

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 × RF | STRENGTH I LIMIT STATE | | | | | | | | COMMENT NUMBER | | |
|--------------------|-----------------------------------|----------------------|---------------------------------|-----------------------------------|---------------|--|---------------|-------------|--------------|--|---------------|----------|--------------|----------------|--|--|
| | | | | | | LIVE-LOAD FACTORS (γ _L) | MOMENT | | | | SHEAR | | | | | |
| | | | | | | | 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 | 1.05 | -- | 1.75 | 1.35 | 1 | TOP SLAB | 3.40 | 1.05 | 1 | TOP SLAB | 6.88 | | |
| | HL-93 (OPERATING) | N/A | | 1.36 | -- | 1.35 | 1.75 | 1 | TOP SLAB | 3.40 | 1.36 | 1 | TOP SLAB | 6.88 | | |
| | HS-20 (INVENTORY) | 36,000 | ② | 1.19 | 42.84 | 1.75 | 1.41 | 1 | TOP SLAB | 3.40 | 1.19 | 1 | TOP SLAB | 6.88 | | |
| | HS-20 (OPERATING) | 36,000 | | 1.54 | 55.44 | 1.35 | 1.83 | 1 | TOP SLAB | 3.40 | 1.54 | 1 | TOP SLAB | 6.88 | | |
| LEGAL LOAD RATING | SINGLE VEHICLE (SV) | SNSH | 13,500 | | 2.21 | 29.84 | 1.40 | 2.58 | 1 | TOP SLAB | 3.40 | 2.21 | 1 | TOP SLAB | 6.88 | |
| | | SNGARBS2 | 20,000 | | 2.07 | 41.40 | 1.40 | 2.41 | 1 | TOP SLAB | 3.40 | 2.07 | 1 | TOP SLAB | 6.88 | |
| | | SNAGRIS2 | 22,000 | | 2.21 | 48.62 | 1.40 | 2.57 | 1 | TOP SLAB | 3.40 | 2.21 | 1 | TOP SLAB | 6.88 | |
| | | SNCOTTS3 | 27,250 | ③ | 1.33 | 36.24 | 1.40 | 2.08 | 1 | TOP SLAB | 3.40 | 1.33 | 1 | TOP SLAB | 6.88 | |
| | | SNAGGRS4 | 34,925 | | 1.69 | 59.02 | 1.40 | 2.30 | 1 | BOTTOM SLAB | 7.67 | 1.69 | 1 | TOP SLAB | 6.88 | |
| | | SNS5A | 35,550 | | 1.55 | 55.10 | 1.40 | 2.16 | 1 | BOTTOM SLAB | 7.67 | 1.55 | 1 | TOP SLAB | 6.88 | |
| | | SNS6A | 39,950 | | 1.54 | 61.52 | 1.40 | 2.09 | 1 | BOTTOM SLAB | 7.67 | 1.54 | 1 | TOP SLAB | 6.88 | |
| | | SNS7B | 42,000 | | 1.53 | 64.26 | 1.40 | 2.09 | 1 | BOTTOM SLAB | 7.67 | 1.53 | 1 | TOP SLAB | 6.88 | |
| | TRUCK TRACTOR SEMI-TRAILER (TTST) | TNAGRIT3 | 33,000 | | 2.14 | 70.62 | 1.40 | 2.57 | 1 | TOP SLAB | 3.40 | 2.14 | 1 | TOP SLAB | 6.88 | |
| | | TNT4A | 33,075 | | 1.58 | 52.26 | 1.40 | 2.24 | 1 | BOTTOM SLAB | 7.67 | 1.58 | 1 | TOP SLAB | 6.88 | |
| | | TNT6A | 41,600 | | 1.55 | 64.48 | 1.40 | 2.30 | 1 | BOTTOM SLAB | 7.67 | 1.55 | 1 | TOP SLAB | 6.88 | |
| | | TNT7A | 42,000 | | 1.57 | 65.94 | 1.40 | 2.27 | 1 | BOTTOM SLAB | 7.67 | 1.57 | 1 | TOP SLAB | 6.88 | |
| | | TNT7B | 42,000 | | 1.56 | 65.52 | 1.40 | 2.10 | 1 | BOTTOM SLAB | 7.67 | 1.56 | 1 | TOP SLAB | 6.88 | |
| | | TNAGRIT4 | 43,000 | | 1.58 | 67.94 | 1.40 | 1.92 | 1 | BOTTOM SLAB | 7.67 | 1.58 | 1 | TOP SLAB | 6.88 | |
| TNAGT5A | 45,000 | | 1.58 | 71.10 | 1.40 | 1.92 | 1 | BOTTOM SLAB | 7.67 | 1.58 | 1 | TOP SLAB | 6.88 | | | |
| TNAGT5B | 45,000 | | 1.58 | 71.10 | 1.40 | 1.95 | 1 | BOTTOM SLAB | 7.67 | 1.58 | 1 | TOP SLAB | 6.88 | | | |

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 | -- |

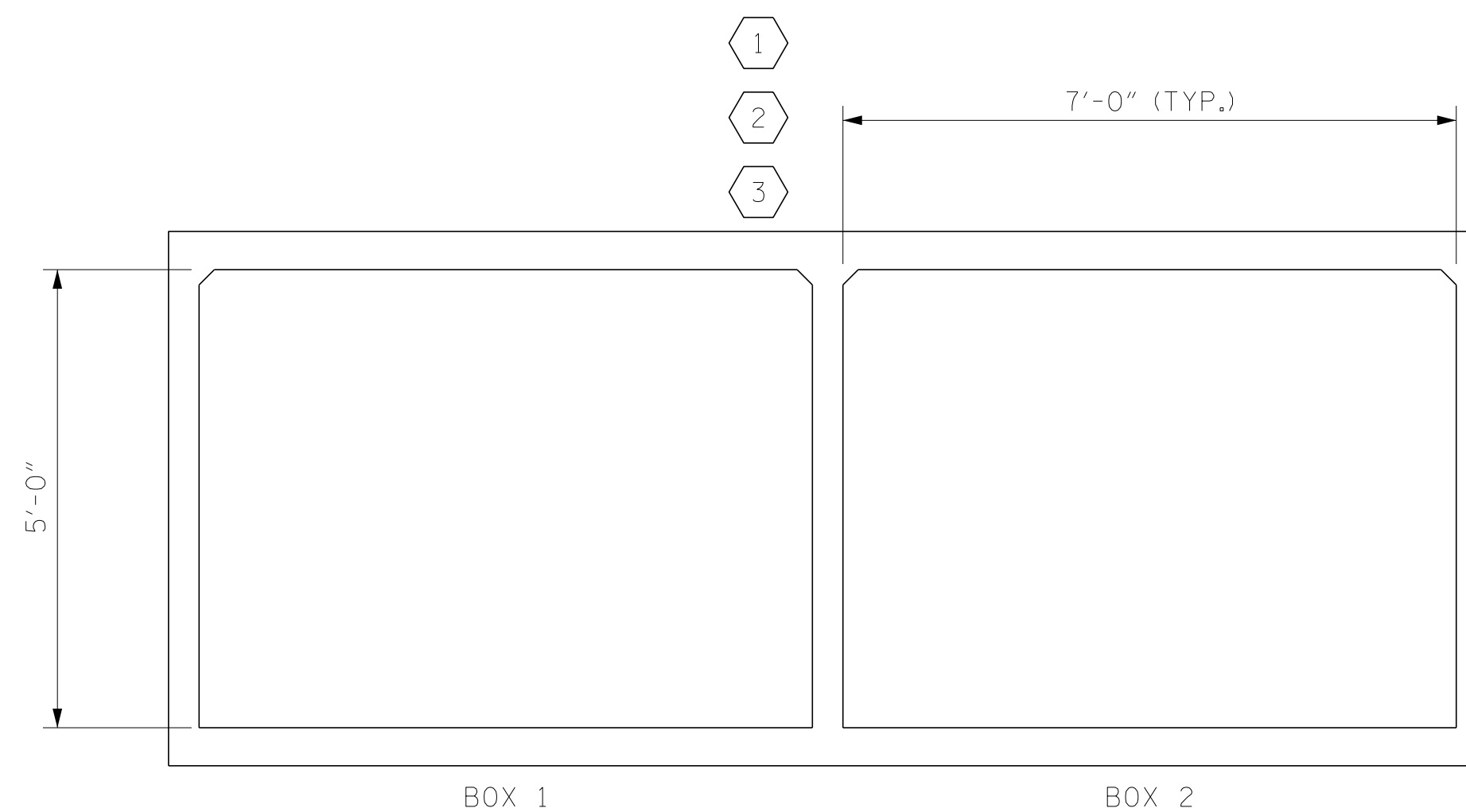
NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

- 1.
- 2.
- 3.
- 4.

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



PROJECT NO. R-4705
MARTIN COUNTY
 STATION: 53+70.00 -L-

SHEET 2 OF 5

| ENGINEER OF RECORD 4/30/2019 John Arthur Dilworth WETHERILL ENGINEERING | STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH STANDARD LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS (NON-INTERSTATE TRAFFIC) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|-----------|-----|-----|-------|----------------------|--|-----------|-----|-----|-------|-----|-----|-------|--|---|--|--|---|--|--|----------------------|---|--|--|---|--|--|
| 1223 Jones Franklin Rd. Raleigh, N.C. 27606 Bus: 919 851 8077 Fax: 919 851 8107 LICENSE NO. F-4377 | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="6">REVISIONS</th> <th>SHEET NO.</th> </tr> <tr> <th>NO.</th> <th>BY:</th> <th>DATE:</th> <th>NO.</th> <th>BY:</th> <th>DATE:</th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td></td> <td>3</td> <td></td> <td></td> <td rowspan="2">C2 TOTAL SHEETS 5</td> </tr> <tr> <td>2</td> <td></td> <td></td> <td>4</td> <td></td> <td></td> </tr> </tbody> </table> | REVISIONS | | | | | | SHEET NO. | NO. | BY: | DATE: | NO. | BY: | DATE: | | 1 | | | 3 | | | C2 TOTAL SHEETS 5 | 2 | | | 4 | | |
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| NO. | BY: | DATE: | NO. | BY: | DATE: | | | | | | | | | | | | | | | | | | | | | | | |
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| 2 | | | 4 | | | | | | | | | | | | | | | | | | | | | | | | | |

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UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : A.J. KLINK DATE : 11/18
 CHECKED BY : J.A. DILWORTH DATE : 11/18