

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

| LEVEL | VEHICLE | WEIGHT (W) (TONS) | CONTROLLING LOAD RATING # | MINIMUM RATING FACTORS (RF) | TONS = W x RF | STRENGTH I LIMIT STATE | | | | | | | | COMMENT NUMBER | | |
|--------------------------|--------------------------------------|----------------------|---------------------------------|-----------------------------------|---------------|---------------------------|---------------|-------------|-----------------|--|---------------|----------|-----------------|----------------|--|--|
| | | | | | | MOMENT | | | | SHEAR | | | | | | |
| | | | | | | LIVE-LOAD FACTORS (LL) | RATING FACTOR | BOX NO. | ELEMENT TYPE | DISTANCE FROM LEFT END OF ELEMENT (ft) | RATING FACTOR | BOX NO. | ELEMENT TYPE | | DISTANCE FROM LEFT END OF ELEMENT (ft) | |
| DESIGN LOAD RATING | HL-93 (INVENTORY) | N/A | ① | 1.32 | -- | 1.75 | 2.50 | 1 | TOP SLAB | 3.45 | 1.32 | 1 | TOP SLAB | 6.85 | | |
| | HL-93 (OPERATING) | N/A | | 1.71 | -- | 1.35 | 3.24 | 1 | TOP SLAB | 3.45 | 1.71 | 1 | TOP SLAB | 6.85 | | |
| | HS-20 (INVENTORY) | 36.00 | ② | 1.97 | 70.98 | 1.75 | 3.64 | 1 | TOP SLAB | 3.45 | 1.97 | 1 | TOP SLAB | 6.85 | | |
| | HS-20 (OPERATING) | 36.00 | | 2.56 | 92.01 | 1.35 | 4.72 | 1 | TOP SLAB | 3.45 | 2.56 | 1 | TOP SLAB | 6.85 | | |
| LEGAL LOAD RATING | SINGLE VEHICLE (SV) | SNSH | 13.50 | | 3.52 | 47.58 | 1.40 | 6.58 | 1 | TOP SLAB | 3.45 | 3.52 | 1 | TOP SLAB | 6.85 | |
| | | SNGARBS2 | 20.00 | | 3.33 | 66.59 | 1.40 | 6.19 | 1 | TOP SLAB | 3.45 | 3.33 | 1 | TOP SLAB | 6.85 | |
| | | SNAGRIS2 | 22.00 | | 3.52 | 77.54 | 1.40 | 6.58 | 1 | TOP SLAB | 3.45 | 3.52 | 1 | TOP SLAB | 6.85 | |
| | | SNCOTTS3 | 27.25 | ③ | 1.63 | 44.41 | 1.40 | 3.12 | 1 | TOP SLAB | 3.45 | 1.63 | 1 | TOP SLAB | 6.85 | |
| | | SNAGGRS4 | 34.93 | | 1.92 | 66.97 | 1.40 | 3.38 | 1 | BOTTOM SLAB | 7.09 | 1.92 | 1 | TOP SLAB | 6.85 | |
| | | SNS5A | 35.55 | | 1.77 | 62.97 | 1.40 | 3.16 | 1 | BOTTOM SLAB | 7.09 | 1.77 | 1 | TOP SLAB | 6.85 | |
| | | SNS6A | 39.95 | | 1.79 | 71.47 | 1.40 | 3.16 | 1 | BOTTOM SLAB | 7.09 | 1.79 | 1 | TOP SLAB | 6.85 | |
| | | SNS7B | 42.00 | | 1.79 | 75.14 | 1.40 | 3.16 | 1 | BOTTOM SLAB | 7.09 | 1.79 | 1 | TOP SLAB | 6.85 | |
| | TRUCK TRACTOR SEMI-TRAILER (TTST) | TNAGRIT3 | 33.00 | | 2.57 | 84.92 | 1.40 | 4.64 | 1 | BOTTOM SLAB | 7.09 | 2.57 | 1 | BOTTOM SLAB | 6.85 | |
| | | TNT4A | 33.08 | | 1.94 | 64.17 | 1.40 | 3.70 | 1 | BOTTOM SLAB | 7.09 | 1.94 | 1 | TOP SLAB | 6.85 | |
| | | TNT6A | 41.60 | | 1.88 | 78.33 | 1.40 | 3.41 | 1 | BOTTOM SLAB | 7.09 | 1.88 | 1 | TOP SLAB | 6.85 | |
| | | TNT7A | 42.00 | | 1.94 | 81.34 | 1.40 | 3.77 | 1 | BOTTOM SLAB | 7.09 | 1.94 | 1 | TOP SLAB | 6.85 | |
| | | TNT7B | 42.00 | | 1.87 | 78.59 | 1.40 | 3.27 | 1 | BOTTOM SLAB | 7.09 | 1.87 | 1 | BOTTOM SLAB | 6.85 | |
| | | TNAGRIT4 | 43.00 | | 1.85 | 79.63 | 1.40 | 3.29 | 1 | BOTTOM SLAB | 7.09 | 1.85 | 1 | TOP SLAB | 6.85 | |
| TNAGT5A | 45.00 | | 1.89 | 85.26 | 1.40 | 3.38 | 1 | BOTTOM SLAB | 7.09 | 1.89 | 1 | TOP SLAB | 6.85 | | | |
| TNAGT5B | 45.00 | | 1.90 | 85.49 | 1.40 | 3.44 | 1 | BOTTOM SLAB | 7.09 | 1.90 | 1 | TOP SLAB | 6.85 | | | |

LOAD FACTORS:

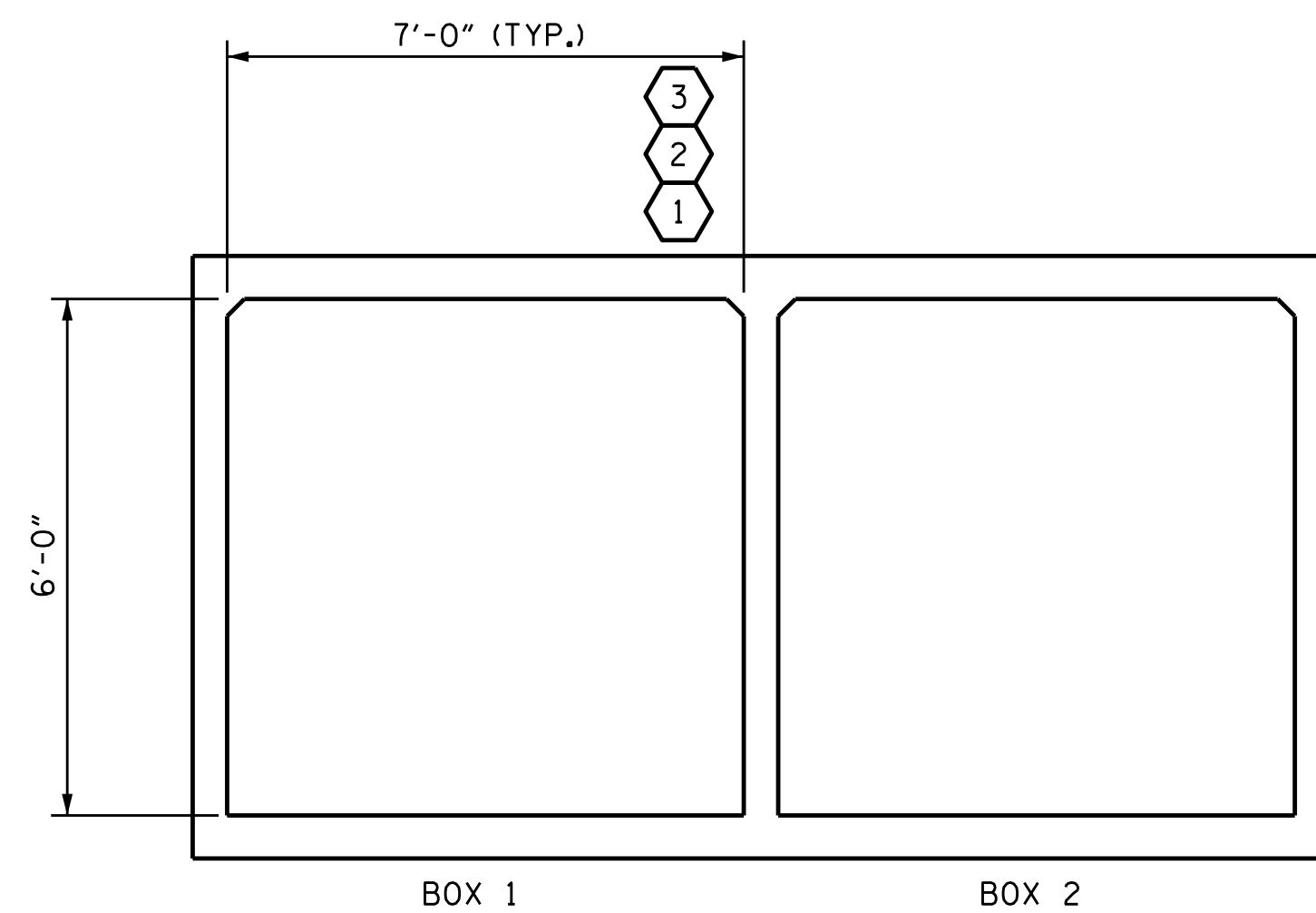
DESIGN LOAD RATING FACTORS

| LOAD TYPE | MAX FACTOR | MIN FACTOR |
|-----------|------------|------------|
| DC | 1.25 | 0.90 |
| DW | 1.50 | 0.65 |
| EV | 1.30 | 0.90 |
| EH | 1.35 | 0.90 |
| ES | 1.35 | 0.90 |
| LS | 1.75 | -- |
| WA | 1.00 | -- |

NOTE:

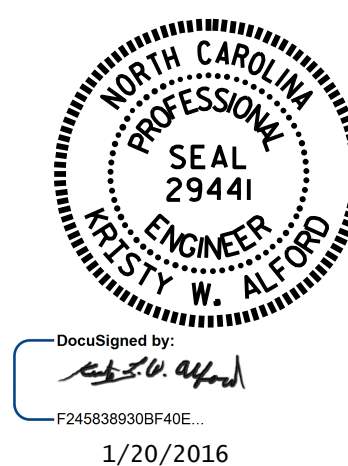
RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

| | |
|-------------------------------|----------------------------|
| # | CONTROLLING LOAD RATING |
| ① | DESIGN LOAD RATING (HL-93) |
| ② | DESIGN LOAD RATING (HS-20) |
| ③ | LEGAL LOAD RATING ** |
| ** SEE CHART FOR VEHICLE TYPE | |



LRFR SUMMARY
(LOOKING DOWNSTREAM)

PROJECT NO. B-5128
RANDOLPH COUNTY
 STATION: 13+78.00 -L-



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 LRFR SUMMARY FOR
 REINFORCED CONCRETE
 BOX CULVERTS
 (NON-INTERSTATE TRAFFIC)

| | |
|---|-----------------|
| ASSEMBLED BY : <i>William J. Parker</i> | DATE : 10/20/14 |
| CHECKED BY : T.L. AVERETTE | DATE : 1/20/15 |
| DRAWN BY : WMC | 7/11 |
| CHECKED BY : GM | 7/11 |
| REV. 10/1/11 | MAA/GM |

| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|-------------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | C-4 |
| 1 | | | 3 | | | TOTAL SHEETS 4 |
| 2 | | | 4 | | | |

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED