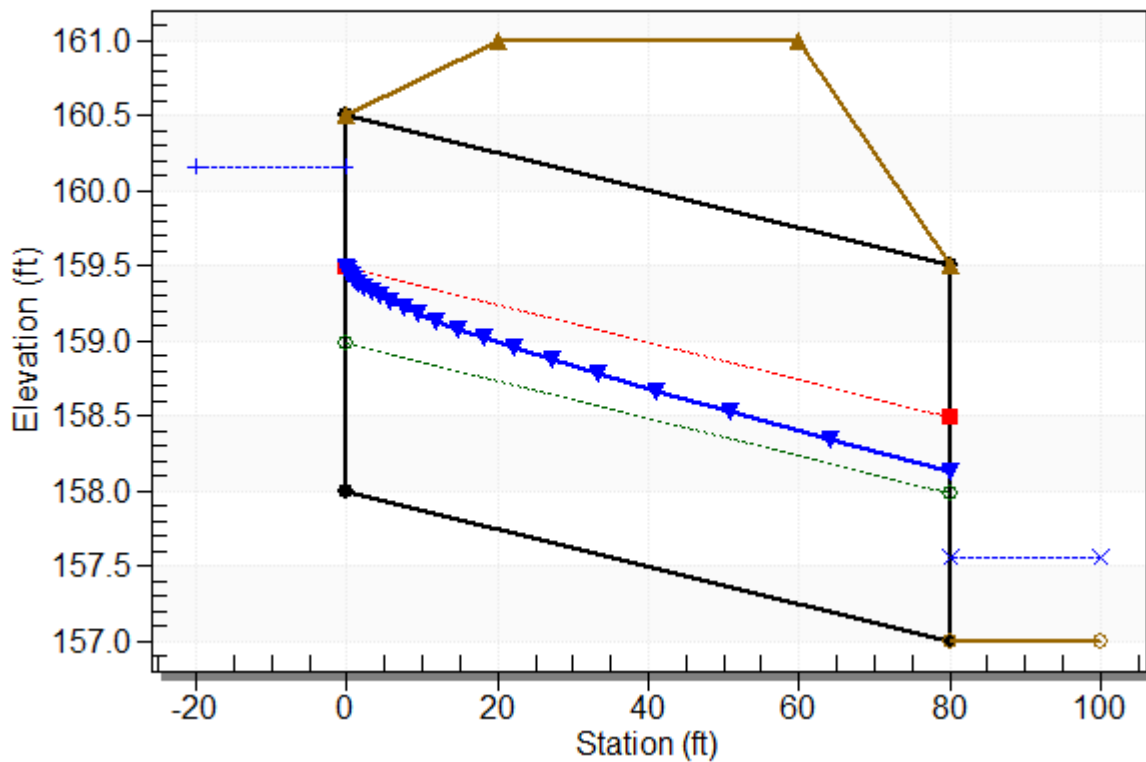
Culvert Performance Curve Plot: 140+00



Water Surface Profile Plot for Culvert: 140+00

Crossing - Crossing 9, Design Discharge - 19.4 cfs

Culvert - 140+00, Culvert Discharge - 19.4 cfs



Site Data - 140+00

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 158.00 ft

Outlet Station: 80.00 ft

Outlet Elevation: 157.00 ft

Number of Barrels: 1

Culvert Data Summary - 140+00

Barrel Shape: Circular

Barrel Diameter: 2.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: NONE

Table 27 - Downstream Channel Rating Curve (Crossing: Crossing 9)

| Flow (cfs) | Water Surface Elev (ft) | Depth (ft) | Velocity (ft/s) | Shear (psf) | Froude Number |
|------------|-------------------------|------------|-----------------|-------------|---------------|
| 15.00 | 157.47 | 0.47 | 5.79 | 2.36 | 1.55 |
| 16.00 | 157.49 | 0.49 | 5.92 | 2.46 | 1.55 |
| 17.00 | 157.51 | 0.51 | 6.05 | 2.55 | 1.56 |
| 18.00 | 157.53 | 0.53 | 6.17 | 2.64 | 1.56 |
| 19.00 | 157.55 | 0.55 | 6.28 | 2.72 | 1.57 |
| 19.40 | 157.55 | 0.55 | 6.33 | 2.76 | 1.57 |
| 21.00 | 157.58 | 0.58 | 6.50 | 2.89 | 1.58 |
| 22.00 | 157.60 | 0.60 | 6.61 | 2.97 | 1.59 |
| 23.00 | 157.61 | 0.61 | 6.71 | 3.05 | 1.59 |
| 24.00 | 157.63 | 0.63 | 6.80 | 3.13 | 1.60 |
| 25.00 | 157.64 | 0.64 | 6.90 | 3.21 | 1.60 |

Tailwater Channel Data - Crossing 9

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 5.00 ft

Side Slope (H:V): 1.00 (1:1)

Channel Slope: 0.0800

Channel Manning's n: 0.0400

Channel Invert Elevation: 157.00 ft

Roadway Data for Crossing: Crossing 9

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 161.00 ft

Roadway Surface: Paved

Roadway Top Width: 40.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 5 cfs

Design Flow: 7 cfs

Maximum Flow: 10 cfs

Table 28 - Summary of Culvert Flows at Crossing: Crossing 10

| Headwater Elevation (ft) | Total Discharge (cfs) | 129+90 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|-----------------------------|-----------------------|---------------------------|----------------------------|-------------|
| 135.02 | 5.00 | 5.00 | 0.00 | 1 |
| 135.09 | 5.50 | 5.50 | 0.00 | 1 |
| 135.15 | 6.00 | 6.00 | 0.00 | 1 |
| 135.20 | 6.50 | 6.50 | 0.00 | 1 |
| 135.26 | 7.00 | 7.00 | 0.00 | 1 |
| 135.31 | 7.50 | 7.50 | 0.00 | 1 |
| 135.37 | 8.00 | 8.00 | 0.00 | 1 |
| 135.42 | 8.50 | 8.50 | 0.00 | 1 |
| 135.47 | 9.00 | 9.00 | 0.00 | 1 |
| 135.51 | 9.50 | 9.50 | 0.00 | 1 |
| 135.56 | 10.00 | 10.00 | 0.00 | 1 |
| 139.00 | 33.83 | 33.83 | 0.00 | Overtopping |

Rating Curve Plot for Crossing: Crossing 10

Total Rating Curve

Crossing: Crossing 10

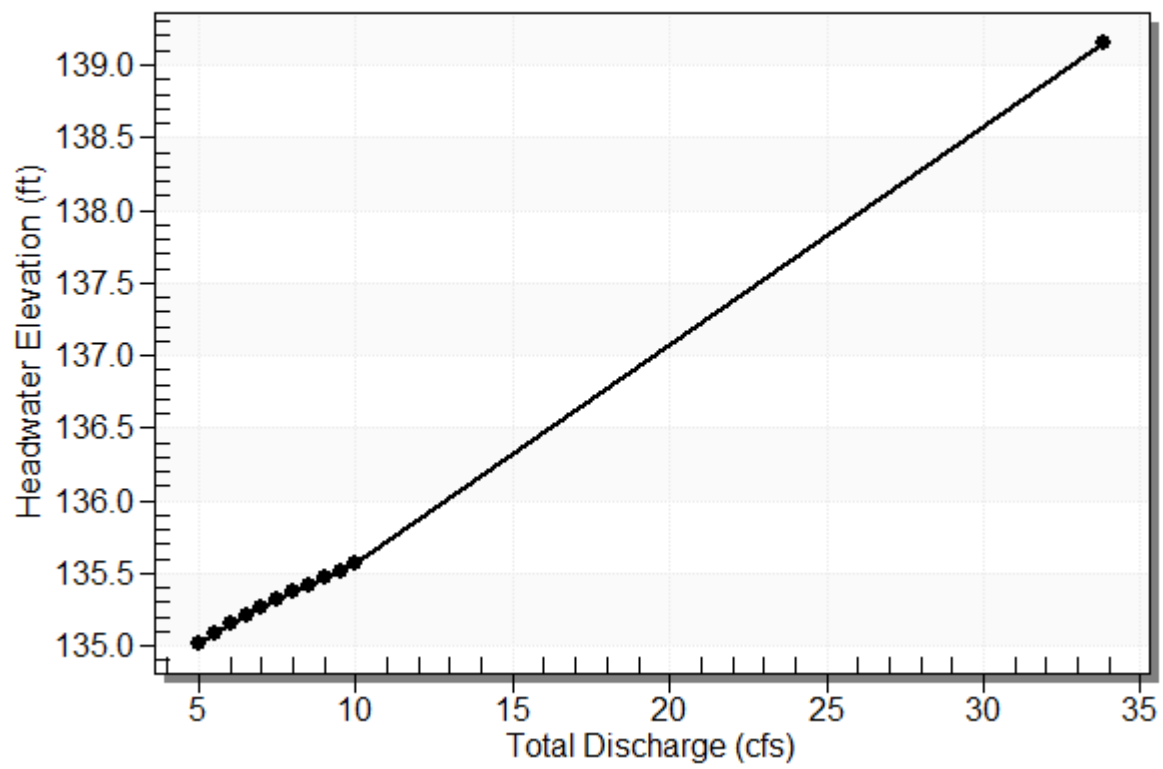


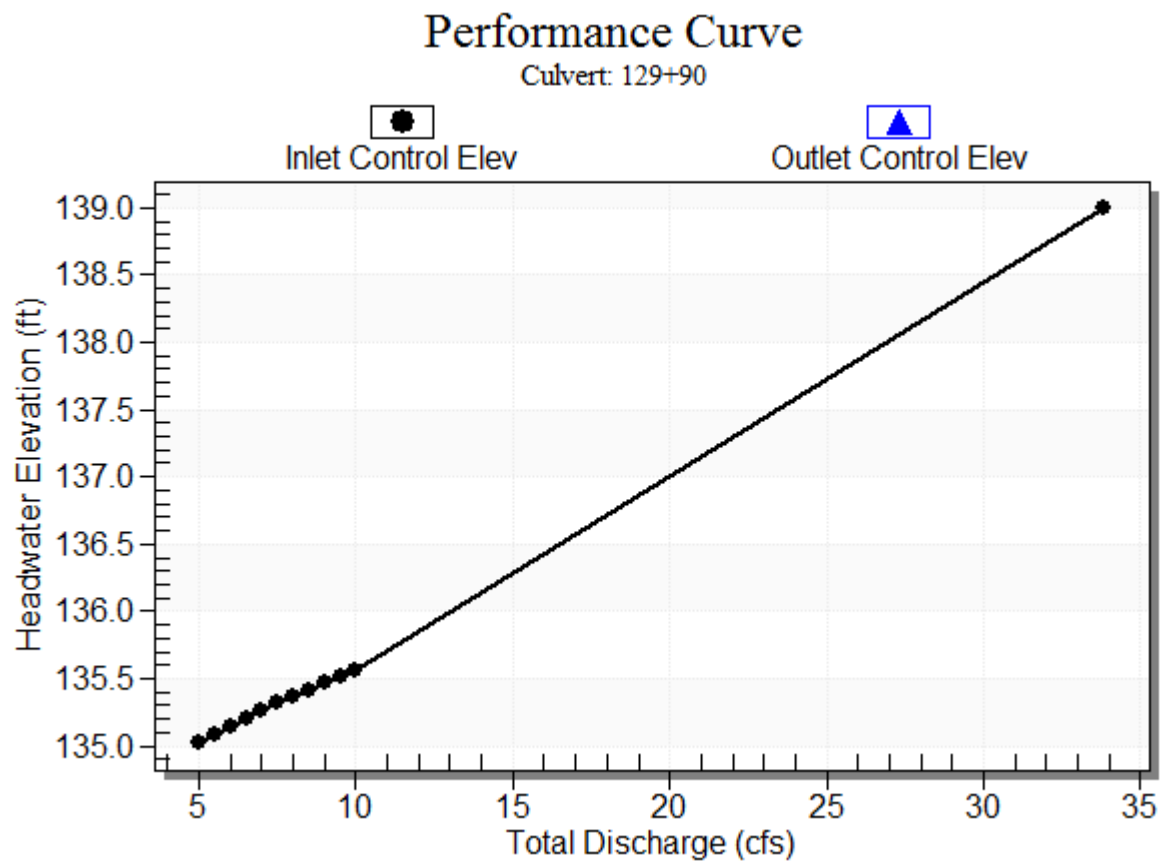
Table 29 - Culvert Summary Table: 129+90

| Total Discharge (cfs) | Culvert Discharge (cfs) | Headwater Elevation (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tailwater Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|-----------------------|-------------------------|--------------------------|--------------------------|---------------------------|-----------|-------------------|---------------------|-------------------|----------------------|------------------------|---------------------------|
| 5.00 | 5.00 | 135.02 | 1.022 | 0.0* | 1-S2n | 0.328 | 0.783 | 0.328 | 0.423 | 12.787 | 4.159 |
| 5.50 | 5.50 | 135.09 | 1.085 | 0.0* | 1-S2n | 0.348 | 0.825 | 0.404 | 0.445 | 10.791 | 4.278 |
| 6.00 | 6.00 | 135.15 | 1.146 | 0.0* | 1-S2n | 0.366 | 0.865 | 0.366 | 0.466 | 13.286 | 4.387 |
| 6.50 | 6.50 | 135.20 | 1.205 | 0.0* | 1-S2n | 0.379 | 0.903 | 0.446 | 0.487 | 10.757 | 4.490 |
| 7.00 | 7.00 | 135.26 | 1.261 | 0.0* | 1-S2n | 0.391 | 0.939 | 0.391 | 0.507 | 14.269 | 4.586 |
| 7.50 | 7.50 | 135.31 | 1.314 | 0.0* | 1-S2n | 0.404 | 0.974 | 0.404 | 0.526 | 14.704 | 4.678 |
| 8.00 | 8.00 | 135.37 | 1.366 | 0.0* | 1-S2n | 0.416 | 1.006 | 0.489 | 0.544 | 11.677 | 4.764 |
| 8.50 | 8.50 | 135.42 | 1.417 | 0.0* | 1-S2n | 0.429 | 1.038 | 0.429 | 0.561 | 14.883 | 4.847 |
| 9.00 | 9.00 | 135.47 | 1.466 | 0.0* | 1-S2n | 0.441 | 1.069 | 0.441 | 0.579 | 15.130 | 4.925 |
| 9.50 | 9.50 | 135.51 | 1.514 | 0.0* | 1-S2n | 0.454 | 1.098 | 0.535 | 0.595 | 12.285 | 5.001 |
| 10.00 | 10.00 | 135.56 | 1.562 | 0.0* | 1-S2n | 0.466 | 1.126 | 0.541 | 0.612 | 12.757 | 5.074 |

* Full Flow Headwater elevation is below inlet invert.

Straight Culvert
Inlet Elevation (invert): 134.00 ft, Outlet Elevation (invert): 128.00 ft
Culvert Length: 80.22 ft, Culvert Slope: 0.0750

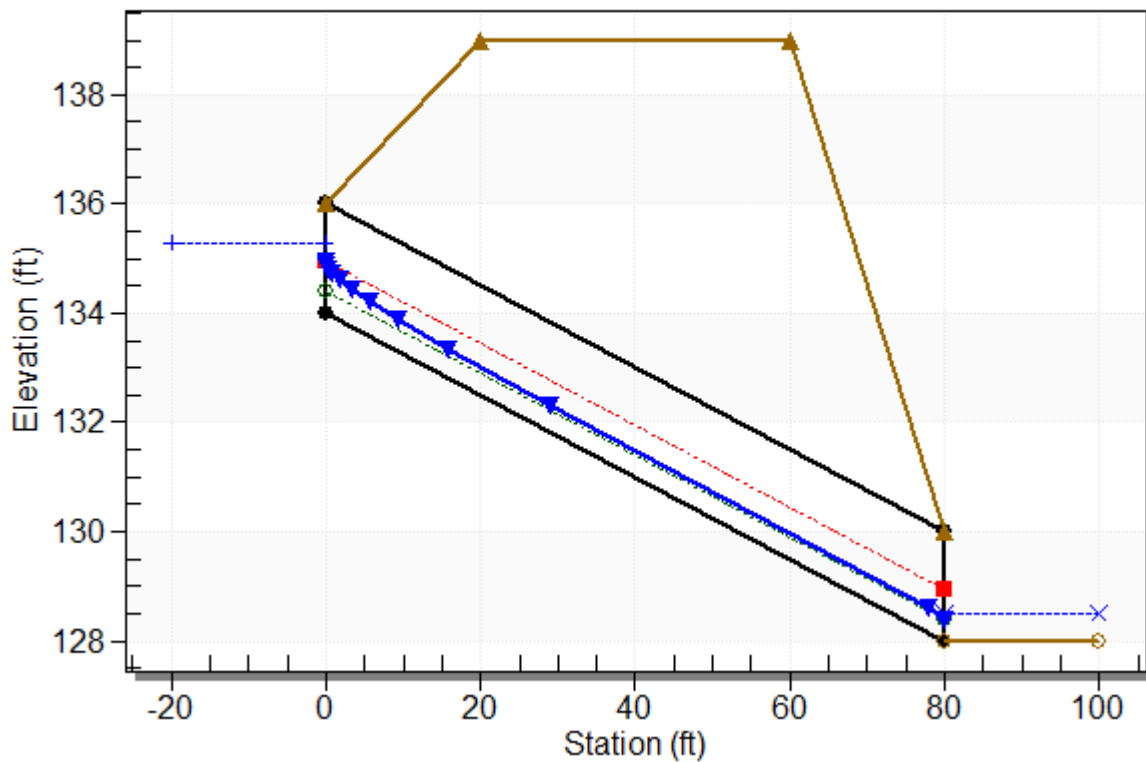
Culvert Performance Curve Plot: 129+90



Water Surface Profile Plot for Culvert: 129+90

Crossing - Crossing 10, Design Discharge - 7.0 cfs

Culvert - 129+90, Culvert Discharge - 7.0 cfs



Site Data - 129+90

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 134.00 ft

Outlet Station: 80.00 ft

Outlet Elevation: 128.00 ft

Number of Barrels: 1

Culvert Data Summary - 129+90

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: NONE

Table 30 - Downstream Channel Rating Curve (Crossing: Crossing 10)

| Flow (cfs) | Water Surface Elev (ft) | Depth (ft) | Velocity (ft/s) | Shear (psf) | Froude Number |
|------------|-------------------------|------------|-----------------|-------------|---------------|
| 5.00 | 128.42 | 0.42 | 4.16 | 1.58 | 1.28 |
| 5.50 | 128.44 | 0.44 | 4.28 | 1.67 | 1.29 |
| 6.00 | 128.47 | 0.47 | 4.39 | 1.75 | 1.30 |
| 6.50 | 128.49 | 0.49 | 4.49 | 1.82 | 1.31 |
| 7.00 | 128.51 | 0.51 | 4.59 | 1.90 | 1.31 |
| 7.50 | 128.53 | 0.53 | 4.68 | 1.97 | 1.32 |
| 8.00 | 128.54 | 0.54 | 4.76 | 2.04 | 1.32 |
| 8.50 | 128.56 | 0.56 | 4.85 | 2.10 | 1.33 |
| 9.00 | 128.58 | 0.58 | 4.93 | 2.17 | 1.33 |
| 9.50 | 128.60 | 0.60 | 5.00 | 2.23 | 1.34 |
| 10.00 | 128.61 | 0.61 | 5.07 | 2.29 | 1.34 |

Tailwater Channel Data - Crossing 10

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 2.00 ft

Side Slope (H:V): 2.00 (1:1)

Channel Slope: 0.0600

Channel Manning's n: 0.0400

Channel Invert Elevation: 128.00 ft

Roadway Data for Crossing: Crossing 10

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 139.00 ft

Roadway Surface: Paved

Roadway Top Width: 40.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 14 cfs

Design Flow: 17.7 cfs

Maximum Flow: 22 cfs

Table 31 - Summary of Culvert Flows at Crossing: Crossing 11

| Headwater Elevation (ft) | Total Discharge (cfs) | 114+90 Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|-----------------------------|-----------------------|---------------------------|----------------------------|-------------|
| 76.56 | 14.00 | 14.00 | 0.00 | 1 |
| 76.62 | 14.80 | 14.80 | 0.00 | 1 |
| 76.67 | 15.60 | 15.60 | 0.00 | 1 |
| 76.73 | 16.40 | 16.40 | 0.00 | 1 |
| 76.78 | 17.20 | 17.20 | 0.00 | 1 |
| 76.81 | 17.70 | 17.70 | 0.00 | 1 |
| 76.88 | 18.80 | 18.80 | 0.00 | 1 |
| 76.92 | 19.60 | 19.60 | 0.00 | 1 |
| 76.97 | 20.40 | 20.40 | 0.00 | 1 |
| 77.02 | 21.20 | 21.20 | 0.00 | 1 |
| 77.06 | 22.00 | 22.00 | 0.00 | 1 |
| 90.00 | 140.78 | 140.78 | 0.00 | Overtopping |

Rating Curve Plot for Crossing: Crossing 11

Total Rating Curve

Crossing: Crossing 11

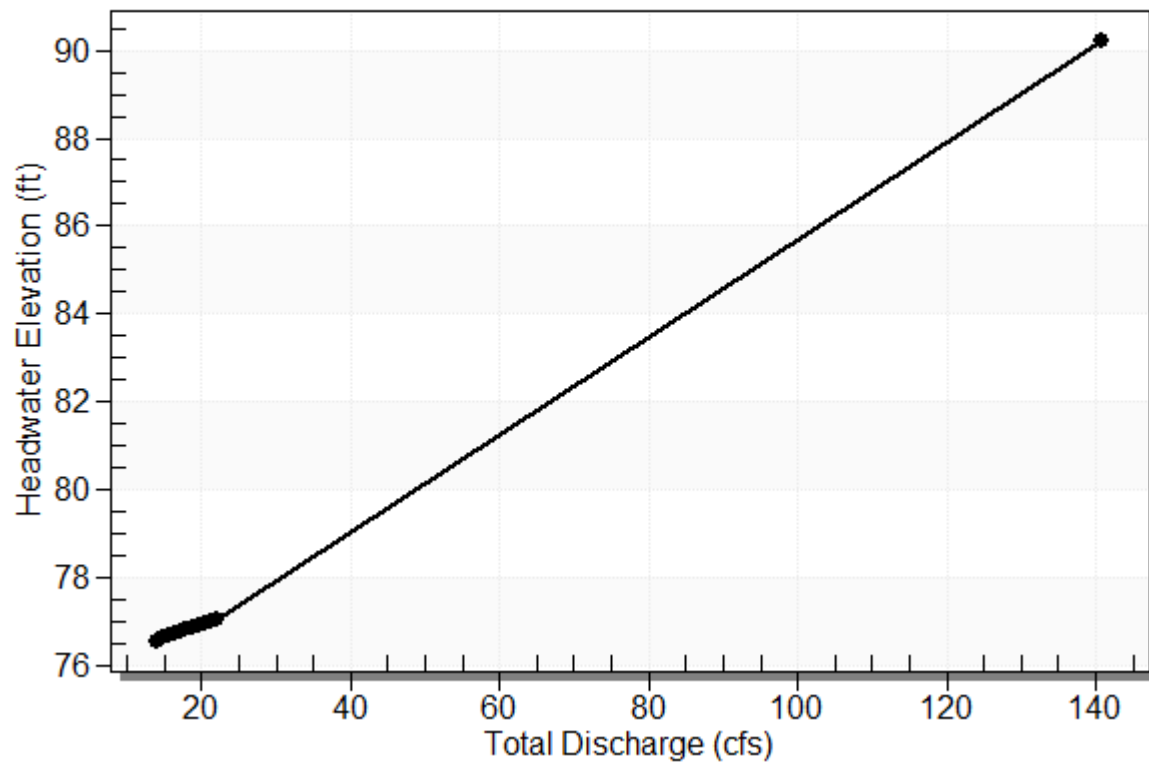


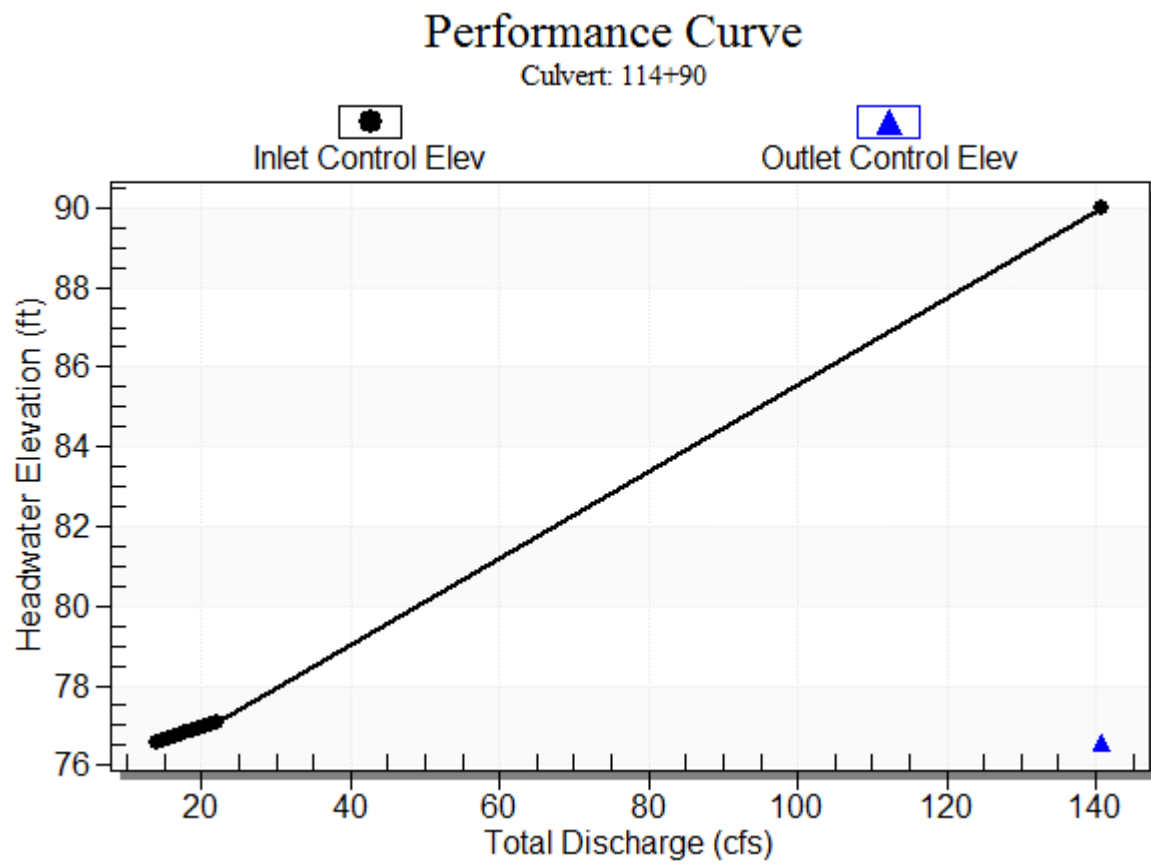
Table 32 - Culvert Summary Table: 114+90

| Total Discharge (cfs) | Culvert Discharge (cfs) | Headwater Elevation (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tailwater Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|-----------------------|-------------------------|--------------------------|--------------------------|---------------------------|-----------|-------------------|---------------------|-------------------|----------------------|------------------------|---------------------------|
| 14.00 | 14.00 | 76.56 | 1.563 | 0.0* | 1-S2n | 0.497 | 1.189 | 0.575 | 1.657 | 13.013 | 1.590 |
| 14.80 | 14.80 | 76.62 | 1.619 | 0.0* | 1-S2n | 0.515 | 1.222 | 0.515 | 1.700 | 15.840 | 1.612 |
| 15.60 | 15.60 | 76.67 | 1.673 | 0.0* | 1-S2n | 0.532 | 1.257 | 0.532 | 1.741 | 15.987 | 1.634 |
| 16.40 | 16.40 | 76.73 | 1.726 | 0.0* | 1-S2n | 0.548 | 1.292 | 0.548 | 1.781 | 16.189 | 1.655 |
| 17.20 | 17.20 | 76.78 | 1.777 | 0.0* | 1-S2n | 0.559 | 1.325 | 0.559 | 1.820 | 16.561 | 1.675 |
| 17.70 | 17.70 | 76.81 | 1.808 | 0.0* | 1-S2n | 0.566 | 1.346 | 0.566 | 1.844 | 16.785 | 1.687 |
| 18.80 | 18.80 | 76.88 | 1.876 | 0.0* | 1-S2n | 0.581 | 1.390 | 0.581 | 1.895 | 17.254 | 1.714 |
| 19.60 | 19.60 | 76.92 | 1.924 | 0.0* | 1-S2n | 0.592 | 1.420 | 0.592 | 1.931 | 17.576 | 1.732 |
| 20.40 | 20.40 | 76.97 | 1.971 | 0.0* | 1-S2n | 0.603 | 1.450 | 0.603 | 1.966 | 17.439 | 1.750 |
| 21.20 | 21.20 | 77.02 | 2.017 | 0.0* | 1-S2n | 0.614 | 1.480 | 0.614 | 2.000 | 17.654 | 1.767 |
| 22.00 | 22.00 | 77.06 | 2.062 | 0.0* | 1-S2n | 0.625 | 1.508 | 0.625 | 2.033 | 17.859 | 1.783 |

* Full Flow Headwater elevation is below inlet invert.

Straight Culvert
Inlet Elevation (invert): 75.00 ft, Outlet Elevation (invert): 54.00 ft
Culvert Length: 322.68 ft, Culvert Slope: 0.0652

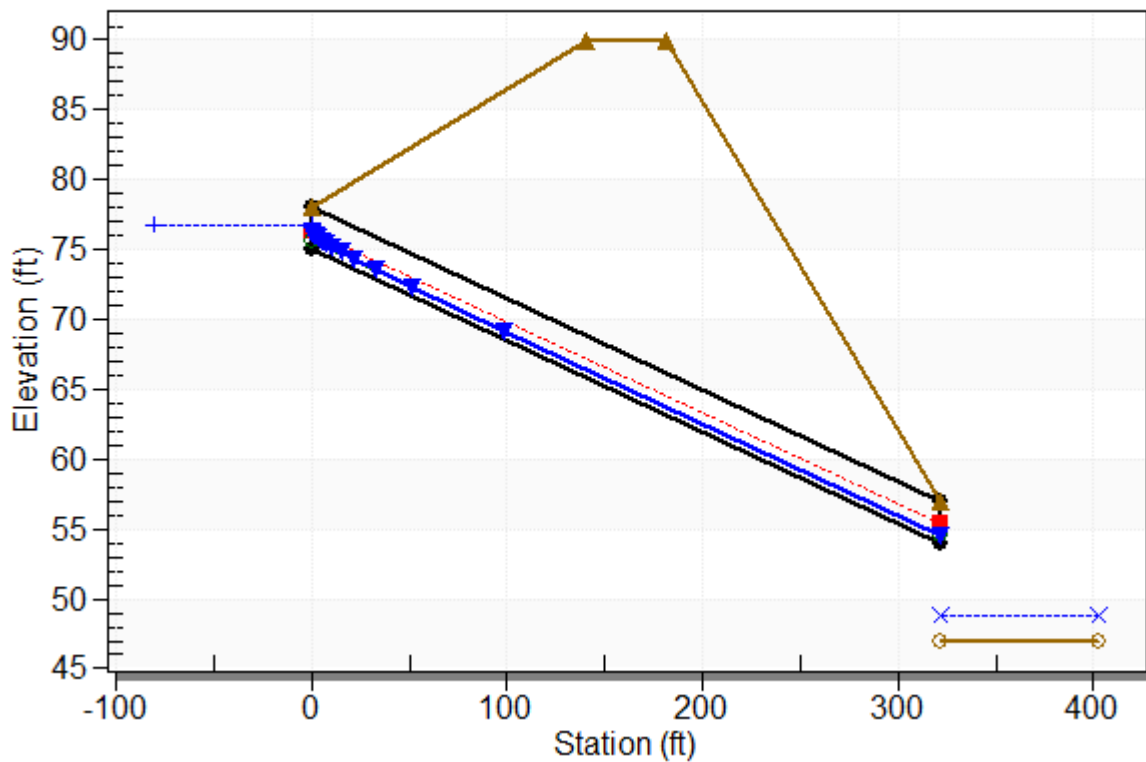
Culvert Performance Curve Plot: 114+90



Water Surface Profile Plot for Culvert: 114+90

Crossing - Crossing 11, Design Discharge - 17.7 cfs

Culvert - 114+90, Culvert Discharge - 17.7 cfs



Site Data - 114+90

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 75.00 ft

Outlet Station: 322.00 ft

Outlet Elevation: 54.00 ft

Number of Barrels: 1

Culvert Data Summary - 114+90

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: NONE

Table 33 - Downstream Channel Rating Curve (Crossing: Crossing 11)

| Flow (cfs) | Water Surface Elev (ft) | Depth (ft) | Velocity (ft/s) | Shear (psf) | Froude Number |
|------------|-------------------------|------------|-----------------|-------------|---------------|
| 14.00 | 48.66 | 1.66 | 1.59 | 0.21 | 0.28 |
| 14.80 | 48.70 | 1.70 | 1.61 | 0.21 | 0.28 |
| 15.60 | 48.74 | 1.74 | 1.63 | 0.22 | 0.28 |
| 16.40 | 48.78 | 1.78 | 1.66 | 0.22 | 0.28 |
| 17.20 | 48.82 | 1.82 | 1.68 | 0.23 | 0.28 |
| 17.70 | 48.84 | 1.84 | 1.69 | 0.23 | 0.28 |
| 18.80 | 48.89 | 1.89 | 1.71 | 0.24 | 0.28 |
| 19.60 | 48.93 | 1.93 | 1.73 | 0.24 | 0.28 |
| 20.40 | 48.97 | 1.97 | 1.75 | 0.25 | 0.28 |
| 21.20 | 49.00 | 2.00 | 1.77 | 0.25 | 0.28 |
| 22.00 | 49.03 | 2.03 | 1.78 | 0.25 | 0.28 |

Tailwater Channel Data - Crossing 11

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 2.00 ft

Side Slope (H:V): 2.00 (2:1)

Channel Slope: 0.0020

Channel Manning's n: 0.0400

Channel Invert Elevation: 47.00 ft

Roadway Data for Crossing: Crossing 11

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 90.00 ft

Roadway Surface: Paved

Roadway Top Width: 40.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 15 cfs

Design Flow: 17.7 cfs

Maximum Flow: 22 cfs

Table 34 - Summary of Culvert Flows at Crossing: Crossing 12

| Headwater Elevation (ft) | Total Discharge (cfs) | 114+90OutletSection Discharge (cfs) | Roadway Discharge (cfs) | Iterations |
|-----------------------------|-----------------------|--|----------------------------|-------------|
| 48.62 | 15.00 | 15.00 | 0.00 | 1 |
| 48.66 | 15.70 | 15.70 | 0.00 | 1 |
| 48.70 | 16.40 | 16.40 | 0.00 | 1 |
| 48.74 | 17.10 | 17.10 | 0.00 | 1 |
| 49.00 | 17.70 | 17.70 | 0.00 | 1 |
| 49.05 | 18.50 | 18.50 | 0.00 | 1 |
| 49.09 | 19.20 | 19.20 | 0.00 | 1 |
| 49.13 | 19.90 | 19.90 | 0.00 | 1 |
| 49.17 | 20.60 | 20.60 | 0.00 | 1 |
| 49.21 | 21.30 | 21.30 | 0.00 | 1 |
| 49.25 | 22.00 | 22.00 | 0.00 | 1 |
| 69.12 | 210.39 | 210.39 | 0.00 | Overtopping |

Rating Curve Plot for Crossing: Crossing 12

Total Rating Curve

Crossing: Crossing 12

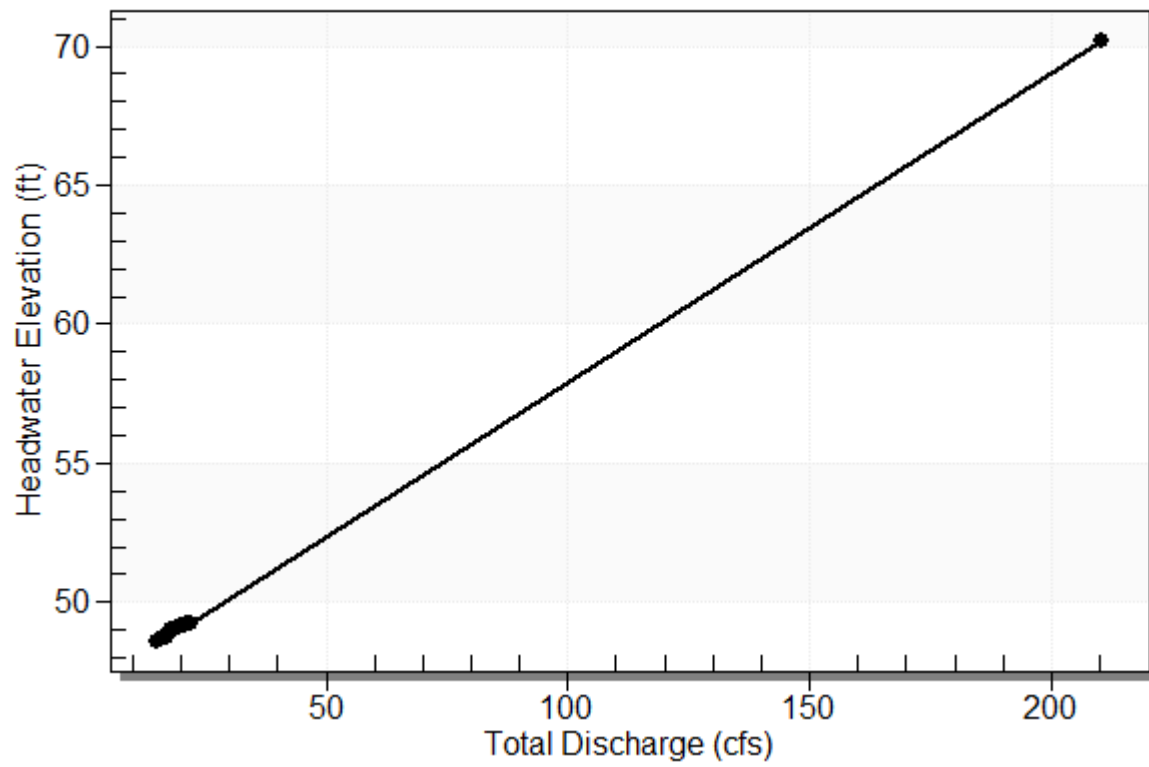


Table 35 - Culvert Summary Table: 114+90OutletSection

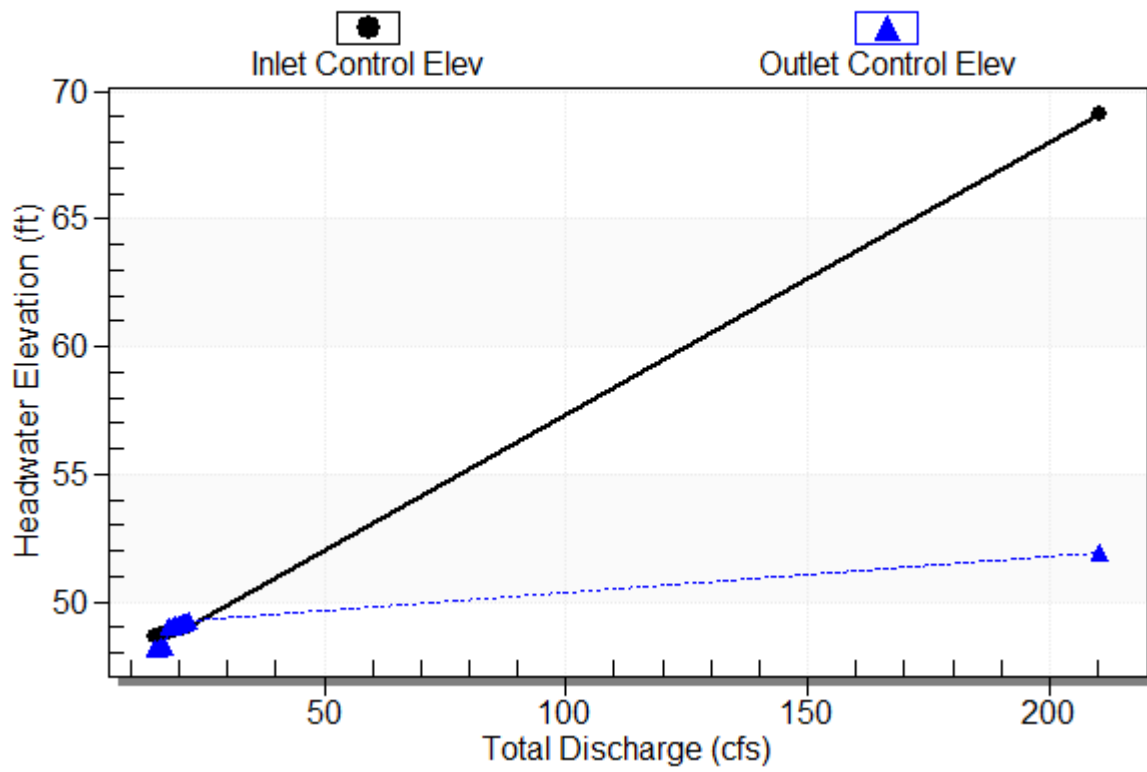
| Total Discharge (cfs) | Culvert Discharge (cfs) | Headwater Elevation (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tailwater Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|-----------------------|-------------------------|--------------------------|--------------------------|---------------------------|-----------|-------------------|---------------------|-------------------|----------------------|------------------------|---------------------------|
| 15.00 | 15.00 | 48.62 | 1.623 | 1.150 | 1-S2n | 1.166 | 1.176 | 1.166 | 0.722 | 4.685 | 4.677 |
| 15.70 | 15.70 | 48.66 | 1.664 | 1.185 | 1-S2n | 1.196 | 1.205 | 1.196 | 0.740 | 4.738 | 4.738 |
| 16.40 | 16.40 | 48.70 | 1.705 | 1.219 | 1-S2n | 1.227 | 1.233 | 1.227 | 0.757 | 4.788 | 4.799 |
| 17.10 | 17.10 | 48.74 | 1.745 | 1.253 | 1-S2n | 1.257 | 1.260 | 1.257 | 0.774 | 4.835 | 4.856 |
| 17.70 | 17.70 | 49.00 | 1.783 | 1.999 | 2-M2c | 1.282 | 1.280 | 1.280 | 0.788 | 5.558 | 4.905 |
| 18.50 | 18.50 | 49.05 | 1.834 | 2.047 | 2-M2c | 1.312 | 1.310 | 1.310 | 0.807 | 5.627 | 4.967 |
| 19.20 | 19.20 | 49.09 | 1.878 | 2.089 | 2-M2c | 1.338 | 1.337 | 1.337 | 0.823 | 5.685 | 5.019 |
| 19.90 | 19.90 | 49.13 | 1.921 | 2.130 | 2-M2c | 1.365 | 1.362 | 1.362 | 0.839 | 5.743 | 5.070 |
| 20.60 | 20.60 | 49.17 | 1.964 | 2.170 | 2-M2c | 1.391 | 1.388 | 1.388 | 0.854 | 5.800 | 5.120 |
| 21.30 | 21.30 | 49.21 | 2.006 | 2.210 | 2-M2c | 1.418 | 1.413 | 1.413 | 0.870 | 5.856 | 5.169 |
| 22.00 | 22.00 | 49.25 | 2.047 | 2.248 | 2-M2c | 1.444 | 1.434 | 1.434 | 0.885 | 5.929 | 5.215 |

Straight Culvert
Inlet Elevation (invert): 47.00 ft, Outlet Elevation (invert): 46.91 ft
Culvert Length: 40.00 ft, Culvert Slope: 0.0023

Culvert Performance Curve Plot: 114+90OutletSection

Performance Curve

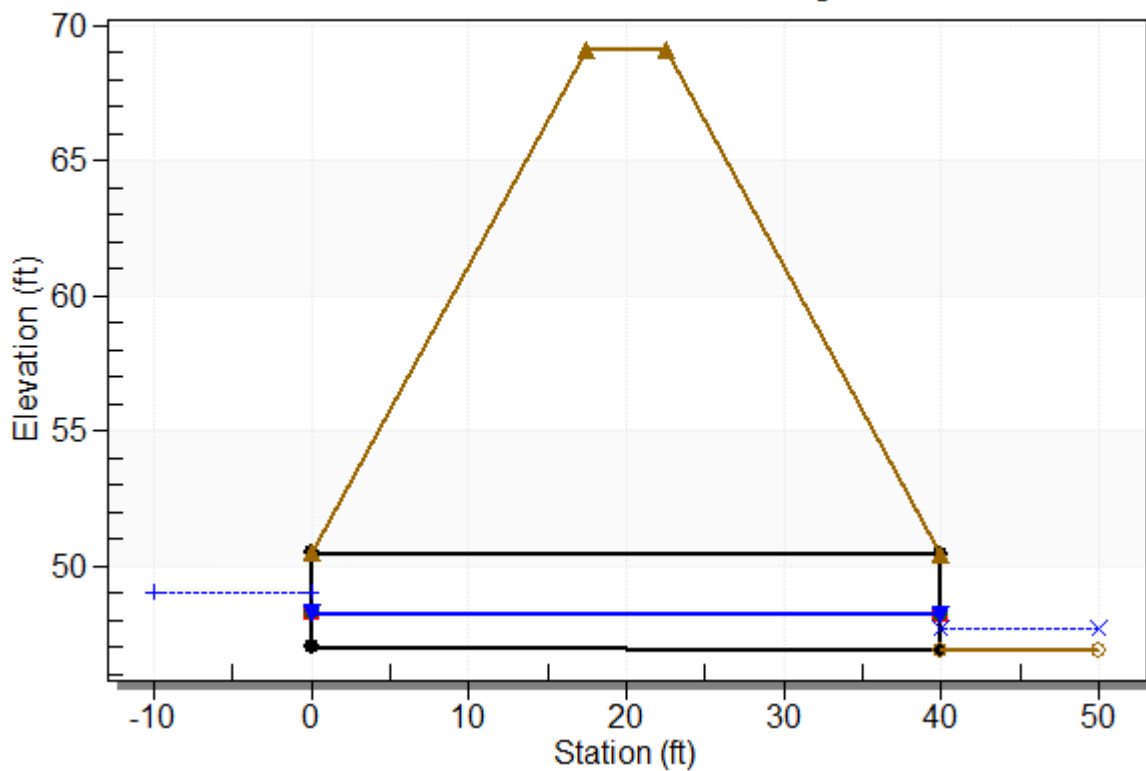
Culvert: 114+90OutletSection



Water Surface Profile Plot for Culvert: 114+90OutletSection

Crossing - Crossing 12, Design Discharge - 17.7 cfs

Culvert - 114+90OutletSection, Culvert Discharge - 17.7 cfs



Site Data - 114+90OutletSection

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 47.00 ft

Outlet Station: 40.00 ft

Outlet Elevation: 46.91 ft

Number of Barrels: 1

Culvert Data Summary - 114+90OutletSection

Barrel Shape: Circular

Barrel Diameter: 3.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Table 36 - Downstream Channel Rating Curve (Crossing: Crossing 12)

| Flow (cfs) | Water Surface Elev (ft) | Depth (ft) | Velocity (ft/s) | Shear (psf) | Froude Number |
|------------|-------------------------|------------|-----------------|-------------|---------------|
| 15.00 | 47.63 | 0.72 | 4.68 | 2.70 | 1.12 |
| 15.70 | 47.65 | 0.74 | 4.74 | 2.77 | 1.12 |
| 16.40 | 47.67 | 0.76 | 4.80 | 2.83 | 1.12 |
| 17.10 | 47.68 | 0.77 | 4.86 | 2.90 | 1.13 |
| 17.70 | 47.70 | 0.79 | 4.90 | 2.95 | 1.13 |
| 18.50 | 47.72 | 0.81 | 4.97 | 3.02 | 1.13 |
| 19.20 | 47.73 | 0.82 | 5.02 | 3.08 | 1.13 |
| 19.90 | 47.75 | 0.84 | 5.07 | 3.14 | 1.14 |
| 20.60 | 47.76 | 0.85 | 5.12 | 3.20 | 1.14 |
| 21.30 | 47.78 | 0.87 | 5.17 | 3.26 | 1.14 |
| 22.00 | 47.79 | 0.88 | 5.22 | 3.31 | 1.14 |

Tailwater Channel Data - Crossing 12

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 3.00 ft

Side Slope (H:V): 2.00 (2:1)

Channel Slope: 0.0600

Channel Manning's n: 0.0500

Channel Invert Elevation: 46.91 ft

Roadway Data for Crossing: Crossing 12

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 10.00 ft

Crest Elevation: 69.12 ft

Roadway Surface: Paved

Roadway Top Width: 5.00 ft

Project:

Camden

PIN:

18283.00

Town:

Camden Rt1

Prepared by:

A. Mann

Date:

8/11/2017

USGS Quad:

Peak Flow Calculations by USGS Small Watershed Regression Equations (Lombard & Hodgkins, 2015)

Units

US

US or metric

| Area | ID | Station | Area ac | NWI Wetland % | Length (10/85) mi | Δ Elev ft | Benson Slope ft/mi | Q ₂ | Q ₅ | Q ₁₀ | Q ₂₅ | Q ₅₀ | Q ₁₀₀ | Warnings | | Remarks |
|------|---------------------|--------------|------------|---------------------|-------------------------|--------------|--------------------------|----------------|----------------|-----------------|-----------------|-----------------|------------------|----------|-------|--|
| | | | | | | | | ft3/s | ft3/s | ft3/s | ft3/s | ft3/s | ft3/s | Area | Slope | |
| | 1 | 79+80 | 59.28 | 0.51 | | | | 9.32 | 14.70 | 18.72 | 24.28 | 28.69 | 33.47 | X | | |
| | 2 | 87+75 | 170.65 | | | | | 22.18 | 35.23 | 45.02 | 58.58 | 69.43 | 81.09 | X | | |
| | 2.5 | 92+45 | 2.82 | | | | | 0.82 | 1.28 | 1.62 | 2.08 | 2.44 | 2.84 | X | | |
| | 3 | 95+65 | 23.29 | | | | | 4.48 | 7.04 | 8.95 | 11.58 | 13.67 | 15.94 | X | | |
| | 4 | 100+80 | 9.16 | | | | | 2.12 | 3.31 | 4.20 | 5.42 | 6.38 | 7.44 | X | | |
| | 4.5 | 105+00Lt | 23.97 | | | | | 4.59 | 7.20 | 9.17 | 11.85 | 14.00 | 16.31 | X | | |
| | 5 | 121+10 | 7.33 | 0.68 | | | | 1.73 | 2.69 | 3.41 | 4.40 | 5.17 | 6.02 | X | | |
| | 5.5 | 124+10 | 7.33 | | | | | 1.77 | 2.76 | 3.51 | 4.52 | 5.32 | 6.20 | X | | |
| | 6 | 127+70 | 6.07 | | | | | 1.52 | 2.37 | 3.01 | 3.87 | 4.56 | 5.31 | X | | |
| | 6.5 | 129+95 | 10.23 | | | | | 2.31 | 3.61 | 4.59 | 5.92 | 6.98 | 8.13 | X | | |
| | 7 | 134+05 | 7.49 | | | | | 1.80 | 2.81 | 3.57 | 4.60 | 5.42 | 6.31 | X | | |
| | 8 | 137+02 | 7.92 | | | | | 1.89 | 2.94 | 3.73 | 4.81 | 5.67 | 6.60 | X | | |
| | 9 | 139+99 | 16.97 | 11.00 | | | | 2.38 | 3.63 | 4.50 | 5.82 | 6.69 | 7.80 | X | | |
| | 10 | 146+07 | 28.25 | 20.00 | | | | 2.62 | 3.94 | 4.79 | 6.19 | 6.99 | 8.14 | X | | |
| | 11 | 155+45 | 74.13 | 2.73 | | | | 10.33 | 16.23 | 20.58 | 26.70 | 31.40 | 36.64 | X | | |
| | Bridge 2 | 156+95 | | | | | | | | | | | | | | |
| | Ditch to Box 2 | 90+50Lt | 34.10 | | | | | 6.09 | 9.58 | 12.20 | 15.79 | 18.66 | 21.76 | X | | |
| | Ditch to Bridge 1 | 110+00Lt | 16.99 | | | | | 3.48 | 5.45 | 6.93 | 8.96 | 10.57 | 12.31 | X | | |
| | | | | | | | | | | | | | | | | |
| | 6 | 127+70 | 6.07 | | | | | 1.52 | 2.37 | 3.01 | 3.87 | 4.56 | 5.31 | X | | |
| | 6 +5.5 | 124+00 | 13.40 | | | | | 2.88 | 4.50 | 5.72 | 7.38 | 8.71 | 10.14 | X | | |
| | 6+5.5+5 | 121+10 | 20.73 | 0.24 | | | | 4.05 | 6.35 | 8.07 | 10.43 | 12.31 | 14.34 | X | | |
| | 6+5.5+5+5A | 115+00 | 26.74 | 0.19 | | | | 4.98 | 7.81 | 9.94 | 12.86 | 15.18 | 17.70 | X | | |
| | | 140+00 | 29.59 | | | | | 5.43 | 8.54 | 10.87 | 14.07 | 16.62 | 19.38 | X | | |
| | Drive Pipe Addition | 103+10Rt | 1.36 | | | | | 0.46 | 0.71 | 0.89 | 1.15 | 1.35 | 1.56 | X | | |
| | Drive Pipe Total | 103+10Rt | 24.65 | | | | | 4.69 | 7.36 | 9.37 | 12.13 | 14.32 | 16.69 | X | | |
| | CB with drive pipe | overflow, | 1.22 | | | | | 0.42 | 0.65 | 0.82 | 1.05 | 1.23 | 1.43 | X | | |
| | Drivepipe to CB13 | 140+45Rt | 0.26 | | | | | 0.12 | 0.18 | 0.23 | 0.30 | 0.35 | 0.40 | X | | |
| | Drivepipe to CB10 | 115+25Rt | 0.46 | | | | | 0.19 | 0.29 | 0.37 | 0.47 | 0.55 | 0.64 | X | | |
| | CB1 | 88+80Lt | 0.10 | | | | | 0.06 | 0.09 | 0.11 | 0.14 | 0.16 | 0.19 | X | | |
| | CB2 | 90+50Lt | 0.59 | | | | | 0.23 | 0.36 | 0.45 | 0.58 | 0.68 | 0.79 | X | | |
| | CB3 | 91+75Rt | 0.05 | | | | | 0.03 | 0.05 | 0.06 | 0.08 | 0.09 | 0.11 | X | | |
| | CB4 | 91+75Rt | 0.04 | | | | | 0.03 | 0.04 | 0.05 | 0.07 | 0.08 | 0.09 | X | | F Basin |
| | CB5 | 95+40Lt | 23.29 | | | | | 4.48 | 7.03 | 8.95 | 11.58 | 13.67 | 15.93 | X | | Special Catch Basin in the ditch (Crosspipe 3) |
| | CB6 | 95+50Rt | 0.00 | | | | | | | | | | | | | My receive some flow but no curb |
| | CB7 | 104+98Lt | 23.97 | | | | | 4.59 | 7.20 | 9.16 | 11.85 | 13.99 | 16.31 | X | | Special Catch Basin in the ditch (Crosspipe 4.5) |
| | CB8 | 105+45LT | 1.26 | | | | | 0.43 | 0.66 | 0.84 | 1.08 | 1.26 | 1.47 | X | | Primarily to catch overflow water in ditch |
| | CB9 | 111+50 | 0.00 | | | | | | | | | | | | | Manhole Junction |
| | CB10 | 114+50Rt | 0.00 | | | | | | | | | | | | | Manhole Junction |
| | CB11 | 134+10Lt | 0.10 | | | | | 0.06 | 0.09 | 0.11 | 0.14 | 0.16 | 0.18 | X | | |
| | CB12 | 134+10Lt Swa | 7.40 | | | | | 1.78 | 2.78 | 3.53 | 4.55 | 5.36 | 6.24 | X | | Swale CB (Crosspipe 7) |
| | CB13 | 140+00Rt | 0.00 | | | | | | | | | | | | | Junction and sediment trap |
| | CB14 | 147+20Lt | 0.53 | | | | | 0.21 | 0.33 | 0.42 | 0.53 | 0.62 | 0.72 | X | | |
| | CB15 | 148+80Lt | 0.09 | | | | | 0.05 | 0.08 | 0.10 | 0.12 | 0.15 | 0.17 | X | | |
| | CB16 | 148+80Lt Swa | 0.39 | | | | | 0.17 | 0.26 | 0.32 | 0.41 | 0.49 | 0.56 | X | | |
| | CB17 | 150+52Rt | 0.04 | | | | | 0.03 | 0.04 | 0.05 | 0.07 | 0.08 | 0.09 | X | | |
| | CB18 | 150+55Lt | 0.11 | | | | | 0.06 | 0.09 | 0.11 | 0.14 | 0.17 | 0.20 | X | | |
| | CB19 | 152+50Lt | 0.02 | | | | | 0.02 | 0.03 | 0.03 | 0.04 | 0.05 | 0.05 | X | | |
| | CB20 | 154+45Rt | 0.39 | | | | | 0.17 | 0.26 | 0.33 | 0.42 | 0.49 | 0.57 | X | | |
| | CB21 | 155+00Lt | 0.00 | | | | | | | | | | | | | Some flow but no curb |