SEE INDEX OF SHEETS & LIST OF STANDARDS ON SHEET 2

VT STATE PLANE GRID N

# STATE OF VERMONT
# AGENCY OF TRANSPORTATION

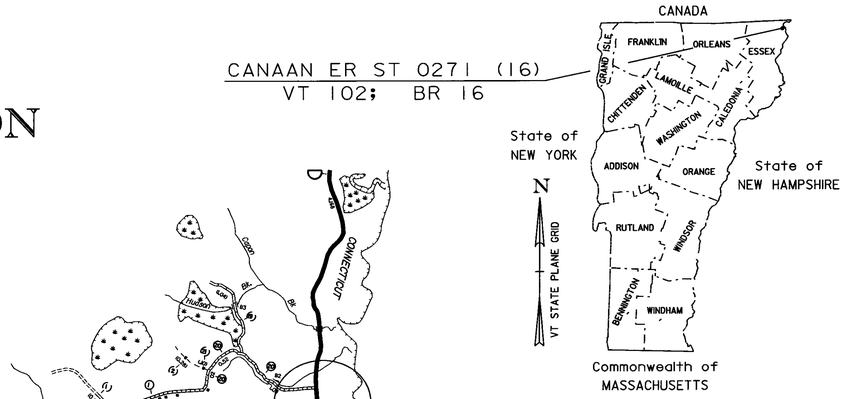
PROJECT LOCATION : BEGINNING AT A POINT ON VT 102 APPROXIMATELY 2.0 MILES NORTH OF ITS JUNCTION WITH VT 26 AND PROCEEDING NORTHERLY APPROXIMATELY 0.1 MILES ALONG VT 102.

PROJECT DESCRIPTION : CONSTRUCT A NEW BRIDGE ON THE EXISTING ALIGNMENT, INCLUDING RELATED CHANNEL AND ROADWAY APPROACH WORK.

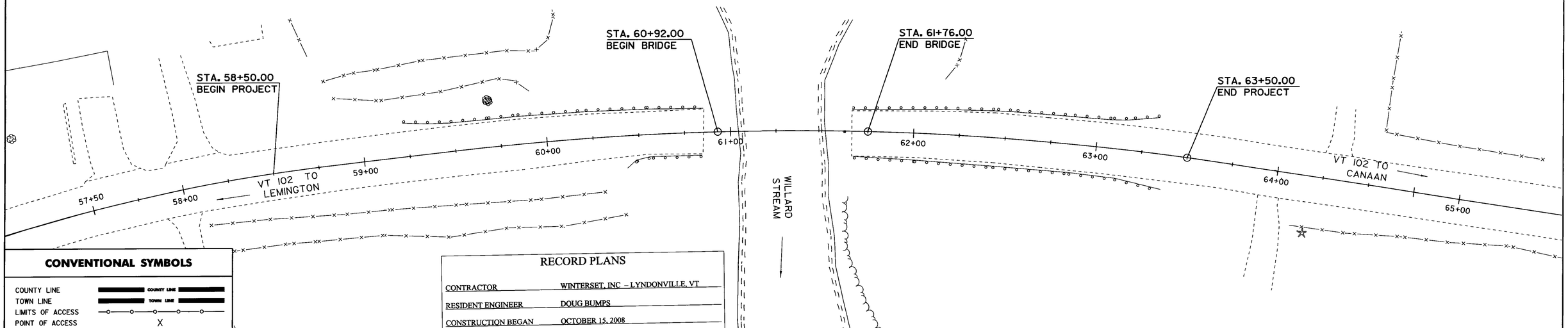
LENGTH OF STRUCTURE : 84 FEET.
LENGTH OF ROADWAY : 416 FEET.
LENGTH OF PROJECT : 500 FEET.

# PROPOSED IMPROVEMENT
# BRIDGE PROJECT
# TOWN OF CANAAN
# COUNTY OF ESSEX
# VT. 102 (MAJOR COLLECTOR)
# BRIDGE #16

CANAAN ER ST 0271 (16)
VT 102; BR 16




CANAAN ER ST 0271 (16)
VT 102; BR 16




## CONVENTIONAL SYMBOLS

COUNTY LINE
TOWN LINE
LIMITS OF ACCESS
POINT OF ACCESS
FENCE LINE
STONE WALL
TRAVELED WAY
GUARD RAIL
RAILROAD
SURVEY LINE
CULVERT
POWER POLE
TELEPHONE POLE
TREES
CONTROL OF ACCESS
PROPERTY LINE
R.O.W. TAKING LINE
SLOPE RIGHTS (SR SR SR)
TOP OF CUT
TOE OF SLOPE

SURVEYED BY : R. GILMAN
SURVEYED DATE : OCT. 19, 2004

DATUM
VERTICAL: NAVD 88
HORIZONTAL: NAD 83 (96)

## RECORD PLANS

| | |
|---|---|
| CONTRACTOR | WINTERSET, INC – LYNDONVILLE, VT |
| RESIDENT ENGINEER | DOUG BUMPS |
| CONSTRUCTION BEGAN | OCTOBER 15, 2008 |
| CONSTRUCTION COMPLETE | AUGUST 3, 2009 |
| RECORD PLANS BY | DOUG BUMPS & C PIERCE |

I HEREBY CERTIFY THAT ALL THE CONSTUCTION REQUIRED BY THIS SET OF DRAWINGS HAS BEEN ACCOMPLISHED AS INDICATED HEREIN

BY _____ RESIDENT ENGINEER

DATE 6/15/10

NOTE Any further information concerning final quantities, amounts or other details relative to this project may be found at Central Files in the electronic archives

SCALE 1" = 25'-0
25 0 25

THESE PLANS ARE SUBJECT TO SUCH ENGINEERING CHANGES AS MAY BE REQUIRED BY THE FEDERAL HIGHWAY ADMINISTRATION OR THE DIRECTOR OF PROGRAM DEVELOPMENT.

CONSTRUCTION IS TO BE CARRIED ON IN ACCORDANCE WITH THESE PLANS AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION DATED 2006, AS APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION ON JUNE 15, 2006 FOR USE ON THIS PROJECT, INCLUDING ALL SUBSEQUENT REVISIONS AND SUCH REVISED SPECIFICATIONS AND SPECIAL PROVISIONS AS ARE INCORPORATED IN THESE PLANS.

DIRECTOR OF PROGRAM DEVELOPMENT
APPROVED _____ DATE 7-28-08

PROJECT MANAGER : M. EVANS-MONGEON

PROJECT NAME : CANAAN
PROJECT NUMBER : ER ST 0271 (16)

SHEET 1 OF 66 SHEETS

STATE OF VERMONT
AGENCY OF TRANSPORTATION

# PRELIMINARY INFORMATION SHEET

## INDEX OF SHEETS


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4. TYPICAL SECTIONS SHEET 2
5. QUANTITY SHEET 1
6. QUANTITY SHEET 2
7. BRIDGE QUANTITY SHEET 1
8.-10. ROW SHEETS
11. SURVEY TIE SHEET
12. LAYOUT SHEET 1
13. LAYOUT SHEET 2
14. PROFILE SHEET #1
15. PROFILESHEET #2
16. EROSION CONTROL NARRATIVE
17. EXISTING CONDITIONS SITE PLAN 1
18. EXISTING CONDITIONS SITE PLAN 2
19. EROSION AND SEDIMENT CONTROL PLAN 1
20. EROSION AND SEDIMENT CONTROL PLAN 2
21. FINAL CONDITIONS SITE PLAN 1
22. FINAL CONDITIONS SITE PLAN 2
23. EROSION DETAIL SHEET 1
24. EROSION DETAIL SHEET 2
25. TEMPORARY DETOUR SHEET
26. TRAFFIC CONTROL SHEET 1
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28. BORING INFORMATION SHEET
29. BORING LOG SHEET 1
30. BORING LOG SHEET 2
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32. UTILITIES SHEET 1
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34. GENERAL NOTES
35. DECK REINFORCING PLAN
36. FRAMING PLAN
37. EXPANSION BEARING DETAIL
38. FIXED BEARING DETAIL
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40. BRIDGE END DETAILS
41. APPROACH SLAB DETAILS
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44. ABUTMENT #1 DETAILS
45. ABUTMENT #2 DETAILS
46. FOOTING REINFORCING PLANS
47. WING WALL DETAILS
48.-49. NETC RAIL DETAILS
50. DRY HYDRANT DETAIL
51. REINFORCING STEEL SCHEDULE
52.-61. VT 102 CROSS SECTIONS
62. BANKING DIAGRAM AND MATERIAL TRANSITION
63.-66. CHANNEL CROSS SECTIONS


## INDEX OF STANDARDS

| | | |
|---|---|---|
| E-100 | CONSTRUCTION APPROACH SIGNS | 1/2/2004 |
| E-101 | CONSTRUCTION SIGN DETAILS | 5/30/2003 |
| E-102 | CONSTRUCTION SIGN DETAILS | 6/30/2003 |
| E-102A | CONSTRUCTION SIGN DETAILS | 5/01/2004 |
| E-121 | STANDARD SIGN PLACEMENT | 8/8/1995 |
| E-134 | BRIDGE NUMBER PLAQUE | 8/8/1995 |
| E-160 | FLANGED CHANNEL STEEL SIGN POST | 5/20/1999 |
| E-191 | PAVEMENT MARKING DETAIL | 2/1/1999 |
| E-192 | PAVEMENT MARKING DETAILS | 10/12/2000 |
| E-198 | DELINEATORS AND MILEPOSTS | 4/1/2005 |
| G-1 | HEAVY DUTY STEEL BEAM GUARDRAIL | 1/3/2000 |
| G-1D | HEAVY DUTY STEEL BEAM GUARDRAIL | 1/3/2000 |

## FINAL HYDRAULIC REPORT

### HYDROLOGIC DATA

Date: Nov. 2006

DRAINAGE AREA : 15.4 sq. mi.
CHARACTER OF TERRAIN : Hilly to Mountainous
STREAM CHARACTERISTICS : Meandering, alluvial channel with some eroding stream banks.
NATURE OF STREAMBED : Silt, sand, gravel and cobbles

PEAK FLOW DATA

| | | | |
|---|---|---|---|
| Q 2.33 = | 1,000 cfs | Q 50 = | 2,160 cfs |
| Q 10 = | 1,500 cfs | Q 100 = | 2,500 cfs |
| Q 25 = | 1,850 cfs | Q 500 = | 3,340 cfs |

DATE OF FLOOD OF RECORD : Unknown
ESTIMATED DISCHARGE: Unknown
WATER SURFACE ELEV.: Unknown
NATURAL STREAM VELOCITY : @ Q50 = 2.8 fps
ICE CONDITIONS : Moderate
DEBRIS: Moderate
DOES THE STREAM REACH MAXIMUM HIGHWATER ELEV. RAPIDLY? Yes
IS ORDINARY RISE RAPID? Yes
IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? No
IF YES, DESCRIBE:

WATERSHED STORAGE: <1%
HEADWATERS:
UNIFORM: X
IMMEDIATELY ABOVE SITE:

### EXISTING STRUCTURE INFORMATION

STRUCTURE TYPE: A concrete arch was damaged in a flood in 2004 and removed.
YEAR BUILT: Built in 1900. Widened in 1973.
CLEAR SPAN(NORMAL TO STREAM): 35'
VERTICAL CLEARANCE ABOVE STREAMBED: 10'
WATERWAY OF FULL OPENING: 250 sq. ft.
DISPOSITION OF STRUCTURE: It has been removed.
TYPE OF MATERIAL UNDER SUBSTRUCTURE: See boring logs.

WATER SURFACE ELEVATIONS AT:

| | | | |
|---|---|---|---|
| Q2.33 = | See note 1. | VELOCITY = | See note 1. |
| Q10 = | 1015.7' | " | |
| Q25 = | | " | |
| Q50 = | 1017.6' | " | |
| Q100 = | 1018.5' | " | |

LONG TERM STREAMBED CHANGES: There is scour through the bridge area.
The stream is laterally unstable with areas of stream bank erosion.

IS THE ROADWAY OVERTOPPED BELOW Q100: No
FREQUENCY: Above Q100
RELIEF ELEVATION: 1021.7'
DISCHARGE OVER ROAD @Q100: None

### UPSTREAM STRUCTURE

TOWN: N.A. - The stream divides
DISTANCE:
HIGHWAY # :
STRUCTURE #:
CLEAR SPAN:
CLEAR HEIGHT:
YEAR BUILT:
FULL WATERWAY:
STRUCTURE TYPE:

### DOWNSTREAM STRUCTURE

TOWN: N.A. - Confluence with Connecticut River
DISTANCE: 4,000'
HIGHWAY # :
STRUCTURE #:
CLEAR SPAN:
CLEAR HEIGHT:
YEAR BUILT:
FULL WATERWAY:
STRUCTURE TYPE:

### SERVICE II LOAD RATING

| RATING FACTORS | LOAD FACTOR ANALYSIS | | | | | | |
|---|---|---|---|---|---|---|---|
| | HL-93 | 3S2 | 6 AXLE | 3 AXLE | 4 AXLE | 5 AXLE | |
| INVENTORY | 1.14 | 2.07 | 1.34 | 1.92 | 1.71 | 1.8 | |
| OPERATING | 1.48 | 2.69 | 1.75 | 2.50 | 2.23 | 2.34 | |
| | | | | | | | |

COMMENTS: LOAD RATED AS A BARE DECK.

### TRAFFIC DATA

| YEAR | ADT | DHV | % D | % T | ADTT |
|---|---|---|---|---|---|
| 2005 | 610 | 220 | 51 | 6 | 40 |
| 2025 | 790 | 240 | 51 | 10 | 80 |

20 year ESAL for flexible pavement from 2005 to 2025 : 320,000
40 year ESAL for flexible pavement from 2005 to 2045 : 787,000
Design Speed : 50 mph

### PROPOSED STRUCTURE

STRUCTURE TYPE: Single span steel beam bridge.

CLEAR SPAN(NORMAL TO STREAM): 80'
VERTICAL CLEARANCE ABOVE STREAMBED: 11' maximum
WATERWAY OF FULL OPENING: 660 sq. ft.

WATER SURFACE ELEVATIONS AT:

| | | | |
|---|---|---|---|
| Q2.33 = | 1014.7' | VELOCITY= | 2.7 fps |
| Q10 = | 1015.5' | " | 3.6 fps |
| Q25 = | 1016.0' | " | 4.0 fps |
| Q50 = | 1016.5' | " | 4.4 fps |
| Q100 = | 1017.0' | " | 4.7 fps |

IS THE ROADWAY OVERTOPPED BELOW Q100: No
FREQUENCY: Above Q100
RELIEF ELEVATION: 1022.8'
DISCHARGE OVER ROAD @Q100: None

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 1018.3
VERTICAL CLEARANCE: @ Q100 1.3'

SCOUR: Estimate 4' of contraction scour up to Q500, based on the fact that the scour hole under the bridge has been at least 4' deeper than when the project was surveyed.
REQUIRED CHANNEL PROTECTION: Stone Fill, Type III

### PERMIT INFORMATION

| | | |
|---|---|---|
| AVERAGE DAILY FLOW: | 30 cfs | |
| ORDINARY LOW WATER: | 15 cfs | DEPTH OR ELEVATION: Elevation 1011' |
| ORDINARY HIGH WATER: | 150 cfs | Elevation 1013' |

### TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: Temporary bridge already in use. It will be moved to a new alignment.
CLEAR SPAN (NORMAL TO STREAM): 80'
VERTICAL CLEARANCE ABOVE STREAMBED: Minimum low beam elev. 1017.0'
WATERWAY AREA OF FULL OPENING: Approximately 500 sq. ft.

### ADDITIONAL INFORMATION

Note 1 - There is not enough information available for the previous arch and preflood conditions to do an accurate hydraulic analysis of that structure. Information shown for the existing bridge is from records and the 1980 Flood Insurance Study. The new bridge has a larger span, so it will result in lower upstream water surface elevations and lower velocities than the previous arch.

### DESIGN CRITERIA

1. DESIGN LIVE LOAD AASHTO HL-93
2. DESIGN SPAN 82 Feet centerline to centerline of bearing
3. ALLOWABLE LOAD FOR SPREAD FOOTINGS ON SOIL 2.5 ksf
   ON LEDGE not applicable
4. ALLOWABLE LOAD FOR PILING not applicable
   TYPE
   ESTIMATED LENGTH
5. STRUCTURAL STEEL AASHTO GRADE 50 (painted)
6. REINFORCING STEEL GRADE 60
7. SPECIAL PROVISION (HIGH PERFORMANCE CONCRETE
   CLASS A LOW CEMENT) f'c : 4000 psi
   CONCRETE CLASS B (HPC-B) f'c : 3500 psi
8. SOIL UNIT WEIGHT 140 pcf Dry Unit wt.
9. DESIGN LOAD FOR SPREAD FOOTINGS ON SOIL 2.5 ksf

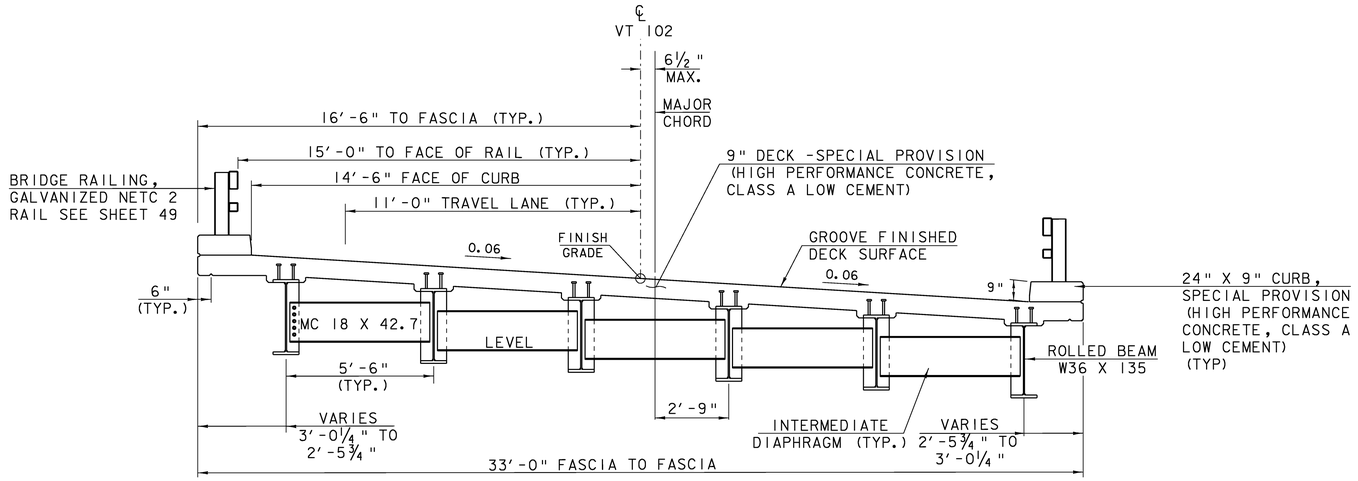
### TRAFFIC MAINTENANCE

1. IS TRAFFIC TO BE MAINTAINED? yes
   IF YES, ON EXISTING STRUCTURE? not applicable
   OR ON TEMPORARY BRIDGE? yes
   ONE OR TWO-WAY TRAVEL? two - way
2. TRAFFIC CONTROL SIGNALS REQUIRED? no
3. ARE SIDEWALKS REQUIRED? no
   IF SO, ON WHAT SIDE? not applicable

PROJECT NAME: **CANAAN**
PROJECT NUMBER: **ER ST 0271(16)**

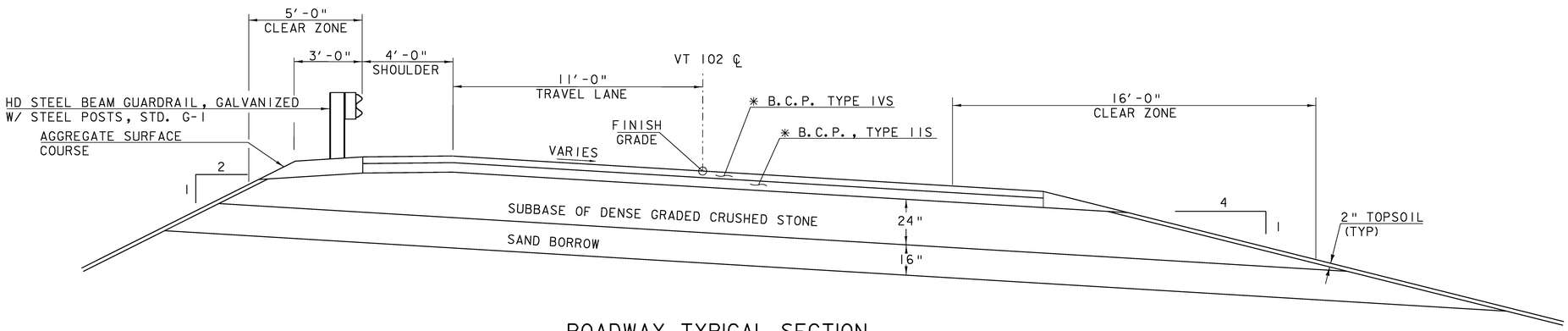
FILE NAME: **\04c098\x04c098excel.xls**
PROJECT MANAGER: **Evans-Mongeon**
DESIGNED BY: **S. SCRIBNER**
**PRELIMINARY INFORMATION SHEET**

PLOT DATE: **7/22/2008**
DRAWN BY: **L. DUQUETTE**
CHECKED BY: **S. SCRIBNER**
SHEET **2** OF **66**




## BRIDGE TYPICAL

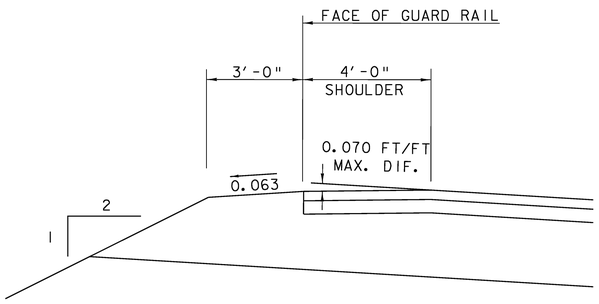
SCALE ⅜" = 1'-0




## ROADWAY TYPICAL SECTION

SCALE ⅜" = 1'-0

✱ 2- 1½" LIFTS OF TYPE IVS
OVER
2- 2½" LIFTS OF TYPE IIS




## DETAIL OF GUARD RAIL ON HIGH SIDE OF BANKED SECTION

## SEEDING FORMULA RURAL AREAS

| % WT. | LBS./A. | NAME | PUR % | GERM % |
|---|---|---|---|---|
| 37.5 | 22.5 | CREEPING RED FESCUE | 98 | 85 |
| 37.5 | 22.5 | TALL FESCUE | 95 | 90 |
| 5.0 | 3.0 | RED TOP | 95 | 90 |
| 15.0 | 9.0 | BIRDSFOOT TREFOIL | 98 | 85 |
| 5.0 | 3.0 | ANNUAL RYEGRASS | 95 | 85 |
| 100.0 | 60.0 | | | |

### GENERAL NOTES

SEED MIXTURE: SHALL NOT HAVE A WEED CONTENT EXCEEDING 0.40% BY WEIGHT AND SHALL BE FREE OF ALL NOXIOUS SEED.

SEED: TO BE APPLIED PER SEEDING FORMULAS OR AS DIRECTED BY THE ENGINEER.

FERTILIZER: FORMULA 10-20-10, TO BE USED WITH SEED, APPLIED AT THE RATE OF 500 LBS./ACRE. (HYDRO SEEDERS MAY USE 19-19-19 FORMULA).

AGRICULTURAL LIMESTONE: TO BE APPLIED AT THE RATE OF 2 TONS/ACRE, OR AS DIRECTED BY THE ENGINEER.

HAY MULCH: TO BE PLACED ON EARTH SLOPES AT THE RATE OF 2 TONS/ACRE, OR AS DIRECTED BY THE ENGINEER.

TOPSOIL: TO BE USED WITH SEED AS INDICATED ON THE PLANS, OR AS DIRECTED BY THE ENGINEER.

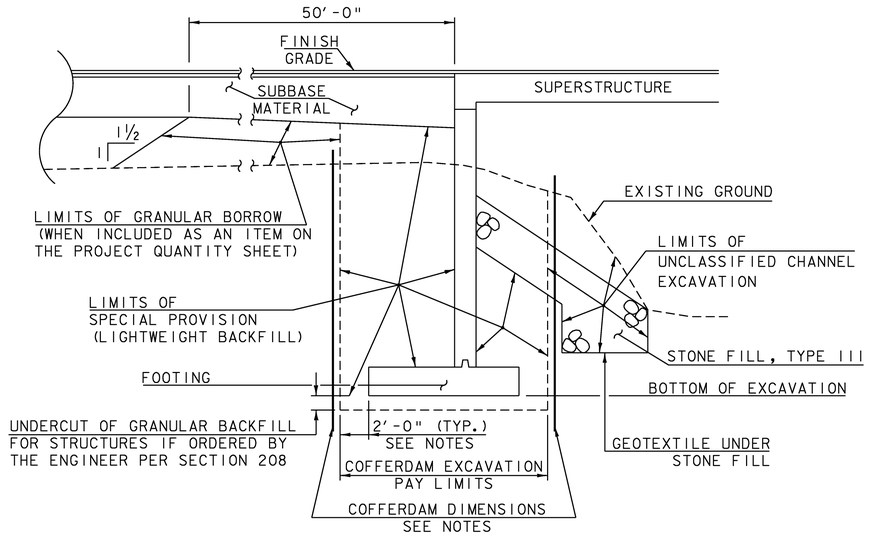
EMULSIFIED FOR TACK COAT 0.025 GAL/SY

| MATERIAL ITEM | TOLERANCE |
|---|---|
| PAVEMENT | ±¼" TOTAL THICKNESS |
| AGGREGATE SURFACE COURSE | ± ½" |
| BASE COURSE | ± ½" |
| SUBBASE | ± 1" |
| SAND BORROW | ± 1" |
| GRANULAR BORROW | ± 1" |

***TYPICAL SECTIONS SHEET (1)***

PROJECT NAME: Canaan
PROJECT NUMBER: ER ST 0271(16)

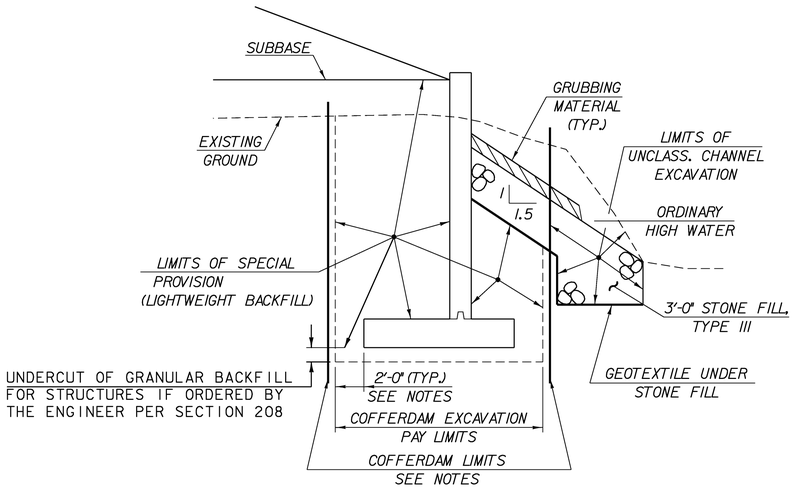
FILE NAME: Structures\x04c098typ.dgn
PROJECT LEADER: M. Evans-Mongeon
DESIGNED BY: S. Scribner
PLOT DATE: 18-AUG-2008
DRAWN BY: T. Husk
CHECKED BY: S. SCRIBNER
SHEET 3 OF 66



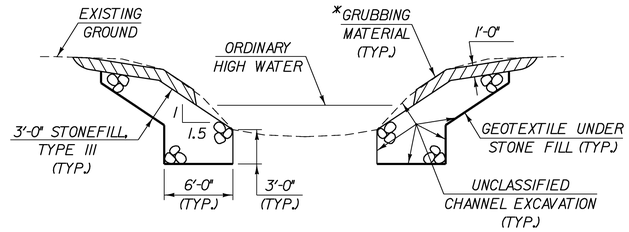

COFFERDAM AND EARTHWORK SECTION
(NOT TO SCALE)

## COFFERDAM NOTES

1. COFFERDAM DIMENSIONS TO BE DETERMINED BY THE CONTRACTOR.
2. THE PAY LIMITS OF "COFFERDAM EXCAVATION, EARTH" SHALL BE 2'-0" OUTSIDE THE PERIMETER OF THE FOOTING AND FROM BOTTOM OF EXCAVATION UP TO THE EXISTING GROUND OR BOTTOM OF SUBBASE, WHICHEVER IS LOWER.
3. IF A COFFERDAM IS CONSTRUCTED WHICH IS LARGER THAN THE INDICATED COFFERDAM EXCAVATION PAY LIMITS, PAYMENT FOR ALL UNCLASSIFIED CHANNEL EXCAVATION, INCLUDING THAT PORTION WHICH IS INSIDE THE COFFERDAM BUT OUTSIDE THE COFFERDAM PAY LIMITS, WILL BE MADE AT THE CONTRACT UNIT PRICE FOR UNCLASSIFIED CHANNEL EXCAVATION. NO MEASUREMENT AND PAYMENT WILL BE MADE FOR COFFERDAM EXCAVATION, GRANULAR BACKFILL FOR STRUCTURES, AND SPECIAL PROVISION LIGHTWEIGHT BACKFILL OUTSIDE THE PAY LIMITS DEFINED IN NOTE 2.




TYPICAL WINGWALL SECTION
(NOT TO SCALE)




TYPICAL CHANNEL SECTION
(NOT TO SCALE)

*GRUBBING MATERIAL SHALL NOT BE PLACED ON THE STONE FILL IN THE AREA UNDER THE BRIDGE. WHENEVER CHANNEL SLOPE INTERSECTS ROADWAY SUBBASE, GRUBBING MATERIAL SHALL BEGIN AT THE BOTTOM OF SUBBASE.

**TYPICAL SECTIONS SHEET (2)**

PROJECT NAME: Canaan
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: Structures\x04c098typ.dgn
PROJECT LEADER: M. Evans-Mongeon
DESIGNED BY: S. Scribner
x04c098typ2.1

PLOT DATE: 18-AUG-2008
DRAWN BY: T. Husk
CHECKED BY: S. SCRIBNER
SHEET 4 OF 66

STATE OF VERMONT
AGENCY OF TRANSPORTATION

# QUANTITY SHEET 1

## SUMMARY OF ESTIMATED QUANTITIES

| Roadway | Erosion Control | Bridge | Full C&E | Alternate ZA | Alternate ZB |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2320 | | | | | |
| | | 930 | | | |
| 950 | | | | | |
| 50 | | | | | |
| | | 95 | | | |
| | | 2500 | | | |
| | | 1 | | | |
| | | 1 | | | |
| 560 | | | | | |
| 1560 | | | | | |
| 70 | | | | | |
| 5 | | | | | |
| | | 390 | | | |
| | | 85070 | | | |
| | | 53980 | | | |
| | | 27573 | | | |
| | | 1 | | | |
| | | 1 | | | |
| | | 1 | | | |
| | | 30 | | | |
| | | 30 | | | |
| | | 90 | | | |
| | | 204 | | | |
| | | | 1 | | |
| | | | 1 | | |
| | | | 1 | | |
| | | | 1 | | |
| | | | | 1 | |
| | | | | 1 | |
| | | | | 1 | |
| | | 12 | | | |
| 1 | | | | | |
| | | 703 | | | |
| 615 | | | | | |
| 390 | | | | | |

## TOTALS

| GRAND TOTAL | FINAL |
|---|---|
| 1 | |
| 2320 | |
| 930 | |
| 950 | |
| 50 | |
| 95 | |
| 2500 | |
| 1 | |
| 1 | |
| 560 | |
| 1560 | |
| 70 | |
| 5 | |
| 390 | |
| 85070 | |
| 53980 | |
| 27573 | |
| 1 | |
| 1 | |
| 1 | |
| 30 | |
| 30 | |
| 90 | |
| 204 | |
| 1 | |
| 1 | |
| 1 | |
| 1 | |
| 1 | |
| 1 | |
| 1 | |
| 12 | |
| 1 | |
| 703 | |
| 615 | |
| 390 | |

## DESCRIPTIONS

| UNIT | ITEMS | ITEM NUMBER | ROUND |
|---|---|---|---|
| LS | CLEARING AND GRUBBING, INCLUDING INDIVIDUAL TREES AND STUMPS | 201.10 | |
| CY | COMMON EXCAVATION | 203.15 | |
| CY | UNCLASSIFIED CHANNEL EXCAVATION | 203.27 | |
| CY | SAND BORROW | 203.31 | |
| CY | TRENCH EXCAVATION OF EARTH | 204.20 | |
| CY | GRANULAR BACKFILL FOR STRUCTURES | 204.30 | |
| CY | COFFERDAM EXCAVATION, EARTH | 208.30 | |
| LS | COFFERDAM (STA. 60+93) | 208.40 | |
| LS | COFFERDAM (STA. 61+75) | 208.40 | |
| SY | COLD PLANING, BITUMINOUS PAVEMENT | 210.10 | |
| CY | SUBBASE OF DENSE GRADED CRUSHED STONE | 301.35 | |
| CY | AGGREGATE SURFACE COURSE | 401.10 | |
| CWT | EMULSIFIED ASPHALT | 404.65 | |
| CY | CONCRETE, HIGH PERFORMANCE CLASS B | 501.34 | |
| LB | STRUCTURAL STEEL, ROLLED BEAM | 506.50 | |
| LB | REINFORCING STEEL | 507.15 | |
| LB | EPOXY COATED REINFORCING STEEL | 507.17 | |
| LS | SHEAR CONNECTORS (996 - 7/8" X 7") | 508.15 | |
| LS | STRUCTURAL PAINTING, SHOP APPLIED (39.1 TONS) | 513.25 | |
| LS | SURFACE PREPARATION, SHOP (39.1 TONS) | 513.40 | |
| GAL | WATER REPELLENT, SILANE | 514.10 | |
| LF | BRIDGE EXPANSION JOINT, ASPHALTIC PLUG | 516.10 | |
| LF | JOINT SEALER, HOT POURED | 524.11 | |
| LF | BRIDGE RAILING, GALVANIZED NETC 2 RAIL | 525.33 | |
| | BEGIN ALTERNATE ZA | | |
| LS | MAINTENANCE OF STRUCTURES AND APPROACHES | 527.10 | |
| LS | TWO-WAY TEMPORARY BRIDGE (2080 SF - EST) | 528.11 | |
| EACH | REMOVAL OF STRUCTURE (200 SF - EST) | 529.15 | |
| LS | TRAFFIC CONTROL | 641.10 | |
| | END ALTERNATE ZA | | |
| | BEGIN ALTERNATE ZB | | |
| EACH | PARTIAL REMOVAL OF STRUCTURE | 529.20 | |
| LS | TRAFFIC CONTROL | 641.10 | |
| LS | SPECIAL PROVISION (RELOCATE AND REMOVE EXISTING TEMPORARY BRIDGE) | 900.645 | |
| | END ALTERNATE ZB | | |
| EACH | BEARING DEVICE ASSEMBLY, ELASTOMERIC PAD | 531.11 | |
| MGAL | DUST CONTROL WITH WATER | 609.10 | |
| CY | STONE FILL, TYPE III | 613.12 | |
| LF | REMOVAL OF EXISTING FENCE | 620.55 | |
| LF | HD STEEL BEAM GUARDRAIL, GALVANIZED | 621.21 | |

## DETAILED SUMMARY OF QUANTITIES

**EARTH WORKS SUMMARY**

| QUANTITIES | UNIT | ITEMS |
|---|---|---|
| **410** | **CY** | **FILL REQUIRED** |
| | | **FILL AVAILABLE** |
| 2320 | CY | COMMON EXCAVATION: 2320 x 1.0 |
| 558 | CY | UNCLASSIFIED CHANNEL EXCAVATION: 930 x 0.6 |
| 50 | CY | TRENCH EXCAVATION EARTH: 50 x 1.0 |
| 625 | CY | COFFERDAM EXCAVATION EARTH: 2500 x 0.25 |
| 3553 | CY | SUBTOTAL |
| 7 | CY | ROUNDING |
| **3560** | **CY** | **TOTAL** |
| 3560 | CY | FILL AVAILABLE |
| 410 | CY | FILL REQUIRED |
| 3150 | CY | WASTE |

PROJECT NAME: CANAAN
PROJECT NUMBER: ER ST 0271 (16)

FILE NAME: structures/04c098/x04c098excel
PROJECT LEADER: M. EVANS-MONGEON
DESIGNED BY: S. SCRIBNER
QUANTITY SHEET #1

PLOT DATE: 08/13/2008
DRAWN BY: L. DUQUETTE
CHECKED BY: S. SCRIBNER

STATE OF VERMONT
AGENCY OF TRANSPORTATION

# QUANTITY SHEET 2

| SUMMARY OF ESTIMATED QUANTITIES | | | | | | | | | TOTALS | | DESCRIPTIONS | | | | DETAILED SUMMARY OF QUANTITIES | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Roadway | Erosion Control | Bridge | Full C&E | Alternate ZA | Alternate ZB | GRAND TOTAL | FINAL | UNIT | ITEMS | ITEM NUMBER | ROUND | QUANTITIES | UNIT | ITEMS |
| | | | | 4 | | | | | | 4 | | EACH | ANCHOR FOR STEEL BEAM RAIL | 621.60 | | | | |
| | | | | 4 | | | | | | 4 | | EACH | GUARDRAIL APPROACH SECTION, GALVANIZED NETC 2 RAIL | 621.72 | | | | |
| | | | | 400 | | | | | | 400 | | LF | REMOVAL AND DISPOSAL OF GUARDRAIL | 621.80 | | | | |
| | | | | 40 | | | | | | 40 | | LF | TEMPORARY TRAFFIC BARRIER | 621.90 | | | | |
| | | | | 150 | | | | | | 150 | | HR | FLAGGERS | 630.15 | | | | |
| | | | | | | | 1 | | | 1 | | LS | FIELD OFFICE, ENGINEERS | 631.10 | | | | |
| | | | | | | | 1 | | | 1 | | LS | TESTING EQUIPMENT, CONCRETE | 631.16 | | | | |
| | | | | | | | 1 | | | 1 | | LS | TESTING EQUIPMENT, BITUMINOUS | 631.17 | | | | |
| | | | | | | | 1 | | | 1 | | LU | FIELD OFFICE TELEPHONE (N.A.B.I.) | 631.25 | | | | |
| | | | | 1 | | | | | | 1 | | LS | MOBILIZATION/DEMOBILIZATION | 635.11 | | | | |
| | | | | 1540 | | | | | | 1540 | | LF | 4 INCH WHITE LINE | 646.20 | | | | |
| | | | | 1540 | | | | | | 1540 | | LF | 4 INCH YELLOW LINE | 646.21 | | | | |
| | | | | | | 840 | | | | 840 | | SY | GEOTEXTILE UNDER STONE FILL | 649.31 | | | | |
| | | | | | 245 | | | | | 245 | | SY | GEOTEXTILE FOR SILT FENCE | 649.51 | | | | |
| | | | | | 120 | | | | | 120 | | SY | GEOTEXTILE FOR SILT FENCE, WOVEN WIRE REINFORCED | 649.515 | | | | |
| | | | | | 130 | | | | | 130 | | SY | GEOTEXTILE FOR FILTER CURTAIN | 649.61 | | | | |
| | | | | | 50 | | | | | 50 | | LB | SEED | 651.15 | | | | |
| | | | | | 200 | | | | | 200 | | LB | FERTILIZER | 651.18 | | | | |
| | | | | | 2 | | | | | 2 | | TON | AGRICULTURAL LIMESTONE | 651.20 | | | | |
| | | | | | 3 | | | | | 3 | | TON | HAYMULCH | 651.25 | | | | |
| | | | | 105 | | | | | | 105 | | CY | TOPSOIL | 651.35 | | | | |
| | | | | | | 400 | | | | 400 | | SY | GRUBBING MATERIAL | 651.40 | | | | |
| | | | | | 1 | | | | | 1 | | LS | EPSC PLAN | 652.10 | | | | |
| | | | | | 150 | | | | | 150 | | HR | MONITORING EPSC PLAN | 652.20 | | | | |
| | | | | | 1 | | | | | 1 | | LU | MAINTENANCE OF EPSC PLAN (N.A.B.I.) | 652.30 | | | | |
| | | | | | 1000 | | | | | 1000 | | SY | TEMPORARY EROSION MATTING | 653.20 | | | | |
| | | | | | 16 | | | | | 16 | | CY | VEHICLE TRACKING PAD | 653.35 | | | | |
| | | | | | 748 | | | | | 748 | | LF | BARRIER FENCE | 653.50 | | | | |
| | | | | | 752 | | | | | 752 | | LF | PROJECT DEMARCATION FENCE | 653.55 | | | | |
| | | | | 1 | | | | | | 1 | | SF | TRAFFIC SIGNS, TYPE A | 675.20 | | | | |
| | | | | 16 | | | | | | 16 | | LF | FLANGED CHANNEL SIGN POST | 675.301 | | | | |
| | | | | 4 | | | | | | 4 | | EACH | DELINEATOR WITH STEEL POST | 676.10 | | | | |
| | | | | | | 150 | | | | 150 | | CY | SPECIAL PROVISION (HIGH PERFORMANCE CONCRETE, CLASS A LOW CEMENT) (FPQ) | 900.608 | | | | |
| | | | | | | 1360 | | | | 1360 | | CY | SPECIAL PROVISION (LIGHTWEIGHT BACKFILL) | 900.608 | | | | |
| | | | | 1 | | | | | | 1 | | LS | SPECIAL PROVISION (DRY HYDRANT) | 900.645 | | | | |
| | | | | 1 | | | | | | 1 | | LU | SPECIAL PROVISION (MAT DENSITY PAY ADJUSTMENT, SMALL QUANTITY)(N.A.B.I.) | 900.650 | | | | |
| | | | | 1 | | | | | | 1 | | LU | SPECIAL PROVISION (MIXTURE PAY ADJUSTMENT)(N.A.B.I) | 900.650 | | | | |
| | | | | | | 420 | | | | 420 | | SY | SPECIAL PROVISION (LONGITUDINAL DECK GROOVING) | 900.675 | | | | |
| | | | | 840 | | | | | | 840 | | TON | SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY) | 900.680 | | | | |

PROJECT NAME: CANAAN
PROJECT NUMBER: ER ST 0271 (16)

FILE NAME: structures/04c098/x04c098excel
PROJECT LEADER: M. EVANS-MONGEON
DESIGNED BY: S. SCRIBNER
QUANTITY SHEET #2

PLOT DATE: 08/13/2008
DRAWN BY: L. DUQUETTE
CHECKED BY: S. SCRIBNER
SHEET 6 OF 66

STATE OF VERMONT
AGENCY OF TRANSPORTATION

# BRIDGE QUANTITY SHEET 1

| SUMMARY OF BRIDGE QUANTITIES | | | TOTALS | DESCRIPTIONS | | | DETAILED SUMMARY OF QUANTITIES | | |
|---|---|---|---|---|---|---|---|---|---|
| ABUT.1 | ABUT.2 | SUPER-STRUCTURE | BRIDGE TOTAL | UNIT | ITEMS | ITEM NUMBER | QUANTITIES | UNIT | ITEMS |
| 275 | 655 | | 930 | CY | UNCLASSIFIED CHANNEL EXCAVATION | 203.27 | | | |
| 45 | 50 | | 95 | CY | GRANULAR BACKFILL FOR STRUCTURES | 204.30 | | | |
| 1282 | 1218 | | 2500 | CY | COFFERDAM EXCAVATION, EARTH | 208.30 | | | |
| 1 | | | 1 | LS | COFFERDAM (STA. 60+93) | 208.40 | | | |
| | 1 | | 1 | LS | COFFERDAM (STA. 61+75) | 208.40 | | | |
| 202 | 188 | | 390 | CY | CONCRETE, HIGH PERFORMANCE CLASS B | 501.34 | | | |
| | | 85070 | 85070 | LB | STRUCTURAL STEEL, ROLLED BEAM | 506.50 | | | |
| 27916 | 26064 | | 53980 | LB | REINFORCING STEEL | 507.15 | | | |
| 2223 | 2218 | 23132 | 27573 | LB | EPOXY COATED REINFORCING STEEL | 507.17 | | | |
| | | 1 | 1 | LS | SHEAR CONNECTORS (996 - 7/8" X 7") | 508.15 | | | |
| | | 1 | 1 | LS | STRUCTURAL PAINTING, SHOP APPLIED (39.1 TONS) | 513.25 | | | |
| | | 1 | 1 | LS | SURFACE PREPARATION, SHOP (39.1 TONS) | 513.40 | | | |
| 12 | 12 | 6 | 30 | GAL | WATER REPELLENT, SILANE | 514.10 | | | |
| | 30 | | 30 | LF | BRIDGE EXPANSION JOINT, ASPHALTIC PLUG | 516.10 | | | |
| 30 | 30 | 30 | 90 | LF | JOINT SEALER, HOT POURED | 524.11 | | | |
| | | 204 | 204 | LF | BRIDGE RAILING, GALVANIZED NETC 2 RAIL | 525.33 | | | |
| 6 | 6 | | 12 | EACH | BEARING DEVICE ASSEMBLY, ELASTOMERIC PAD | 531.11 | | | |
| 283 | 420 | | 703 | CY | STONE FILL, TYPE III | 613.12 | | | |
| 274 | 566 | | 840 | SY | GEOTEXTILE UNDER STONE FILL | 649.31 | | | |
| 130 | 270 | | 400 | SY | GRUBBING MATERIAL | 651.40 | | | |
| | | 150 | 150 | CY | SPECIAL PROVISION (HIGH PERFORMANCE CONCRETE, CLASS A LOW CEMENT) (FPQ) | 900.608 | | | |
| 680 | 680 | | 1360 | CY | SPECIAL PROVISION (LIGHTWEIGHT BACKFILL) | 900.608 | | | |
| | | 420 | 420 | SY | SPECIAL PROVISION (LONGITUDINAL DECK GROOVING) | 900.675 | | | |

PROJECT NAME: CANAAN
PROJECT NUMBER: ER ST 0271 (16)

FILE NAME: structures/04c098/x04c098excel
PROJECT LEADER: M. EVANS-MONGEON
DESIGNED BY: S. SCRIBNER
BRIDGE QUANTITY SHEET #1

PLOT DATE: 08/18/2008
DRAWN BY: L. DUQUETTE
CHECKED BY: S. SCRIBNER
SHEET 7 OF 66

STATE OF VERMONT
AGENCY OF TRANSPORTATION

# RIGHT - OF - WAY DETAIL SHEET

## TABLE OF PROPERTY ACQUISITION

| PARCEL NO. | PROPERTY OWNER | SHEET NO. | BEGINNING STATION | ENDING STATION | TAKE | REMAINDER | RIGHT | | | RECORDING DATA | | | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | AREA± | AREA± | TYPE | (T)/(P) | AREA ± | TITLE | DATE | TOWN / CITY | BOOK | PAGE | |
| 1A | RICHARDS, DENNIS B. & LISA G. | 14,15 | 58+50.00 LT. | 62+14.82 LT. | 4,113 S.F. | | | | | WD | 05/21/08 | CANAAN | 55 | 623 | |
| 1B | | 14,15 | 60+74.00 RT. | 61+99.99 RT. | 3493 S.F. | | | | | | | | | | |
| 1C | | 14,15 | 56+21.00 RT. | 64+55.24 LT. | .95A | | ALL R.T. & I. | | | | | | | | VT. RTE. 102 HWY. EASEMENT |
| | | | 56+21 RT. | 64+52 RT. | | | UE | (P) | .23 A | | | | | | 9932 S.F.± |
| | | | 56+21 RT. | 64+50 RT. | | | UE | (T) | | | | | | | |
| | | | 56+21 RT. | 57+44 RT. | | | REMOVE | (T) | | | | | | | FENCE |
| | | | 57+97 RT. | | | | DRIVE | (T) | | | | | | | 12' DRIVE GRAVEL MM 0109 |
| | | | 58+47 RT. | 61+03 RT. | | | CONST. | (T) | 2,294 S.F. | | | | | | INCLUDES EROSION CONTROL & PDF |
| | | | 58+11 RT. | 60+98 RT. | | | REMOVE | (T) | | | | | | | FENCE |
| | | | 58+61 RT. | 60+98 RT. | | | REMOVE | (T) | | | | | | | FENCE |
| | | | 58+87 RT. | 63+89 RT. | | | DETOUR | (T) | .46 A | | | | | | 19,837 S.F.± |
| | | | 59+17 RT. | 60+07 RT. | | | SLOPE | (T) | 776 S.F. | | | | | | |
| | | | 61+58 RT. | 64+20 RT. | | | CONST. | (T) | 2,404 S.F. | | | | | | INCLUDES EROSION CONTROL & PDF |
| | | | 62+75 RT. | 62+99 RT. | | | SLOPE | (P) | 19 S.F. | | | | | | |
| | | | 62+99 RT. | 63+72 RT. | | | SLOPE | (T) | 1135 S.F. | | | | | | |
| | | | 64+10 RT. | 64+50 RT. | | | REMOVE | (T) | | | | | | | FENCE |
| | | | 57+58 LT. | | | | DRIVE | (T) | | | | | | | 19' DRIVE GRAVEL MM 0109 |
| | | | 58+11 LT. | | | | DRIVE | (T) | | | | | | | 12' DRIVE GRAVEL MM 0110 |
| | | | 58+17 LT. | 61+07 LT. | | | CONST. | (T) | 2,335 S.F. | | | | | | INCLUDES EROSION CONTROL & PDF |
| | | | 58+82 LT. | 59+92 LT. | | | REMOVE | (T) | | | | | | | FENCE |
| | | | 58+87 LT. | 60+04 LT. | | | REMOVE | (T) | | | | | | | FENCE |
| | | | 58+90 LT. | 60+49 LT. | | | SLOPE | (P) | 2,686 S.F. | | | | | | |
| | | | 61+56 LT. | 64+38 LT. | | | CONST. | (T) | 2,556 S.F. | | | | | | INCLUDES EROSION CONTROL & PDF |
| | | | 62+00 LT. | 63+69 LT. | | | SLOPE | (P) | 1,233 S.F. | | | | | | |
| | | | 62+03 LT. | 62+23 LT. | | | REMOVE | (T) | | | | | | | FENCE |
| | | | 63+04 LT | 63+30 LT. | | | REMOVE | (T) | | | | | | | FENCE |
| | | | 63+98 RT. | | | | DRIVE | (T) | | | | | | | 14' DRIVE FIELD MM 0120 |
| | | | 64+33 LT. | | | | DRIVE | (T) | | | | | | | 12' DRIVE FIELD MM 0120 |
| 2 | SARACO, MICHAEL D. III | 15 | 64+50 RT. | 64+89 RT. | | | INSTALL | (T) | 106 S.F. | | | CANAAN | | | PDF |
| | MAGUIRE, KEVIN C. | | 64+50 RT. | 65+12 RT | | | UE | (T) | | | | | | | |
| | | | 64+51 RT. | 65+30.83 RT. | | | UE | (P) | 918 S.F. | | | | | | |
| | | | 64+50.61 RT. | 65+30.83 RT. | 3857 S.F. | | ALL R.T.& I. | | | | | | | | VT. RTE. 102 HWY EASEMENT |
| 3 | WHITE MOUNTAIN CABLEVISION | | | | | | | | | | | | | | UTILITY |
| 4 | VERMONT ELECTRIC COOPERATIVE INC. | | | | | | | | | | | | | | UTILITY |
| 5 | VERIZON NEW ENGLAND INC. | | | | | | | | | | | | | | UTILITY |

## TABLE OF REVISIONS

| REVISION NO. | SHEET NO. | DESCRIPTION | DATE |
|---|---|---|---|
| 1 | 13,14 | PARCEL NO. 1 RICHARDS. CHANGE THE EIGHT RIGHTS | 11/30/07 |
| | 15 | FROM REMOVE & RESET FENCE TO REMOVE FENCE. | |
| | | CHANGE BEGINNING STATION OF DRIVE (T) FROM 63+98 LT. | |
| | | TO STA. 63+98 RT. PER C.O. 9502 | |
| | | MADE BY: MR APPROVED BY: HP | |
| 2 | 13 | PARCEL NO. 1 RICHARDS. CHANGE THE ENDING STATION | 01/10/08 |
| | | FOR REMOVE (T) FENCE FROM 57+24 TO 57+44. | |
| | | PER C.O. 9508 | |
| | | MADE BY: JAB APPROVED BY: HP | |
| 3 | 13 | PARCEL NO. 1C RICHARDS. CHANGE THE AREA FOR THE | 01/14/08 |
| | | SLOPE (P) AT STA. 62+00 LT. ~ 63+69 LT. FROM 581 SF± | |
| | | TO 1,233 S.F.± PER C.O. 9509 | |
| | | MADE BY: MR APPROVED BY: HP | |
| | | PRE-FINAL PLANS NUMBERED FOR LEAD DIVISION | 05/07/08 |

PLAN LEGEND

| | |
|---|---|
| EXISTING RIGHT-OF-WAY | TOE OF SLOPE |
| TAKING WITH ACCESS | TOP OF CUT |
| TAKING WITHOUT ACCESS | SLOPE RIGHT (SR (P)) |
| CLEAR ZONE (CZ) | CONSTRUCTION RIGHT (CONST.(T)) |
| PROPERTY LINE (P / L) | PROJECT DEMARCATION FENCE (PDF — PDF) |

| | |
|---|---|
| EC | -EROSION CONTROL |
| (P) | -PERMANENT |
| (T) | -TEMPORARY |
| DR. | -DRAINAGE RIGHT |
| DIT. | -DITCHING RIGHT |
| CH. | -CHANNEL RIGHT |
| DRIVE | -DRIVE RIGHT |
| CUL. | -CULVERT RIGHT |
| C&T | -CLEARING & TRIMMING RIGHT |
| SR | -SLOPE RIGHT |
| UE | -UTILITY EASEMENT |

APPROVED: HARRY PETROVS DATE: 10-25-07
CHIEF, PLANS & TITLES

PLOT DATE 07/22/08

PROJECT NAME: **CANAAN**
PROJECT NUMBER: **ER ST 0271(16)**

FILE NAME: **RC098DET.XLS**
PROJECT LEADER: **EVANS-MONGEON**
DESIGNED BY:
**R.O.W. DETAIL SHEET #1**

PLOT DATE:
DRAWN BY: **MR**
CHECKED BY: **BF**
SHEET **8** OF **66**

VT STATE PLANE GRID

N

SPECIAL PROVISION (DRY HYDRANT)
STA. 61+34.00 - 62+04.92 LT

DELINEATOR WITH STEEL POST (TYPE I)
STA. 59+84 LT (GREEN)
STA. 59+81 RT (BLUE)

REMOVAL AND DISPOSAL OF GUARDRAIL
STA. 60+43.09 - 60+84.28 RT
STA. 59+22.82 - 60+85.48 LT
STA. 61+50.29 - 63+37.35 RT
STA. 61+49.41 - 62+25.00 LT

4" YELLOW LINE (DOUBLE)
STA. 57+50 - 62+25

4" WHITE LINE
STA. 57+50 - 62+25 LT
STA. 57+50 - 62+25 RT

HEAVY DUTY STEEL BEAM GUARDRAIL, GALVANIZED
STA. 59+69.40 - 60+58.90 LT
STA. 59+61.67 - 60+57.17 RT
STA. 62+09.73 - 62+25.00 LT
STA. 62+10.04 - 62+25.00 RT

ANCHORS FOR HEAVY DUTY STEEL BEAM GUARD RAIL
STA. 59+78.90 LT
STA. 59+75.00 RT

CONSTRUCT DRIVE
STA. 57+58 LT, 19' - GRAVEL
STA. 58+11 LT, 14' - GRAVEL
STA. 57+97 RT, 12' - GRAVEL

REMOVAL OF EXISTING FENCE
STA. 58+50 - STA. 61+00 RT
STA. 59+00 - STA. 60+00 LT
STA. 62+15 - STA. 62+20 LT

BEGIN R.O.W. PROJECT
ER ST 0271(16)
STA. 56+21.00
33.44 RT.

*RICHARDS, DENNIS B. & LISA G.*

STA. 60+65.00 MAINLINE
STA. 16+77.00 CHANNEL LINE
Δ = 90° TO TANGENT

POE
Sta 18+01.92

BEGIN BRIDGE
STA 60+92.00

END BRIDGE
STA 61+76.00

SPECIAL PROVISION
(DRY HYDRANT)

60+49.48
37.94 LT.

60+49.62
28.53 LT.

60+95.73
48.17 LT.

61+68.04
51.16 LT.

62+14.82
24.75' LT.

74.68'
STONE FILL
TYPE III

1A

BARN

PERMANENT CONST. LIMITS

BEGIN PROJECT
STA 58+50.00
30' R
(TYP)

58+50
28.36 LT.

58+50
24.36 LT.

199.62'

355.11'

VT ROUTE 102

1C

60+74.00
32.99 RT.

N27° 19' 14.96"W

BEGIN APPROACH
STA 57+50.00
DETOUR STATION
7+00

233.96'

20' R
(TYP)

GRAVEL DRIVE

441.94'

56+21.00
24.75LT

56+21.00
24.75' RT.

49.50'

8.69'

EXISTING POLE

VT 102
TO LEMINGTON

EXISTING ROW

STATE OF VERMONT

TO BE REMOVED BY VT ELEC. CO-OP.

TEMPORARY POLE

TEMPORARY POLES

SEE STANDARD E-134

BRIDGE 16 VT102

1B

123.33'

60+91.27
43.50 RT.

60+94.50
51.86 RT.
℄ TEMP.

6.00' DETOUR
93.95'

60+98.75
76.74 RT.

61+05.06
76.62 RT.

61+99.99
33.48 RT.

61+99.77
52.30 RT.

247.

MATCHLINE STA 62+25

WILLARD STREAM

CHANNEL LINE

POB
Sta 15+00.00

GUARDRAIL APPROACH SECTION, GALVANIZED NETC 2 RAIL
STA. 60+58.90 - STA. 60+83.90 LT
STA. 60+57.17 - STA. 60+82.17 RT
STA. 61+84.73 - STA. 62+09.73 LT
STA. 61+85.04 - STA. 62+10.04 RT

BRIDGE RAILING, GALVANIZED NETC 2 RAIL
STA. 60+83.90 - STA. 61+84.73 LT
STA. 60+82.17 - STA. 61+85.04 RT

TRAFFIC SIGNS, TYPE A
STA. 60+50.00 21' RT
STA. 62+25.00 21' LT

CURVE #1
Delta = 14°18'01.25"
D = 5°43'46.48"
R = 1000.00'
T = 125.45'
L = 249.59'
E = 7.84'

CURVE #2
Delta = 15°33'13.32"
D = 3°41'47.7"
R = 1550.00'
T = 211.69'
L = 420.78'
E = 14.39'

APPROXIMATE AERIAL UTILITY RELOCATION
ROUTE BY VERMONT ELECTRIC COOPERATIVE, INC. VERIZON NEW ENGLAND, INC. TWINSTATE CABLE T.V., INC.

*RICHARDS, DENNIS B. & LISA G.*

PREVIOUS BRIDGE DATA
SINGLE SPAN OPEN BOTTOM CONCRETE ARCH - DESTROYED IN 2004 FLOOD
CLEAR SPAN (NORMAL TO STREAM): 31 FEET MIN.
OVERALL LENGTH: 34.5 FEET BACK TO BACK OF ABUTMENTS
VERTICAL CLEARANCE: 7 FEET
BRIDGE WIDTH: +/- 34.5 FEET FACE OF RAIL TO FACE OF RAIL

CURRENT STRUCTURE
WIDTH: 24
LENGTH: 80

SCALE 1" = 20'-0
20 0 20

LINES SHOWN ON THIS PLAN AS EXISTING PROPERTY LINES P/L ARE BELIEVED TO BE ACCURATE BUT SHOULD NOT BE RELIED UPON FOR PURPOSES UNRELATED TO THE STATE OF VERMONT'S ACQUISITION OF LAND AND RIGHTS FOR THIS PROJECT.

**ROW LAYOUT SHEET #1**

PROJECT NAME: Canaan
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: 04c098\struc\x04c098bdr
PROJECT LEADER: M. Evans-Mongeon
DESIGNED BY: S. Scribner
ROW SHEET 14 OF 15

PLOT DATE: 18-AUG-2008
DRAWN BY: L. DUQUETTE
CHECKED BY: S. SCRIBNER.

4" YELLOW LINE (DOUBLE)
STA. 62+25 - 65+15

4" WHITE LINE
STA. 62+25 - 65+15 LT
STA. 62+25 - 65+15 RT

DELINEATOR WITH STEEL POST (TYPE I)
STA. 63+33.50 LT (BLUE)
STA. 63+36.50 RT (GREEN)

HEAVY DUTY STEEL BEAM GUARDRAIL, GALVANIZED
STA. 62+25.00 - 63+49.23 LT
STA. 62+25.00 - 63+49.54 RT

ANCHORS FOR HEAVY DUTY STEEL BEAM GUARD RAIL
STA. 63+39.00 LT
STA. 63+43.00 RT

REMOVAL AND DISPOSAL OF GUARDRAIL
STA. 62+25.00 - 63+37.35 RT
STA. 62+25.00 - 63+32.51 LT

CONSTRUCT DRIVE
STA. 64+33 LT, 12' - GRAVEL
STA. 63+98 RT, 14' - GRAVEL

VT STATE PLANE GRID N

BRIDGE 16 VT102
SEE STANDARD E-134

*RICHARDS, DENNIS B. & LISA G.*

END R.O.W. PROJECT
ER ST 0271(16)
STA. 65+30.83
24.32' RT.

*SARACO, MICHAEL D. III & MAGUIRE, KEVIN C.*

REMOVE (T)
CONST. (T)
SR (P)
PERMANENT CONST. LIMITS
END PROJECT STA 63+50.00
242.91'
20' R (TYP)
DRIVE (T)
64+55.24
24.75' LT.
END APPROACH STA 65+15.00
65+30.83
25.18 LT.
75.59'
1C
63+00
64+50.61 CL.
4.62'
64+55.23 CL.
°45'59.63"W
64+00
14+00
14+27
65+00
24.75'
49.50'
VT 102 TO CANAAN
[247.11]
12+00
UE (P)
TO BE REMOVED BY VT ELEC. CO-OP.
AER E&T
TEMPORARY POLE
DETOUR (T)
CONST. (T)
TEMPORARY CONST. LIMITS
FIELD DR
8.25'
INSTALL (T)
80.21'
EXISTING POLE
64+50.82
33.00 RT.
64+50.61
24.75' RT.
REMOVE (T)
2
P/L
POE STA 64+01.61

*SARACO, MICHAEL D. III & MAGUIRE, KEVIN C.*

*RICHARDS, DENNIS B. & LISA G.*

*ADDITIONAL ROW ACQUIRED 2/9/73 BK. X PG. 332 CANAAN LAND RECORDS FROM ROLAND & EUNICE RICHARDS*

LINES SHOWN ON THIS PLAN AS EXISTING PROPERTY LINES P/L ARE BELIEVED TO BE ACCURATE BUT SHOULD NOT BE RELIED UPON FOR PURPOSES UNRELATED TO THE STATE OF VERMONT'S ACQUISITION OF LAND AND RIGHTS FOR THIS PROJECT.

SCALE 1" = 20'-0
20 0 20

## ROW LAYOUT SHEET #2

PROJECT NAME: Canaan
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: 04c098\struc\x04c098bdr
PROJECT LEADER: M. Evans-Mongeon
DESIGNED BY: S. SCRIBNER
ROW SHEET 15 OF 15

PLOT DATE: 18-AUG-2008
DRAWN BY: L. DUQUETTE
CHECKED BY: S. SCRIBNER
SHEET 10 OF 66

## GPS CONTROL POINTS

### HVCTRL #1

DESIGNATION

"VT/NH BRM 78"

** N = 892289.6500

E = 1892838.4500

ELEV. = 1021.0900

GENERAL LOCATION, CANAAN, VT. OWNERSHIP, BILL JOHNSON, 3603 VT ROUTE 102, CANAAN, VT 05903. TO REACH FROM THE INTERSECTION OF VT ROUTES 114, 102, AND 253 GO SOUTHWEST ALONG VT ROUTE 102 FOR 4.3 MI TO THE INTERSECTION OF A FIELD DRIVE LEFT, JUST NORTH OF HOUSE NO 2566. PARK VEHICLE AND WALK EAST ALONG THE FIELD DRIVE FOR ABOUT 120 M TO THE SITE OF THE MARK AT THE SOUTH EDGE OF A LARGE FIELD. THE MARK IS A 12.5 CM DIAMETER UNITED STATES SUPREME COURT REFERENCE MARK DISK SET IN THE TOP OF A 30 CM SQUARE GRANITE MONUMENT WHICH PROJECTS 50 CM ABOVE GROUND SURFACE. IT IS 19.2 M WEST NORTHWEST OF A 30 CM ELM, 23.9 M EAST OF A 25 CM WHITE BIRCH, 7.4 M NORTH NORTHWEST OF THE TOP OF A SMALL BANK, 38.0 M SOUTHEAST OF A CLUMP OF FOUR 15 CM BIRCHES, AND 0.3 M NORTH OF A FIBERGLASS WITNESS POST.

### HVCTRL #2

DESIGNATION

"VT/NH BRM 77"

** N = 890752.1900

E = 1893251.0900

ELEV. = 1022.7000

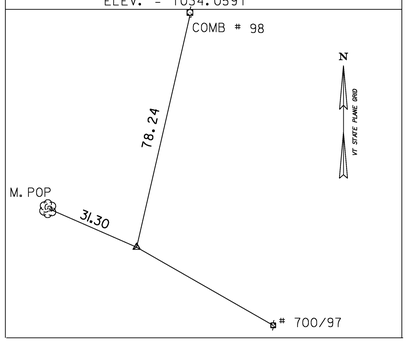
GENERAL LOCATION, CANAAN, VT. OWNERSHIP, BILL JOHNSON, 3603 VT ROUTE 102, CANAAN, VT 05903. TO REACH FROM THE INTERSECTION OF VT ROUTES 114, 102, AND 253 GO SOUTHWEST ALONG VT ROUTE 102 FOR 4.6 MI TO A LARGE WHITE FARM HOUSE ON THE RIGHT AND AN L-SHAPED BARN ON THE LEFT. PARK VEHICLE AND WALK EAST FOR ABOUT 150 M TO THE SITE OF THE MARK AT THE NORTH EDGE OF A LARGE FIELD. THE MARK IS A 12.5 CM DIAMETER UNITED STATES SUPREME COURT REFERENCE MARK DISK SET IN THE TOP OF A 30 CM SQUARE GRANITE MONUMENT WHICH PROJECTS 40 CM ABOVE GROUND SURFACE. IT IS ABOUT ON AN EAST BEARING WITH THE HOUSE. IT IS ABOUT 95 M EAST SOUTHEAST OF THE SOUTHEAST CORNER OF A FALLING DOWN BARN ELL, 18.0 M SOUTH OF THE NORTH EDGE OF A STEEP EMBANKMENT, AND 0.3 M SOUTHEAST OF A FIBERGLASS WITNESS POST.

* DESCRIPTION PROVIDED BY VERMONT AGENCY OF TRANSPORTATION GEODETIC SURVEY UNIT

## TRAVERSE TIES

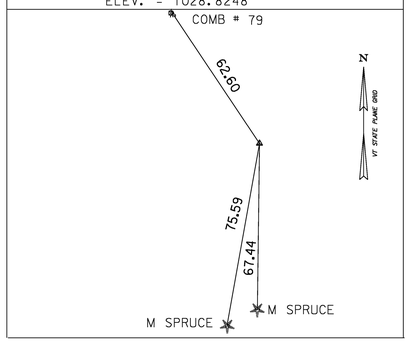
### HVCTRL #5

NORTH = 885726.5391
EAST = 1893603.2064
ELEV. = 1034.0591




### HVCTRL #6

NORTH = 884399.6010
EAST = 1894274.0068
ELEV. = 1028.8248




NORTH =
EAST =
ELEV. =

* MAIN TRAVERSE COMPLETED: AUGUST 11, 2004 BY R.GILMAN PC, P.WINTERS

## ALIGNMENT TIES

### POB 56+00.00

NORTH = 884626.29
EAST = 1894047.57

NOT TIED

## ALIGNMENT TIES

### PC 56+32.80

NORTH = 884650.81
EAST = 1894025.78

NOT TIED

### PT 58+82.39

NORTH = 884856.04
EAST = 1893884.88

NOT TIED

### PC 59+49.64

NORTH = 884915.7988
EAST = 1893854.01

NOT TIED

### PT 63+70.43

NORTH = 885311.11
EAST = 1893713.68

NOT TIED

### POE 66+00.00

NORTH = 885535.87
EAST = 1893666.87

NOT TIED

* Alignment as of 12/7/06

DATUM

VERTICAL NAVD 88

HORIZONTAL NAD 83(96)

ADJUSTMENT COMPASS

## SURVEY TIE SHEET

PROJECT NAME: CANAAN

PROJECT NUMBER: ER ST 0271(16)

FILE NAME: 04c098\struc\x04c098t1.dgn
PROJECT LEADER: M. EVANS-MONGEON
DESIGNED BY: S. SCRIBNER

PLOT DATE: 18-AUG-2008
DRAWN BY: J.HULETT
CHECKED BY: P.HODGE
SHEET 11 OF 66

VT STATE PLANE GRID

N

SPECIAL PROVISION (DRY HYDRANT)
STA. 61+34.00 - 62+04.92 LT

DELINEATOR WITH STEEL POST (TYPE I)
STA. 59+84 LT (GREEN)
STA. 61+81 RT (BLUE)

REMOVAL AND DISPOSAL OF GUARDRAIL
STA. 60+43.09 - 60+84.28 RT
STA. 59+22.82 - 60+85.48 LT
STA. 61+50.29 - 63+37.35 RT
STA. 61+49.41 - 62+25.00 LT

4" YELLOW LINE (DOUBLE)
STA. 57+50 - 62+25

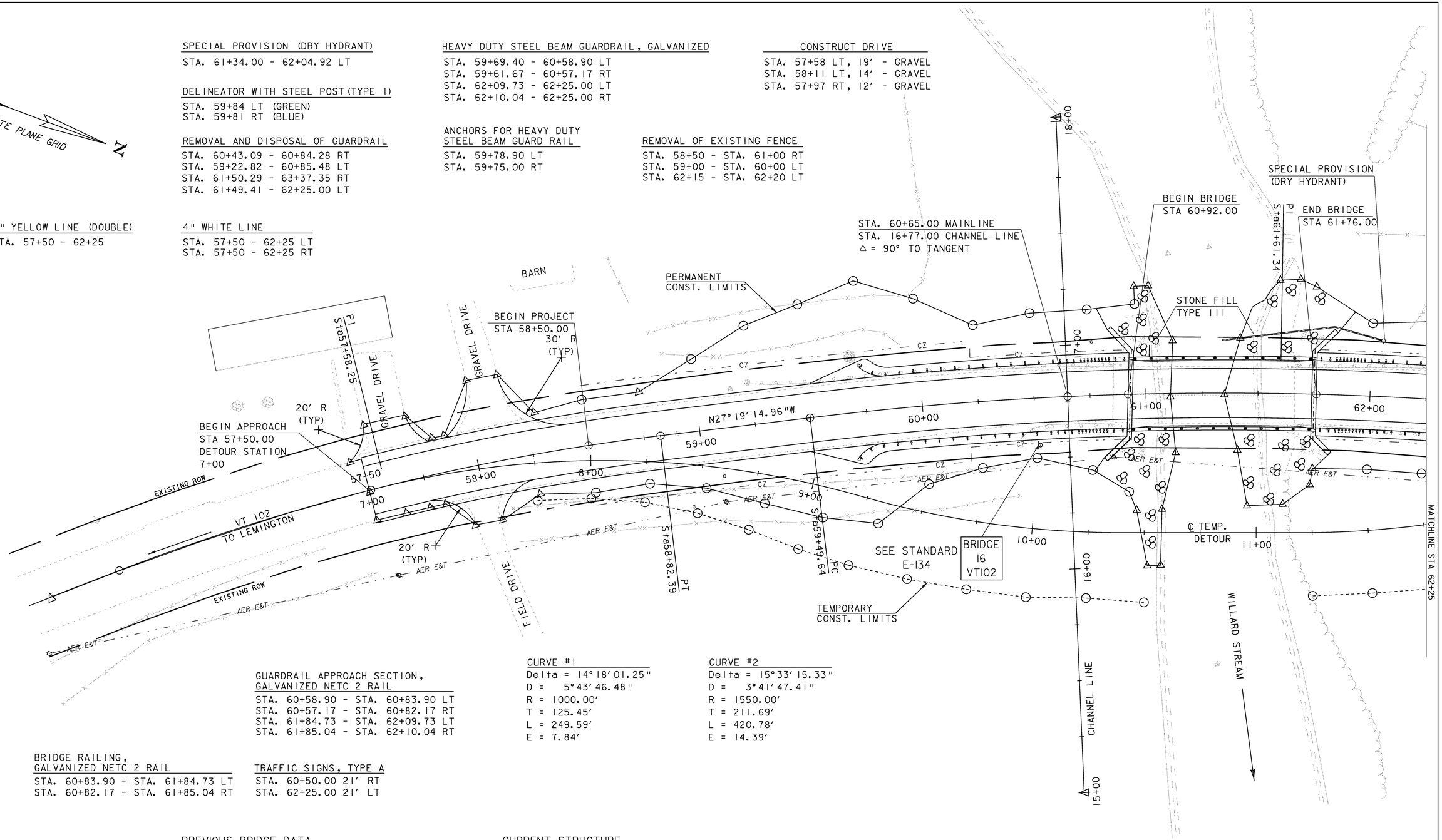
4" WHITE LINE
STA. 57+50 - 62+25 LT
STA. 57+50 - 62+25 RT

HEAVY DUTY STEEL BEAM GUARDRAIL, GALVANIZED
STA. 59+69.40 - 60+58.90 LT
STA. 59+61.67 - 60+57.17 RT
STA. 62+09.73 - 62+25.00 LT
STA. 62+10.04 - 62+25.00 RT

ANCHORS FOR HEAVY DUTY STEEL BEAM GUARD RAIL
STA. 59+78.90 LT
STA. 59+75.00 RT

REMOVAL OF EXISTING FENCE
STA. 58+50 - STA. 61+00 RT
STA. 59+00 - STA. 60+00 LT
STA. 62+15 - STA. 62+20 LT

CONSTRUCT DRIVE
STA. 57+58 LT, 19' - GRAVEL
STA. 58+11 LT, 14' - GRAVEL
STA. 57+97 RT, 12' - GRAVEL




GUARDRAIL APPROACH SECTION, GALVANIZED NETC 2 RAIL
STA. 60+58.90 - STA. 60+83.90 LT
STA. 60+57.17 - STA. 60+82.17 RT
STA. 61+84.73 - STA. 62+09.73 LT
STA. 61+85.04 - STA. 62+10.04 RT

BRIDGE RAILING, GALVANIZED NETC 2 RAIL
STA. 60+83.90 - STA. 61+84.73 LT
STA. 60+82.17 - STA. 61+85.04 RT

TRAFFIC SIGNS, TYPE A
STA. 60+50.00 21' RT
STA. 62+25.00 21' LT

CURVE #1
Delta = 14°18'01.25"
D = 5°43'46.48"
R = 1000.00'
T = 125.45'
L = 249.59'
E = 7.84'

CURVE #2
Delta = 15°33'15.33"
D = 3°41'47.41"
R = 1550.00'
T = 211.69'
L = 420.78'
E = 14.39'

PREVIOUS BRIDGE DATA
SINGLE SPAN OPEN BOTTOM CONCRETE ARCH - DESTROYED IN 2004 FLOOD
CLEAR SPAN (NORMAL TO STREAM): 31FEET MIN.
OVERALL LENGTH: 34.5 FEET BACK TO BACK OF ABUTMENTS
VERTICAL CLEARANCE: 7 FEET
BRIDGE WIDTH: +/- 34.5 FEET FACE OF RAIL TO FACE OF RAIL

CURRENT STRUCTURE
WIDTH: 24
LENGTH: 80

SCALE 1" = 20'-0
20 0 20

## LAYOUT SHEET #1

PROJECT NAME: Canaan
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: 04c098\struc\x04c098bdr
PROJECT LEADER: M. Evans-Mongeon
DESIGNED BY: S. Scribner
PLOT DATE: 18-AUG-2008
DRAWN BY: L. DUQUETTE
CHECKED BY: S. SCRIBNER.
SHEET 12 OF 66

4" YELLOW LINE (DOUBLE)
STA. 62+25 - 65+15

4" WHITE LINE
STA. 62+25 - 65+15 LT
STA. 62+25 - 65+15 RT

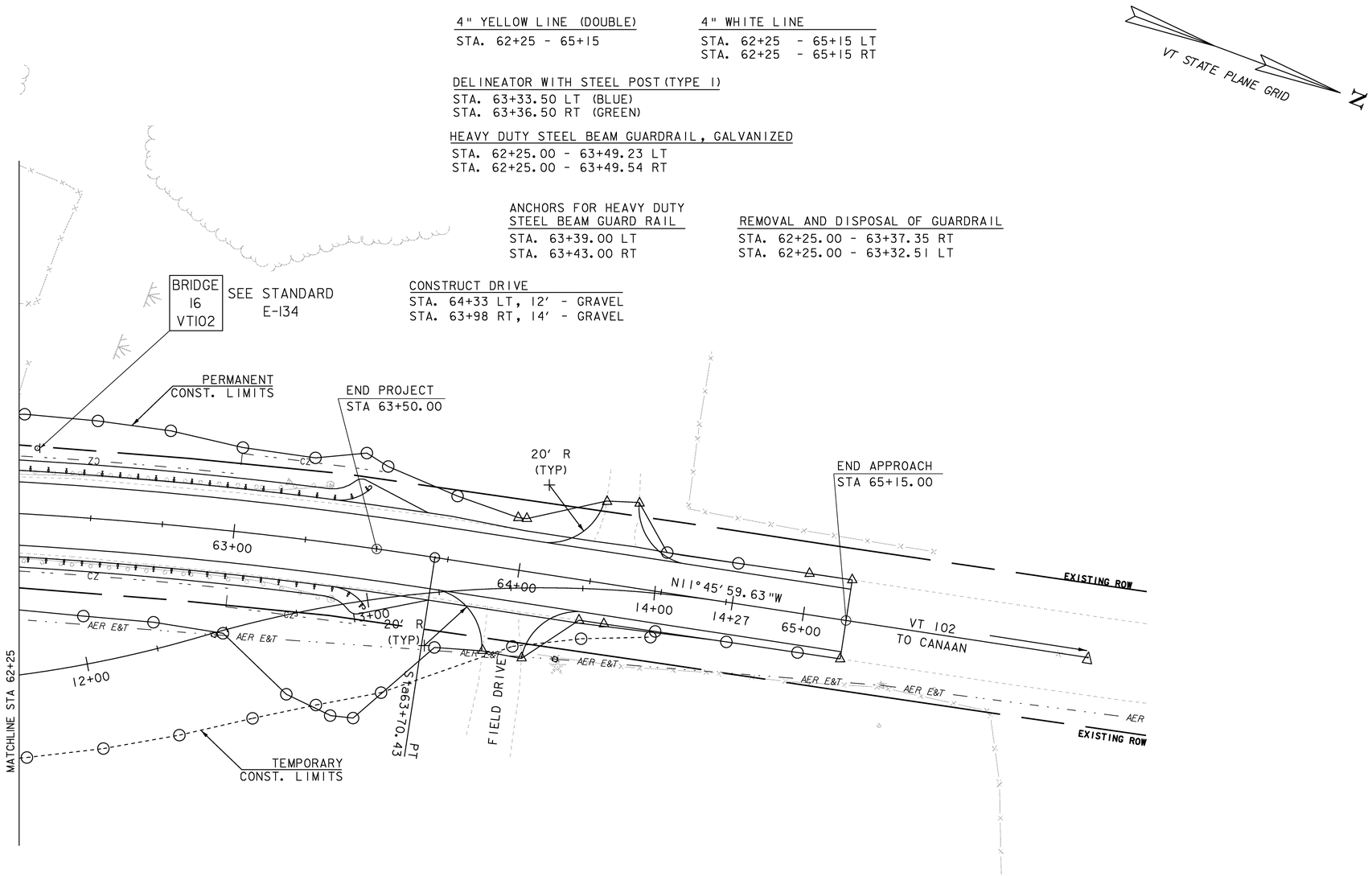
DELINEATOR WITH STEEL POST (TYPE I)
STA. 63+33.50 LT (BLUE)
STA. 63+36.50 RT (GREEN)

HEAVY DUTY STEEL BEAM GUARDRAIL, GALVANIZED
STA. 62+25.00 - 63+49.23 LT
STA. 62+25.00 - 63+49.54 RT

ANCHORS FOR HEAVY DUTY STEEL BEAM GUARD RAIL
STA. 63+39.00 LT
STA. 63+43.00 RT

REMOVAL AND DISPOSAL OF GUARDRAIL
STA. 62+25.00 - 63+37.35 RT
STA. 62+25.00 - 63+32.51 LT

CONSTRUCT DRIVE
STA. 64+33 LT, 12' - GRAVEL
STA. 63+98 RT, 14' - GRAVEL



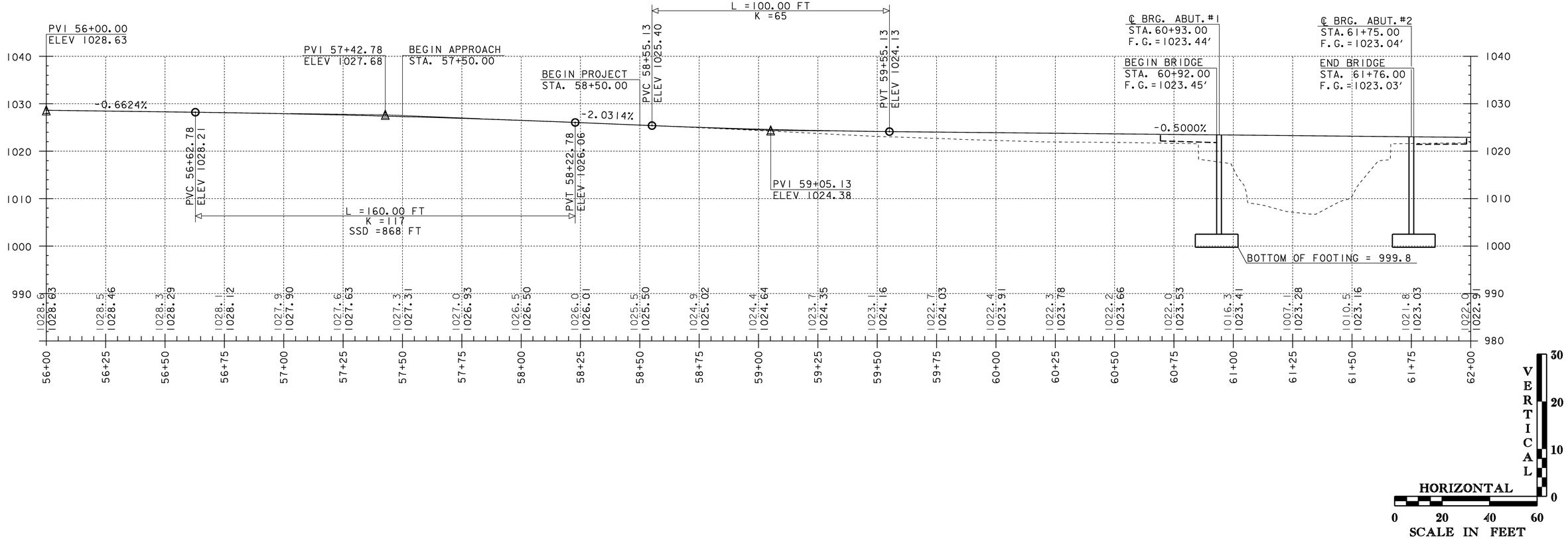

SCALE 1" = 20'-0
20 0 20

## LAYOUT SHEET #2

PROJECT NAME: Canaan
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: 04c098\struc\x04c098bdr
PROJECT LEADER: M. Evans-Mongeon
DESIGNED BY: S. SCRIBNER
PLOT DATE: 18-AUG-2008
DRAWN BY: L. DUQUETTE
CHECKED BY: S. SCRIBNER
SHEET 13 OF 66

# *PROFILE ALONG CENTERLINE VT 102*

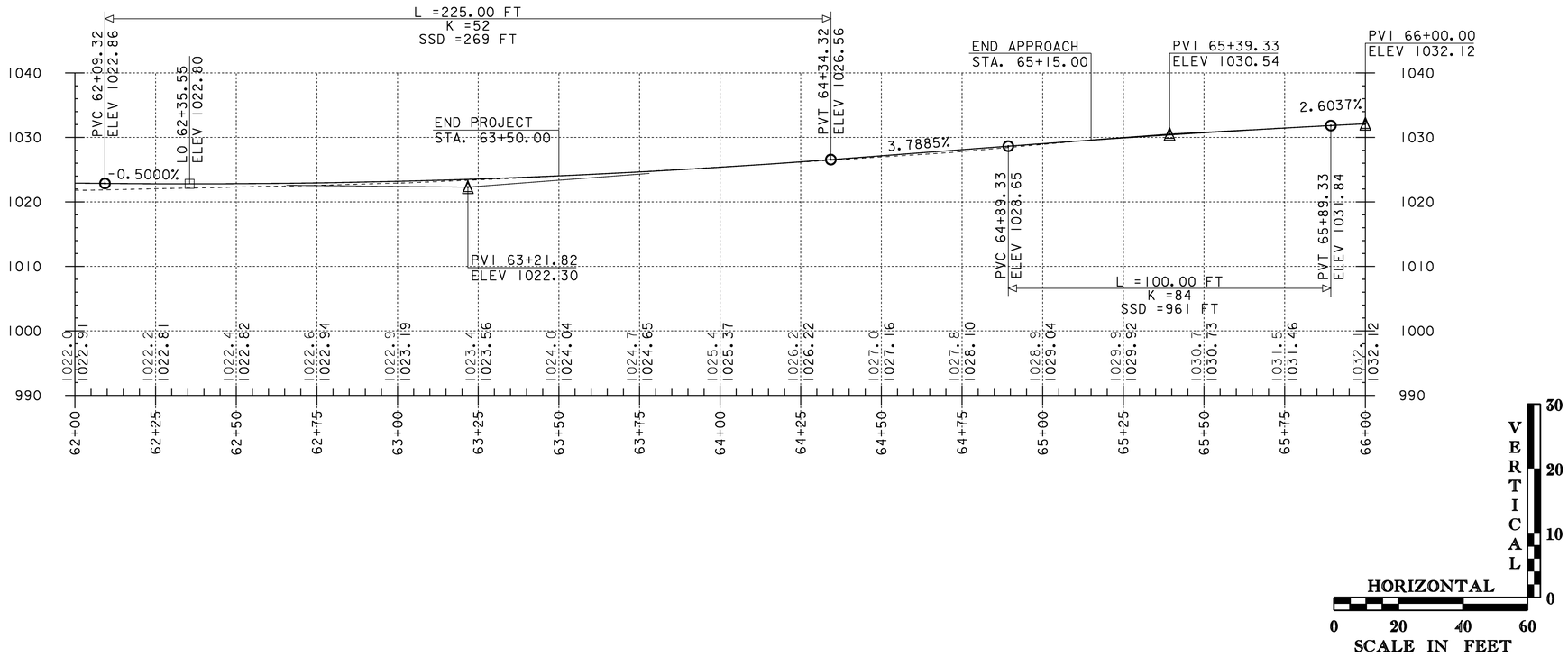



NOTE: ELEVATIONS SHOWN TO THE TENTH ARE EXISTING GROUND
ELEVATIONS SHOWN TO THE HUNDREDTH ARE FINISH GRADE

***PROFILE SHEET #1***

| | |
|---|---|
| PROJECT NAME: Canaan | |
| PROJECT NUMBER: ER ST 0271(16) | |
| FILE NAME: Structures\x04c098xs.dgn | PLOT DATE: 18-AUG-2008 |
| PROJECT LEADER: M. Evans-Mongeon | DRAWN BY: T. Husk |
| DESIGNED BY: S. Scribner | CHECKED BY: S. SCRIBNER. |
| x04c098pfl.1 | SHEET 14 OF 66 |

# *PROFILE ALONG CENTERLINE VT 102*




NOTE: ELEVATIONS SHOWN TO THE TENTH ARE EXISTING GROUND
ELEVATIONS SHOWN TO THE HUNDREDTH ARE FINISH GRADE

## *PROFILE SHEET #2*

| | |
|---|---|
| PROJECT NAME: | Canaan |
| PROJECT NUMBER: | ER ST 0271(16) |

| | |
|---|---|
| FILE NAME: Structures\x04c098xs.dgn | PLOT DATE: 18-AUG-2008 |
| PROJECT LEADER: M. Evans-Mongeon | DRAWN BY: T. Husk |
| DESIGNED BY: S. Scribner | CHECKED BY: S. SCRIBNER. |
| x04c098pf2.1 | SHEET 15 OF 66 |

STATE OF VERMONT
AGENCY OF TRANSPORTATION

# EROSION CONTROL NARRATIVE

**DESCRIPTION OF PROJECT**

This project involves the reconstruction of a bridge over the Willard Stream. The project is on VT 102, a paved, Major Collector, in the town of Canaan. A new two lane, single span, steel beam bridge will be constructed at the location of the existing bridge while traffic is maintained on the temporary bridge during construction. Following completion of the new bridge, the temporary bridge and abutments will be removed. The bridge spans the Willard Stream approximately 1/2 of a mile upstream of its confluence with the Connecticut River. This portion of the brook and its flood plain are located outside of the Connecticut River flood plain. Total roadway approach work, including both approaches, is approximately 680 feet. The limits of construction do not approach any buildings or other structures. Wetlands have been identified in the project area.

The land outside of the state right of way is privately owned.

It is anticipated this project will last two construction seasons.

Total disturbed area (excluding waste, borrow and staging areas):
is .510 ha (1.26 ac.)

**SITE INVENTORY & ANALYSIS**

**OFF SITE DRAINAGE CHARACTERISTICS:**
The property surrounding the project site consists of well established vegetation with moderate sloping banks. The surrounding area consists of terraces and plains with hay cover with defined drainage ways. Due to the nature of the surrounding terrain, runoff water entering the project site will be primarily limited to that which is conveyed along roadway embankment, and that which follows VT 102 along the .5% grade at the beginning of the project limits. The current roadway ditches are not well defined and are not lined with stone.

**DRAINAGE, WATERWAYS, BODIES OF WATER:**
The Willard Stream is located in the project area. There are wetlands within the project area. The Willard Stream is classified as a sinuous river. At normal water levels, it is a slow velocity river. The river bed is shallow to deep with a sandy silt bottom. Around the bridge abutments there are sandy silt beaches, at ordinary high water these beaches are submerged. The contributing drainage area is 15.42 square miles.

The portion of the wetland and buffer zone in the area of proposed impact, lies within a wet meadow, agricultural field, and swamp wetland. The wetland is located adjacent to the Willard Stream and receives water from the Willard Stream in flood events. The wetland provides the function of flood storage.

The proposed project does impact this function because it minimizes permanent construction in the wetland. The only construction that will occur in the wetland is for the temporary bypass that will be completely removed at the end of the project. Before placement of temporary fill for the detour, geotextile will be placed on original grade to facilitate restoration of pre-existing grade and preservation of plant roots and seeds. After removal of the temporary bridge and approaches, the area will be planted with appropriate native species.

The wetlands occur in the floodplain of a medium size stream. Wetlands vegetation is fairly dense and likely to stabilize soil during flood events. The wetlands provide this function. The wetlands can readily be observed from the bridge by passing motorists.

**TOPOGRAPHY, EXISTING ROADS, BUILDINGS, UTILITIES:**
The topography of the project site is level terraces and plains at the base of a mountain side. The site lies within the Connecticut River valley and most structures within the vicinity of the site are residential or agricultural and none lie in the limits of the project. VT 102 runs perpendicular to Willard Stream which is contained by moderately sloping stream banks along each side as it meanders through a level plain before entering the Connecticut River. Overhead utility service follows along VT 102 and will be required to be relocated.

**VEGETATION:**
A mix of hardwood and softwood trees of all sizes exist along VT 102. Fields and agricultural crops exist in the vicinity of the project. Impacts to vegetation will be limited to that which are effected by the construction of the new bridge and temporary bridge on existing alignment. Some small 6 inch to 12 inch trees, both softwood and hardwood, may have to be be removed.

The buffer zone consists of the fill placed for the existing road embankment. The buffer is typically vegetated with field grass

Following construction of the new bridge, the temporary bridge and roadway approaches will be removed, the slopes stabilized with stone fill and vegetation reestablished with standard seed and mulch practices.

**SOILS:**
The Soil Conservation Service has mapped the soils throughout Essex County. The soil types identified for this are Rumney Very Fine Sandy Loam(0%-2% slope). This soil type is described as "….very deep to bedrock and well drained. Permeability is moderate or moderately rapid in the solum, and rapid or very rapid in the substratum." These soils formed in flood plains. Another soil type is Colton-Duxbury Complex(8%-15%). This soil type is described as "….very deep to bedrock and excessively drained. Permeability is moderately rapid to very rapid in the solum, and very rapid in the substratum." These soils formed in terraces and plains. The last soil found on this project is Croghan Loamy Fine Sand(3%-8%). This soil type is described as "….very deep to bedrock and poorly drained. Permeability is moderately rapid or rapid in the surface layer, and rapid or very rapid in the subsoil and stratum."

The listed Soil Erodibility Coefficient (K-value) for Rumney Very Fine Sandy Loam ranges from 0.20 to 0.37, Colton-Duxbury Complex ranges from 0.10 to 0.49, and Croghan Loamy Fine Sand is 0.17.

Generally, K-values indicate the following: 0.0 - 0.23 = low erodibility; 0.24 - 0.36 = moderate erodibility; 0.37 and higher = higher erodibility

Soils are saturated during at least part of the growing season. Because this wetland is located within the floodplain of the Willard stream, it is capable of being inundated by many feet of water. However, in most years inundation does not occur in the project area.

**SENSITIVE RESOURCE AREAS:**

No 'Threatened & Endangered Species' have been identified within the project limits and there will be no adverse effect to Historic or Archaeological features. Willard Stream is the only identified resource. There are wetlands in the vicinity of the project.

**PROXIMITY TO NATURAL OR MAN-MADE WATER FEATURES:**
Disturbance of soils near natural or man-made waterways consists of that which is necessary to construct two new concrete bridge abutments and applicable roadway approaches as well as the removal of the existing temporary bridge. Stabilization of disturbances to stream banks will be accomplished with Stone Fill, Type III.

**TEMPORARY EROSION PREVENTION & SEDIMENT CONTROL**

**Temporary erosion prevention measures to be utilized include:**

Project Demarcation Fence denoted -PDF- and Barrier Fence denoted -BF- on the plans, to delineate the limits the contractor can access with construction equipment. This measure limits the area that can be disturbed and exposed to erosion.

Seeding, mulching and biodegradable erosion control matting, or an equivalent product, will be utilized on all slopes steeper than 3:1 that are not lined with stone fill.

These slopes shall be stabilized within 48 hours of reaching final grade or during intermittent phases of construction activity.

Tracking of all exposed slopes, combined with temporary mulching, will also be utilized on a regular basis. Any slopes to be exposed for several days prior to final grading shall be tracked and mulched. The forecast of rainfall events shall also trigger protection of exposed slopes.

Before placement of temporary fill for the detour, geotextile will be placed on original grade to facilitate restoration of pre-existing grade and preservation of plant roots and seeds. All disturbed area will be top soiled, fertilized, seeded, and mulched. The construction area will be protected by erosion and sedimentation controls until disturbed areas are stabilized.

Geotextile placed under the temporary bridge approaches shall be Road Bed Seperator in accordance with section 649 and will be paid incidental to the temporary bridge item in the contract.

**Temporary measures to control sediment transport include:**
Silt fence will be installed and maintained as indicated in "erosion & sediment control plan". The contractor may need to adjust locations as indicated on the plans to better suit their construction needs. Proposed and or alternate silt fence locations will prevent sediment transport to down gradient areas. Each line of silt fence will be placed along the contour with ends turned slightly uphill to create a ponding effect should water try to run along the fencing and around the ends. The maximum slope length between separate runs of silt fence is 100 feet. Silt fence shall be installed prior to any upslope earthwork.

Filter curtains will be installed and maintained as indicated in "erosion & sediment control plan". The contractor may need to adjust locations as indicated on the plans to better suit their construction needs. Proposed and or alternate filter curtain locations will prevent sediment transport to to the Willard stream. Filter curtain shall be installed prior to any in stream construction.

Measures such as silt fence and sand bags shall be checked regularly for accumulation of sediment. Sediment build-up shall be removed when the level of sediment reaches one-half the height of the control measure. Sediments shall be disposed of in an approved area such that they will not be subject to erosion.

Stabilized construction entrances to the project site, staging areas, as well as to waste and borrow areas shall be established. The minimum size of a stabilized construction entrance is 12 feet X 50 feet. All surface water flowing to or diverted towards a construction entrance shall be piped under the stone. Pipes shall be appropriately sized for the contributing area, however, no pipes smaller than 6 inches diameter shall be used. See typical detail on 'Erosion and Sediment Control Plan' sheet for materials and construction method to be utilized when constructing a stabilized entrance.

Temporary sediment settling basins may or may not be utilized on this project. If a settling basin is to be used for dewatering a cofferdam, it should be sized based upon the pumping rate and target particle size to be settled out for the project site. The following sizing criteria is based upon a target particle size of .01 millimeters and is provided as general guidance on sheet 18.

**PERMANENT EROSION CONTROL MEASURES**

Several permanent erosion control measures will be utilized:

Stone lining of the stream banks with Stone Fill, Type III as specified by Vtrans Hydraulics personnel is specified. This stone will protect from stream bank erosion during design storm events.

Grass, or other suitable ground cover will be established outside of the roadway limits where stone lining has been determined. Specifically at the toes of slopes and any other disturbed area.

**GENERAL EROSION & SEDIMENT CONTROL GUIDELINES**

The Erosion Control Plans are meant as a guideline for preventing erosion and controlling sediment transport. The work outlined in this narrative consists of applying measures throughout the life of the project to control erosion and minimize the sedimentation of receiving waters. The measures include stabilization and structural practices, storm water controls and other pollution prevention controls.

Coordinate the installation, use, and removal of erosion and sediment control measures with construction activities to ensure economical, effective and continuous erosion and sediment control. Employ temporary stabilization practices in incremental stages as construction proceeds. The contractor will use additional erosion control measures as necessitated by the sequence of construction and as directed by the Engineer. See section 105.23 of the Vermont AOT Standard Specifications for Construction, dated 2006.

Install all erosion prevention and sediment control measures as shown in the Erosion Prevention and Sediment Control Plan or as directed by the Resident Engineer. Do not modify the type, size or location of any control or practice without approval of the Resident Engineer. Any changes shall be noted on the plans, in the weekly inspection report, and reported to the appropriate authority in a timely manner. Inspect all control measures weekly and after each rainfall event. Repair measures promptly once damage is discovered.

Preventing initial soil erosion is much more effective than treating eroded sediment. Therefore, stabilize all disturbed areas promptly after construction activity has temporarily or permanently ceased. Temporary vegetation shall be established if the area is to be without construction activity for a period of 14 days. Perimeter control measures shall be installed following clearing, but prior to the start of any grubbing or grading activity, install other temporary controls in incremental stages as construction proceeds.

Maintaining vegetated buffers along stream banks, wetlands or other sensitive areas is a crucial erosion and sediment control measure that should be utilized wherever possible.

Control only sediment-laden runoff generated by the project site. Collect and route clean offsite runoff around or through the project site using diversion berms, diversion channels, culverts and/or temporary pipes. Do not allow construction equipment to operate on the down slope side of perimeter control measures.

| | | | |
|---|---|---|---|
| PROJECT NAME: | CANAAN | | |
| PROJECT NUMBER: | ER ST 0271 (16) | | |
| FILE NAME: | M:/structures/s04c098ecn.dgn | PLOT DATE: | 8/18/2008 |
| PROJECT LEADER: | M. EVANS-MONGEON | DRAWN BY: | G. ROKES |
| DESIGNED BY: | S.S. SCRIBNER | CHECKED BY: | G. ROKES |
| EROSION CONTROL NARRATIVE | | SHEET 16 | OF 66 |

VT STATE PLANE GRID

N

SOIL INFORMATION
RUMNEY VERY FINE SANDY LOAM, 0-2% SLOPES
HYDROLOGIC SOILGROUP C
LAND IS HIGHLY ERODIBLE

SOIL INFORMATION
COMBINED W/32C COLTON-DUXBURY COMPLEX, 8-15% SLOPES, HYDROLOGIC SOIL-GROUP A, HIGHLY ERODIBLE

RIPARIAN BUFFER

WETLAND BUFFER

BARN

GRAVEL DRIVE

FIELD DRIVE

VT 102
TO LEMINGTON

WILLARD STREAM

MATCHLINE STA 62+25

57+50 58+00 59+00 60+00 61+00 62+00

1025 1020 1015 1010

LEGEND

- CLASS II WETLAND
- EXISTING COUNTOURS 1020
- SOIL BOUNDARY
- WETLAND BUFFER ZONE
- AGRICULTURAL AG

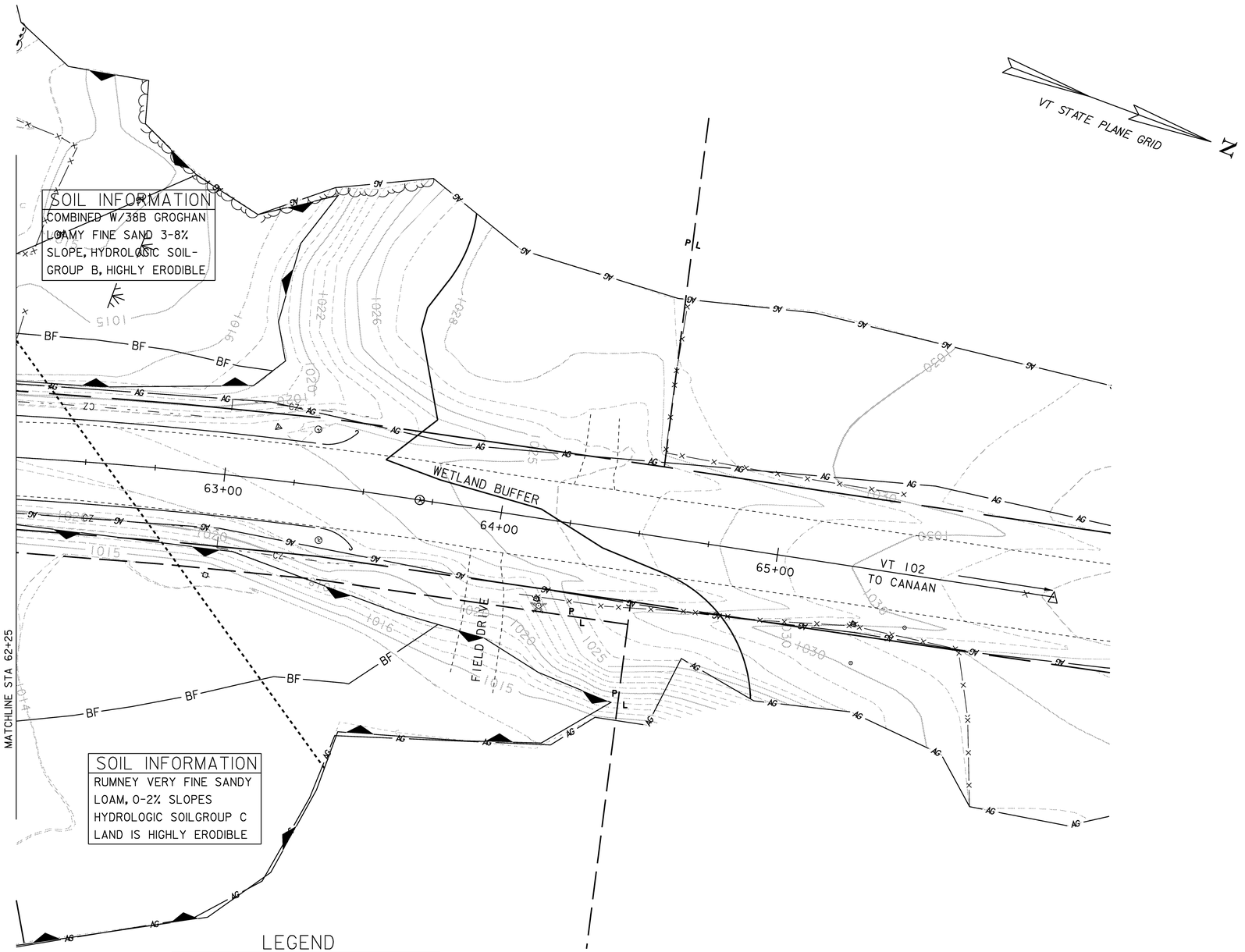
SCALE 1" = 20'-0
20 0 20

## EXISTING CONDITIONS SITE PLAN (1)

PROJECT NAME: Canaan
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: Structures\x04c098erobdr.d
PROJECT LEADER: M. Evans-Mongeon
DESIGNED BY: S. Scribner
x04c098erol.i

PLOT DATE: 18-AUG-2008
DRAWN BY: T. Husk
CHECKED BY: S. SCRIBNER
SHEET 17 OF 66




SCALE 1" - 20'-0

20 0 20

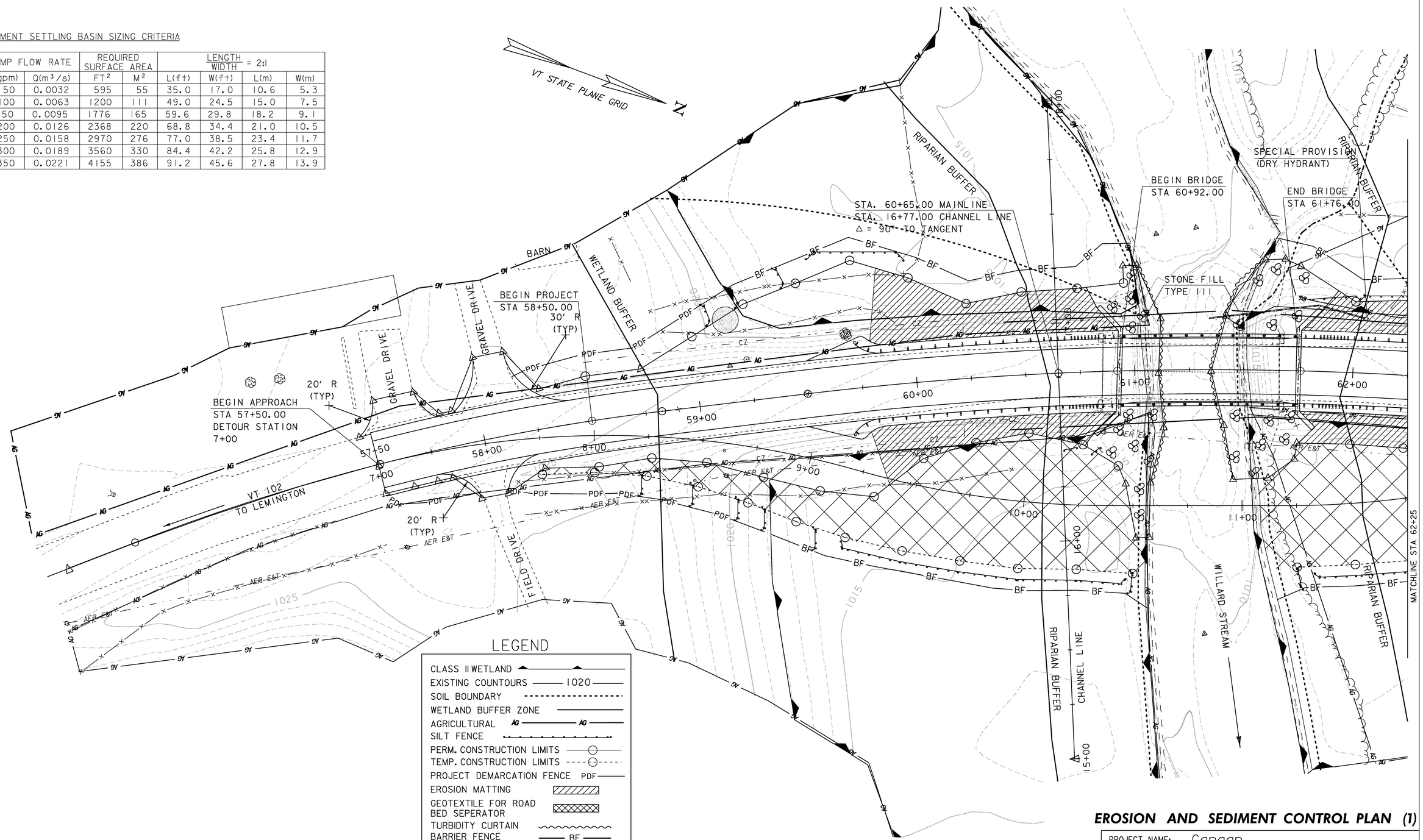
## EXISTING CONDITIONS SITE PLAN (2)

| | |
|---|---|
| PROJECT NAME: | Canaan |
| PROJECT NUMBER: | ER ST 0271(16) |

| | | | |
|---|---|---|---|
| FILE NAME: | Structures\x04c098erobdr.d | PLOT DATE: | 18-AUG-2008 |
| PROJECT LEADER: | M. Evans-Mongeon | DRAWN BY: | T. Husk |
| DESIGNED BY: | S. Scribner | CHECKED BY: | S. SCRIBNER |
| x04c098erol.i | | SHEET 18 | OF 66 |

SEDIMENT SETTLING BASIN SIZING CRITERIA

| PUMP FLOW RATE | | REQUIRED SURFACE AREA | | LENGTH / WIDTH = 2:1 | | | |
|---|---|---|---|---|---|---|---|
| Q(gpm) | Q($m^3/s$) | $FT^2$ | $M^2$ | L(ft) | W(ft) | L(m) | W(m) |
| 50 | 0.0032 | 595 | 55 | 35.0 | 17.0 | 10.6 | 5.3 |
| 100 | 0.0063 | 1200 | 111 | 49.0 | 24.5 | 15.0 | 7.5 |
| 150 | 0.0095 | 1776 | 165 | 59.6 | 29.8 | 18.2 | 9.1 |
| 200 | 0.0126 | 2368 | 220 | 68.8 | 34.4 | 21.0 | 10.5 |
| 250 | 0.0158 | 2970 | 276 | 77.0 | 38.5 | 23.4 | 11.7 |
| 300 | 0.0189 | 3560 | 330 | 84.4 | 42.2 | 25.8 | 12.9 |
| 350 | 0.0221 | 4155 | 386 | 91.2 | 45.6 | 27.8 | 13.9 |




LEGEND

- CLASS II WETLAND
- EXISTING COUNTOURS — 1020
- SOIL BOUNDARY
- WETLAND BUFFER ZONE
- AGRICULTURAL — AG
- SILT FENCE
- PERM. CONSTRUCTION LIMITS
- TEMP. CONSTRUCTION LIMITS
- PROJECT DEMARCATION FENCE — PDF
- EROSION MATTING
- GEOTEXTILE FOR ROAD BED SEPERATOR
- TURBIDITY CURTAIN
- BARRIER FENCE — BF
- PROPOSED SEDIMENT DEWATERING LOCATION

SCALE 1" = 20'-0

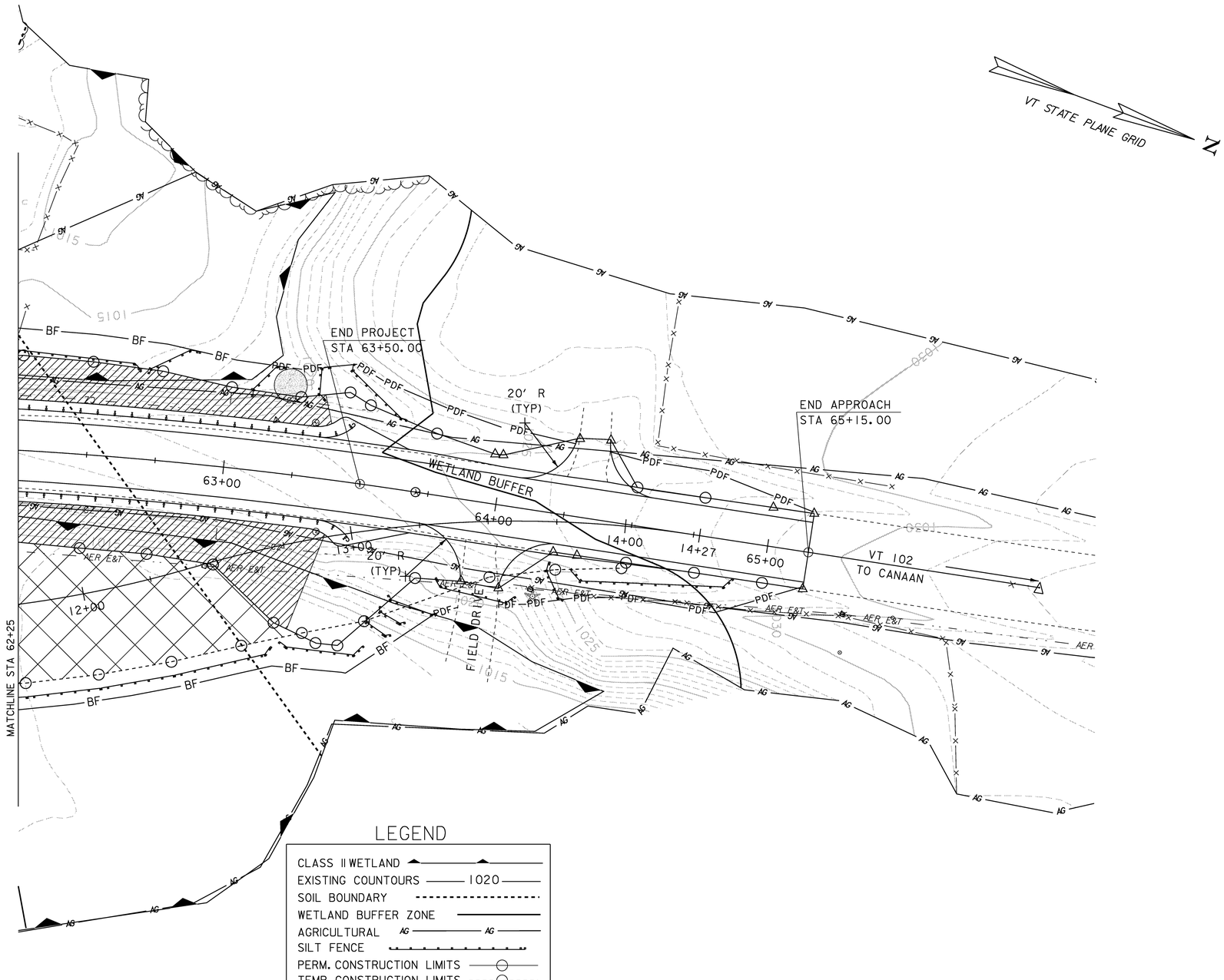
20 0 20

## EROSION AND SEDIMENT CONTROL PLAN (1)

PROJECT NAME: Canaan
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: Structures\x04c098erobdr.d
PROJECT LEADER: M. Evans-Mongeon
DESIGNED BY: S. Scribner
x04c098erol.1

PLOT DATE: 18-AUG-2008
DRAWN BY: T. Husk
CHECKED BY: S. SCRIBNER




## LEGEND

- CLASS II WETLAND
- EXISTING COUNTOURS — 1020
- SOIL BOUNDARY
- WETLAND BUFFER ZONE
- AGRICULTURAL — AG — AG
- SILT FENCE
- PERM. CONSTRUCTION LIMITS
- TEMP. CONSTRUCTION LIMITS
- PROJECT DEMARCATION FENCE — PDF
- EROSION MATTING
- GEOTEXTILE FOR ROAD BED SEPERATOR
- BARRIER FENCE — BF
- PROPOSED SEDIMENT DEWATERING LOCATION

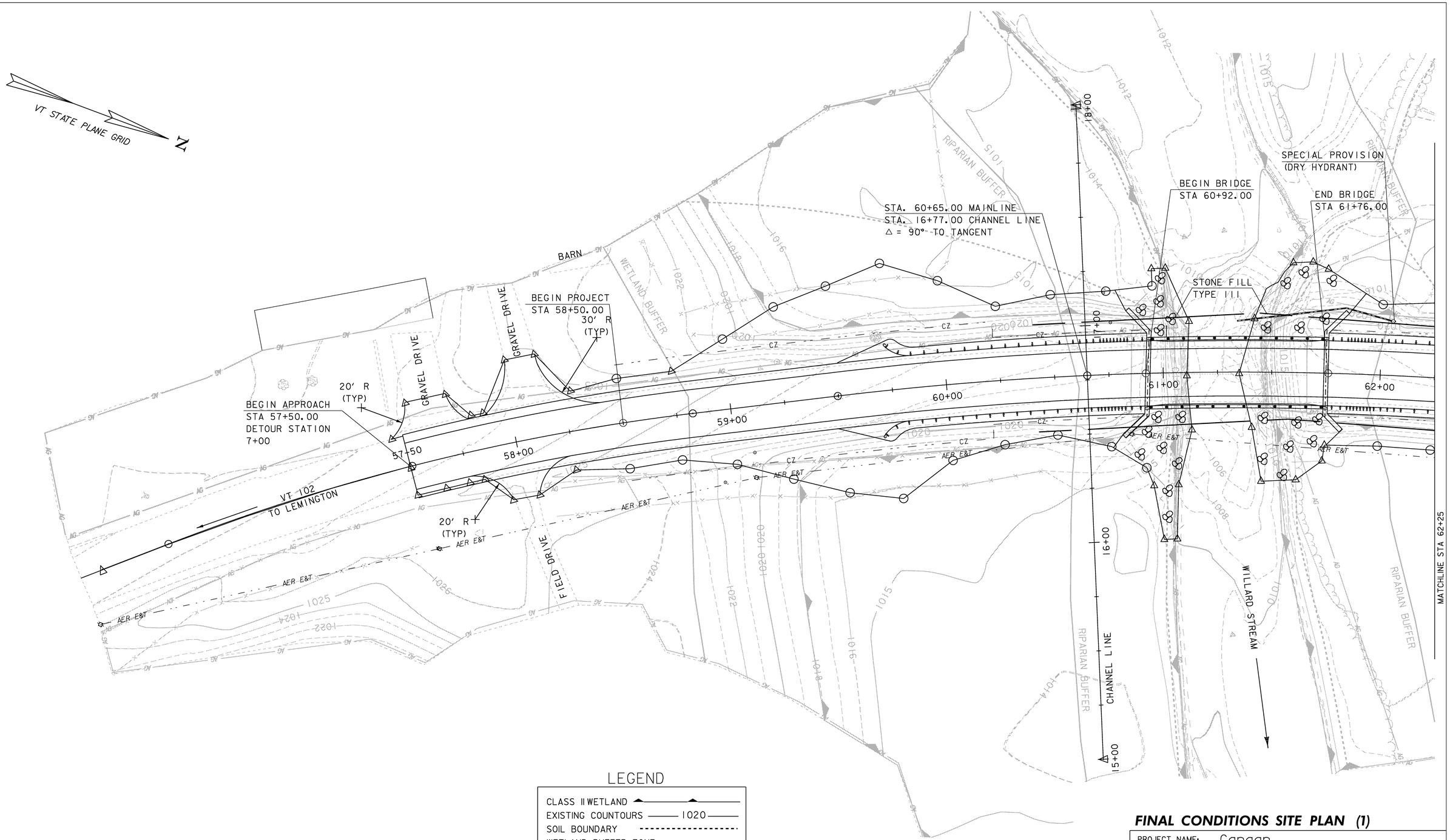
SCALE 1" = 20'-0
20 0 20

# EROSION AND SEDIMENT CONTROL PLAN (2)

PROJECT NAME: Canaan
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: Structures\x04c098erobdr.d
PROJECT LEADER: M. Evans-Mongeon
DESIGNED BY: S. Scribner
x04c098ero4.i

PLOT DATE: 18-AUG-2008
DRAWN BY: T. Husk
CHECKED BY: S. SCRIBNER
SHEET 20 OF 66




LEGEND

- CLASS II WETLAND
- EXISTING COUNTOURS — 1020
- SOIL BOUNDARY
- WETLAND BUFFER ZONE
- AGRICULTURAL AG — AG

SCALE 1" = 20'-0
20 0 20

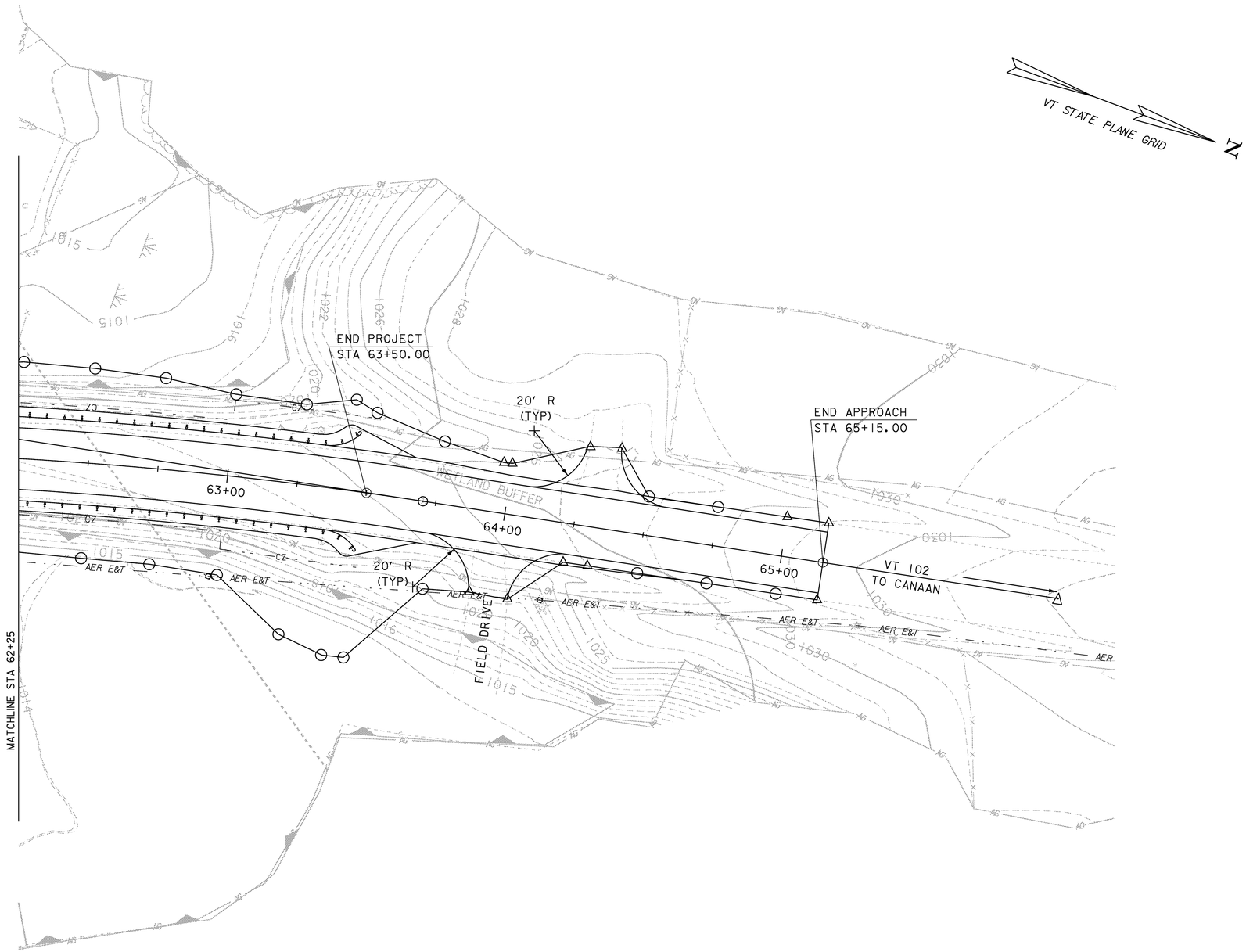
CONTOURS SHOWN ARE EXISTING CONTOURS,
SEE CROSS SECTIONS FOR PROPOSED CONTOURS.

## FINAL CONDITIONS SITE PLAN (1)

PROJECT NAME: Canaan
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: Structures\x04c098erobdr.d
PROJECT LEADER: M. Evans-Mongeon
DESIGNED BY: S. Scribner
x04c098ero5.i

PLOT DATE: 18-AUG-2008
DRAWN BY: T. Husk
CHECKED BY: S. SCRIBNER
SHEET 21 OF 66




LEGEND

| | |
|---|---|
| CLASS II WETLAND | |
| EXISTING COUNTOURS | 1020 |
| SOIL BOUNDARY | |
| WETLAND BUFFER ZONE | |
| AGRICULTURAL | AG |

SCALE 1" = 20'-0

20 0 20

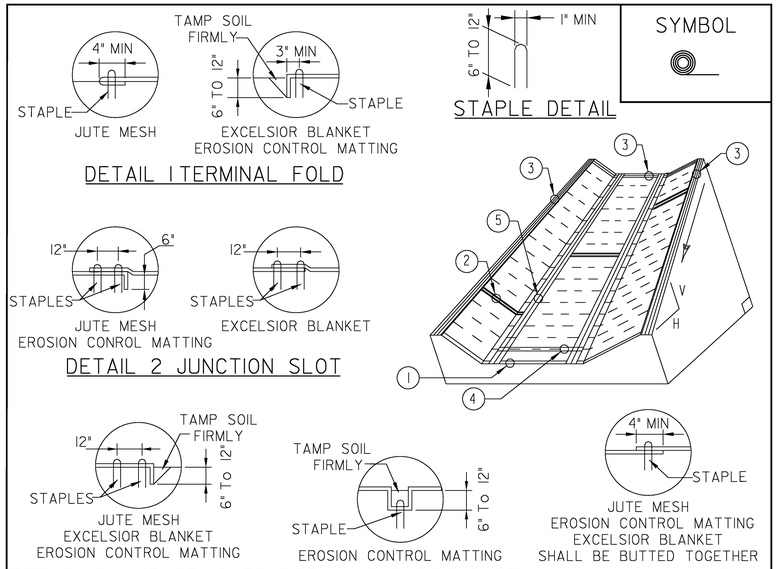
CONTOURS SHOWN ARE EXISTING CONTOURS,
SEE CROSS SECTIONS FOR PROPOSED CONTOURS.

## *FINAL CONDITIONS SITE PLAN (2)*

PROJECT NAME: Canaan
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: Structures\x04c098erobdr.d
PROJECT LEADER: M. Evans-Mongeon
DESIGNED BY: S. Scribner
x04c098ero6.1

PLOT DATE: 18-AUG-2008
DRAWN BY: T. Husk
CHECKED BY: S. SCRIBNER
SHEET 22 OF 66




## CONSTRUCTION SPECIFICATIONS

1. EROSION MATTING, CHECK SLOTS, SHALL BE SPACED IN DITCH CHANNEL SO THAT ONE OCCURS WITHIN EACH 50' ON SLOPES OF MORE THAN 4% AND LESS THAN 6%. ON SLOPES OF 6% OR MORE, THEY SHALL BE SPACED SO THAT ONE OCCURS WITHIN EACH 25'.

2. APPLY FERTILIZER, LIME SEED PRIOR TO PLACING MATTING.

3. STAPLES ARE TO BE PLACED ALTERNATELY, IN COLUMNS APPROXIMATELY 2' APART AND IN ROWS APPROXIMATELY 3' APART. APPROXIMATELY 175 STAPLES ARE REQUIRED PER 4'X225' ROLL OF MATERIAL AND 125 STAPLES ARE REQUIRED PER 4'X150' ROLL OF MATERIAL.

4. DISTURBED AREAS SHALL BE SMOOTHLY GRADED. EROSION CONTROL MATERIAL SHALL BE PLACED LOOSELY OVER GROUND SURFACE. DO NOT STRETCH.

5. ALL TERMINAL ENDS AND TRANSVERSE LAPS SHALL BE STAPLED AT APPROXIMATELY 12" INTERVALS.

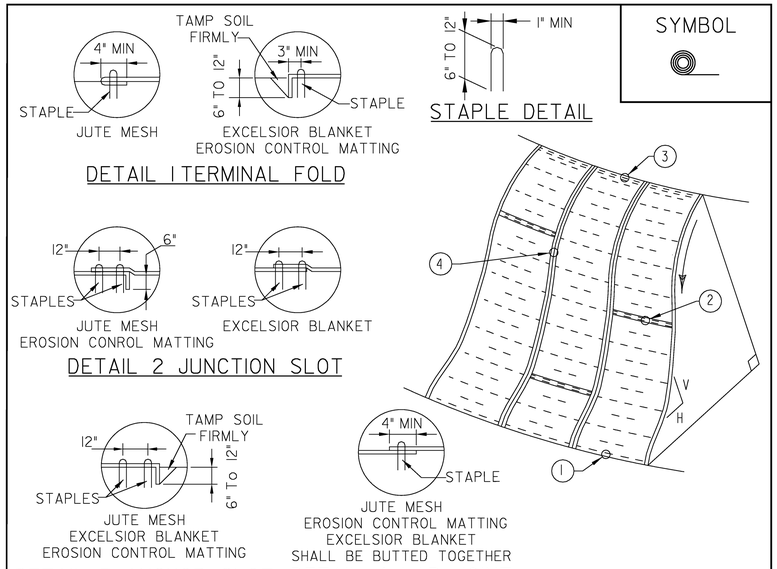
ADAPTED FROM DETAILS PROVIDED BY: ILLINOIS USDA-NRCS
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

ROLLED EROSION CONTROL PRODUCT (RECP) DITCH

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS ITEM SHALL BE PAID FOR UNDER ITEM
653.20 TEMPORARY EROSION MATTING OR
~~653.21 PERMANENT EROSION MATTING~~

| REVISIONS | |
|---|---|
| MARCH 8, 2007 | JMF |
| APRIL 16, 2007 | WHF |
| | |
| | |
| | |




## CONSTRUCTION SPECIFICATIONS

1. APPLY TO SLOPES GREATER THAN 3H:1V OR WHERE NECESSARY TO AID IN ESTABLISHING VEGETATION.

2. APPLY FERTILIZER, LIME AND SEED PRIOR TO PLACING MATTING.

3. STAPLES ARE TO BE PLACED ALTERNATELY, IN COLUMNS APPROXIMATELY 2' APART AND IN ROWS APPROXIMATELY 3' APART. APPROXIMATELY 175 STAPLES ARE REQUIRED PER 4'X225' ROLL OF MATERIAL AND 125 STAPLES ARE REQUIRED PER 4'X150' ROLL OF MATERIAL.

4. DISTURBED AREAS SHALL BE SMOOTHLY GRADED. EROSION CONTROL MATERIAL SHALL BE PLACED LOOSELY OVER GROUND SURFACE. DO NOT STRETCH.

5. ALL TERMINAL ENDS AND TRANSVERSE LAPS SHALL BE STAPLED AT APPROXIMATELY 12" INTERVALS.

ADAPTED FROM DETAILS PROVIDED BY: ILLINOIS USDA-NRCS
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

ROLLED EROSION CONTROL PRODUCT (RECP) SIDE SLOPE

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS ITEM SHALL BE PAID FOR UNDER ITEM
653.20 TEMPORARY EROSION MATTING OR
~~653.21 PERMANENT EROSION MATTING~~

| NEW | |
|---|---|
| APRIL 16, 2007 | WHF |
| REVISIONS | |
| | |
| | |
| | |

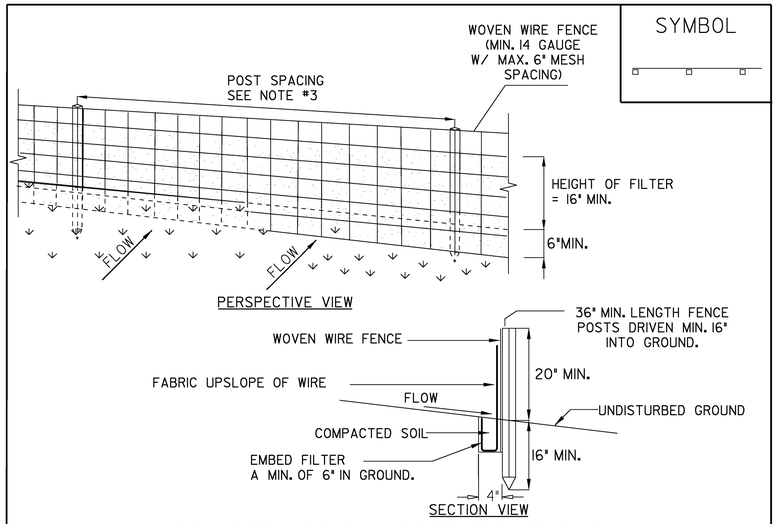
***EROSION DETAIL SHEET 1***

PROJECT NAME: Canaan
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: Structures•c098ero.dgn
PROJECT LEADER: M. Evans-Mongeon
DESIGNED BY: S. Scribner
x04c098ero8.1

PLOT DATE: 18-AUG-2008
DRAWN BY: T. Husk
CHECKED BY: S. SCRIBNER

SYMBOL




## CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE REINFORCEMENT IS ONLY REQUIRED WITHIN 100 FT UPSLOPE OF RECEIVING WATERS.

2. WHERE REQUIRED FENCE SHALL BE WOVEN WIRE, MIN. 14 GAUGE WITH A 6" MAXIMUM MESH OPENING. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N OR APPROVED EQUIVALENT.

3. POST SPACING FOR WIRE-BACKED FENCE SHALL BE 10' MAXIMUM. FOR FILTER-CLOTH FENCE, WHEN ELONGATION IS >50%, POST SPACING SHALL NOT EXCEED 4'. FOR FILTER-CLOTH FENCE, WHEN ELONGATION IS <50%, POST SPACING SHALL NOT EXCEED 6'.

4. WOVEN WIRE FENCE IS TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES. FILTER CLOTH IS TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.

5. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED.

6. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.

7. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN SEDIMENT REACHES HALF OF FABRIC HEIGHT.

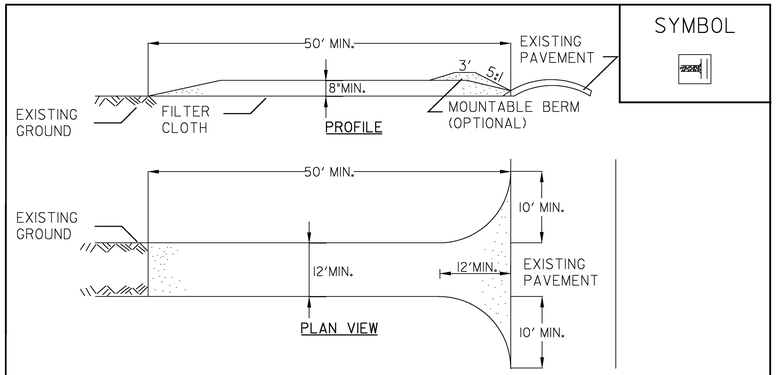
ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SILT FENCE

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS ITEM SHALL BE PAID FOR UNDER ITEM
STANDARD SPECIFICIATION 649.51 GEOTEXTILE FOR SILT FENCE OR
SPECIAL PROVISION 900.675 (GEOTEXTILE FOR SILT FENCE, WOVEN WIRE REINFORCED)

SYMBOL




## CONSTRUCTION SPECIFICATIONS

1. STONE SIZE - USE 1-4" STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.

2. LENGTH - NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH APPLIES).

3. THICKNESS - NOT LESS THAN EIGHT (8) INCHES.

4. WIDTH - TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.

5. GEOTEXTILE MUST BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.

6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.

7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.

8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.

9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED ACCORDING TO PERMIT REQUIREMENTS.

ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

STABILIZED
CONSTRUCTION
ENTRANCE

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS ITEM SHALL BE PAID FOR UNDER ITEM
653.35 VEHICLE TRACKING PAD

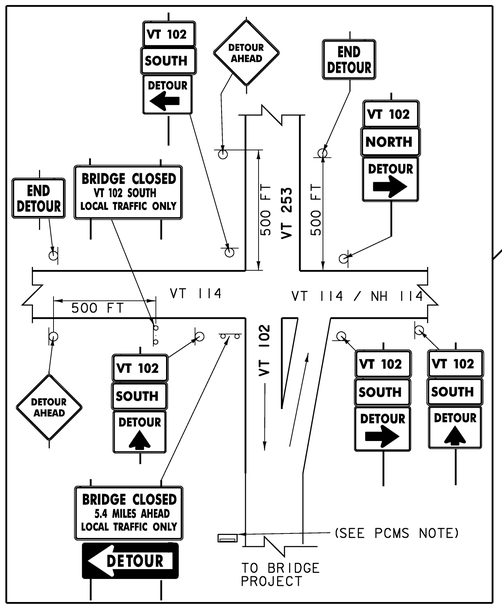
| REVISIONS | |
|---|---|
| FEBRUARY 9, 2007 | WHF |
| MARCH 8, 2007 | JMF |
| | |
| | |
| | |

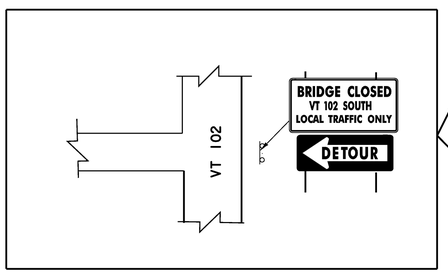
***EROSION DETAIL SHEET 2***

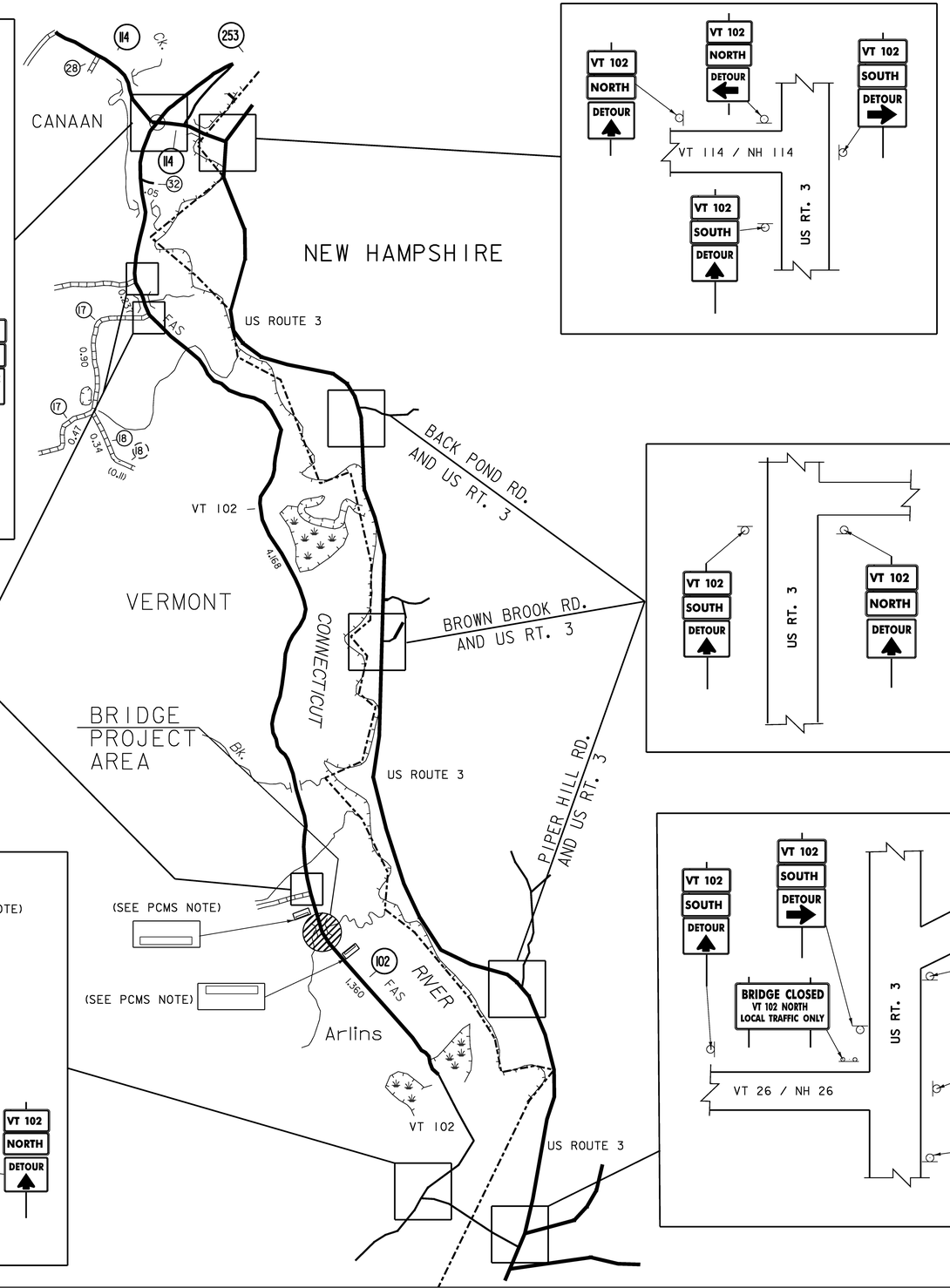
PROJECT NAME: Canaan
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: Structures•c098ero.dgn
PROJECT LEADER: M. Evans-Mongeon
DESIGNED BY: S. Scribner
x04c098ero9.i

PLOT DATE: 18-AUG-2008
DRAWN BY: T. Husk
CHECKED BY: S. SCRIBNER
SHEET 24 OF 66



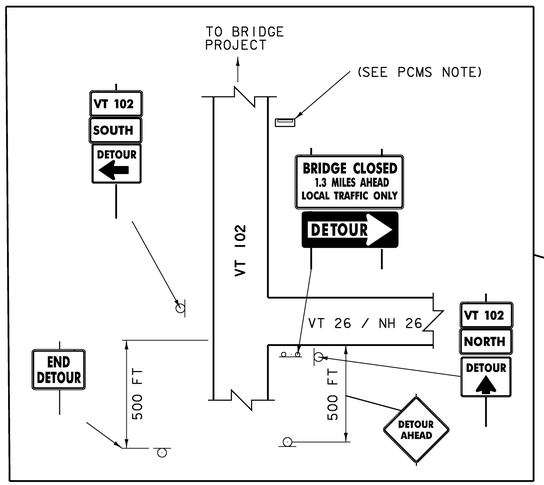



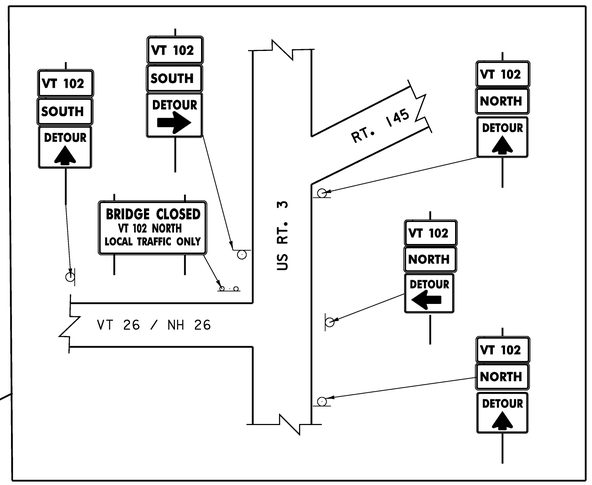













NOTE 1: THE PLACEMENT OF DETOUR SIGNS ON THIS SHEET ARE APPROXIMATE. PLACEMENT OF DETOUR SIGNS IN URBAN AREAS SHALL NOT BLOCK TURNING TRAFFIC'S SIGHT DISTANCE AND WILL NOT EFFECT SIGHT DISTANCES OF PROPERTY OWNERS ENTERING THE HIGHWAY. IF ADDITIONAL SIGNS ARE REQUIRED TO BETTER MARK OUT THE DETOUR, THESE ADDITIONAL SIGNS WILL BE INCIDENTAL TO ITEM TRAFFIC CONTROL.

NOTE 2: PAYMENT FOR DETOUR SIGNING WILL BE INCLUDED IN THE UNIT BID PRICE FOR ITEM TRAFFIC CONTROL.

NOTE 3: SEE GENERAL NOTE SHEET TRAFFIC CONTROL SECTION FOR ADDITIONAL INFORMATION ON TRAFFIC CONTROL.

NOTE 4: TEMPORARY DETOUR APPLICABLE TO ALTERNATE ZB ONLY

PCMS NOTE: PCMS (PORTABLE CHANGEABLE MESSAGE SIGN )SHALL BE PLACED 500 FEET BEFORE THE PROJECT OR AS INDICATED BY ENGINEER. PLACE SIGN 2 WEEKS PRIOR TO THE BRIDGE CLOSURE WITH THE DATES OF THE CLOSURE DISPLAYED. UPON CLOSURE OF THE BRIDGE, THE PCMS BOARDS WILL BE RELOCATED TO THE INTERSECTIONS OF VT 102/VT26 AND VT 102/VT114. THE PCMS BOARD SHALL READ "BRIDGE CLOSED" FOR THE REMAINDER OF THE TEMPORARY BRIDGE CLOSURE AND CAN BE REMOVED ONCE THE TEMPORARY BRIDGE IS OPEN TO TRAFFIC. PAYMENT WILL BE INCIDENTAL TO ITEM TRAFFIC CONTROL.

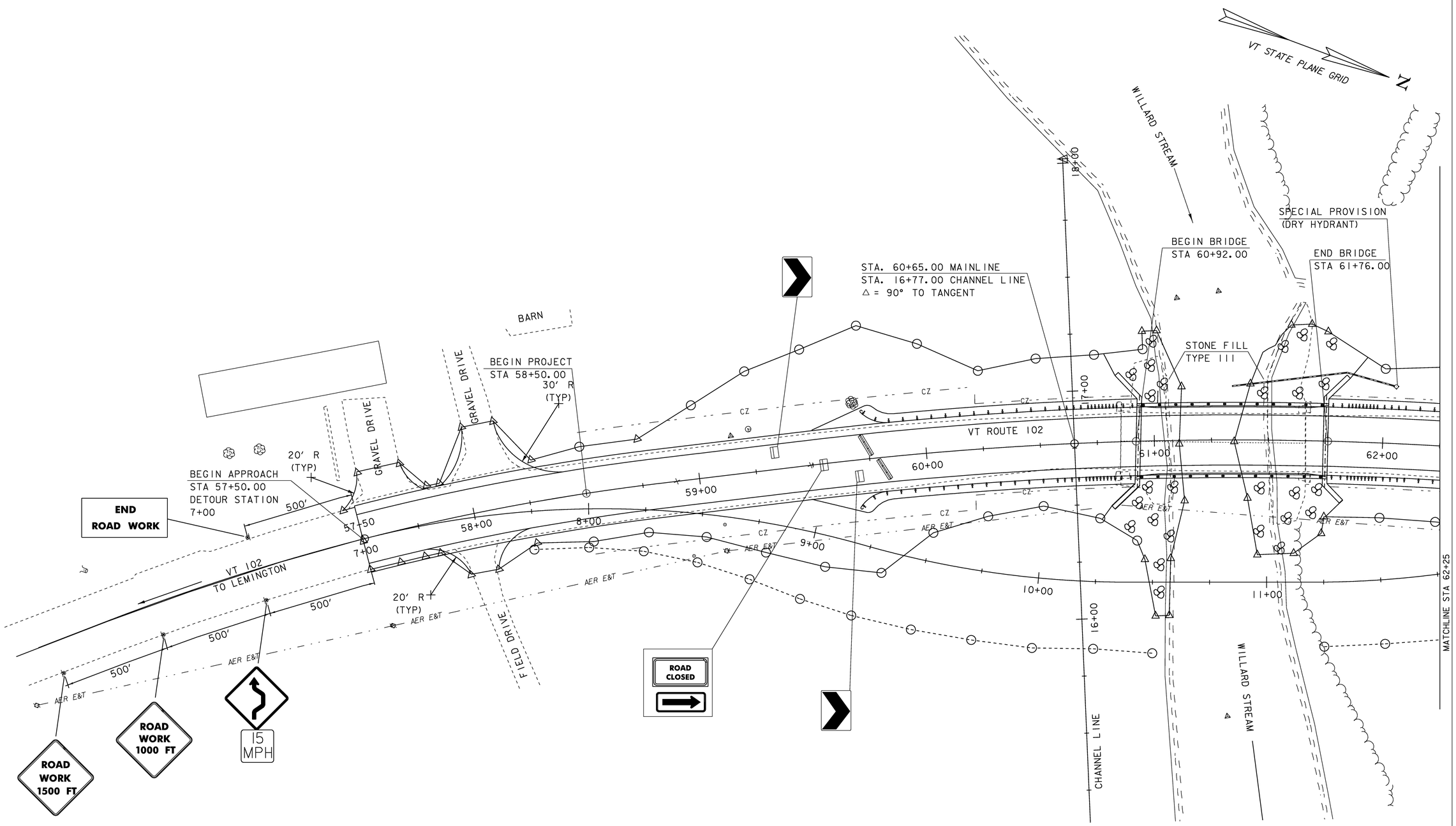
MAP AND INTERSECTION ENLARGEMENTS ARE NOT TO SCALE

NOT TO SCALE

## *TEMPORARY DETOUR SHEET*

PROJECT NAME: CANAAN
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: 04C098\STR\x04c098tcs.dgn
PROJECT LEADER: M. EVANS-MONGEON
DESIGNED BY: G. ROKES
PLOT DATE: 18-AUG-2008
DRAWN BY: G. ROKES
CHECKED BY: S. SCIBNER
SHEET 25 OF 66




TYPE III BARRICADE

TEMPORARY TRAFFIC BARRIER

SCALE 1" - 20'-0

20 0 20

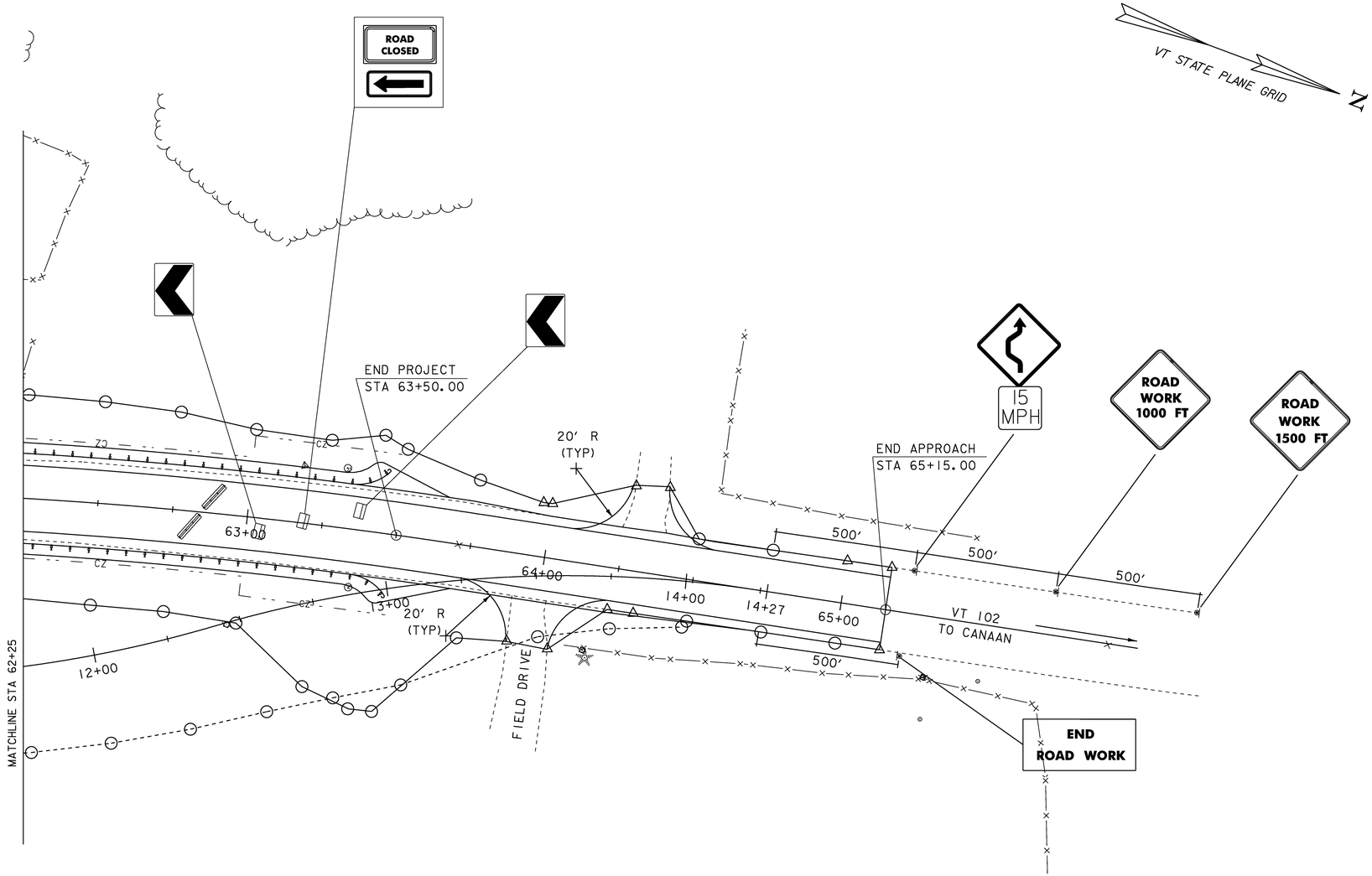
## TRAFFIC CONTROL SHEET #1

PROJECT NAME: Canaan

PROJECT NUMBER: ER ST 0271(16)

FILE NAME: Structures/04c098tcs.dgn
PROJECT LEADER: M. Evans-Mongeon
DESIGNED BY: S. Scribner
x04c098tcsl.1

PLOT DATE: 18-AUG-2008
DRAWN BY: T. Husk
CHECKED BY: S. SCRIBNER
SHEET 26 OF 66




TYPE III BARRICADE

TEMPORARY TRAFFIC BARRIER

SCALE 1" = 20'-0

20 0 20

## TRAFFIC CONTROL SHEET #2

PROJECT NAME: Canaan

PROJECT NUMBER: ER ST 0271(16)

FILE NAME: Structures/04c098tcs.dgn
PROJECT LEADER: M. Evans-Mongeon
DESIGNED BY: S. Scribner
x04c098tcs2.1

PLOT DATE: 18-AUG-2008
DRAWN BY: T. Husk
CHECKED BY: S. SCRIBNER
SHEET 27 OF 66

## SOIL CLASSIFICATION

| AASHTO | |
|---|---|
| A1 | Gravel and Sand |
| A3 | Fine Sand |
| A2 | Silty or Clayey Gravel and Sand |
| A4 | Silty Soil - Low Compressibility |
| A5 | Silty Soil - Highly Compressible |
| A6 | Clayey Soil - Low Compressibility |
| A7 | Clayey Soil - Highly Compressible |

## ROCK QUALITY DESIGNATION

| R.Q.D. (%) | ROCK DESCRIPTION |
|---|---|
| <25 | Very Poor |
| 25 to 50 | Poor |
| 51 to 75 | Fair |
| 76 to 90 | Good |
| >90 | Excellent |

## SHEAR STRENGTH

| UNDRAINED SHEAR STRENGTH IN P.S.F. | CONSISTENCY |
|---|---|
| <250 | Very Soft |
| 250-500 | Soft |
| 500-1000 | Med. Stiff |
| 1000-2000 | Stiff |
| 2000-4000 | Very Stiff |
| >4000 | Hard |

## CORRELATION GUIDE OF "N" TO DENSITY/CONSISTENCY

| DENSITY (GRANULAR SOILS) | | CONSISTENCY (COHESIVE SOILS) | |
|---|---|---|---|
| N | DESCRIPTIVE TERM | N | DESCRIPTIVE TERM |
| <5 | Very Loose | <2 | Very Soft |
| 5-10 | Loose | 2-4 | Soft |
| 11-24 | Med. Dense | 5-8 | Med. Stiff |
| 25-50 | Dense | 9-15 | Stiff |
| >50 | Very Dense | 16-30 | Very Stiff |
| | | 31-60 | Hard |
| | | >60 | Very Hard |

## COMMONLY USED SYMBOLS

| | |
|---|---|
| ▼ | Water Elevation |
| ⊗ | Standard Penetration Boring |
| ⊕ | Auger Boring |
| O | Rod Sounding |
| S | Sample |
| N | Standard Penetration Test Blow Count Per Foot For: 2" O.D. Sampler 1 3/8" I.D. Sampler Hammer Weight Of 140 Lbs. Hammer Fall Of 30" |
| VS | Field Vane Shear Test |
| US | Undisturbed Soil Sample |
| B | Blast |
| DC | Diamond Core |
| MD | Mud Drill |
| WA | Wash Ahead |
| HSA | Hollow Stem Auger |
| AX | Core Size 1 1/8" |
| BX | Core Size 1 5/8" |
| NX | Core Size 2 1/8" |
| M | Double Tube Core Barrel Used |
| LL | Liquid Limit |
| PL | Plastic Limit |
| PI | Plasticity Index |
| NP | Non Plastic |
| w | Moisture Content (Dry Wgt. Basis) |
| D | Dry |
| M | Moist |
| MTW | Moist To Wet |
| W | Wet |
| Sat | Saturated |
| Bo | Boulder |
| Gr | Gravel |
| Sa | Sand |
| Si | Silt |
| Cl | Clay |
| HP | Hardpan |
| Le | Ledge |
| NLTD | No Ledge To Depth |
| CNPF | Can Not Penetrate Further |
| TLOB | To Ledge Or Boulder |
| NR | No Recovery |
| Rec. | Recovery |
| %Rec. | Percent Recovery |
| RQD | Rock Quality Designation |
| CBR | California Bearing Ratio |
| < | Less Than |
| > | Greater Than |
| R | Refusal (N 100) |

| COLOR | | | |
|---|---|---|---|
| blk | Black | pnk | Pink |
| bl | Blue | pu | Purple |
| brn | Brown | rd | Red |
| dk | Dark | tn | Tan |
| gry | Gray | wh | White |
| gn | Green | yel | Yellow |
| lt | Light | mlc | Multicolored |
| or | Orange | | |

## DEFINITIONS (AASHTO)

**BEDROCK (LEDGE)** - Rock in its native location of indefinite thickness.

**BOULDER** - A rock fragment with an average dimension > 12 inches.

**COBBLE** - Rock fragments with an average dimension between 3 and 12 inches.

**GRAVEL** - Rounded particles of rock < 3" and > 0.0787" (#10 sieve).

**SAND** - Particles of rock < 0.0787" (#10 sieve) and > 0.0029" (#200 sieve).

**SILT** - Soil < 0.0029" (#200 sieve), non or slightly plastic and exhibits no strength when air-dried.

**CLAY** - Fine grained soil, exhibits plasticity when moist and considerable strength when air-dried.

**VARVED** - Alternate layers of silt and clay.

**HARDPAN** - Extremely dense soil, cemented layer, not softened when wet.

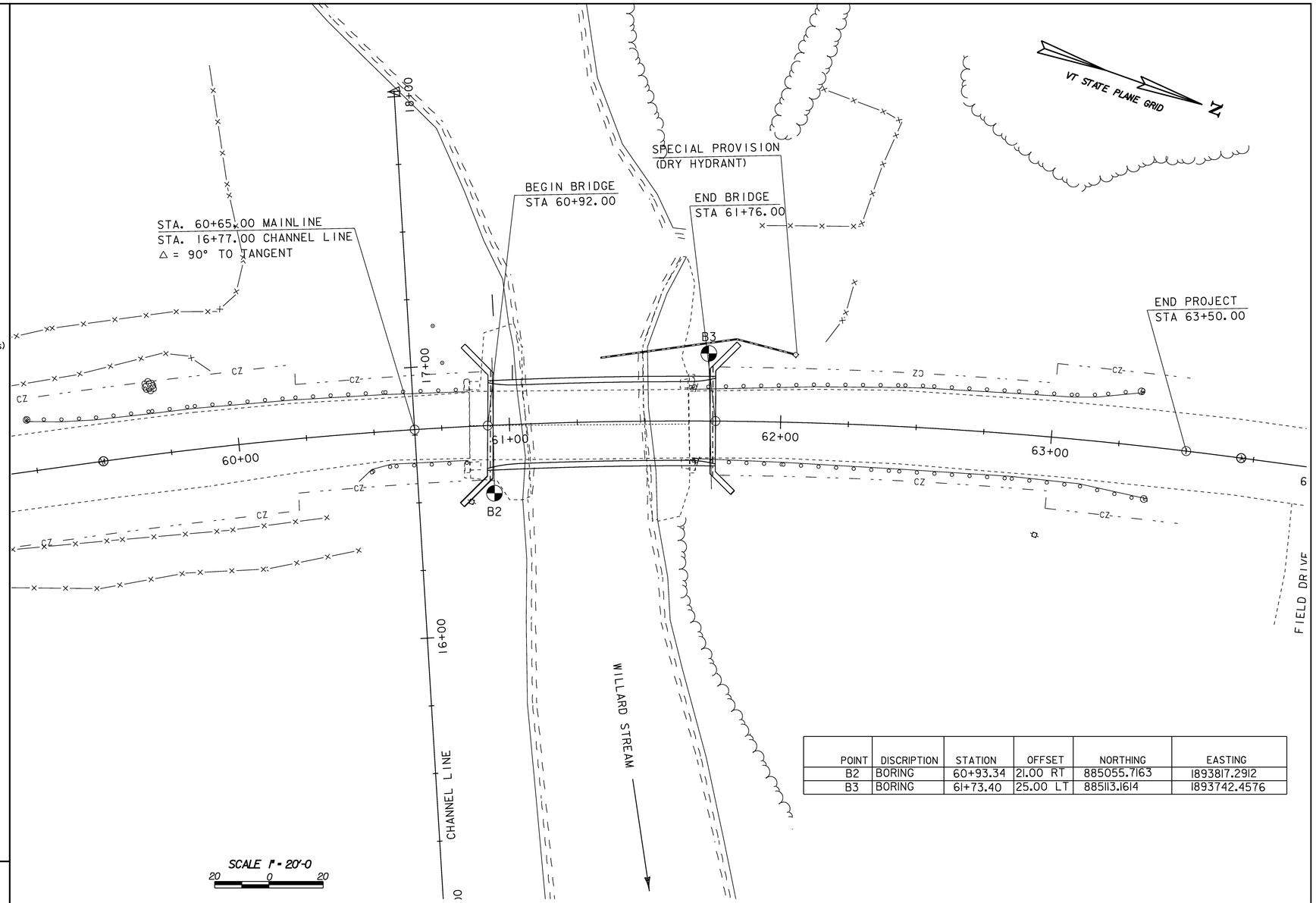
**MUCK** - Soft organic soil (containing > 10% organic material.

**MOISTURE CONTENT** - Weight of water divided by dry weight of soil.

**FLOWING SAND** - Granular soil so saturated (loose) that it flows into drill casing during extraction of wash rod.

**STRIKE** - Angle from magnetic north to line of intersection of bed with a horizontal plane.

**DIP** - Inclination of bed with a horizontal plane.




| POINT | DISCRIPTION | STATION | OFFSET | NORTHING | EASTING |
|---|---|---|---|---|---|
| B2 | BORING | 60+93.34 | 21.00 RT | 885055.7163 | 1893817.2912 |
| B3 | BORING | 61+73.40 | 25.00 LT | 885113.1614 | 1893742.4576 |

## GENERAL NOTES

1. The subsurface explorations shown herein were made between 10/30/04 and 12/03/04 by the Agency.
2. Soil and rock classifications, properties and descriptions are based on engineering interpretation from available subsurface information by the Agency and may not necessarily reflect actual variations in subsurface conditions that may be encountered between individual boring or sample locations.
3. Observed water levels and/or conditions indicated are as recorded at the time of exploration and may vary according to the prevailing rainfall, methods of exploration and other factors.
4. Engineering Judgement was exercised in preparing the subsurface information presented herein. Analysis and interpretation of subsurface data was performed and interpreted for Agency design and estimating purposes. Presentation of the information in the Contract is intended to provide the Contractor access to the same data available to the Agency. The subsurface information is presented in good faith and is not intended as a substitute for personal investigation, independent interpretation, independent analysis or judgement by the Contractor.
5. Pictorial structure details shown on the boring plan layout or soils profile are for illustrative purposes only and may not accurately portray final contract details.
6. Terminology used on boring logs to describe the hardness, degree of weathering, and spacing of fractures, joints and other discontinuities in the bedrock is defined in the AASHTO Manual on Subsurface Investigations, 1988.

# STATE OF VERMONT
## AGENCY OF TRANSPORTATION

| | |
|---|---|
| Town Of CANAAN | Bridge No. 16 |
| Highway No. VT 102 | Log Sta. |
| | Surv. Sta. |

**BORING INFORMATION SHEET**

| | |
|---|---|
| Designed By S. SCRIBNER | Drawn By T. HUSK |
| Checked By S. SCRIBNER Date | Bridge Design Supervisor Date |
| PROJECT CANAAN | PROJECT NO. ER ST 0271(16) |
| I.G.C. Info. | |
| Bridge Sheet No. | Sheet 28 of 66 |

STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

BORING NUMBER: B-2
SHEET 1 of 2
DATE STARTED: 11/01/04
DATE COMPLETED: 11/09/04

PROJECT NAME: CANAAN
SITE NAME: BR-16
STATION: 60+93.34
OFFSET: 21.00

PROJECT NUMBER: ST 0271(16)
SITE NUMBER: VT-102
GROUND ELEVATION: 1017.0 ft
GROUNDWATER DEPTH: 8.0 ft 11/09/04

BORING CREW
CREW CHIEF: TALLMAN
DRILLER: TALLMAN
LOGGER: RUSSELL

BORING RIG: LARGE SKID RIG
BORING TYPE: WASH BORE
SAMPLE TYPE: SPLIT BARREL
CHECKED BY: CAA

BOTTOM OF FOOTING
ELEVATION = 999.80

| DEPTH (ft) | SYMBOL | CLASSIFICATION OF MATERIALS (Description) | BLOWS PER FOOT | M.C. (%) | GRAVEL (%) | SAND (%) | FINES (%) | LL (%) | PI (%) |
|---|---|---|---|---|---|---|---|---|---|
| | | A-1-b, GrSa, brn, Moist, Rec. = 0.4 ft | 10 | 17.3 | 31.5 | 48.7 | 19.8 | | |
| | | No Recovery, 2.0 ft - 4.0 ft | 5 | | | | | | |
| | | A-1-b, SaGr, brn, Moist, Rec. = 0.5 ft | 5 | 12.6 | 45.3 | 43.1 | 11.6 | | |
| | | A-1-b, SaGr, brn, Moist, Rec. = 0.4 ft | 10 | 13.9 | 46.6 | 39.6 | 13.8 | | |
| 10 | | A-1-a, SaGr, brn, Moist, Rec. = 0.8 ft | 7 | 14.9 | 51.7 | 37.7 | 10.6 | | |
| | | A-1-a, SaGr, brn, Moist, Rec. = 0.7 ft | 6 | 12.2 | 60.7 | 29.7 | 9.6 | | |
| | | A-4, SaSi, Dk/gry, Moist, Rec. = 1.1 ft | 7 | 21.8 | 0.2 | 37.6 | 62.2 | | |
| | | A-4, Si, Dk/gry, Moist, Rec. = 2.0 ft | 4 | 22.0 | 0.0 | 8.9 | 91.1 | | |
| | | A-4, Si, Dk/gry, Moist, Rec. = 2.0 ft | 3 | 26.5 | 0.0 | 4.8 | 95.2 | | |
| 20 | | A-4, Si, Dk/gry, Moist, Rec. = 2.0 ft | 2 | 27.9 | 0.0 | 6.7 | 93.3 | | |
| | | A-4, Si, Dk/gry, Moist, Rec. = 2.0 ft | 2 | 25.4 | 0.0 | 4.9 | 95.1 | | |
| 30 | | A-4, Si, Dk/gry, Moist, Rec. = 1.2 ft | 2 | 24.7 | 0.0 | 3.7 | 96.3 | | |
| | | A-4, Si, Dk/gry, Moist, Rec. = 1.0 ft | 3 | 26.3 | 0.0 | 5.0 | 95.0 | | |
| 40 | | A-4, Si, Dk/gry, Moist, Rec. = 1.1 ft | 2 | 23.5 | 0.0 | 7.0 | 93.0 | | |
| | | A-4, Si, Dk/gry, Moist, Rec. = 1.2 ft | 2 | 26.5 | 0.0 | 3.9 | 96.1 | | |
| 50 | | A-4, Si, Dk/gry, Moist, Rec. = 1.0 ft | WH | 29.5 | 0.0 | 2.1 | 97.9 | | |
| | | A-4, Si, Dk/gry, Moist, Rec. = 1.1 ft | WH | 27.4 | 0.0 | 1.8 | 98.2 | | |
| 60 | | A-4, Si, Dk/gry, Moist, Rec. = 0.8 ft | 2 | 28.4 | 0.0 | 1.8 | 98.2 | | |
| | | A-4, Si, Dk/gry, Moist, Rec. = 0.9 ft | WH | 28.4 | 0.0 | 1.4 | 98.6 | | |
| 70 | | A-4, Si, Dk/gry, Moist, Rec. = 1.4 ft | WH | 28.3 | 0.0 | 1.2 | 98.8 | 24 | 3 |
| | | A-4, Si, Dk/gry, Moist, Rec. = 1.3 ft | WH | 29.2 | 0.0 | 1.4 | 98.6 | 25 | 3 |
| 80 | | A-4, Si, Dk/gry, Moist, Rec. = 1.4 ft | WH | 28.2 | 0.0 | 1.0 | 99.0 | 25 | 2 |
| | | 84.0 ft, No sample, Still in same mareial, Will continue in 10 ft. intervals until material changes. | | | | | | | |
| 90 | | A-4, Si, Dk/gry, Moist, Rec. = 2.0 ft | WH | 28.4 | 0.0 | 1.9 | 98.1 | 25 | 3 |
| 100 | | A-4, Si, Dk/gry, Moist, Rec. = 2.0 ft | WH | 27.9 | 0.0 | 1.9 | 98.1 | 25 | 4 |
| | | No Recovery, 105.0 ft - 107.0 ft | 9 | | | | | | |

LOG OF BORING CANAAN ST0271(16).GPJ VT_ADT.GDT 8/9/05

STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

BORING NUMBER: B-2
SHEET 2 of 2
DATE STARTED: 11/01/04
DATE COMPLETED: 11/09/04

PROJECT NAME: CANAAN
SITE NAME: BR-16
STATION: 60+93.34
OFFSET: 21.00

PROJECT NUMBER: ST 0271(16)
SITE NUMBER: VT-102
GROUND ELEVATION: 1017.0 ft
GROUNDWATER DEPTH: 8.0 ft 11/09/04

BORING CREW
CREW CHIEF: TALLMAN
DRILLER: TALLMAN
LOGGER: RUSSELL

BORING RIG: LARGE SKID RIG
BORING TYPE: WASH BORE
SAMPLE TYPE: SPLIT BARREL
CHECKED BY: CAA

| DEPTH (ft) | SYMBOL | CLASSIFICATION OF MATERIALS (Description) | BLOWS PER FOOT | M.C. (%) | GRAVEL (%) | SAND (%) | FINES (%) | LL (%) | PI (%) |
|---|---|---|---|---|---|---|---|---|---|
| | | A-4, SaSi, Dk/gry, Moist, Rec. = 1.9 ft | 9 | 19.7 | 0.0 | 28.6 | 71.4 | | |
| | | 112.0 ft, Drillers noted pocket of sandy material that changed back to silt between 110 ft. and 120 ft. | | | | | | | |
| 120 | | A-4, Si, Dk/gry, Moist, Rec. = 1.8 ft, Encountered flowing water. | WH | 29.5 | 0.0 | 1.0 | 99.0 | 27 | 4 |
| 130 | | Visual Class: A-4, Si, Dk/gry, Moist, Rec. = 1.9 ft, 130.0 ft - 132.0 ft | WH | 29.2 | | | | | |
| 140 | | Visual Class: A-4, Si, Dk/gry, Moist, Rec. = 1.6 ft, 140.0 ft - 142.0 ft | WH | 30.5 | | | | | |
| 150 | | A-4, Si, Dk/gry, Moist, Rec. = 1.5 ft | WH | 30.3 | 0.0 | 1.5 | 98.5 | 26 | 3 |
| 160 | | Visual Class: A-4, Si, Dk/gry, Moist, Rec. = 1.5 ft, 160.0 ft - 162.0 ft | WH | 31.3 | | | | | |
| 170 | | A-4, ClSi, Dk/gry, Moist, Rec. = 1.8 ft | WH | 31.3 | 0.0 | 0.5 | 99.5 | 30 | 7 |
| 180 | | 180.0 ft - 182.0 ft, No Sample, Advanced casing. | | | | | | | |
| 190 | | 190.0 ft - 192.0 ft, No Sample, Advanced casing. | | | | | | | |
| 200 | | A-4, Si, Dk/gry, Moist, Rec. = 1.9 ft | WH | 30.0 | 0.0 | 1.6 | 98.4 | 27 | 3 |
| | | Hole stopped @ 202.0 ft | | | | | | | |
| 210 | | DRILLER'S NOTES:<br>Encountered flowing water at 120.0 feet. | | | | | | | |

LOG OF BORING CANAAN ST0271(16).GPJ VT_ADT.GDT 8/9/05

**BORING LOG SHEET 1**

PROJECT NAME: Canaan
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: Structures/04c098ero.dgn
PROJECT LEADER: M. Evans-Mongeon
DESIGNED BY: S. Scribner
x04c098bsl.i

PLOT DATE: 18-AUG-2008
DRAWN BY: T. Husk
CHECKED BY: S. SCRIBNER
SHEET 29 OF 66

STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

BORING NUMBER: B-3
SHEET 1 of 2
DATE STARTED: 11/30/04
DATE COMPLETED: 12/03/04

PROJECT NAME: CANAAN
SITE NAME: BR-16
STATION: 61+73.40
OFFSET: -25.00

PROJECT NUMBER: ST 0271(16)
SITE NUMBER: VT-102
GROUND ELEVATION: 1020.72 ft
GROUNDWATER DEPTH: 11.16 ft 12/03/04

BORING CREW
CREW CHIEF: TALLMAN
DRILLER: TALLMAN
LOGGER: RUSSELL

BORING RIG: LAG TRACK RIG
BORING TYPE: WASH BORE
SAMPLE TYPE: SPLIT BARREL
CHECKED BY: CAA

| DEPTH (ft) | SYMBOL | CLASSIFICATION OF MATERIALS (Description) | BLOWS PER FOOT | M.C. (%) | GRAVEL (%) | SAND (%) | FINES (%) | LL (%) | PI (%) |
|---|---|---|---|---|---|---|---|---|---|
| 5 | | BXDC, Cleaned out casing., 4.5 ft - 5.0 ft | | | | | | | |
| | | A-1-a, SaGr, brn, Moist, Rec. = 0.3 ft | 4 | 12.0 | 53.2 | 39.7 | 7.1 | | |
| 10 | | A-1-b, GrSa, brn, Moist, Rec. = 1.0 ft | 15 | 13.8 | 40.7 | 46.7 | 12.6 | | |
| 15 | | A-1-a, SaGr, gry, Moist, Rec. = 0.5 ft | 8 | 13.2 | 57.7 | 27.6 | 14.7 | | |
| | | 17.0 ft, Little gray silt at bottom of sampler. | | | | | | | |
| 20 | | A-4, Si, Dk/gry, Moist, Rec. = 2.0 ft | 2 | 26.9 | 0.0 | 3.2 | 96.8 | 24 | 4 |
| 25 | | VS = 717/68 psf, 26.5 ft - 26.9 ft | | | | | | | |
| 30 | | A-4, Si, Dk/gry, Moist, Rec. = 1.5 ft | 2 | 29.2 | 0.0 | 3.3 | 96.7 | | |
| 35 | | VS = 845/166 psf, 36.5 ft - 36.9 ft | | | | | | | |
| 40 | | A-4, Si, Dk/gry, Moist, Rec. = 1.5 ft | 4 | 27.8 | 0.0 | 1.1 | 98.9 | | |
| 45 | | VS = 936/174 psf, 46.5 ft - 46.9 ft | | | | | | | |

BOTTOM OF FOOTING
ELEVATION = 999.80

LOG OF BORING CANAAN ST0271(16).GPJ VT AOT.GDT 8/8/05

STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

BORING NUMBER: B-3
SHEET 2 of 2
DATE STARTED: 11/30/04
DATE COMPLETED: 12/03/04

PROJECT NAME: CANAAN
SITE NAME: BR-16
STATION: 61+73.40
OFFSET: -25.00

PROJECT NUMBER: ST 0271(16)
SITE NUMBER: VT-102
GROUND ELEVATION: 1020.72 ft
GROUNDWATER DEPTH: 11.16 ft 12/03/04

BORING CREW
CREW CHIEF: TALLMAN
DRILLER: TALLMAN
LOGGER: RUSSELL

BORING RIG: LAG TRACK RIG
BORING TYPE: WASH BORE
SAMPLE TYPE: SPLIT BARREL
CHECKED BY: CAA

| DEPTH (ft) | SYMBOL | CLASSIFICATION OF MATERIALS (Description) | BLOWS PER FOOT | M.C. (%) | GRAVEL (%) | SAND (%) | FINES (%) | LL (%) | PI (%) |
|---|---|---|---|---|---|---|---|---|---|
| 55 | | A-4, Si, Dk/gry, Moist, Rec. = 1.4 ft | 3 | 25.9 | 0.0 | 2.5 | 97.5 | | |
| | | VS = 905/151 psf, 56.5 ft - 56.9 ft | | | | | | | |
| 60 | | A-4, Si, Dk/gry, MTW, Rec. = 1.7 ft | 2 | 29.5 | 0.0 | 0.6 | 99.4 | 24 | 3 |
| 65 | | VS = 1071/211 psf, 66.5 ft - 66.9 ft | | | | | | | |
| 70 | | A-4, Si, Dk/gry, MTW, Rec. = 1.8 ft | 4 | 27.7 | 0.0 | 0.4 | 99.6 | | |
| 75 | | VS = 1011/196 psf, 76.5 ft - 76.9 ft | | | | | | | |
| | | Hole stopped @ 76.9 ft | | | | | | | |

DRILLER'S NOTES:
1. Vane used was 2.5 inches x 5.0 inches.
2. Vane Shear = Initial/Remold.

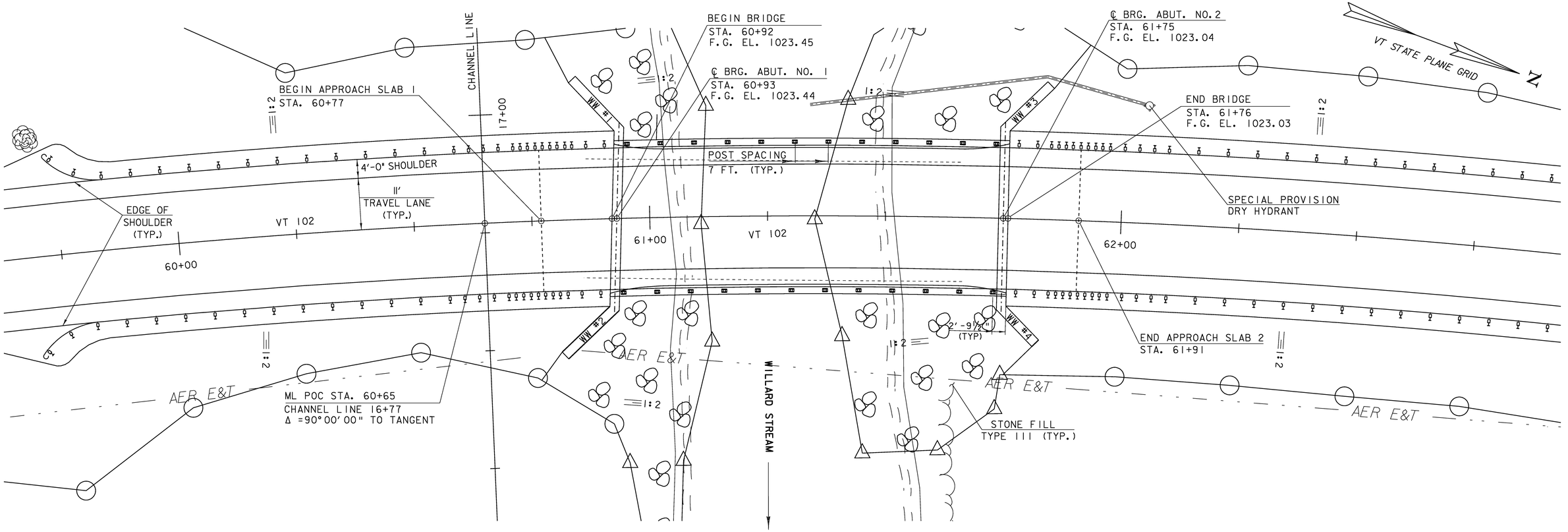
LOG OF BORING CANAAN ST0271(16).GPJ VT AOT.GDT 8/8/05

**BORING LOG SHEET 2**

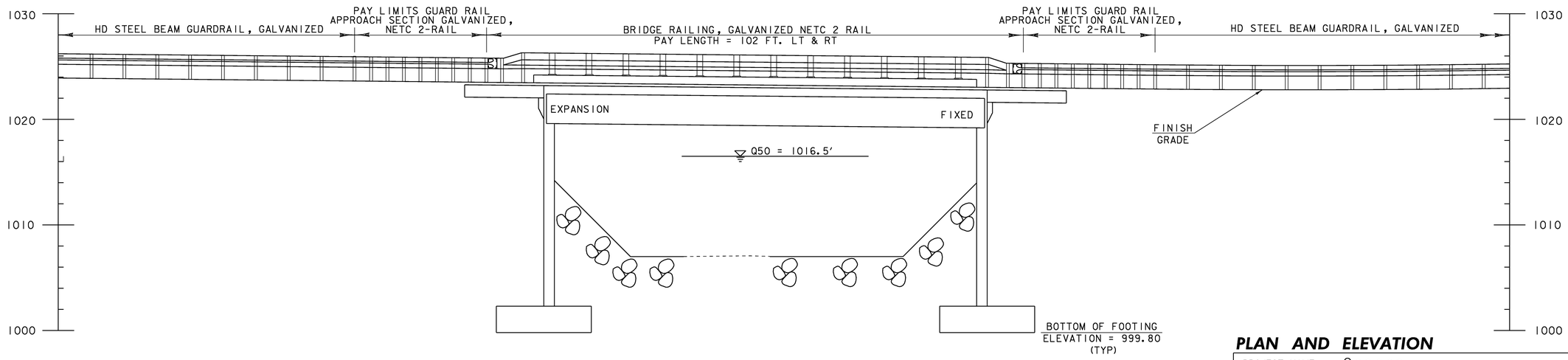
PROJECT NAME: Canaan
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: Structures/04c098ero.dgn
PROJECT LEADER: M. Evans-Mongeon
DESIGNED BY: S. Scribner
x04c098bs2.1

PLOT DATE: 18-AUG-2008
DRAWN BY: T. Husk
CHECKED BY: S. SCRIBNER
SHEET 30 OF 66




## PLAN




## ELEVATION

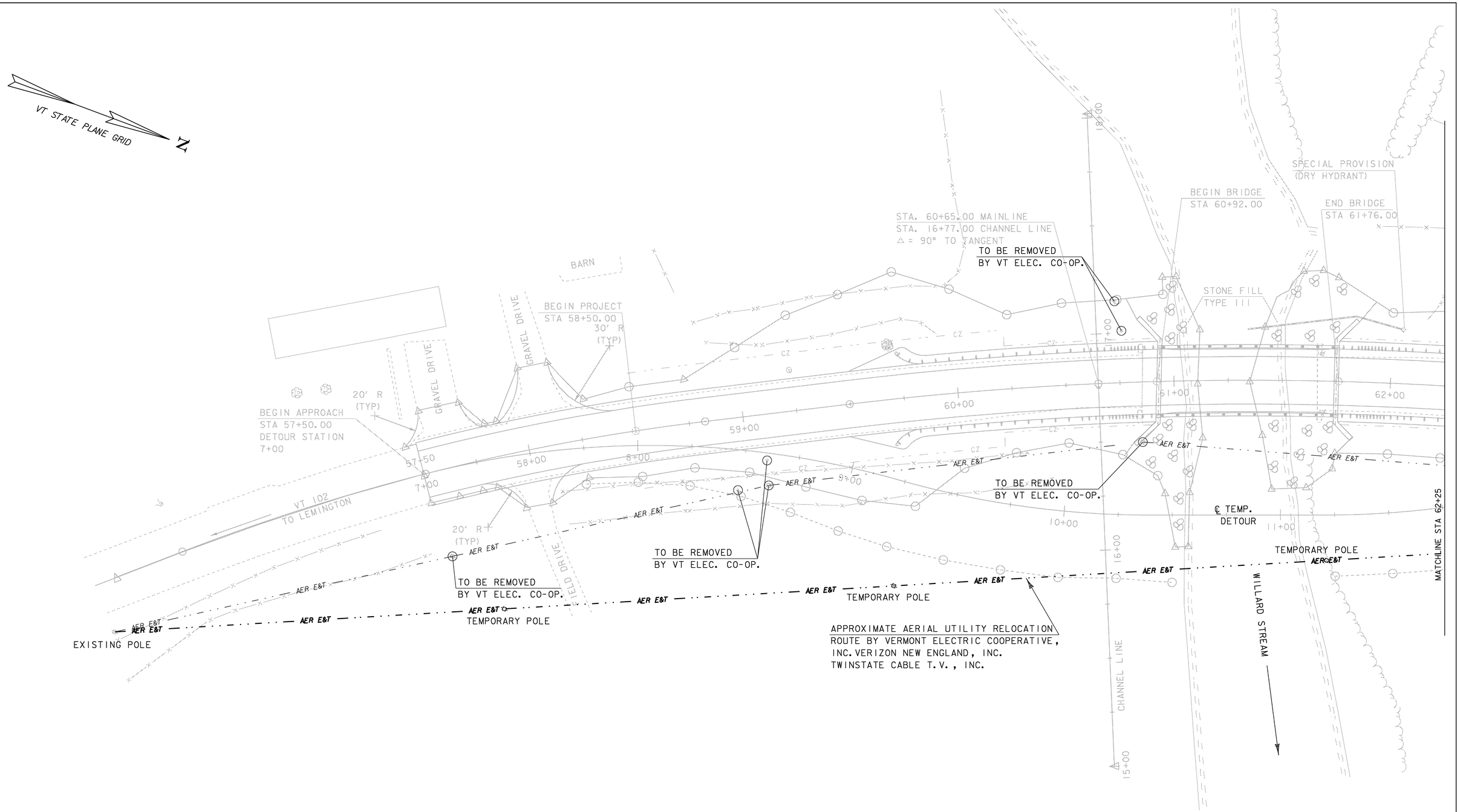
SCALE 1" = 10'-0

10 0 10

## PLAN AND ELEVATION

| | |
|---|---|
| PROJECT NAME: | Canaan |
| PROJECT NUMBER: | ER ST 0271(16) |

| | | | |
|---|---|---|---|
| FILE NAME: Structures/04c098pe.dgn | | PLOT DATE: | 18-AUG-2008 |
| PROJECT LEADER: M. Evans-Mongeon | | DRAWN BY: | L. DUQUETTE |
| DESIGNED BY: | S. Scribner | CHECKED BY: | S. SCRIBNER |
| x04c098pe.1 | | SHEET 31 | OF 66 |

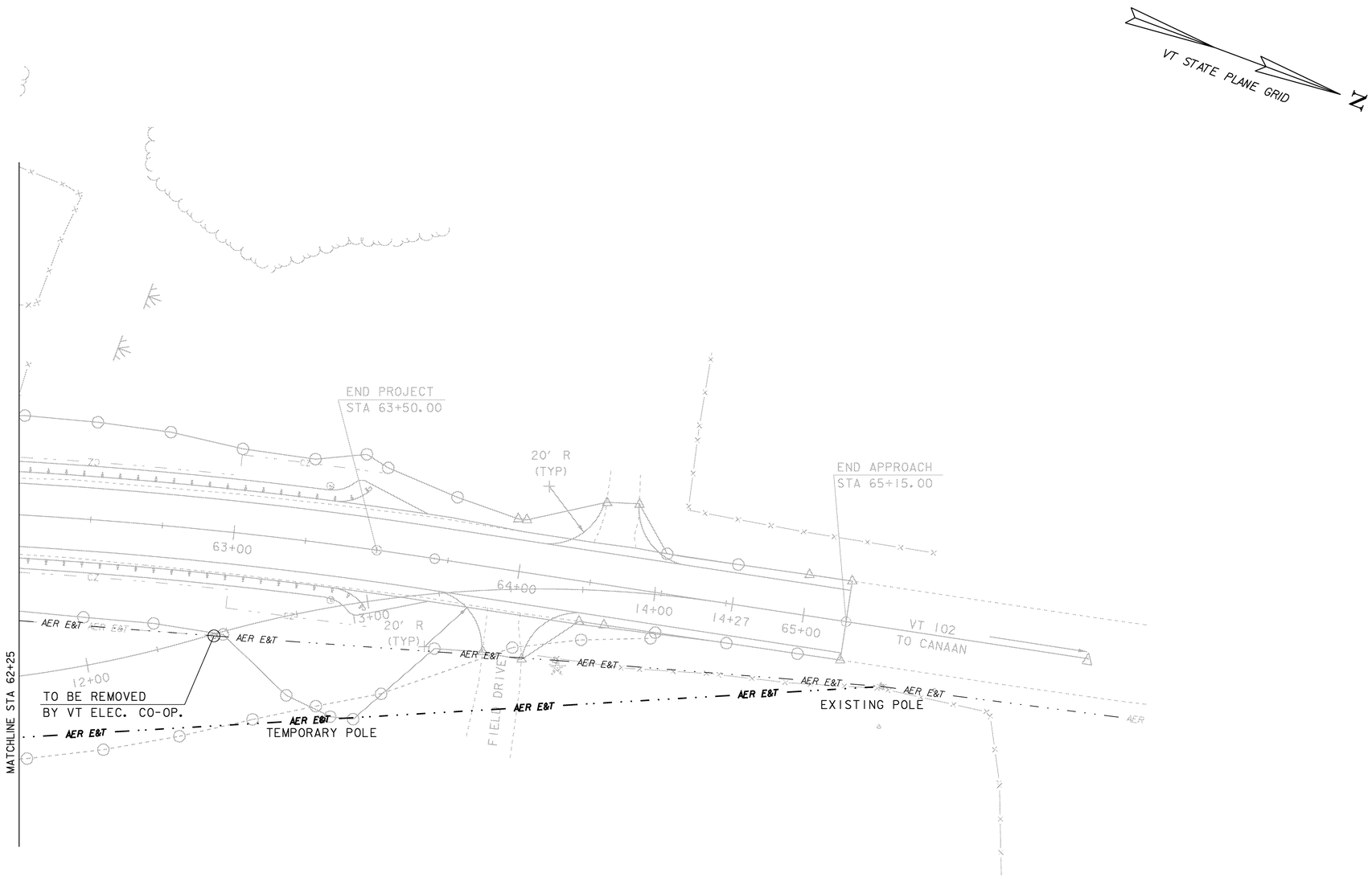



SCALE 1" = 20'-0
20 0 20

## UTILITIES SHEET #1

| | |
|---|---|
| PROJECT NAME: | Canaan |
| PROJECT NUMBER: | ER ST 0271(16) |

| | | | |
|---|---|---|---|
| FILE NAME: 04c098\struc\x04c098b | | PLOT DATE: | 18-AUG-2008 |
| PROJECT LEADER: | M. Evans-Mongeon | DRAWN BY: | L. DUQUETTE |
| DESIGNED BY: | S. Scribner | CHECKED BY: | S. SCRIBNER. |
| x04c098lout1.1 | | SHEET 32 | OF 66 |




SCALE 1" = 20'-0

20 0 20

## UTILITIES SHEET #2

| | |
|---|---|
| PROJECT NAME: | Canaan |
| PROJECT NUMBER: | ER ST 0271(16) |

| | | | |
|---|---|---|---|
| FILE NAME: 04c098\str\s04c098utilbdr | | PLOT DATE: | 18-AUG-2008 |
| PROJECT LEADER: | M. Evans-Mongeon | DRAWN BY: | L. DUQUETTE |
| DESIGNED BY: | S. Scribner | CHECKED BY: | S. SCRIBNER |
| x04c098lout2.1 | | SHEET 33 | OF 66 |

**GENERAL**

1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE STATE OF VERMONT AGENCY OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION DATED 2006, AND ITS LATEST REVISIONS, AND THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, FOURTH EDITION, DATED 2007, AND ITS LATEST REVISIONS.

2. BRIDGE IS DESIGNED FOR HL-93 LIVE LOAD WITH AN ALLOWANCE FOR FUTURE PAVEMENT.

3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PREVENT SILTATION OR POLLUTION, IN PARTICULAR THE DISCHARGE OF RAW CONCRETE INTO WILLARD STREAM, AS DIRECTED BY THE RESIDENT ENGINEER AND STANDARD SPECIFICATIONS SECTION 105.

4. FOR INFORMATION REGARDING UTILITIES, SEE THE SPECIAL PROVISIONS.

5. ALL DIMENSIONS SHOWN IN THE PLANS ARE HORIZONTAL OR VERTICAL AND ARE GIVEN AT 68 DEGREES FAHRENHEIT, UNLESS NOTED OTHERWISE

**TRAFFIC CONTROL**

6. THE CONTRACTOR SHALL ERECT AND MAINTAIN ALL TEMPORARY ON AND OFF-PROJECT SIGNS AND BARRICADES AS DIRECTED BY THE RESIDENT ENGINEER. PAYMENT FOR THIS WORK SHALL BE CONSIDERED INCIDENTAL TO ITEM 641.10, "TRAFFIC CONTROL."

7. FULL ACCESS TO ALL SIDE ROADS AND DRIVES WITHIN THE PROJECT LIMITS SHALL BE MAINTAINED AT ALL TIMES.

**TEMPORARY BRIDGE**

8. DURING CONSTRUCTION, TRAFFIC SHALL BE MAINTAINED ON A TWO-WAY TEMPORARY BRIDGE CONSTRUCTED DOWNSTREAM OF THE EXISTING STRUCTURE. THE CONTRACTOR HAS THE OPTION OF EITHER RELOCATING THE EXISTING TEMPORARY BRIDGE OR INSTALLING A SEPARATE TEMPORARY BRIDGE TO MAINTAIN TRAFFIC. BID ALTERNATIVES HAVE BEEN INCLUDED IN THE PROPOSAL FOR THIS PURPOSE. CONSTRUCTION AND MAINTENANCE OF THE TEMPORARY BRIDGE AND ITS APPROACHES SHALL BE PAID FOR UNDER ITEM 900.645, SPECIAL PROVISION "RELOCATE AND REMOVE EXISTING TEMPORARY BRIDGE", OR ITEM 528.11, TWO-WAY TEMPORARY BRIDGE. THE APPROACHES TO THE TEMPORARY BRIDGE SHALL BE PAVED WITH 2 INCHES OF PAVEMENT.

ALTERNATE ZA

DURING CONSTRUCTION OF THE TEMPORARY BRIDGE ON THE TEMPORARY ALIGNMENT THE CONTRACTOR SHALL MAINTAIN TRAFFIC ON THE TEMPORARY MABEY CURRENTLY IN PLACE. NO ROAD CLOSURE WILL BE ALLOWED UNDER THIS ALTERNATE. DISASSEMBLY OF THE MABEY WILL TAKE PLACE AFTER THE CONTRACTORS TEMPORARY STRUCTURE IS IN PLACE AND TRAFFIC IS ON THE TEMPORARY STRUCTURE.

CONTRACT ITEM 529.15 SHALL INCLUDE THE REMOVAL AND SALVAGE OF THE EXISTING TEMPORARY BRIDGE AND REMOVAL OF THE EXISTING BRIDGE SUBSTRUCTURES NOT REMOVED UNDER CONTRACT ITEMS 203.27 OR 208.30.

ALTERNATE ZB

VT 102 WILL BE CLOSED FOR A MAXIMUM DURATION OF TWO WEEKS WHILE THE EXISTING TEMPORARY BRIDGE IS RELOCATED TO THE TEMPORARY ALIGNMENT. A TEMPORARY DETOUR ROUTE IS SHOWN ON THE TRAFFIC CONTROL SHEET AND WILL BE PAID FOR UNDER ITEM 641.10, "TRAFFIC CONTROL".

THE CONTRACTOR SHALL NOTIFY THE TOWN A MINIMUM OF TWO (2) WEEKS PRIOR TO CLOSING THE ROAD. THE CONTRACTOR WILL ALSO NOTIFY DISTRICT 9 DTA DALE PERRON @ (802-334-7934) A MINIMUM OF TWO WEEKS PRIOR. AS WELL AS NH DISTRICT ENGINEER @ (603-788-4641).

WHEN CONSTRUCTION OF THE NEW BRIDGE IS COMPLETE, THE TEMPORARY MABEY BRIDGE WILL BE REMOVED, DISASSEMBLED, CLEANED, SORTED, BUNDLED, AND TRANSPORTED TO THE MENDON STATE GARAGE. PAYMENT FOR THIS WORK WILL BE MADE UNDER ITEM 900.645 SPECIAL PROVISION "RELOCATE AND REMOVE EXISTING TEMPORARY BRIDGE". SEE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

CONTRACT ITEM 529.20 SHALL INCLUDE THE REMOVAL OF THE EXISTING BRIDGE SUBSTRUCTURES OTHERWISE NOT REMOVED UNDER CONTRACT ITEMS 203.27 OR 208.30.

**EARTHWORK AND RELATED ITEMS**

9. THE FOLLOWING TABLE OF ALLOWABLE STRESSES AND WEIGHTS APPLY TO THESE PLANS FOR DESIGN PURPOSES:

SPECIAL PROVISION (HIGH PERFORMANCE CONCRETE, CLASS A LOW CEMENT) f'c = 4000 PSI fc=1600PSI

HIGH PERFORMANCE CONCRETE, CLASS B f'c = 3500 PSI fc = 1400 PSI

REINFORCING STEEL: Ft = 24,000 GRADE 60

SOIL: UNIT WEIGHT 140 PCF

SPECIAL PROVISION(LIGHTWEIGHT BACKFILL): UNIT WEIGHT 48 PCF

10. TEMPORARY CONSTRUCTION FILLS WITHIN THE WATERCOURSE FOR ANY PURPOSE SHALL CONSIST OF CLEAN STONE FILL ONLY. NO OTHER FILLING IN THE STREAM SHALL OCCUR WITHOUT THE APPROVAL OF THE STREAM ALTERATION ENGINEER.

11. THE CONTRACTOR'S ATTENTION IS DIRECTED TO SUBSECTION 306.06 REGARDING THE COMPACTION OF SUBBASE MATERIAL FOR THIS PROJECT.

12. COFFERDAMS ARE REQUIRED FOR THE CONSTRUCTION OF THE NEW SUBSTRUCTURE UNITS. PAYMENT FOR COFFERDAM EXCAVATION WILL BE MADE ONLY FOR SUCH EXCAVATION WITHIN THE LIMITS SHOWN ON THE PLANS.

13. THE "STONE FILL, TYPE III" UNDER THE BRIDGE AS SHOWN IN THE PLANS SHALL BE PLACED BEFORE THE NEW STEEL GIRDERS ARE SET.

14. A VEHICLE TRACKING PAD SHALL BE USED FOR EROSION CONTROL AT THE DISCRETION OF THE RESIDENT ENGINEER. PAYMENT FOR MATERIAL AND PLACEMENT SHALL BE MADE UNDER ITEM 653.35 VEHICLE TRACKING PAD.

15. THE HEIGHT OF FILL BEHIND ABUTMENTS WILL BE LIMITED TO THE BRIDGE SEAT ELEVATION UNTIL THE DECK HAS BEEN POURED AND THE CURING PERIOD IS UP.

16. DRY HYDRANT AND ALL NEEDED MATERIALS WILL BE PAID UNDER 900.645 SPECIAL PROVISION (DRY HYDRANT) DETAILS ARE SHOWN ON SHEET 50. CONTRACTOR SHALL NOTIFY VERN CRAWFORD @ (802-266-8277) A MINIMUM OF ONE WEEK PRIOR TO INSTALLATION OF THE DRY HYDRANT.

17. AFTER DECK HAS BEEN POURED AND CURED BEAMS AT ABUTMENT 1 WILL BE JACKED UP TO ALLOW THE ELASTOMERIC BEARINGS TO RETURN TO THEIR ORIGINAL POSITION BEFORE WELDING THE SOLE PLATES TO THE BOTTOM FLANGE. FINAL POSITION OF THE VERTICAL BEARING FACES WILL BE STRAIGHT. PAYMENT FOR THIS WORK WILL BE INCIDENTAL TO BEARING ITEM. NO BEARING WILL BE JACKED MORE THAN ½" FROM ITS ORIGINAL POSITION.

**STRUCTURAL STEEL**

18. UNLESS OTHERWISE NOTED, ALL NEW STRUCTURAL STEEL SHALL CONFORM TO AASHTO M 270M/M 270 GRADE 50 AND SHALL BE PAID FOR UNDER ITEM 506.50, "STRUCTURAL STEEL ROLLED BEAM", COLOR CHIP NO. 20059, BROWN.

19. STRUCTURAL STEEL MEMBERS DESIGNATED "CVN" IN THE PLANS SHALL BE CHARPY V-NOTCH TESTED IN ACCORDANCE WITH SUBSECTION 714.01 OF THE STANDARD SPECIFICATIONS.

20. ALL FIELD CONNECTIONS SHALL BE MADE USING 7/8 INCH BOLTS IN 15/16 INCH HOLES PER SECTION 506. ANY CONNECTIONS NOT DESIGNATED SHALL BE DETAILED BY THE FABRICATOR AND SUBMITTED TO THE STRUCTURES ENGINEER FOR APPROVAL.

21. AFTER SUPERSTRUCTURE STEEL HAS BEEN ERECTED, ELEVATIONS ALONG THE TOP OF THE BEAMS SHALL BE TAKEN AS DIRECTED BY THE RESIDENT ENGINEER FOR USE IN DETERMINING FINISHED GRADES.

22. FLEMING BRACKETS OR SIMILAR FALSEWORK SHALL BE SPACED AS REQUIRED BY DESIGN, BUT SHALL BE LIMITED TO A MAXIMUM SPACING OF 4 FEET. THE DESIGN OF FALSEWORK SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

23. ANY BOLT HOLES IN THE WEBS OF FASCIA BEAMS NOT OTHERWISE FILLED SHALL BE FILLED WITH BUTTON HEAD OR HEX HEAD BOLTS. THE BOLTS SHALL BE TIGHTENED IN ACCORDANCE WITH SUBSECTION 506.19 OF THE STANDARD SPECIFICATIONS.

24. ALL WELDING SHALL CONFORM TO THE PROVISIONS OF SUBSECTION 506.10.

**CONCRETE**

25. SUBSTRUCTURE CONCRETE SHALL BE HIGH PERFORMANCE CLASS B AND SHALL BE PAID FOR UNDER ITEM 501.34, "CONCRETE, HIGH PERFORMANCE CLASS B". ITEM 900.608 "SPECIAL PROVISION (HIGH PERFORMANCE CONCRETE, CLASS A LOW CEMENT)" SHALL BE USED TO PAY FOR THE DECK, THE CURBS, AND THE APPROACH SLABS.

26. SURFACES OF BRIDGE SEATS UNDER BEARING DEVICES SHALL BE LEVEL. ALL OTHER AREAS OF BRIDGE SEATS SHALL BE SLOPED 1/2 INCH PER FOOT. THE ENTIRE BRIDGE SEAT SURFACE SHALL BE GIVEN A FLOAT FINISH.

27. CONCRETE PORTIONS OF ABUTMENTS AND WINGWALLS ABOVE ADJACENT BRIDGE SEAT ELEVATIONS SHALL NOT BE PLACED UNTIL FINISH GRADES HAVE BEEN DETERMINED BY THE RESIDENT ENGINEER.

28. THE DECK IS TO BE POURED IN ONE CONTINUOUS POUR WITH A MAXIMUM DURATION OF EIGHT HOURS. IF CIRCUMSTANCES BEYOND THE CONTRACTOR'S CONTROL PREVENT THIS FROM BEING ACCOMPLISHED, A TRANSVERSE CONSTRUCTION JOINT SHALL BE USED BETWEEN ADJACENT POURS. A MINIMUM 96 HOUR DELAY BETWEEN ADJACENT POURS SHALL BE OBSERVED.

29. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1 INCH X 1 INCH.

30. WATER REPELLENT, SILANE, SHALL BE APPLIED TO ALL EXPOSED CONCRETE SURFACES, EXCEPT THE UNDERSIDE OF THE DECK BETWEEN DRIP NOTCHES.

31. JOINTS AND SCORE MARKS IN CONCRETE SHALL BE CONSTRUCTED AS SHOWN IN THE PLANS OR AS DIRECTED BY THE RESIDENT ENGINEER.

32. THE DECK AND APPROACH SLABS WILL HAVE A LONGITUDINAL GROOVED FINISH. THIS WORK WILL BE PAID FOR UNDER ITEM 900.675 "SPECIAL PROVISION (LONGITUDINAL DECK GROOVING)"

33. THE KEY IN CONCRETE CONSTRUCTION JOINTS SHALL BE MONOLITHIC AND CONTINUOUS FOR THE FULL LENGTH OF THE JOINT. UPWARD KEYS SHALL BE PLACED INTEGRALLY WITH THE CONCRETE BELOW THE JOINT.

34. ALL DECK, CURB, CURTAINWALL, AND APPROACH SLAB REINFORCING STEEL SHALL BE EPOXY COATED AND PAID FOR UNDER ITEM 507.17, "EPOXY COATED REINFORCING STEEL". CUTTING AND REPAIRING DAMAGED AREAS OF COATED REINFORCING STEEL SHALL BE PERFORMED IN ACCORDANCE WITH SUBSECTION 507.04 OF THE STANDARD SPECIFICATIONS.

35. MINIMUM COVER FOR REINFORCING STEEL SHALL BE AS INDICATED IN THE PLANS.

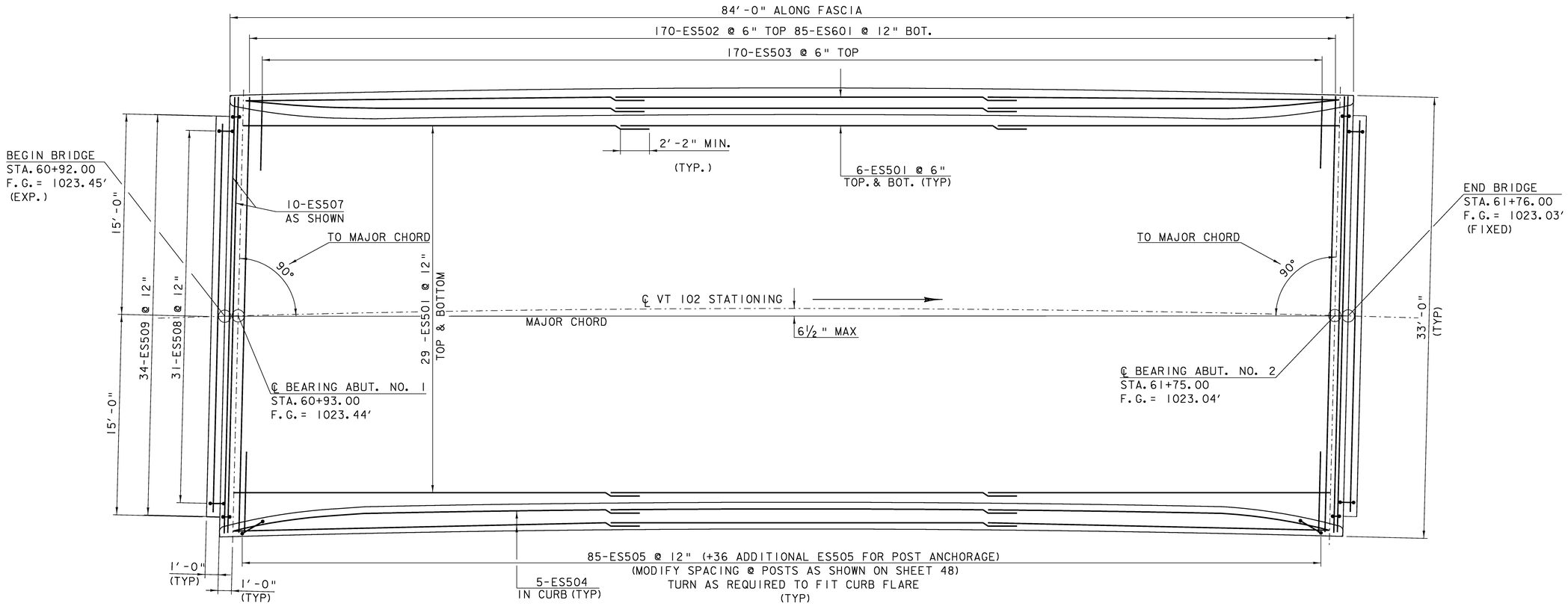
36. PVC WATERSTOPS TO BE USED ON ALL VERTICAL AND HORIZONTAL CONSTRUCTION JOINTS AND THE BOTTOM OF THE CURTAIN WALL AS SHOWN IN PLANS. PAYMENT WILL BE MADE INCIDENTAL TO THE ADJACENT CONCRETE.

37. REINFORCING STEEL PLACEMENT TOLERANCES SHALL BE:
SPACING: +/- 1 INCH
CLEARANCE: +/- 1/4 INCH

## *GENERAL NOTES*

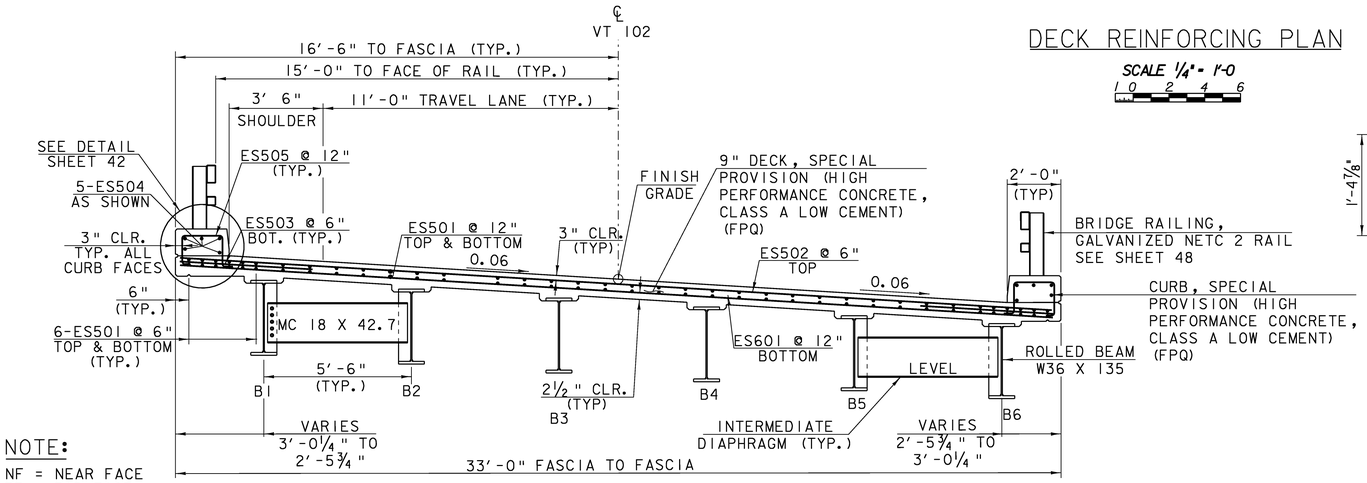
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PROJECT NUMBER: ER ST 0271(16)

FILE NAME: structures/x04c098excel.dg
PROJECT LEADER: M. ENANS-MONGEON
DESIGNED BY: S. SCRIBNER
PLOT DATE: 18-AUG-2008
DRAWN BY: L. DUQUETTE
CHECKED BY: S. SCRIBNER




## DECK REINFORCING PLAN

SCALE 1/4" = 1'-0

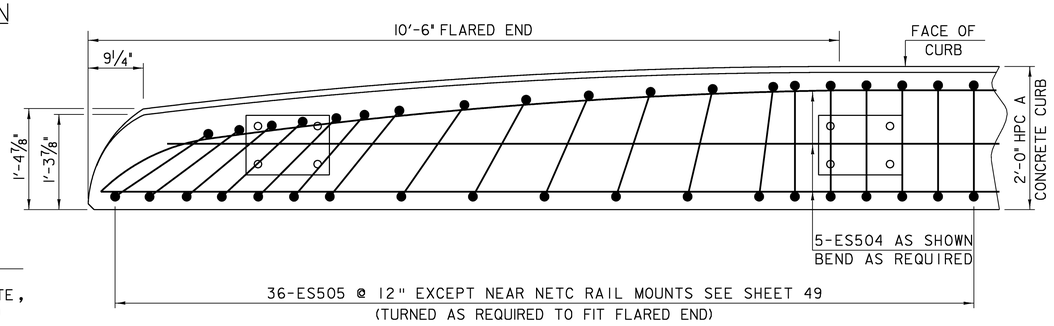



NOTE:

NF = NEAR FACE
FF = FAR FACE
EF = EACH FACE
▲ = CUT TO FIT IN FIELD
3" CLEAR, UNLESS OTHERWISE SPECIFIED ON THE PLANS.
2'-2" BAR LAP UNLESS OTHERWISE SPECIFIED ON THE PLANS.

## BRIDGE TYPICAL

SCALE 3/8" = 1'-0



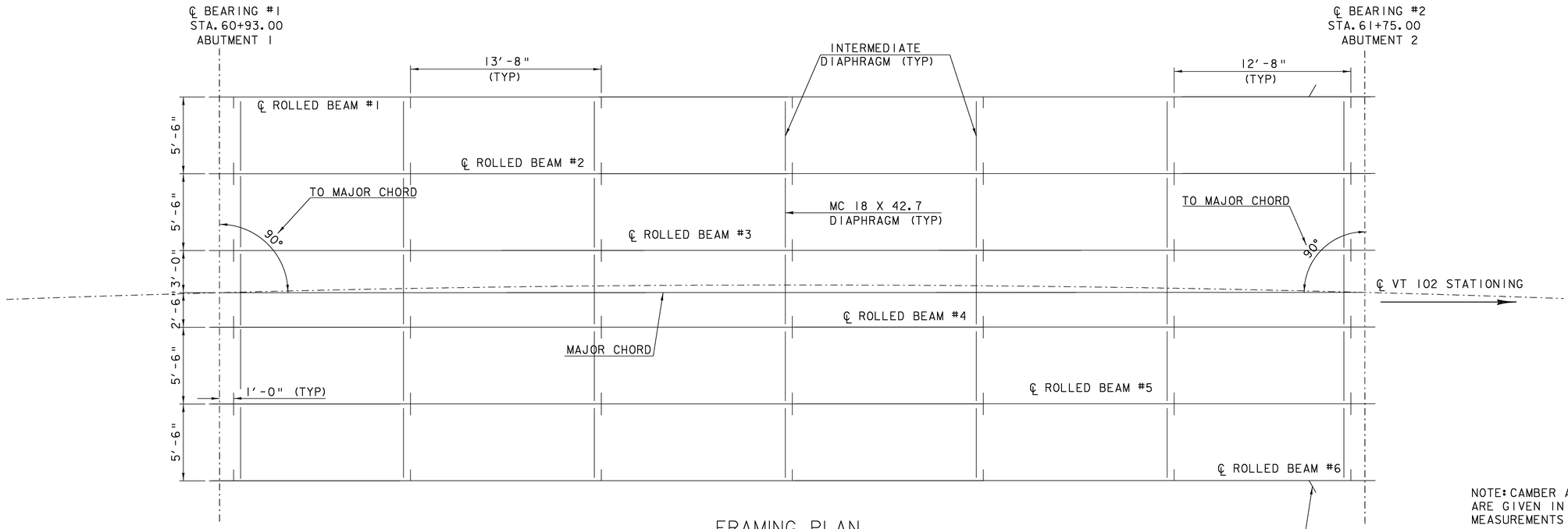

## PLAN VIEW CURB END

NTS

**DECK REINFORCING PLAN**

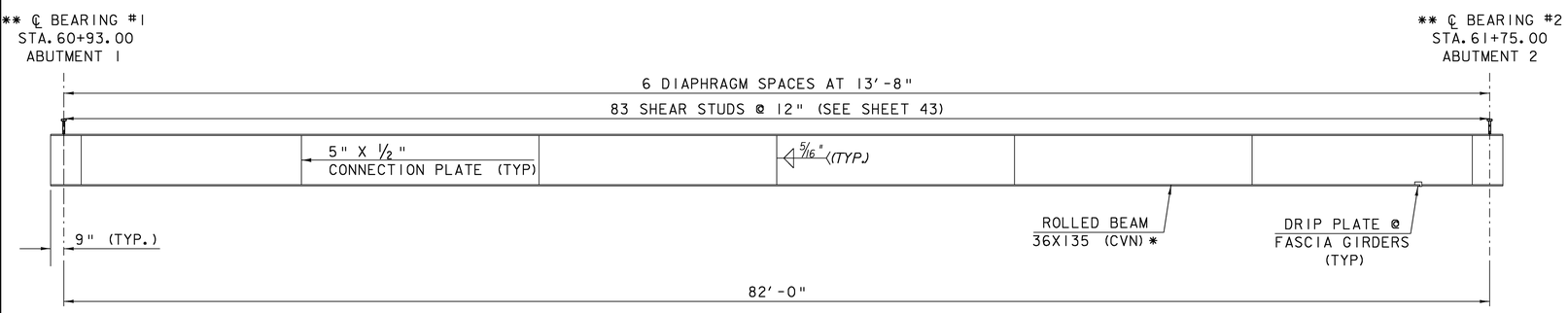
PROJECT NAME: CANAAN
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: 04c098/struc./s04c098sup
PROJECT LEADER: M. EVANS-MONGEON
DESIGNED BY: S.SCRIBNER
PLOT DATE: 18-AUG-2008
DRAWN BY: L. DUQUETTE
CHECKED BY: S. SCRIBNER
SHEET 35 OF 66

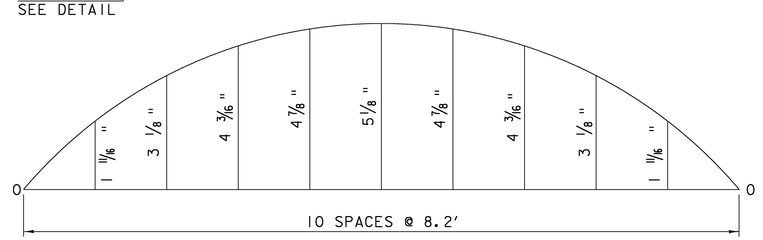



FRAMING PLAN

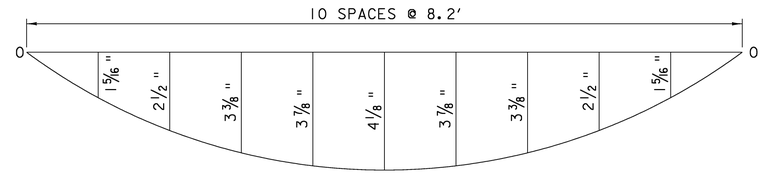
NOTE: CAMBER AND DEFLECTION MEASUREMENTS ARE GIVEN IN INCHES TO THE NEAREST SIXTEENTH. MEASUREMENTS INCLUDE BEAM SELF-WEIGHT.




ROLLED BEAMS




CAMBER DIAGRAM
NOT TO SCALE




DEAD LOAD DEFLECTION DIAGRAM
NOT TO SCALE

* CVN - SHALL MEET CHARPY V-NOTCH REQUIREMENTS FOR MAIN MEMBERS AS INDICATED IN SECTION 714 OF THE STANDARD SPECIFICATIONS

** HOLES FOR TRANSVERSE ABUTMENT REINFORCING STEEL NOT SHOWN. SEE SHEET 40

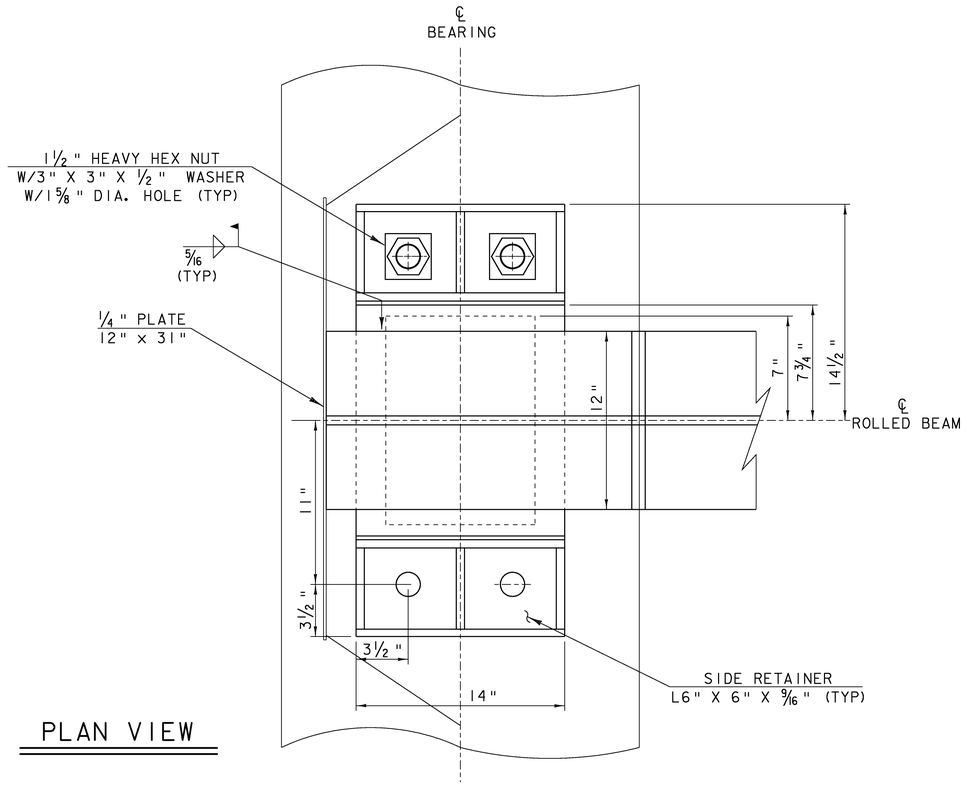
SEE SHEET 42 FOR DETAILS

SCALE 1/4"= 1'-0
1 0 2 4 6

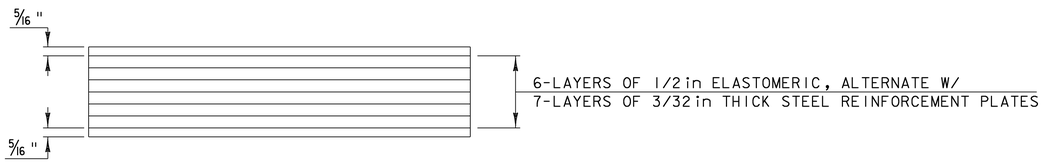
## FRAMING PLAN

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PROJECT NUMBER: ER ST 0271(16)

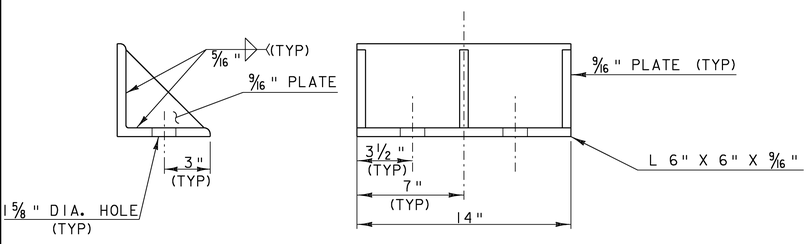
FILE NAME: 04c098/struc./s04c098sup
PROJECT LEADER: M. EVANS-MONGEON
DESIGNED BY: S.SCRIBNER
PLOT DATE: 18-AUG-2008
DRAWN BY: L. DUQUETTE
CHECKED BY: S. SCRIBNER



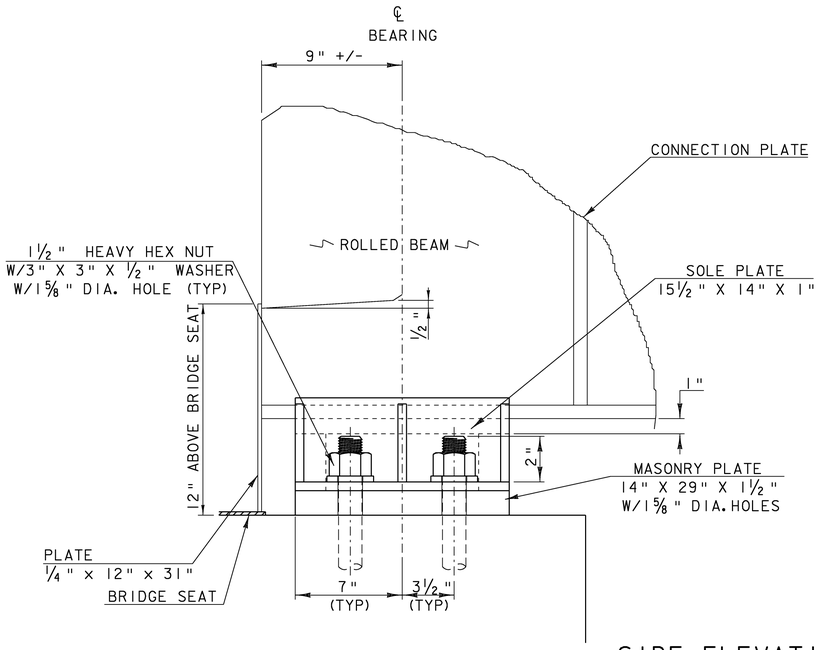

PLAN VIEW



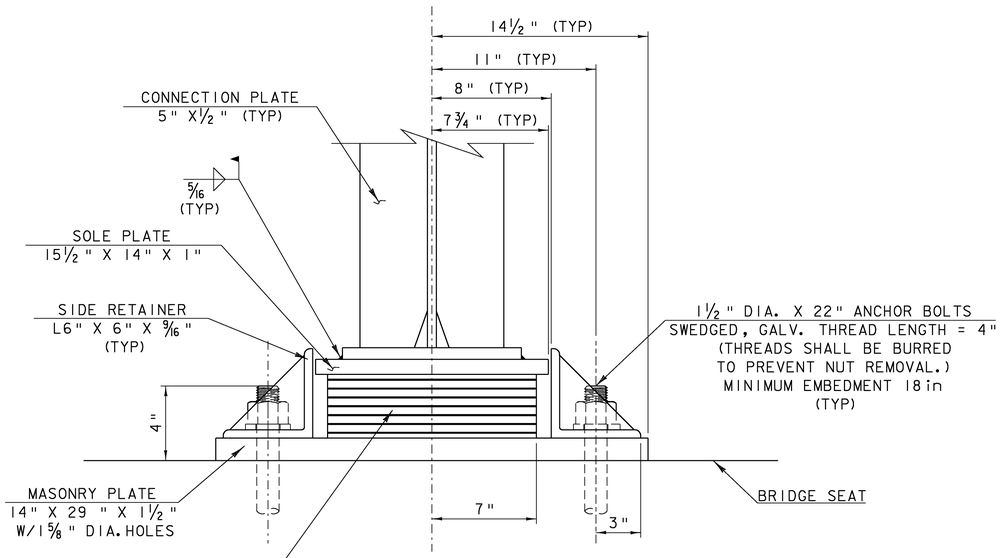

ELASTOMERIC BEARING MAKEUP




SIDE RETAINER




SIDE ELEVATION




END ELEVATION

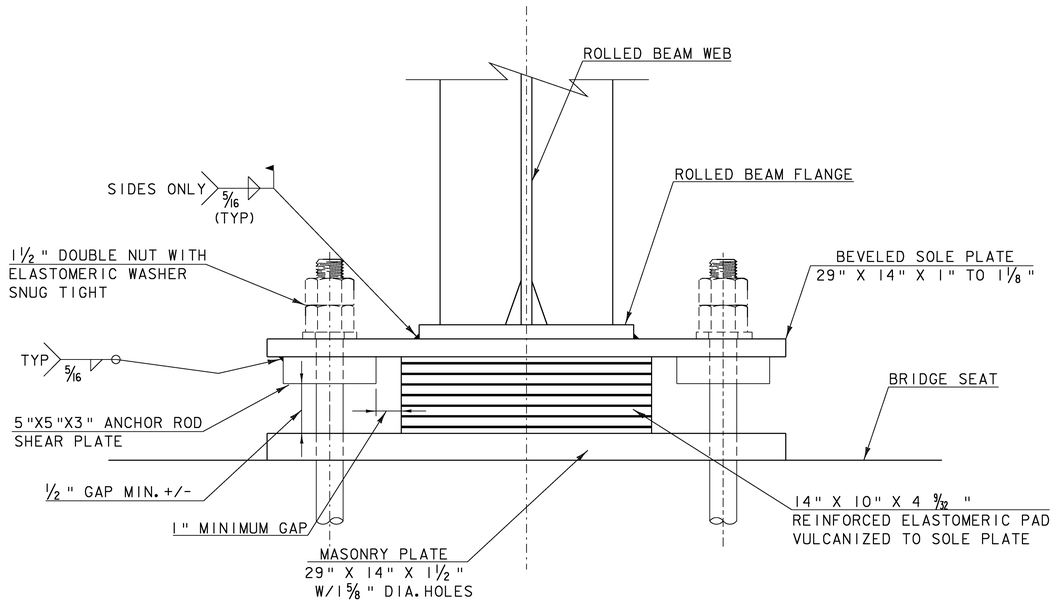
SEE SHEET 39 FOR NOTES

## ABUT. 1 EXPANSION BEARING DETAILS

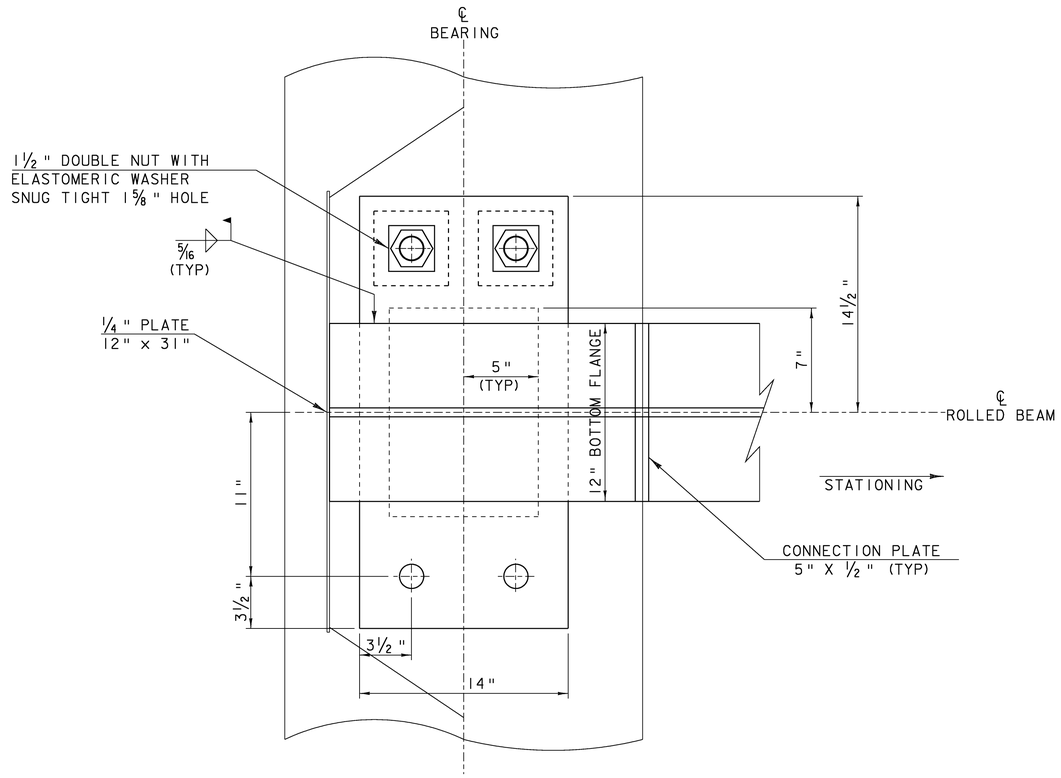
NOT TO SCALE

***EXPANSION BEARING DETAIL***

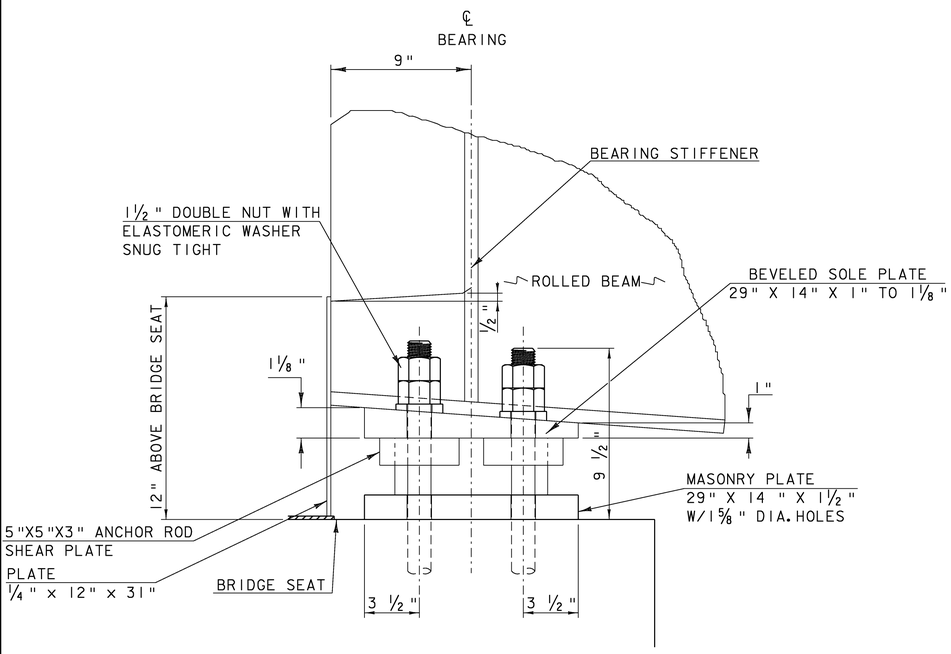
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| PROJECT NAME: | CANAAN |
| PROJECT NUMBER: | ER ST 0271(16) |
| FILE NAME: 04c098/struc./s04c098sup | PLOT DATE: 18-AUG-2008 |
| PROJECT LEADER: M. EVANS-MONGEON | DRAWN BY: L. DUQUETTE |
| DESIGNED BY: S. SCRIBNER | CHECKED BY: S. SCRIBNER |
| | SHEET 37 OF 66 |



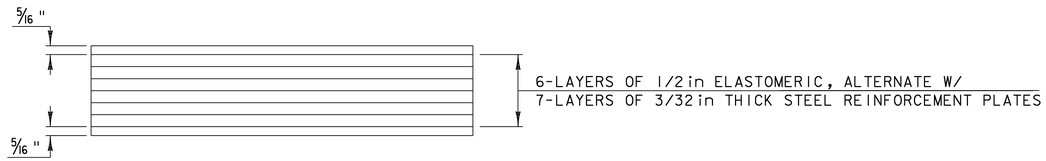

## END ELEVATION




## PLAN VIEW




## SIDE ELEVATION




## ELASTOMERIC BEARING MAKEUP

# Abut. 2 FIXED BEARING DETAILS

NOT TO SCALE

SEE SHEET 39 FOR NOTES

***FIXED BEARING DETAIL***

PROJECT NAME: CANAAN
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: 04c098/struc./s04c098sup
PROJECT LEADER: M. EVANS-MONGEON
DESIGNED BY: S. SCRIBNER
PLOT DATE: 18-AUG-2008
DRAWN BY: L. DUQUETTE
CHECKED BY: S. SCRIBNER

# BEARING NOTES

1. EXPANSION BEARINGS SHALL BE PAID FOR UNDER THE ITEM 531.11 "BEARING DEVICE ASSEMBLY, ELASTOMERIC PAD" AND SHALL CONFORM TO APPLICABLE SUBSECTIONS OF SECTION 531 AND 731.

2. THE FIELD WELD CONNECTING THE BOTTOM FLANGE WITH THE BEARING DEVICE SHALL BE MADE WITH E7018 RODS. AREAS OF METALIZING DAMAGED BY WELDING AND/OR HANDLING SHALL BE REPAIRED BY METALIZING IN ACCORDANCE WITH ASTM A 760.

3. ALL STEEL COMPONENTS SHALL BE METALIZED AS PER SECTION 531.04(b) AND 506.15. AFTER THE BEARINGS ARE METALIZED, THEY SHALL BE SEALED WITH AN APPROVED SEALANT AS SPECIFIED IN SUBSECTION 506.15(b). ALL WASHERS SHALL BE ½" PLATE MINIMUM. PAYMENT FOR ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE INCLUDED IN THE UNIT BID PRICE FOR "BEARING DEVICE ASSEMBLY, ELASTOMERIC PAD." ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED PER AASHTO M 232.

4. ALL STEEL IN BEARING DEVICES SHALL BE AASHTO M 270 GRADE 50 UNLESS NOTED OTHERWISE.

5. ALL REINFORCEMENT BETWEEN LAYERS OF ELASTOMERIC SHALL BE STEEL ASTM A36. ALL INTERNAL STEEL PLATES SHALL BE SAND BLASTED AND FREE OF COATINGS, RUST, AND MILL SCALE. THE PLATES SHALL BE FREE OF SHARP EDGES AND BURRS.

6. STEEL REINFORCED ELASTOMERIC BEARINGS SHALL HAVE A MINIMUM OF ⅛" EDGE SEAL OF ELASTOMER INTEGRAL WITH THE BEARING OVER ALL INTERNAL PLATES.

7. ALTERNATE CONFIGURATIONS FOR BEARINGS MAY BE SUBMITTED FOR APPROVAL. ANY ALTERNATE SUBMITTED SHALL BE DESIGNED AND CERTIFIED TO MEET THE DESIGN LOADS AND CRITERIA SHOWN ON THIS SHEET. THE ALTERNATE SHALL MAINTAIN THE ANCHORAGE SYSTEM SHOWN AND SHALL BE DESIGNED PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS 2007 EDITION AND ITS LATEST REVISIONS.

8. BRIDGE SEAT ELEVATIONS MAY BE REVISED TO ACCOMMODATE AN ALTERNATIVE CONFIGURATION. THE CONCRETE SURFACES UNDER THE BEARING DEVICES SHALL BE LEVEL.

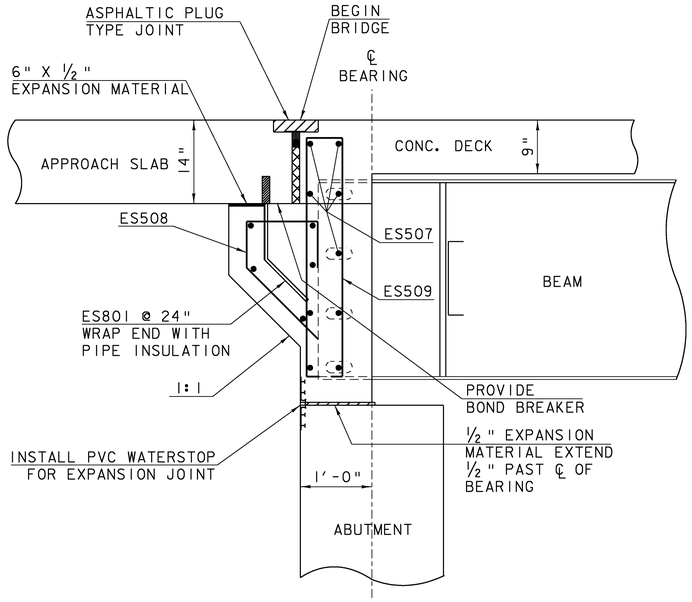
9. DESIGN CRITERIA:
   - A. MASONRY PLATE TO CONCRETE DESIGN PRESSURE = 800 PSI
   - B. DESIGN ROTATION = 0.011 RAD
   - C. HORIZONTAL CAPACITY SHALL BE MINIMUM OF 20% VERTICAL LOAD IN ANY RESTRAINED DIRECTION.
   - D. DESIGN LOAD PER BEARING
     - RDL = 43.8 kips
     - RLL = 58.2 kips
   - E. TEMPERATURE RANGE = -15° TO 105° F
   - F. ELASTOMER SHALL HAVE NOMINAL HARDNESS OF 60 ON SHORE 'A' SCALE. ELASTOMER SHALL HAVE A SHEAR MODULUS BETWEEN 0.13KSI AND 0.20 KSI THE RAW ELASTOMER SHALL BE VIRGIN NEOPRENE CLASSIFIED AS LOW TEMPERATURE GRADE 4 AS DEFINED IN TABLE 18.2.3.1-1 OF AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS
   - G. NO FABRIC REINFORCEMENT WILL BE ALLOWED IN ELASTOMERIC PADS

10. THE STEEL SOLE PLATES AND MASONRY PLATES SHALL BE HOT BONDED TO THE REINFORCED ELASTOMERIC PAD DURING THE VULCANIZATION PROCESS. THE STEEL SURFACES TO BE BONDED TO THE PAD SHALL NOT BE METALIZED.

***BEARING NOTES***

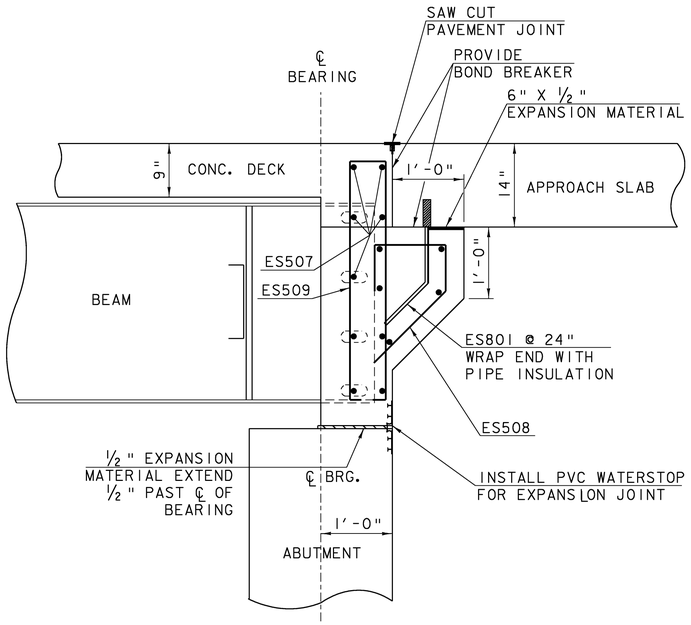
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|---|---|
| PROJECT NAME: | CANAAN |
| PROJECT NUMBER: | ER ST 0271(16) |

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|---|---|---|---|
| FILE NAME: 04c098/struc./s04c098sup | | PLOT DATE: | 18-AUG-2008 |
| PROJECT LEADER: | M. EVANS-MONGEON | DRAWN BY: | L. DUQUETTE |
| DESIGNED BY: | S.SCRIBNER | CHECKED BY: | S. SCRIBNER |
| | | SHEET 39 | OF 66 |




## BRIDGE EXPANSION END DETAIL

ABUTMENT #1




## BRIDGE FIXED END DETAIL

ABUTMENT #2

NOTE:
PAYMENT FOR FURNISHING AND INSTALLING EXPANSION MATERIAL, PIPE INSULATION, BOND BREAKER, AND PVC WATERSTOP WILL BE MADE INCIDENTAL TO THE PAY ITEM FOR ADJACENT CONCRETE.

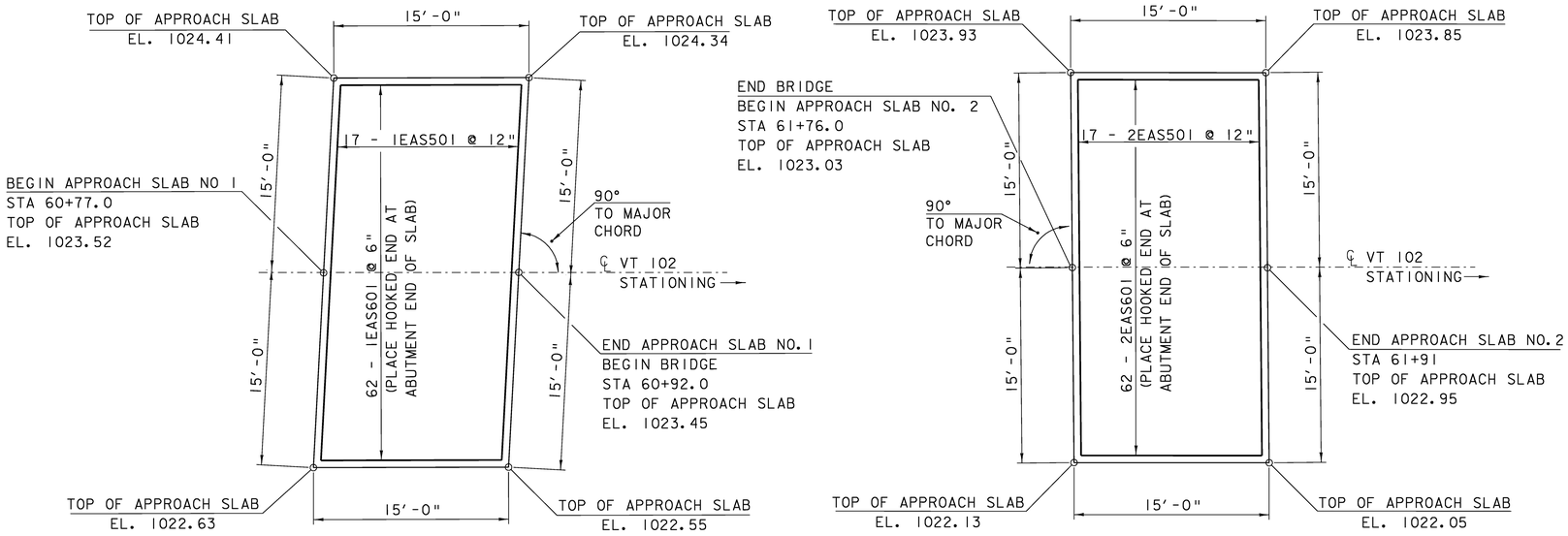
NOTE:
NF = NEAR FACE
FF = FAR FACE
EF = EACH FACE
▲ = CUT TO FIT IN FIELD
3" CLEAR, UNLESS OTHERWISE SPECIFIED ON THE PLANS.
2'-2" BAR LAP UNLESS OTHERWISE SPECIFIED ON THE PLANS.

SCALE 1" = 1'-0
1 9 6 3 0 1 2

**BRIDGE END DETAILS**

PROJECT NAME: CANAAN
PROJECT NUMBER: ER ST 0271(16)

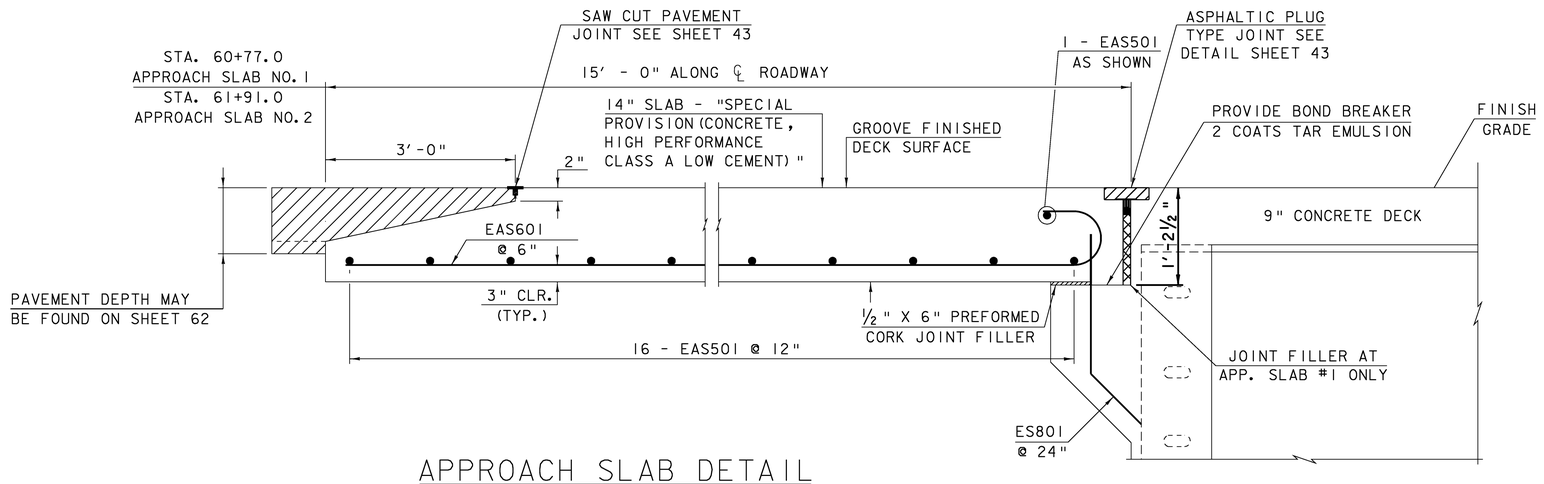
FILE NAME: 04c098/struc./s04c098sup
PROJECT LEADER: M. EVANS-MONGEON
DESIGNED BY: S. SCRIBNER
PLOT DATE: 18-AUG-2008
DRAWN BY: L. DUQUETTE
CHECKED BY: S. SCRIBNER
SHEET 40 OF 66




## APPROACH SLAB PLAN

SCALE 3/16" = 1'-0
1 0 2 4 6 8

NOTE:
PAYMENT FOR FURNISHING AND INSTALLING BOND BREAKER AND JOINT FILLER WILL BE MADE INCIDENTAL TO THE PAY ITEM FOR ADJACENT CONCRETE.




## APPROACH SLAB DETAIL

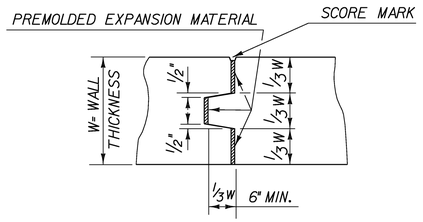
APPROACH SLAB 1 SHOWN
APPROACH SLAB 2 SIMILAR

NOTE:
NF = NEAR FACE
FF = FAR FACE
EF = EACH FACE
▲ = CUT TO FIT IN FIELD
3" CLEAR, UNLESS OTHERWISE SPECIFIED ON THE PLANS.
2'-2" BAR LAP UNLESS OTHERWISE SPECIFIED ON THE PLANS.

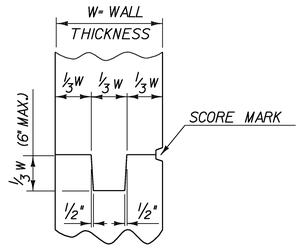
**APPROACH SLAB DETAILS**

PROJECT NAME: CANAAN
PROJECT NUMBER: ER ST 0271(16)

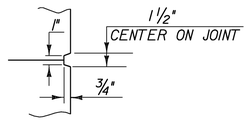
FILE NAME: 04c098/struc./s04c098sup
PROJECT LEADER: M. EVANS-MONGEON
DESIGNED BY: S.SCRIBNER
PLOT DATE: 18-AUG-2008
DRAWN BY: L. DUQUETTE
CHECKED BY: S. SCRIBNER



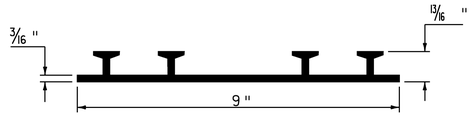

TYPICAL CONCRETE EXPANSION JOINT




TYPICAL CONCRETE CONSTRUCTION JOINT



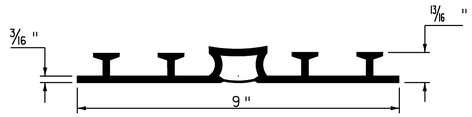

SCORE MARK DETAIL




P.V.C. WATERSTOP FOR CONSTRUCTION JOINTS
(NOT TO SCALE)

PAYMENT FOR THE P.V.C. WATERSTOP SHALL BE INCIDENTAL TO THE UNIT BID PRICE FOR THE ADJACENT CONCRETE.

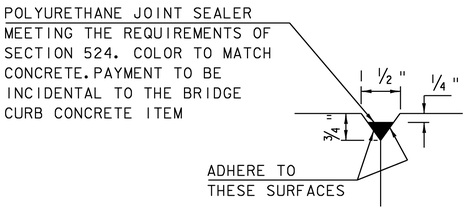
OTHER CONFIGURATIONS OF WATERSTOP MAY BE USED UPON APPROVAL OF THE ENGINEER.



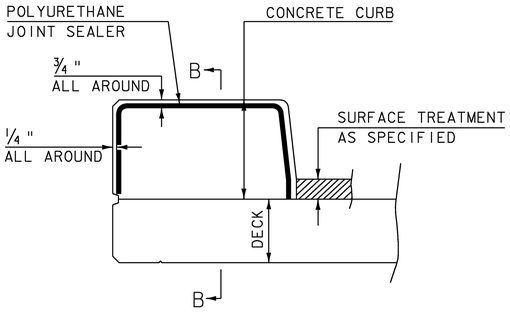

P.V.C. WATERSTOP FOR EXPANSION JOINTS
(NOT TO SCALE)

PAYMENT FOR THE P.V.C. WATERSTOP SHALL BE INCIDENTAL TO THE UNIT BID PRICE FOR THE ADJACENT CONCRETE.

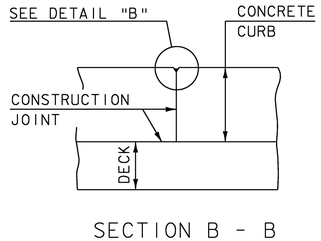
OTHER CONFIGURATIONS OF WATERSTOP MAY BE USED UPON APPROVAL OF THE ENGINEER.




DETAIL "B"
NOT TO SCALE




CONCRETE CURB JOINT SECTION
NOT TO SCALE




SECTION B - B
NOT TO SCALE

## CONCRETE CURB JOINT NOTES

1. CONCRETE CURBS MAY BE PLACED IN ONE CONTINUOUS OPERATION. IF AN APPROVED SHRINKAGE REDUCING ADMIXTURE LISTED IN THE SPECIAL PROVISIONS IS USED WITH THE CONCRETE MIX DESIGN. PAYMENT FOR THE SHRINKAGE REDUCING ADMIXTURE WILL BE INCIDENTAL TO THE BRIDGE CURB CONCRETE ITEM.

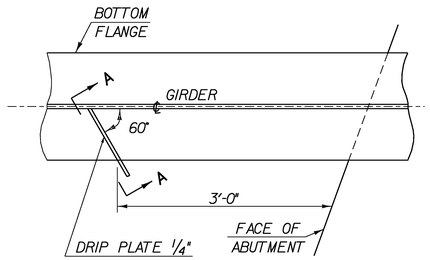
2. IF THE CONTRACTOR CHOOSES NOT TO USE AN APPROVED SHRINKAGE REDUCING ADMIXTURE, THE CURBS SHALL BE CONSTRUCTED WITH CONSTRUCTION JOINTS SPACED AT A MAXIMUM OF 15'-0" CENTER TO CENTER AND 2'-0" MINIMUM FROM THE CENTER OF NEAREST BRIDGE RAILING POST.

3. ON MULTI-SPAN CONTINUOUS SUPERSTRUCTURES, REGARDLESS OF WHETHER APPROVED SHRINKAGE REDUCING ADMIXTURE IS USED, CURB JOINTS SHALL BE LOCATED OVER THE CENTERLINE OF PIERS AND 7'-0" EACH SIDE OF THE CENTERLINE OF EACH PIER.

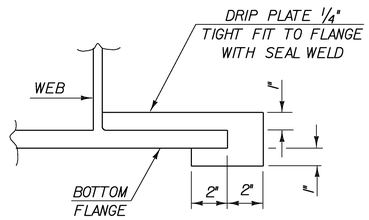
4. WHEN CURB JOINTS ARE USED THE CURBS SHALL BE PLACED IN ALTERNATE SECTIONS WITH A MINIMUM OF 48 HOUR DELAY BETWEEN ADJACENT PLACEMENTS.

5. LONGITUDINAL REINFORCING SHALL BE CONTINUOUS THROUGH CURB CONSTRUCTION JOINTS. CURB STIRRUP BARS SHALL BE TURNED AS NECESSARY TO MAINTAIN COVER IN THE FLARED CURB ENDS.

6. THE JOINT SPACING AND DETAILS SHOWN SHALL APPLY TO SIDEWALKS WHEN SHOWN IN THE PLANS.

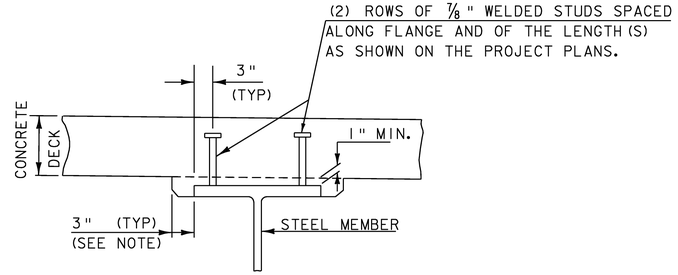



PLAN DRIP PLATE




SECTION A - A

*NOTE: DRIP PLATES SHALL BE PLACED ON OUTSIDE EDGE OF FASCIA GIRDERS ON THE HIGH SIDE OF ALL PIERS AND ABUTMENTS OR AS INDICATED ON PROJECT PLANS.*



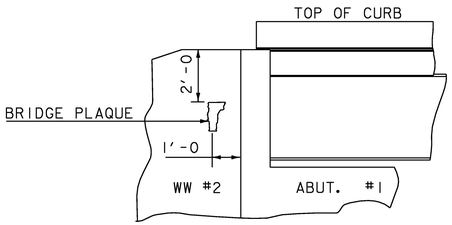

NOTE: THE 3" HORIZONTAL SECTION MAY BE ELIMINATED FOR FORMING SYSTEMS DESIGNED FOR THE CONSTRUCTION OF VERTICAL HAUNCHES. ANY VOIDS RESULTING FROM FORMING SYSTEM ELEMENTS SHALL BE FILLED WITH JOINT SEALER, POLYURETHANE MEETING THE REQUIREMENTS OF SECTION 524. THE COST OF THE JOINT SEALER, POLYURETHANE SHALL BE INCIDENTAL TO THE ADJACENT CONCRETE.

HAUNCH AND SHEAR CONNECTOR DETAIL
(NOT TO SCALE)

**SUPERSTRUCTURE DETAILS (1)**

PROJECT NAME: CANAAN
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: 04c098/struc./s04c098sup
PROJECT LEADER: M. EVANS-MONGEON
DESIGNED BY: S.SCRIBNER
PLOT DATE: 18-AUG-2008
DRAWN BY: L. DUQUETTE
CHECKED BY: S. SCRIBNER

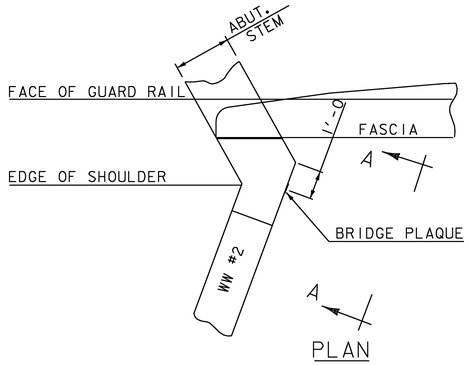



VIEW "A - A"

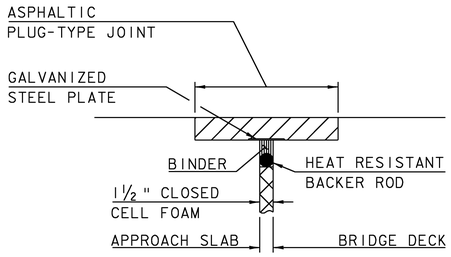
## BRIDGE PLAQUE
(NOT TO SCALE)

THE BRIDGE PLAQUE WILL BE SUPPLIED BY THE AGENCY OF TRANSPORTATION AND SHALL BE INSTALLED BY THE CONTRACTOR AT ABUTMENT #1 ON THE RIGHT SIDE AS SHOWN OR AS DIRECTED BY THE ENGINEER.

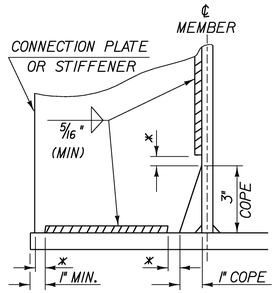
PAYMENT FOR INSTALLATION OF THE BRIDGE PLAQUE SHALL BE INCIDENTAL TO THE ADJACENT CONCRETE.




PLAN

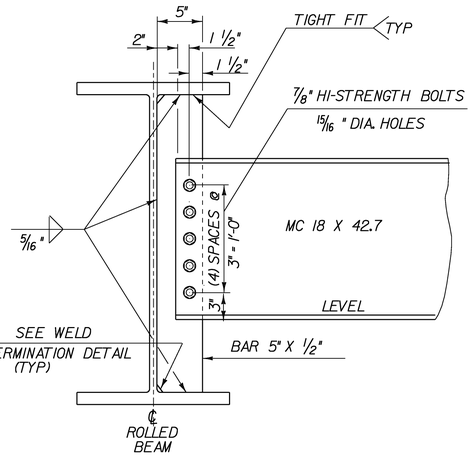



## ASPHALTIC PLUG-TYPE JOINT DETAIL
(NOT TO SCALE)



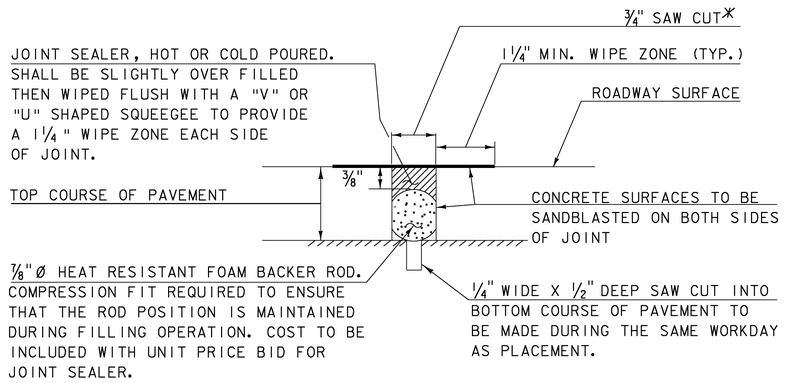

## WELD TERMINATION AND COPING DETAILS FOR STEEL MEMBERS

*NO WELD FOR 3/8" MIN. 7/8" MAX. (EXCEPT MUST MAINTAIN 1" MINIMUM FROM EDGE OF FLANGE)




NOTE: HI-STRENGTH BOLTS, NUTS AND WASHERS SHALL CONFORM TO AASHTO DESIGNATION M164.

## INTERMEDIATE DIAPHRAGMS




## SAWED PAVEMENT JOINT DETAIL
(NOT TO SCALE)

*JOINT IS TO BE LOCATED ACCURATELY BY STRING LINING, OR OTHER MEANS, PRIOR TO PAVING, SO THAT THE SAW CUTS WILL BE MADE DIRECTLY OVER THE END OF CONCRETE DECK. JOINT SHALL BE CUT DRY IN A SINGLE PASS AND BE SEALED WITHIN 24 HOURS OR PRIOR TO EXPOSURE TO TRAFFIC. JOINT SHALL BE CLEANED PRIOR TO APPLYING THE JOINT SEALER. PAYMENT INCIDENTAL TO 406.25

## ASPHALTIC PLUG JOINT NOTES

1. INSTALLATION

A. LOCATE THE JOINT CENTRALLY OVER THE DECK OVERLAY EXPANSION GAP OR FIXED JOINT MARKED OUT TO THE MANUFACTURER'S RECOMMENDED WIDTH.

B. REMOVE THE BITUMINOUS CONCRETE PAVEMENT FULL DEPTH AS SHOWN ON THE PLANS. THE PAVEMENT SHALL BE DRY AND SAW CUT TO THE LIMITS REQUIRED TO PLACE THE JOINT. A PNUMATIC HAMMER AND CHISEL MAY BE USED ADJACENT TO THE CURB ONLY WHEN SAW CUTTING IS NOT POSSIBLE.

C. BLAST CLEAN THE JOINT AREA OF DEBRIS AND ASPHALT. THOROUGHLY DRY THE JOINT AREA WITH COMPRESSED AIR PRIOR TO APPLYING BINDER MATERIAL.

D. REPAIR SPALLED AND DEFECTIVE CONCRETE WITH AN APPROVED MATERIAL AS AGREED UPON BY THE ENGINEER.

E. PLACE PROPERLY SIZED HEAT RESISTANT BACKER ROD IN THE MOVEMENT GAP ALLOWING FOR 1" +/- OF BINDER ABOVE THE ROD.

F. HEAT AND PLACE THE BINDER MATERIAL AS RECOMMENDED BY THE MANUFACTURER.

G. PLACE ¼" THICK BY 8" WIDE SECTIONS OF STEEL PLATE OVER THE CENTER OF THE MOVEMENT GAP. SECURE THE PLATES FROM MOVING BY INSERTING LOCATING PINS THROUGH THE PRESTAMPED HOLES INTO BACKER ROD AND COVER WITH HOT BINDER. THE STEEL PLATES MAY BE OMITTED WHERE THE ENGINEER DETERMINES THAT THE APPROACH SLAB OR BRIDGE DECK WILL PROVIDE INADEQUATE SUPPORT AND WHERE VERTICAL MOVEMENT OF THE PLATES MIGHT OCCUR.

H. HEAT AND MIX THE BINDER MATERIAL AND AGGREGATE AS RECOMMENDED BY THE MANUFACTURER.

I. INSTALLATION OF MATERIAL, COMPACTION, AND TOP COATING SHALL BE AS RECOMMENDED BY THE MANUFACTURER.

J. IMMEDIATELY AFTER TOP COATING, CAST AN ANTI-SKID MATERIAL OVER THE JOINT TOREDUCE THE RISK OF TRACKING.

K. PROTECTED JOINT FROM TRAFFIC UNTIL THE MATERIAL HAS COOLED TO 51 DEG C (125 DEG F) +/-.

2. WEATHER LIMITATIONS. (APPLY BINDER MATERIAL ONLY WHEN THE FOLLOWING CONDITIONS PREVAIL OR AS RECOMMENDED BY THE MANUFACTORER):

A. THE AMBIENT AIR TEMPERATURE IS AT LEAST 10 DEG C (50 DEG F) AND RISING.

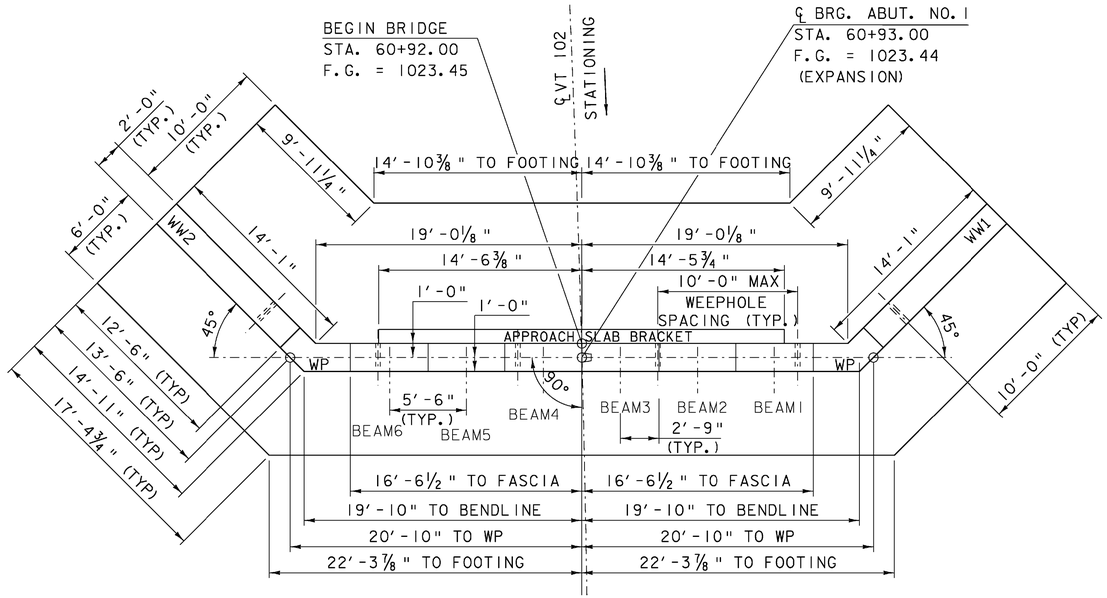
B. THE ROAD SURFACE IS DRY.

C. WEATHER CONDITIONS OR OTHER CONDITIONS ARE FAVORABLE AND ARE EXPECTED TO REMAIN SO FOR THE PERFORMANCE OF SATISFACTORY WORK.

**SUPERSTRUCTURE DETAILS (2)**

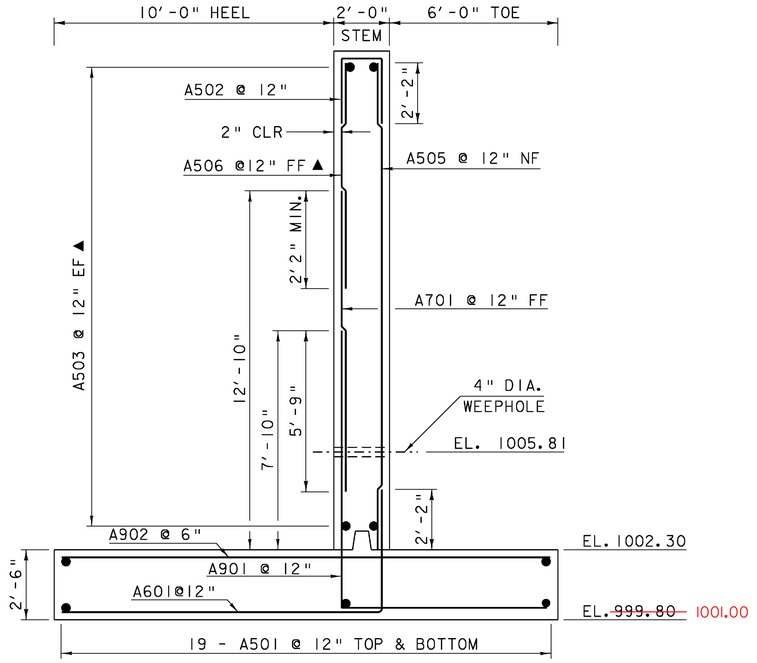
PROJECT NAME: CANAAN
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: 04c098/struc./s04c098sup
PROJECT LEADER: M. EVANS-MONGEON
DESIGNED BY: S.SCRIBNER
PLOT DATE: 18-AUG-2008
DRAWN BY: L. DUQUETTE
CHECKED BY: S. SCRIBNER



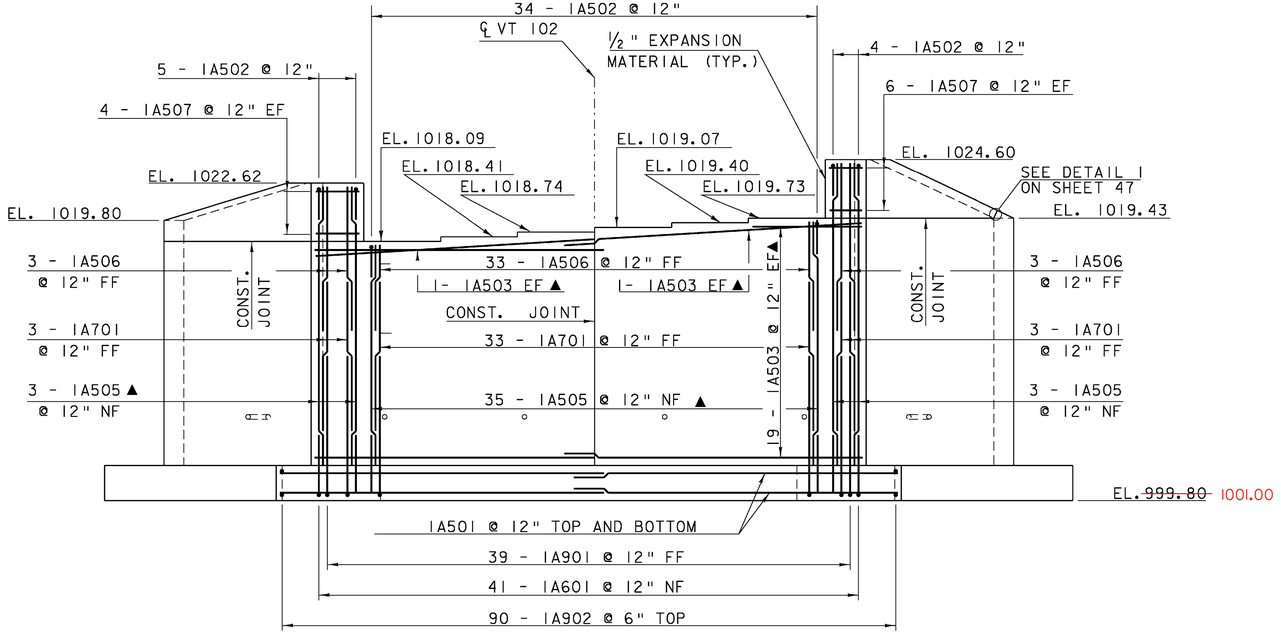

## ABUTMENT NO. 1 PLAN

SCALE 3/16" = 1'-0
1 0 2 4 6 8




## ABUTMENT TYPICAL

SCALE 3/8" = 1'-0
1 0 1 2 3 4




## ABUTMENT NO. 1 ELEVATION

SCALE 3/16" = 1'-0
1 0 2 4 6 8

NOTE:

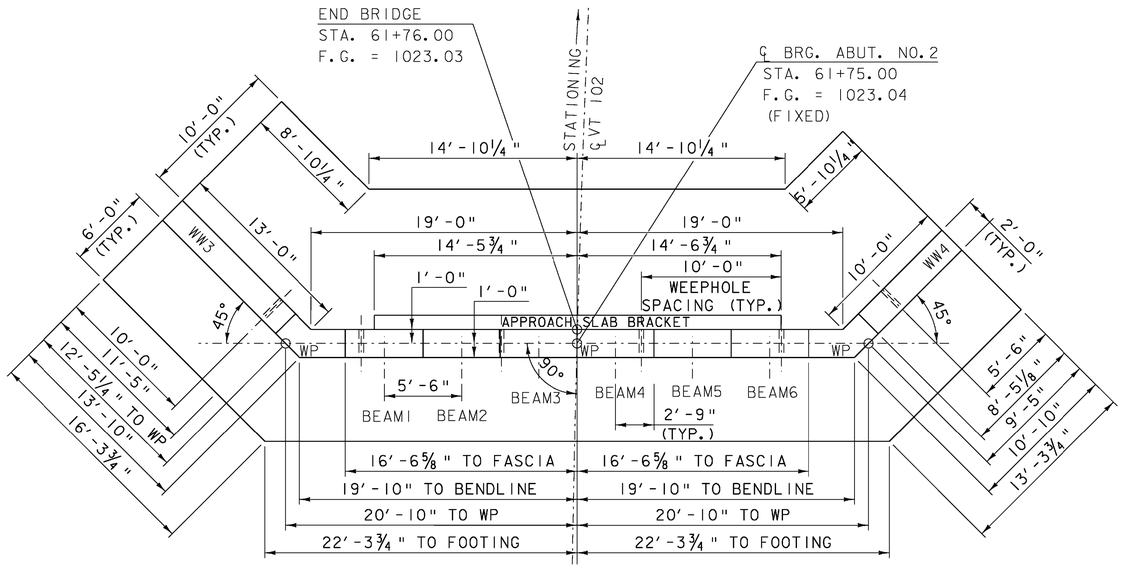
NF = NEAR FACE
FF = FAR FACE
EF = EACH FACE
▲ = CUT TO FIT IN FIELD
3" CLEAR, UNLESS OTHERWISE SPECIFIED ON THE PLANS.
2'-2" BAR LAP UNLESS OTHERWISE SPECIFIED ON THE PLANS.

ALL DIMENSIONS ARE TAKEN FROM THE MAJOR CHORD NOT FROM THE ℄ OF VT 102

## ABUTMENT #1 DETAILS

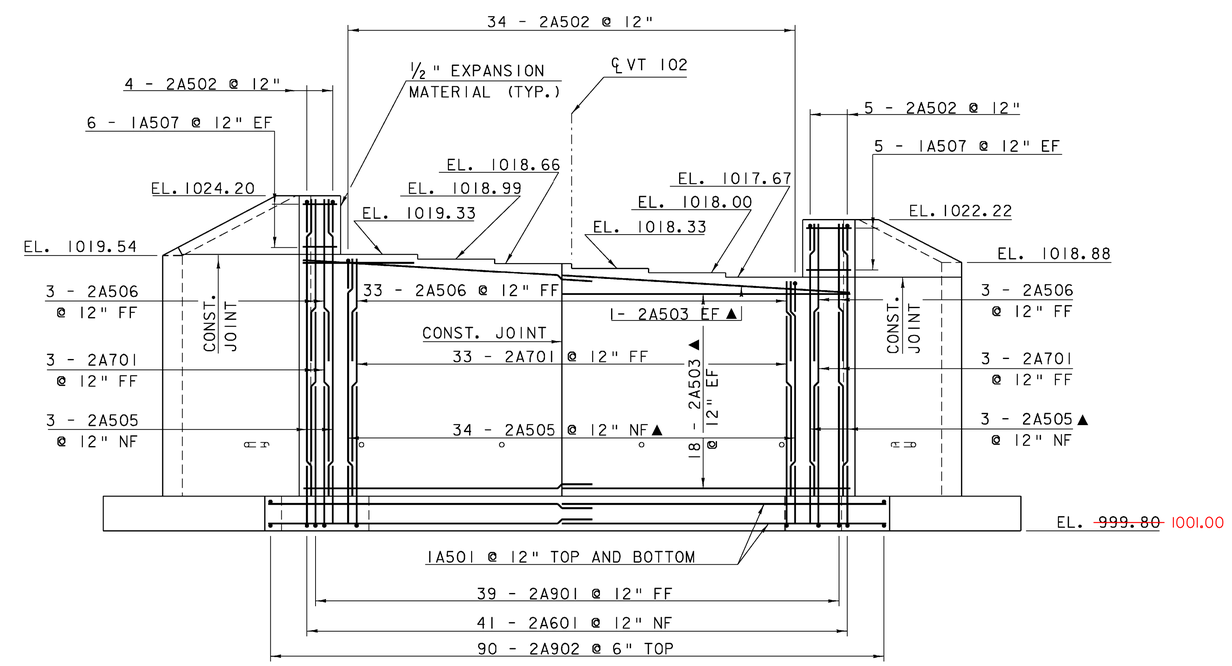
PROJECT NAME: CANAAN
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DESIGNED BY: S.SCRIBNER
PLOT DATE: 18-AUG-2008
DRAWN BY: C. JOLLY
CHECKED BY: S. SCRIBNER
SHEET 44 OF 66



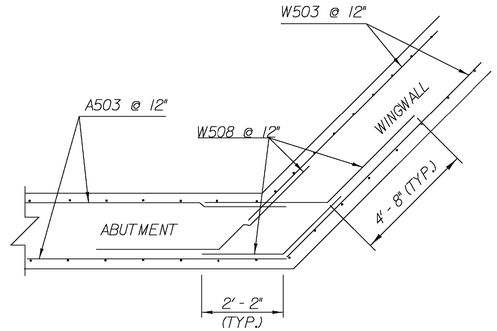

# ABUTMENT NO. 2 PLAN

SCALE 3/16" = 1'-0
1 0 2 4 6 8




# ABUTMENT NO. 2 ELEVATION

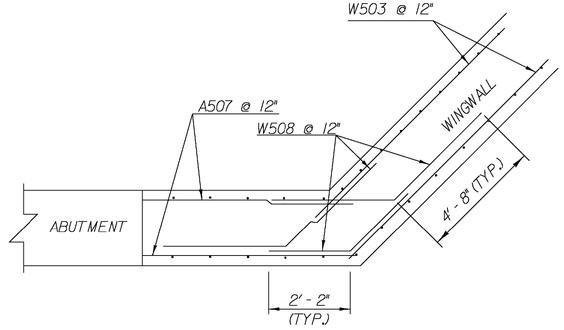
SCALE 3/16" = 1'-0
1 0 2 4 6 8




WINGWALL CORNER DETAIL FOR 45° OR UNDER

# WINGWALL CORNER DETAIL
## (BELOW BRIDGE SEAT)

NOT TO SCALE




WINGWALL CORNER DETAIL FOR 45° OR UNDER

# WINGWALL CORNER DETAIL
## (ABOVE BRIDGE SEAT)

NOT TO SCALE

NOTE:

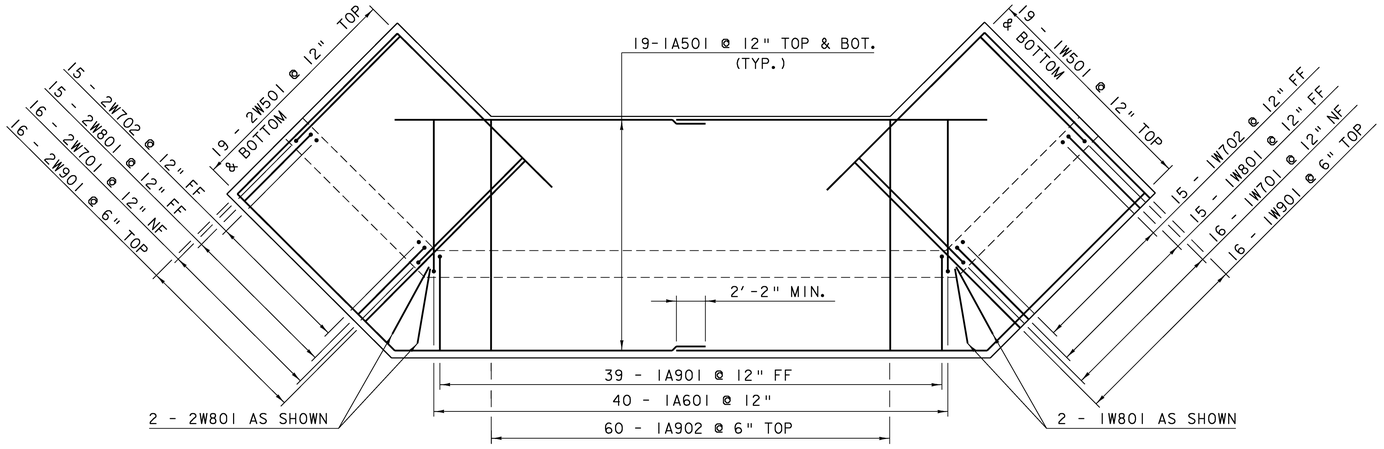
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**ABUTMENT #2 DETAILS**

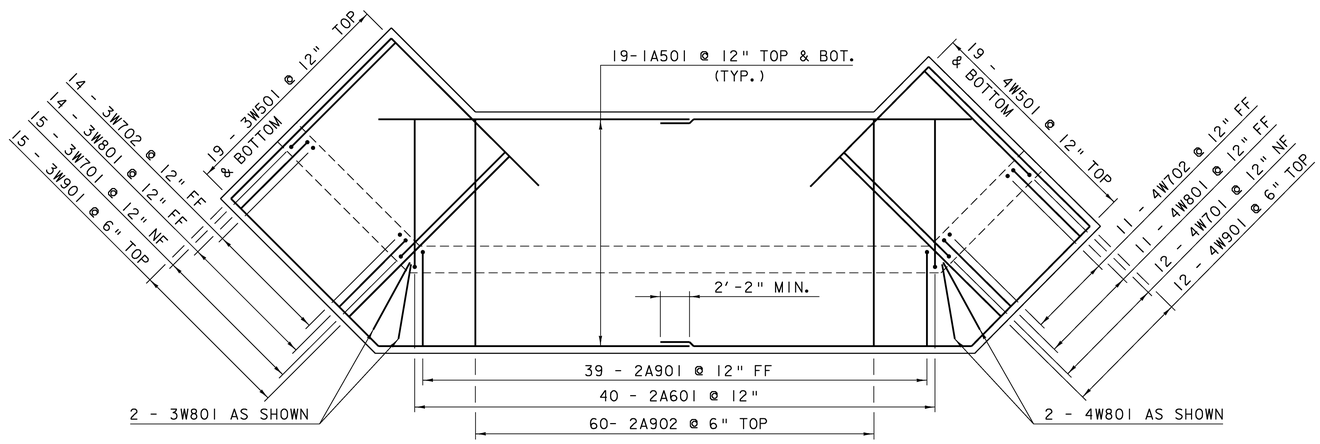
PROJECT NAME: CANAAN
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: 04c098/struc./s04c098sup
PROJECT LEADER: M. EVANS-MONGEON
DESIGNED BY: S.SCRIBNER
PLOT DATE: 18-AUG-2008
DRAWN BY: C. JOLLY
CHECKED BY: S. SCRIBNER
SHEET 45 OF 66




ABUTMENT NO. 1 FOOTING REINFORCING PLAN

SCALE 3/16" = 1'-0




ABUTMENT NO. 2 FOOTING REINFORCING PLAN

SCALE 3/16" = 1'-0

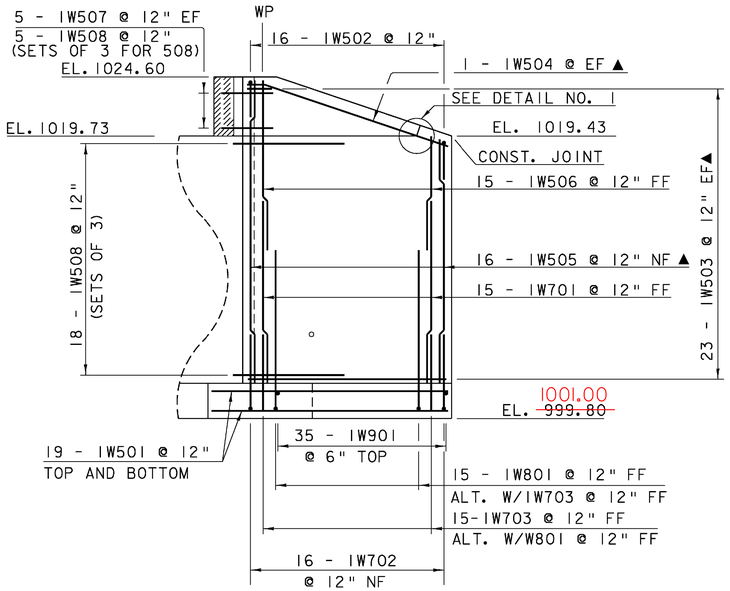
NOTE:

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**FOOTING REINFORCING PLAN**

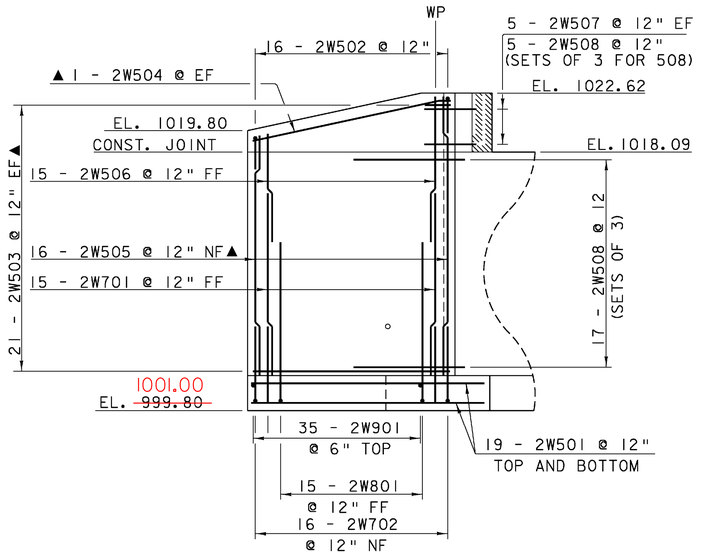
PROJECT NAME: CANAAN
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DESIGNED BY: S.SCRIBNER
PLOT DATE: 18-AUG-2008
DRAWN BY: C. JOLLY
CHECKED BY: S. SCRIBNER
SHEET 46 OF 66



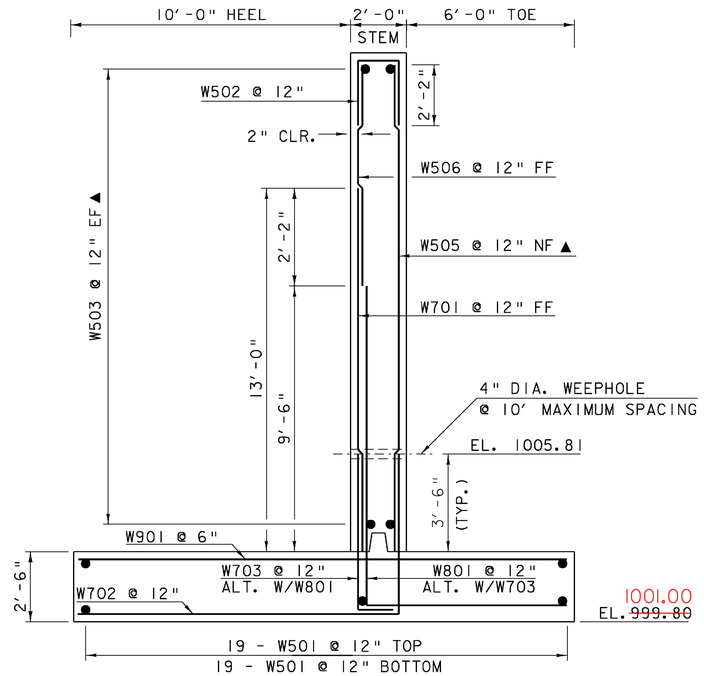

## WINGWALL NO. 1 ELEVATION

SCALE 3/16" = 1'-0



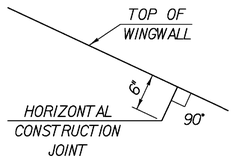

## WINGWALL NO. 2 ELEVATION

SCALE 3/16" = 1'-0



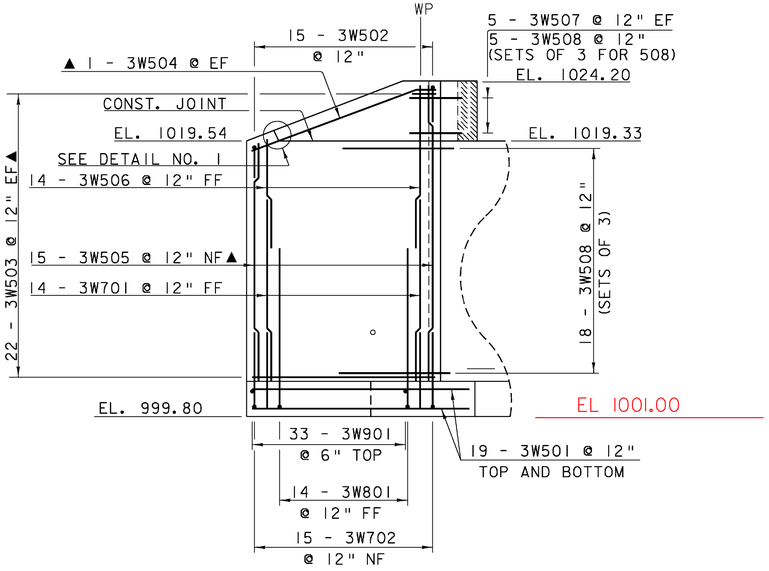

## WINGWALL TYPICAL

SCALE 3/8" = 1'-0



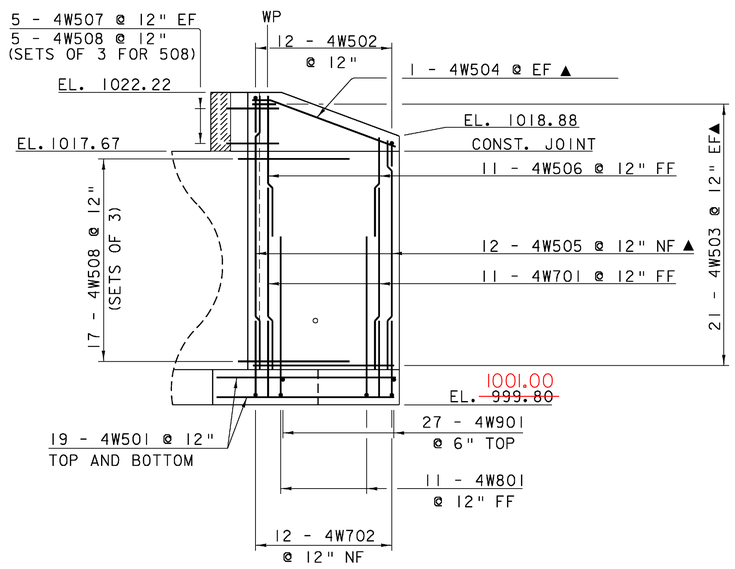

## DETAIL NO. 1

NOT TO SCALE




## WINGWALL NO. 3 ELEVATION

SCALE 3/16" = 1'-0




## WINGWALL NO. 4 ELEVATION

SCALE 3/16" = 1'-0

NOTE:

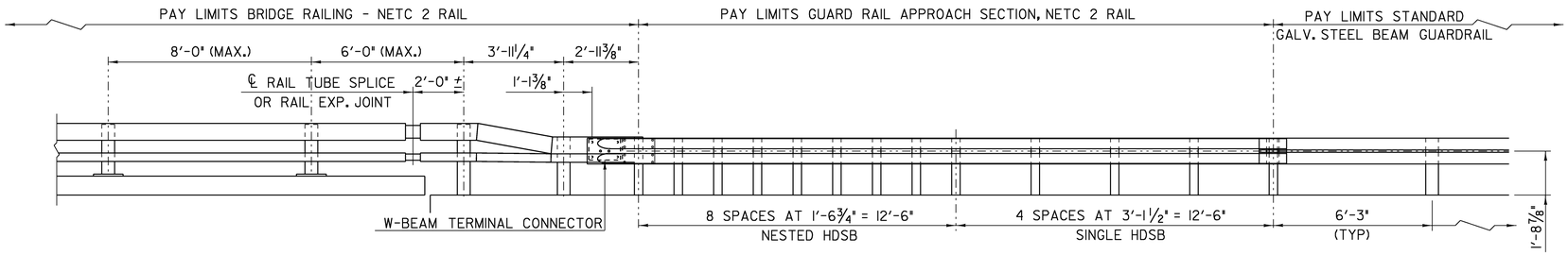
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**WINGWALL DETAILS**

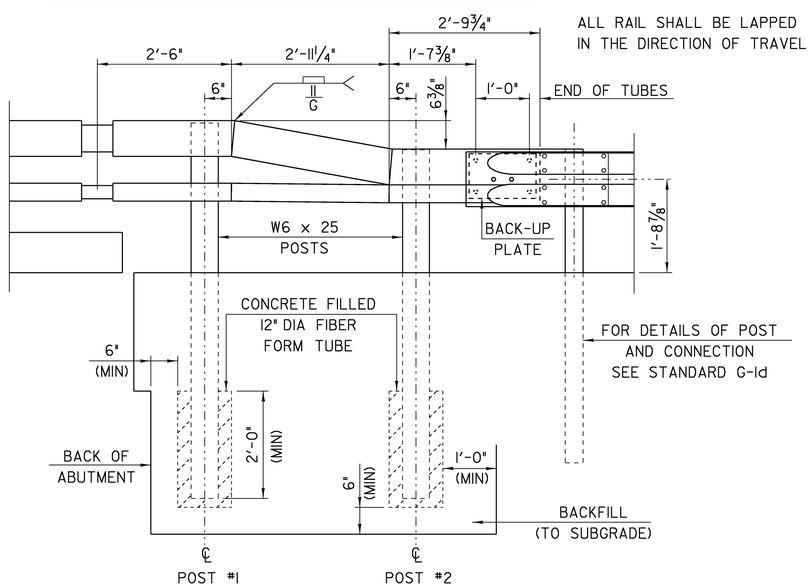
PROJECT NAME: CANAAN
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: 04c098/struc./s04c098sup
PROJECT LEADER: M. EVANS-MONGEON
DESIGNED BY: S.SCRIBNER

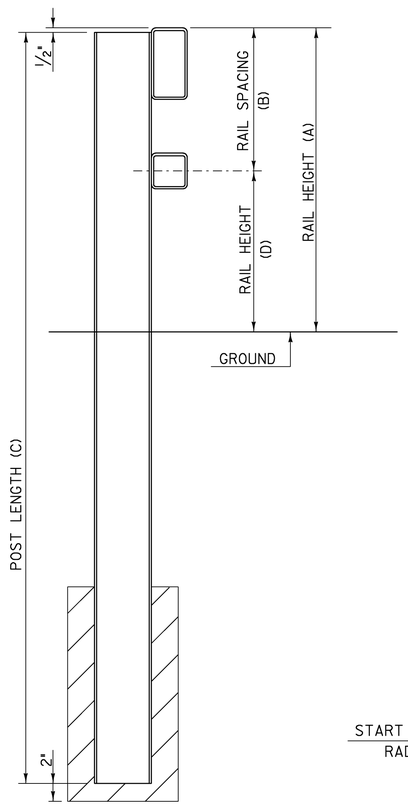
PLOT DATE: 18-AUG-2008
DRAWN BY: C. JOLLY
CHECKED BY: S. SCRIBNER
SHEET 47 OF 66




## RAILING TRANSITION ELEVATION

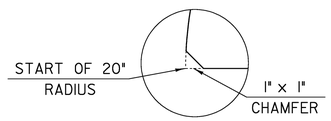



## ELEVATION

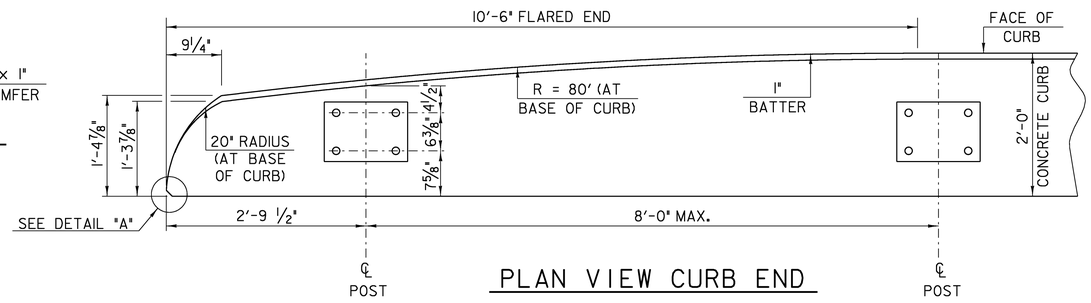



## TYPICAL SECTION

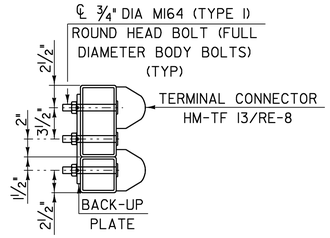
| POST NUMBER | RAIL HEIGHT (A) | RAIL SPACING (B) | POST LENGTH (C) | RAIL HEIGHT (D) |
|---|---|---|---|---|
| 1 | 2'-10" | 1'-4" | 7'-0" | 1'-6" |
| 2 | 2'-3⅝" | 10" | 6'-5" | 1'-5⅝" |



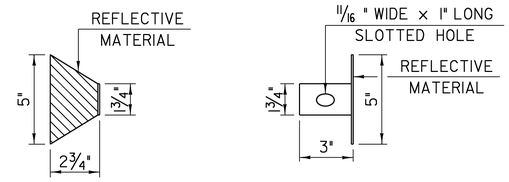

## DETAIL "A"



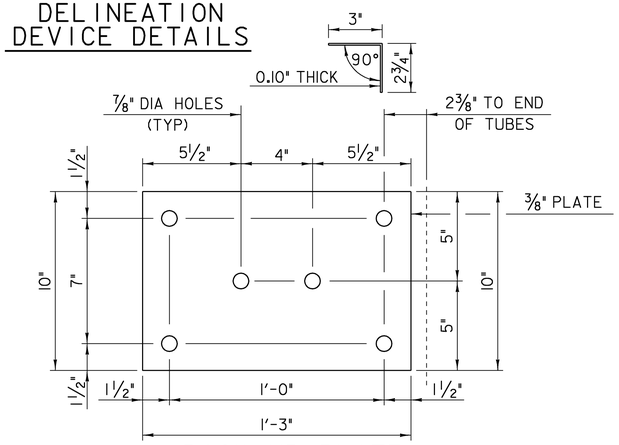

## PLAN VIEW CURB END




## SECTION THROUGH GUARD RAIL CONNECTION AT TERMINAL CONNECTOR




## DELINEATION DEVICE DETAILS




## BACK-UP PLATE

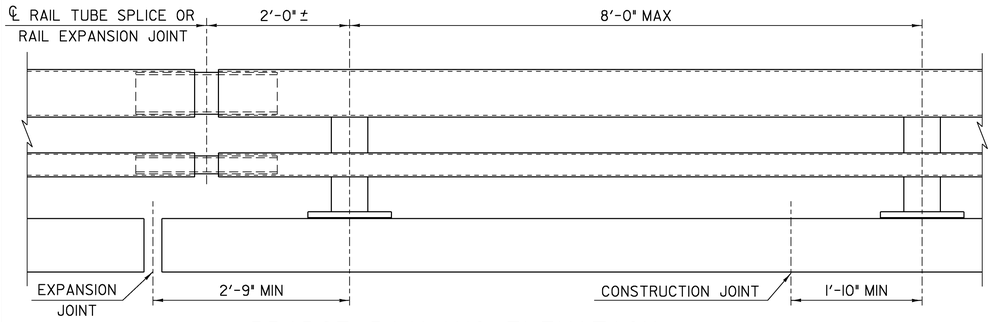
## Notes:

1. REFER TO SHEET 49 FOR ADDITIONAL DETAILS, NOTES AND MATERIAL SPECIFICATIONS.
2. TO FACILITATE FIELD FIT - UP OF THE TRANSITION RAILING, POSTS SHALL BE SET LOOSELY INTO FIBER FORM TUBES WHILE TRANSITION PARTS ARE BEING ASSEMBLED. POST HOLES SHALL BE BACKFILLED WITH A CONCRETE MIX APPROVED BY THE ENGINEER. PAYMENT FOR COMPONENTS, INCLUDING BACKUP PLATE AND END TERMINAL CONNECTOR FOR GUARD RAIL, AUGERING, FIBER FORM TUBES AND CONCRETE, AND INSTALLATION SHALL BE CONSIDERED INCIDENTAL TO BRIDGE RAILING, GALVANIZED NETC 2 RAIL.
3. THE REFLECTORIZED ALUMINUM DELINEATION IS TO BE ERECTED EVERY 30' (OR CLOSEST POST) WITH A ⅝" DIAMETER BOLT. DELINEATORS SHALL MEET SPECIFICATION REQUIREMENTS FOR ASTM B209 ALLOY 5052-H32.
4. RETROREFLECTIVE MATERIAL SHALL MEET REQUIREMENTS OF SUBSECTION 750.08 AND SHALL BE OF ENCAPSULATED LENS SILVER OR AMBER. AMBER IS TO BE INSTALLED ON THE DRIVER'S LEFT AND SILVER ON THEIR RIGHT.
5. ON BRIDGES WITH A SIDEWALK, DELINEATORS ARE NOT TO BE INSTALLED ON THE SIDEWALK SIDE OF THE BRIDGE (I.E. DELINEATORS INSTALLED ONLY ON THE CURB SIDE AND ON THE APPROACH ON THE CURB SIDE). PAYMENT SHALL BE INCIDENTAL TO ALL OTHER ITEMS.
6. ALL APPROACH RAIL SPLICES SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC FLOW.
7. SEE STANDARDS G-1 AND G-1d FOR ADDITIONAL INFORMATION.

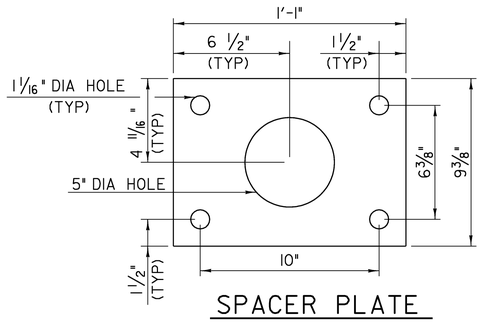
***NETC RAIL DETAILS (1)***

PROJECT NAME: CANAAN
PROJECT NUMBER: ER ST 0271(16)

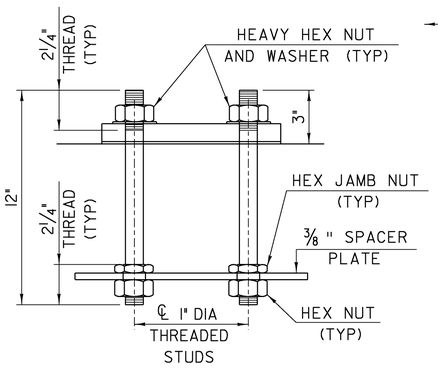
FILE NAME: 04c098/struc./s04c098dtls
PROJECT LEADER: M. EVANS-MONGEON
DESIGNED BY: S.SCRIBNER
PLOT DATE: 18-AUG-2008
DRAWN BY: L. DUQUETTE
CHECKED BY: S. SCRIBNER



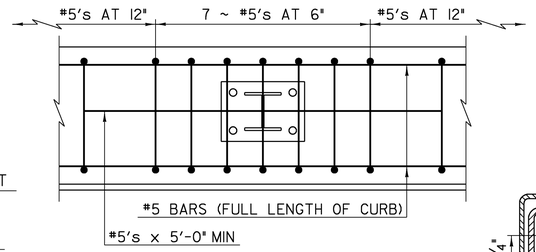

## BRIDGE RAILING ELEVATION



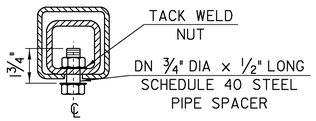

## SPACER PLATE

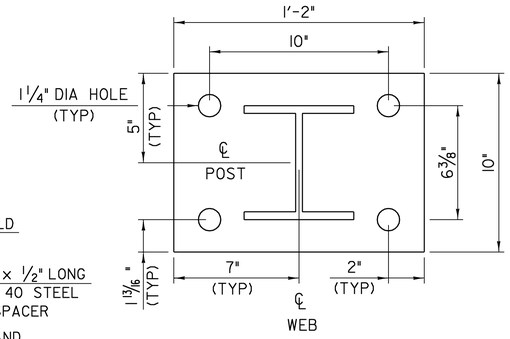



## RAIL POST ANCHORAGE

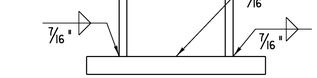



## CURB REINFORCING PLAN




## POST AND BASE PLATE

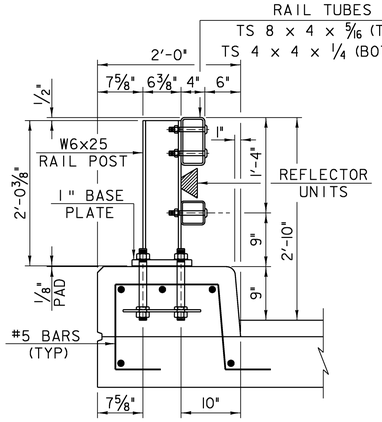



## BASE WELD DETAIL

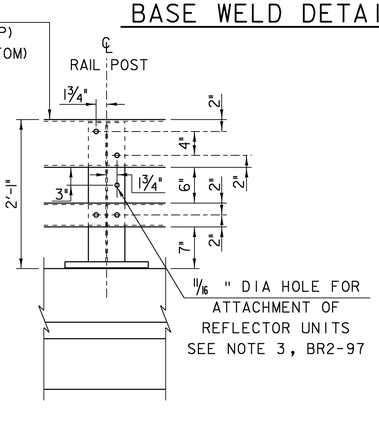
5/8" DIA TAPPED HOLE IN SPLICE TUBE AND 1 1/8" x 'C' SLOT IN RAIL TUBE FOR 5/8" DIA BOLT AND PLAIN HARDENED WASHER

## EXPANSION JOINT SECTION

FOR DETAILS NOT SHOWN, SEE "RAIL TUBE SPLICE SECTION."



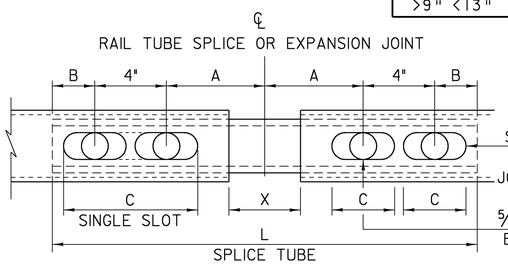

## TYPICAL SECTION




## ELEVATION

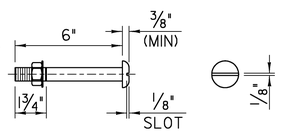
| SPLICE TABLE | | | | | |
|---|---|---|---|---|---|
| T | A | B | C | L | X |
| N/A | 4" | 2" | -- | 20" | 3/4" |
| EXPANSION JOINT TABLE | | | | | |
| <4" | 4" | 2" | 2 1/2" | 20" | 2 1/2" |
| >4" <6 1/2" | 5 1/2" | 2 3/8" | 3 1/2" | 23 3/4" | 4" |
| >6 1/2" <9" | 6 1/2" | 3 3/8" | 9"* | 27 3/4" | 5" |
| >9" <13" | 8 1/2" | 4 3/8" | 11"* | 33 3/4" | 7" |

T = TOTAL MOVEMENT BETWEEN BRIDGE EXPANSION JOINTS. SEE NOTE 6.
* = SINGLE SLOT



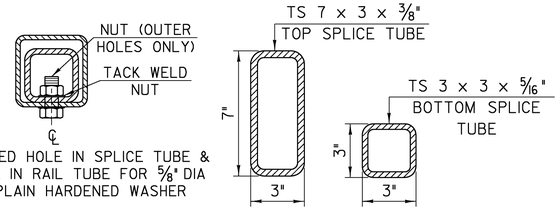

## RAIL TUBE SPLICE AND RAIL EXPANSION JOINT DETAIL

(BOTTOM VIEW)




## 3/4" DIA M164 (TYPE I) ROUND HEAD BOLT

(WITH WASHER AND PREVAILING TORQUE TYPE LOCK NUT)
(SEE NOTE #9)
ONLY FULL DIAMETER BODY BOLTS WILL BE ALLOWED.




5/8" DIA TAPPED HOLE IN SPLICE TUBE & 3/4" DIA HOLE IN RAIL TUBE FOR 5/8" DIA BOLT & PLAIN HARDENED WASHER

## RAIL TUBE SPLICE SECTION

## NOTES

1. ALL WORK AND MATERIALS SHALL CONFORM TO THE PROVISIONS OF SECTION 525.
2. ALL EXPOSED CUT OR SHEARED EDGES SHALL BE ROUNDED TO A 1/16" RADIUS AND BE FREE OF BURRS.
3. RAIL POSTS SHALL BE SET NORMAL TO GRADE.
4. SECTIONS OF RAIL TUBE SHALL BE ATTACHED TO A MINIMUM OF TWO (2) RAIL POSTS AND PREFERABLY TO AT LEAST FOUR (4) POSTS.
5. RAIL TUBE EXPANSION JOINTS SHALL BE PROVIDED IN ANY RAIL BAY SPANNING A SUPERSTRUCTURE EXPANSION JOINT. EXPANSION JOINT WIDTH SHALL BE "X" AT 45°F AND WILL BE ADJUSTED IN THE FIELD BY THE ENGINEER FOR OTHER TEMPERATURES.
6. ALL PARTS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH AASHTO M111, EXCEPT THAT HARDWARE SHALL MEET THE REQUIREMENTS OF AASHTO M232.
7. RAIL POSTS ANCHORING NUTS SHALL BE TIGHTENED TO A SNUG FIT AND GIVEN AN ADDITIONAL ONE-EIGHTH TURN.
8. RAIL TUBES SHALL BE ATTACHED USING 3/4" FULL DIAMETER BODY AASHTO M164 (TYPE I) ROUND HEAD BOLTS INSERTED THROUGH THE FACE OF THE TUBE. HOLES IN POSTS SHALL BE 1/16" LARGER THAN THE BOLT SIZE.
9. HOLES IN RAILS FOR RAIL TUBE ATTACHMENT MAY BE FIELD-DRILLED. HOLES SHALL BE COATED WITH AN APPROVED ZINC-RICH PAINT PRIOR TO ERECTION.
10. ANY BENDING OF RAIL SHALL BE BY SHOP PROCEDURE ONLY.
11. THE FABRICATOR SHALL SUBMIT DRAWINGS INCLUDING WELDING PROCEDURES TO THE STRUCTURES SECTION FOR APPROVAL IN ACCORDANCE WITH THE PROVISIONS OF SUBSECTION 525.03. ALL WELDING SHALL CONFORM WITH SUBSECTION 506.10.
12. RAIL POSTS AND BASE PLATES SHALL BE TESTED FOR IMPACT PROPERTIES IN ACCORDANCE WITH ASTM A-370 CHARPY IMPACT TESTING USING TYPE A SPECIMEN.

## MATERIALS

RAIL TUBES.....ASTM A500, GRADE B OR ASTM A501
RAIL POSTS AND BASE PLATES.....ASTM A709A709M, GRADE 50
ALL OTHER SHAPES AND PLATES.....ASTM A709/A709M, GRADE 36
ANCHOR STUDS.....ASTM A449
ALL OTHER BOLTS (UNLESS NOTED).....AASHTO M164, TYPE I

NUTS FOR AASHTO M164 (ASTM A325) BOLTS AND FOR ANCHOR STUDS SHALL COMPLY WITH AASHTO M291 (ASTM A563).

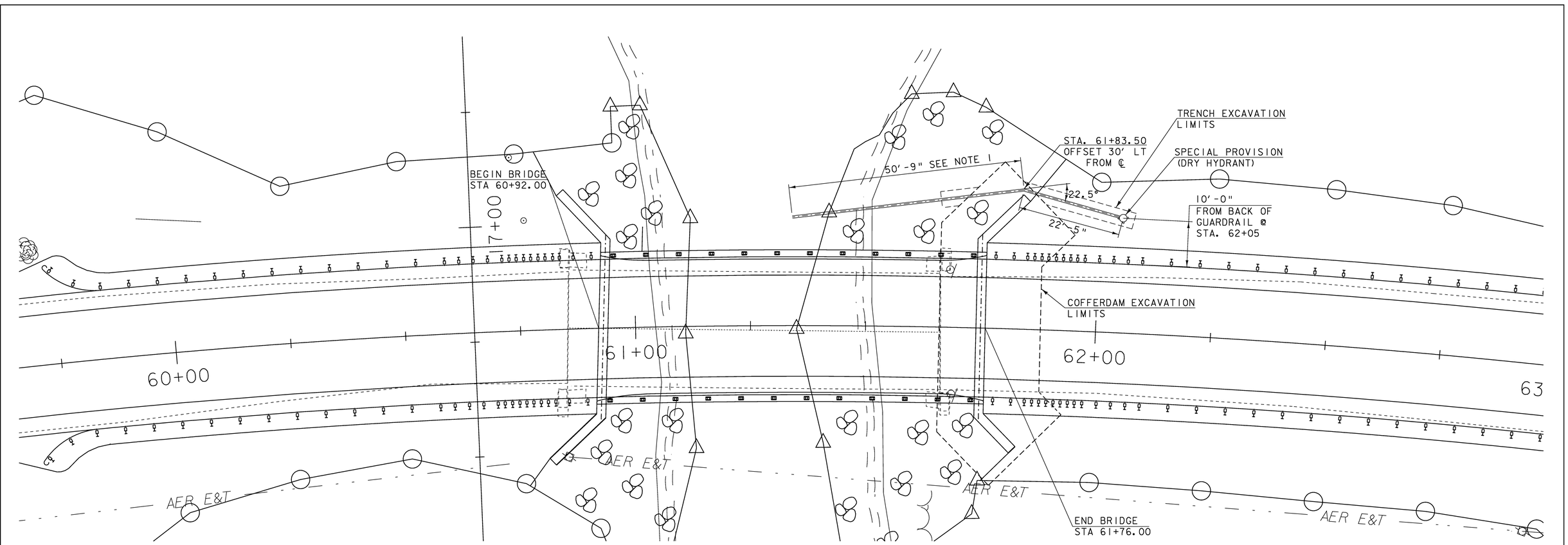
WASHERS SHALL COMPLY WITH AASHTO M293 (ASTM F436) SPECIFICATIONS.

1/8" PAD SHALL COMPLY WITH STANDARD SPECIFICATION SUBSECTION 731.01 OR 731.02.

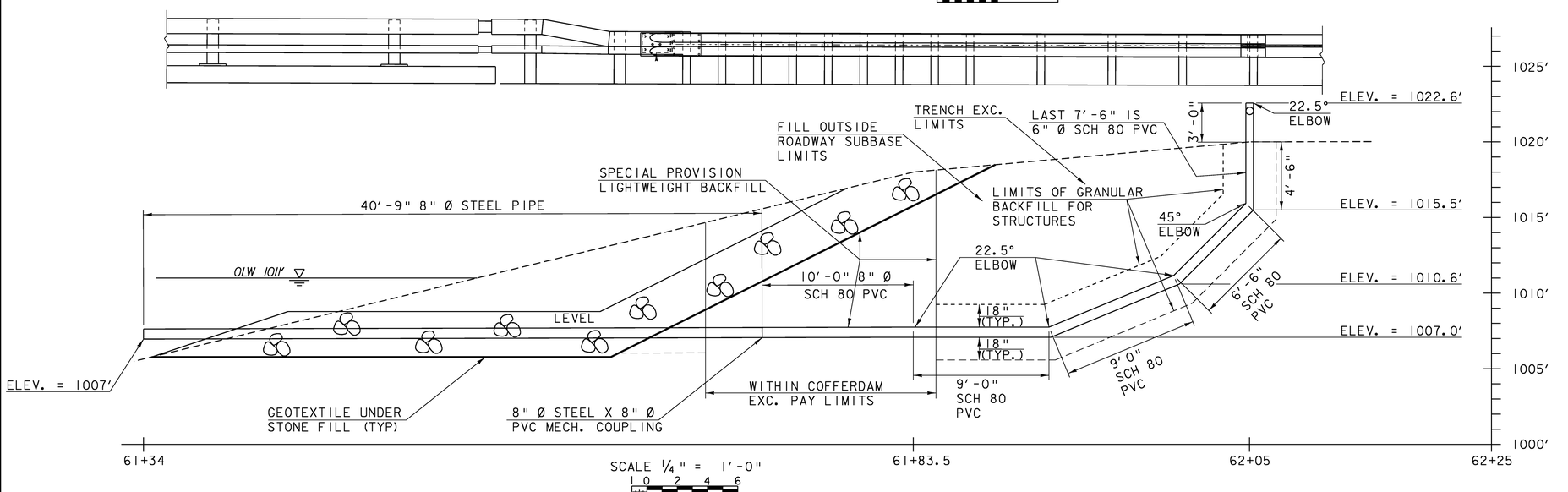
**NETC RAIL DETAILS (2)**

PROJECT NAME: CANAAN
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: 04c098/struc./s04c098dtls
PROJECT LEADER: M. EVANS-MONGEON
DESIGNED BY: S.SCRIBNER
PLOT DATE: 18-AUG-2008
DRAWN BY: L. DUQUETTE
CHECKED BY: S. SCRIBNER
SHEET 49 OF 66




SCALE 1" = 10'-0"
10 0 10




SCALE 1/4" = 1'-0"
1 0 2 4 6

*CARE SHALL BE GIVEN THAT ANY EXCAVATION OUTSIDE THE COFFERDAM EXCAVATION LIMITS AND CHANNEL EXCAVATION LIMITS FOR THE PURPOSE OF PLACING THE DRY HYDRANT WILL BE PAID UNDER TRENCH EXCAVATION LIMITS

NOTE:

1. VERIFY LENGTH TO DEEPEST CHANNEL POINT IN FIELD PRIOR TO INSTALLATION

2. SEE CHANNEL CROSS SECTION 17+00

## DRY HYDRANT DETAIL

PROJECT NAME: Canaan
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: Structures\x04c098xs.dgn
PROJECT LEADER: M. Evans-Mongeon
DESIGNED BY: S. Scribner
x04c098pfl.1

PLOT DATE: 19-AUG-2008
DRAWN BY: L.DUQUETTE
CHECKED BY: S. SCRIBNER.
SHEET 50 OF 66

STATE OF VERMONT
AGENCY OF TRANSPORTATION

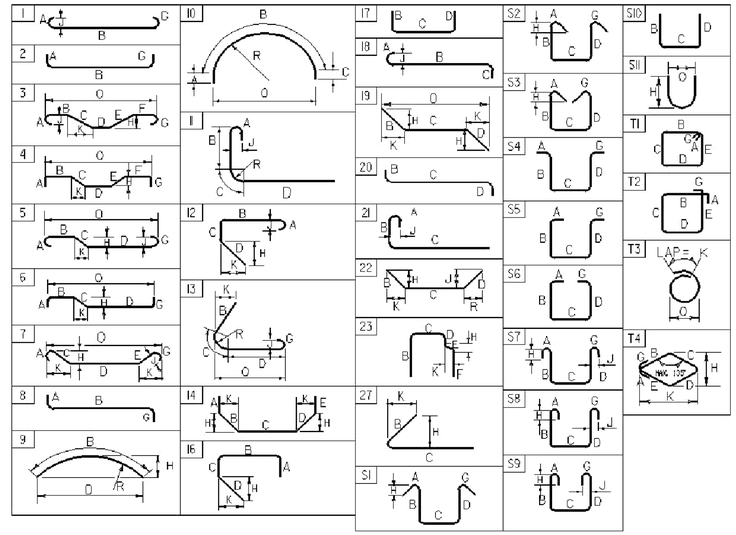
# REINFORCING STEEL SCHEDULE

| ITEM | EACH | SIZE | LENGTH | MARK | TYPE | A | B | C | D | E | F | G | H | J | K | R | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **DECK & CURB** | | | | | | | | | | | | | | | | | |
| | 246 | 5 | 30'- 0" | ES501 | STR | 30'- 0" | | | | | | | | | | | |
| | 170 | 5 | 32'- 6" | ES502 | STR | 32'- 6" | | | | | | | | | | | |
| ✳ | 170 | 5 | 5'- 0" | ES503 | STR | 5'- 0" | | | | | | | | | | | |
| | 30 | 5 | 30'- 0" | ES504 | STR | 30'- 0" | | | | | | | | | | | |
| | 30 | 5 | 32'- 6" | ES507 | STR | 32'- 6" | | | | | | | | | | | |
| | 242 | 5 | 5'- 5" | ES505 | S5 | 1'- 0" | 1'- 0" | 1'- 5" | 1'- 0" | | | 1'- 0" | | | | | |
| | 68 | 5 | 4'- 3" | ES508 | 16 | 1'- 0" | 1'- 3" | 0'- 7" | 1'- 5" | | | | 1'- 0" | | 1'- 0" | | |
| | 68 | 5 | 8'- 2" | ES509 | S6 | 0'- 6" | 3'- 4" | 0'- 6" | 3'- 4" | | | 0'- 6" | | | | | |
| ✳ | 86 | 6 | 32'- 6" | ES601 | STR | 32'- 6" | | | | | | | | | | | |
| △ | 37 | 8 | 3'- 4" | ES801 | 19 | | 1'- 4" | 2'- 0" | | | | | | | | | |
| **ABUTMENT # 1** | | | | | | | | | | | | | | | | | |
| | 76 | 5 | 23'- 1" | 1A501 | STR | 23'- 1" | | | | | | | | | | | |
| ▲ | 76 | 5 | 22'- 8" | 1A503 | STR | 22'- 8" | | | | | | | | | | | |
| | 41 | 5 | 21'- 7" | 1A505 | STR | 21'- 7" | | | | | | | | | | | |
| ✳ | 40 | 5 | 12'- 3" | 1A506 | STR | 12'- 3" | | | | | | | | | | | |
| ▲ | 20 | 5 | 3'- 6" | 1A507 | STR | 3'- 6" | | | | | | | | | | | |
| | 41 | 5 | 5'- 11" | 1A502 | 17 | | 2'- 2" | 1'- 7" | 2'- 2" | | | | | | | | |
| | 41 | 6 | 15'- 11" | 1A601 | 17 | | 4'- 5" | 11'- 6" | | | | | | | | | |
| ✳ | 40 | 7 | 10'- 9" | 1A701 | STR | 10'- 9" | | | | | | | | | | | |
| | 90 | 9 | 17'- 6" | 1A902 | STR | 17'- 6" | | | | | | | | | | | |
| | 39 | 9 | 17'- 8" | 1A901 | 17 | | 10'- 1" | 7'- 7" | | | | | | | | | |
| **WINGWALL # 1** | | | | | | | | | | | | | | | | | |
| | 38 | 5 | 16'- 10" | 1W501 | STR | 16'- 10" | | | | | | | | | | | |
| ▲ | 46 | 5 | 14'- 4" | 1W503 | STR | 14'- 4" | | | | | | | | | | | |
| ▲ | 2 | 5 | 15'- 0" | 1W504 | STR | 15'- 0" | | | | | | | | | | | |
| ▲ | 16 | 5 | 22'- 0" | 1W505 | STR | 22'- 0" | | | | | | | | | | | |
| | 15 | 5 | 12'- 6" | 1W506 | STR | 12'- 6" | | | | | | | | | | | |
| | 16 | 5 | 5'- 11" | 1W502 | 17 | | 2'- 2" | 1'- 7" | 2'- 2" | | | | | | | | |
| | 66 | 5 | 9'- 4" | 1W508 | 19 | | 4'- 8" | 4'- 8" | | | | | | | | | |
| | 15 | 7 | 13'- 0" | 1W701 | STR | 13'- 0" | | | | | | | | | | | |
| | 16 | 7 | 13'- 0" | 1W702 | 17 | | 11'- 6" | 5'- 9" | | | | | | | | | |
| | 15 | 7 | 6'- 9" | 1W703 | 17 | | 1'- 0" | 5'- 9" | | | | | | | | | |
| | 17 | 8 | 19'- 3" | 1W801 | 17 | | 11'- 9" | 7'- 6" | | | | | | | | | |
| | 35 | 9 | 17'- 6" | 1W901 | STR | 17'- 6" | | | | | | | | | | | |
| **WINGWALL # 2** | | | | | | | | | | | | | | | | | |
| | 38 | 5 | 16'- 9" | 2W501 | STR | 16'- 9" | | | | | | | | | | | |
| ▲ | 42 | 5 | 14'- 4" | 2W503 | STR | 14'- 4" | | | | | | | | | | | |
| ▲ | 2 | 5 | 14'- 6" | 2W504 | STR | 14'- 6" | | | | | | | | | | | |
| ▲ | 16 | 5 | 19'- 9" | 2W505 | STR | 19'- 9" | | | | | | | | | | | |
| | 15 | 5 | 10'- 6" | 2W506 | STR | 10'- 6" | | | | | | | | | | | |
| | 16 | 5 | 5'- 11" | 2W502 | 17 | | 2'- 2" | 1'- 7" | 2'- 2" | | | | | | | | |
| | 69 | 5 | 9'- 4" | 2W508 | 19 | | 4'- 8" | 4'- 8" | | | | | | | | | |
| | 15 | 7 | 13'- 0" | 2W701 | STR | 13'- 0" | | | | | | | | | | | |
| | 16 | 7 | 17'- 3" | 2W702 | 17 | | 5'- 9" | 11'- 6" | | | | | | | | | |
| | 15 | 7 | 6'- 9" | 2W703 | 17 | | 1'- 0" | 5'- 9" | | | | | | | | | |
| | 17 | 8 | 19'- 3" | 2W801 | 17 | | 11'- 9" | 7'- 6" | | | | | | | | | |
| ✳ | 35 | 9 | 17'- 6" | 2W901 | STR | 17'- 6" | | | | | | | | | | | |
| **APPROACH SLAB # 1** | | | | | | | | | | | | | | | | | |
| | 17 | 5 | 29'- 6" | 1EAS501 | STR | 29'- 6" | | | | | | | | | | | |
| | 62 | 6 | 16'- 2" | 1EAS601 | 1 | | 14'- 6" | | | | | 1'- 8" | | 0'- 9" | | | |

| ITEM | EACH | SIZE | LENGTH | MARK | TYPE | A | B | C | D | E | F | G | H | J | K | R | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ABUTMENT # 2** | | | | | | | | | | | | | | | | | |
| | 76 | 5 | 23'- 2" | 2A501 | STR | 23'- 2" | | | | | | | | | | | |
| ▲ | 72 | 5 | 21'- 5" | 2A503 | STR | 21'- 5" | | | | | | | | | | | |
| ▲ | 41 | 5 | 21'- 0" | 2A505 | STR | 21'- 0" | | | | | | | | | | | |
| | 39 | 5 | 12'- 1" | 2A506 | STR | 12'- 1" | | | | | | | | | | | |
| ▲ | 20 | 5 | 3'- 6" | 2A507 | STR | 3'- 6" | | | | | | | | | | | |
| | 43 | 5 | 5'- 11" | 2A502 | 17 | | 2'- 2" | 1'- 7" | 2'- 2" | | | | | | | | |
| ✳ | 42 | 6 | 15'- 11" | 2A601 | 17 | | 4'- 5" | 11'- 6" | | | | | | | | | |
| | 39 | 7 | 10'- 9" | 2A701 | STR | 10'- 9" | | | | | | | | | | | |
| | 90 | 9 | 17'- 6" | 2A902 | STR | 17'- 6" | | | | | | | | | | | |
| | 39 | 9 | 17'- 8" | 2A901 | 17 | | 10'- 1" | 7'- 7" | | | | | | | | | |
| **WINGWALL # 3** | | | | | | | | | | | | | | | | | |
| | 38 | 5 | 15'- 9" | 3W501 | STR | 15'- 9" | | | | | | | | | | | |
| ▲ | 44 | 5 | 13'- 4" | 3W503 | STR | 13'- 4" | | | | | | | | | | | |
| ▲ | 2 | 5 | 13'- 11" | 3W504 | STR | 13'- 11" | | | | | | | | | | | |
| ▲ | 15 | 5 | 21'- 4" | 3W505 | STR | 21'- 4" | | | | | | | | | | | |
| | 14 | 5 | 12'- 1" | 3W506 | STR | 12'- 1" | | | | | | | | | | | |
| | 15 | 5 | 5'- 11" | 3W502 | 17 | | 2'- 2" | 1'- 7" | 2'- 2" | | | | | | | | |
| | 69 | 5 | 9'- 4" | 3W508 | 19 | | 4'- 8" | 4'- 8" | | | | | 3'- 4" | | 3'- 4" | | |
| | 14 | 7 | 13'- 0" | 3W701 | STR | 13'- 0" | | | | | | | | | | | |
| | 14 | 7 | 0'- 0" | 3W702 | 17 | | 11'- 6" | 5'- 9" | | | | | | | | | |
| | 14 | 7 | 6'- 9" | 3W703 | 17 | | 5'- 9" | 1'- 0" | | | | | | | | | |
| | 16 | 8 | 19'- 3" | 3W801 | 17 | | 11'- 9" | 7'- 6" | | | | | | | | | |
| | 34 | 9 | 17'- 6" | 3W901 | STR | 17'- 6" | | | | | | | | | | | |
| **WINGWALL # 4** | | | | | | | | | | | | | | | | | |
| | 38 | 5 | 12'- 10" | 4W501 | STR | 12'- 10" | | | | | | | | | | | |
| ▲ | 42 | 5 | 10'- 4" | 4W503 | STR | 10'- 4" | | | | | | | | | | | |
| ▲ | 2 | 5 | 10'- 9" | 4W504 | STR | 10'- 9" | | | | | | | | | | | |
| ▲ | 12 | 5 | 19'- 4" | 4W505 | STR | 19'- 4" | | | | | | | | | | | |
| | 11 | 5 | 10'- 1" | 4W506 | STR | 10'- 1" | | | | | | | | | | | |
| | 12 | 5 | 5'- 11" | 4W502 | 17 | | 2'- 2" | 1'- 7" | 2'- 2" | | | | | | | | |
| | 66 | 5 | 9'- 4" | 4W508 | 19 | | 4'- 8" | 4'- 8" | | | | | 3'- 4" | | 3'- 4" | | |
| | 11 | 7 | 13'- 0" | 4W701 | STR | 13'- 0" | | | | | | | | | | | |
| | 14 | 7 | 0'- 0" | 4W702 | 17 | | 11'- 6" | 5'- 9" | | | | | | | | | |
| | 11 | 7 | 6'- 9" | 4W703 | 17 | | 5'- 9" | 1'- 0" | | | | | | | | | |
| ✳ | 14 | 8 | 19'- 3" | 4W801 | 17 | | 11'- 9" | 7'- 6" | | | | | | | | | |
| | 27 | 9 | 17'- 6" | 4W901 | STR | 17'- 6" | | | | | | | | | | | |
| **APPROACH SLAB # 2** | | | | | | | | | | | | | | | | | |
| | 17 | 5 | 29'- 6" | 2EAS501 | STR | 29'- 6" | | | | | | | | | | | |
| ✳ | 62 | 6 | 16'- 1" | 2EAS601 | 1 | | 14'- 6" | | | | 1'- 7" | | 0'- 9" | | | | |

## ~ NOTES ~

1. UNLESS OTHERWISE DESIGNATED, ALL BAR REINFORCEMENT FOR CONCRETE IN SIZES UP TO AND INCLUDING NO. 18 SHALL CONFORM TO THE REQUIREMENTS OF THE "SPECIFICATIONS FOR DEFORMED BILLET-STEEL BARS FOR CONCRETE REINFORCEMENT", AASHTO M 31 (ASTM A 615-SI). ALL BARS SHALL BE GRADE 60, UNLESS OTHERWISE DESIGNATED.
2. FOR TYPICAL BENDING DETAILS, RECOMMENDED PIN DIAMETER "D" OF BENDS AND HOOKS, AND OTHER STANDARD PRACTICE, SEE CURRENT CONCRETE REINFORCING STEEL INSTITUTE "MANUAL OF STANDARD PRACTICE".
3. BARS WHICH REQUIRE MORE ACCURATE BENDING THAN STANDARD PRACTICES SHOULD HAVE LIMITS INDICATED.
4. ALL DIMENSIONS ARE OUT TO OUT OF BAR EXCEPT "A" AND "G" ON STANDARD 180 DEGREE AND 135 DEGREE HOOKS.
5. "J" DIMENSION ON 180 DEGREE HOOKS TO BE SHOWN ONLY WHERE NECESSARY TO RESTRICT HOOK SIZE. OTHERWISE, STANDARD HOOKS ARE TO BE USED.
6. "H" DIMENSION ON STIRRUPS TO BE SHOWN ONLY WHEN NECESSARY TO MAINTAIN CLEARANCES.
7. WHERE SLOPE DIFFERS FROM 45 DEGREES, DIMENSIONS "H" AND "K" MUST BE SHOWN.
8. ▲ DENOTES BARS TO BE CUT IN FIELD.
9. ✳ DENOTES ONE EXTRA BAR ADDED FOR TESTING PURPOSES.
10. △ DENOTES TWO EXTRA BARS ADDED FOR TESTING PURPOSES.
11. E IN BAR MARK PREFIX DENOTES EPOXY COATED REINFORCING STEEL.



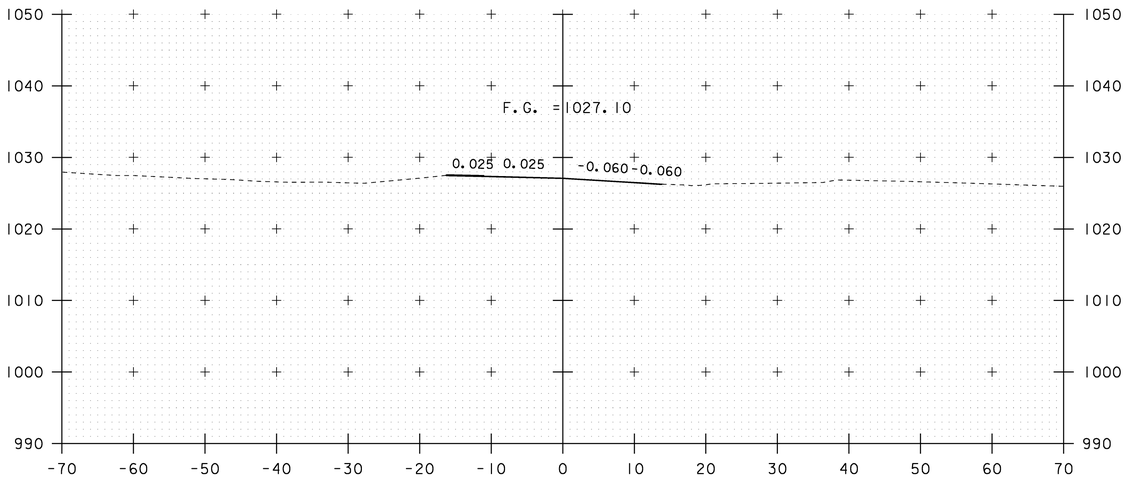

**ASTM STANDARD REINFORCING BARS**

| BAR SIZE DESIGNATION | WEIGHT POUNDS PER FOOT | NOMINAL DIMENSIONS ROUND SECTION | | |
|---|---|---|---|---|
| | | DIAMETER INCHES | AREA INCHES $^2$ | PERIMETER INCHES |
| #3 | 0.376 | 0.375 | 0.11 | 1.178 |
| #4 | 0.668 | 0.500 | 0.20 | 1.571 |
| #5 | 1.043 | 0.625 | 0.31 | 1.963 |
| #6 | 1.502 | 0.750 | 0.44 | 2.356 |
| #7 | 2.044 | 0.875 | 0.60 | 2.749 |
| #8 | 2.670 | 1.000 | 0.79 | 3.142 |
| #9 | 3.400 | 1.128 | 1.00 | 3.544 |
| #10 | 4.303 | 1.270 | 1.27 | 3.990 |
| #11 | 5.313 | 1.410 | 1.56 | 4.430 |
| #14 | 7.65 | 1.693 | 2.25 | 5.32 |
| #18 | 13.60 | 2.257 | 4.00 | 7.09 |

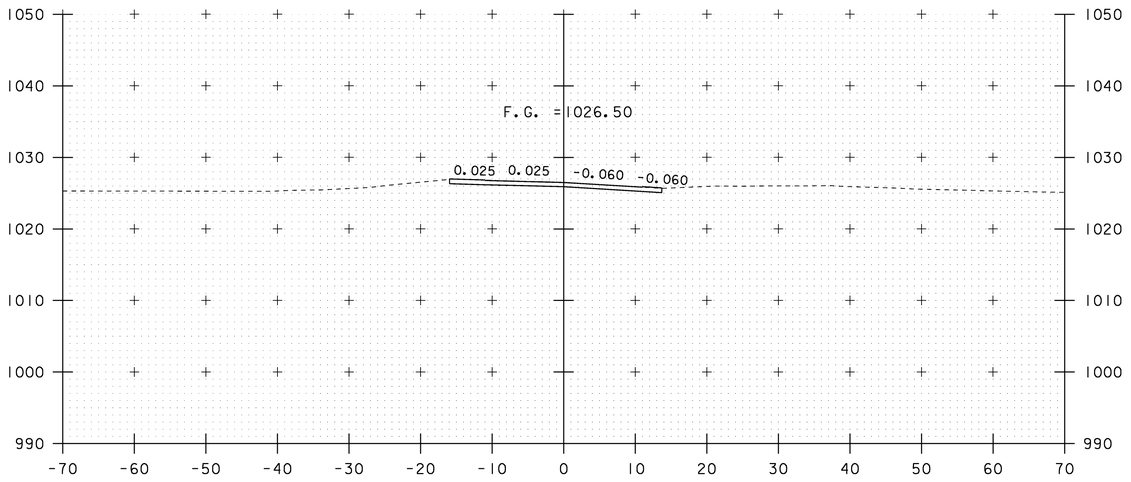
PROJECT NAME: CANAAN
PROJECT NUMBER: ER ST 0271(16)

FILE NAME: 04c098
PROJECT MANAGER: M.EVANS-MONGEON
DESIGNED BY: S.SCRIBNER
REINFORCING STEEL SCHEDULE SHEET #1

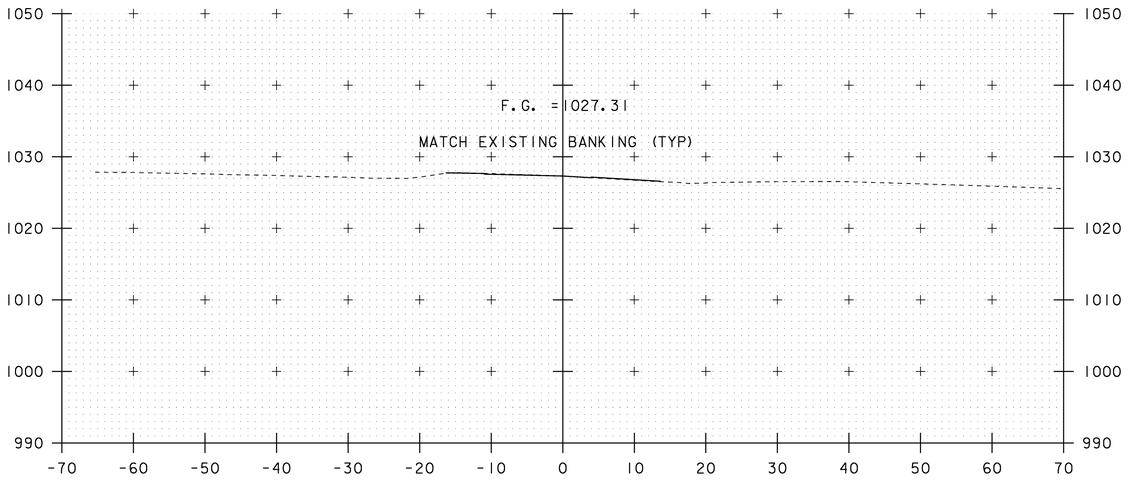
PLOT DATE: 4/22/2008
DRAWN BY: L.DUQUETTE
CHECKED BY: M.EVANS-MONGE
SHEET 51 OF 66




57+64

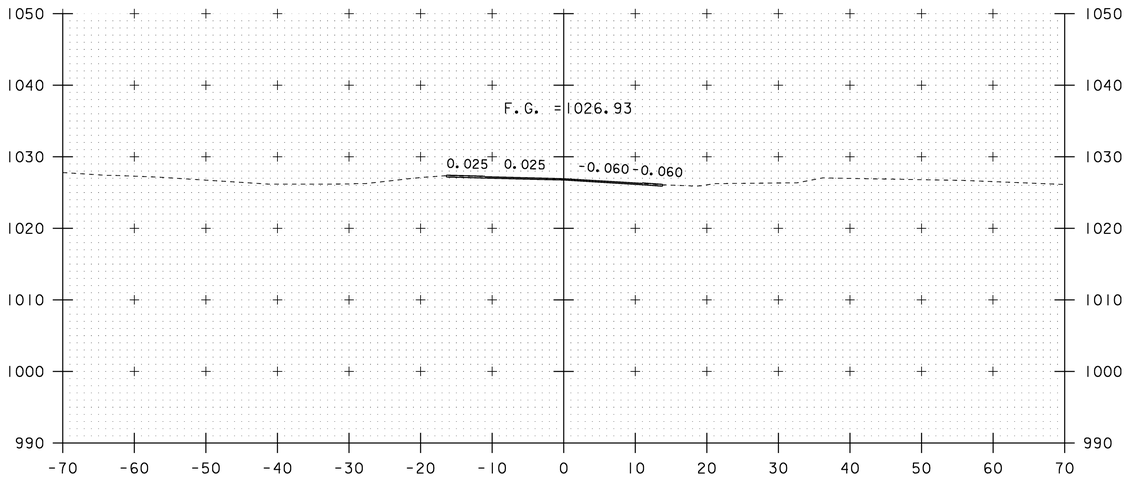



58+00




57+50

STA. 57+50
BEGIN APPROACH
MATCH EXISTING GRADE AND BANKING



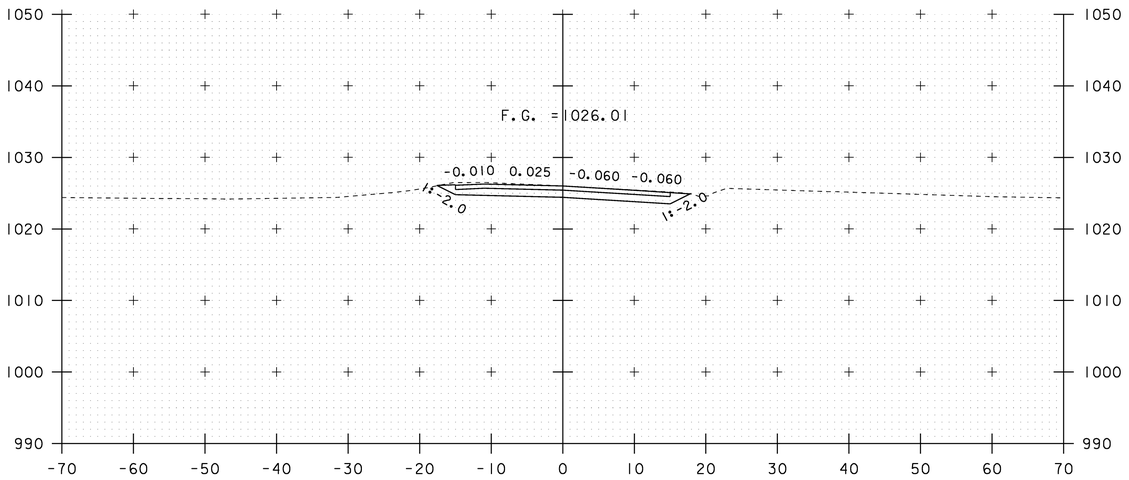

57+75

SCALE 1" = 10'-0
10 0 10

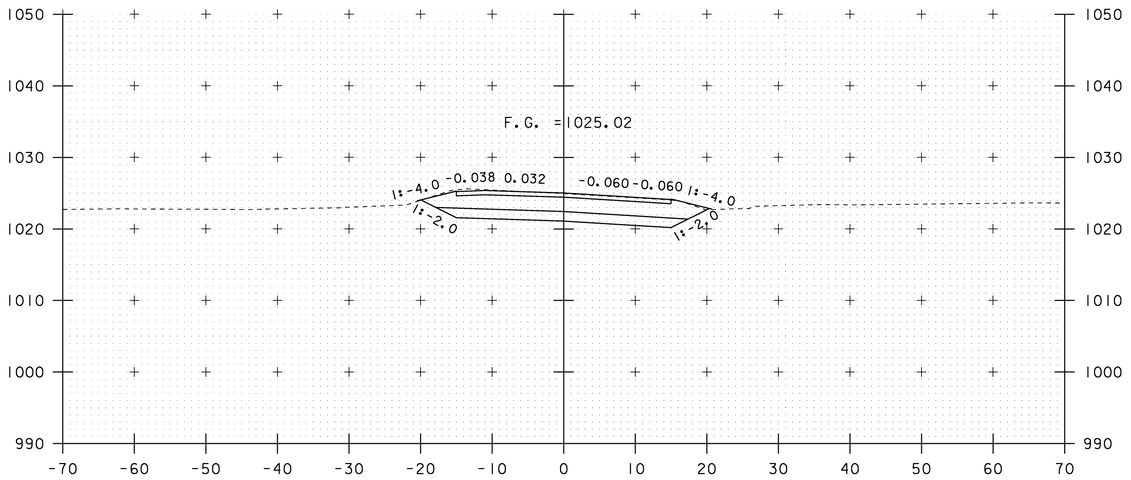
## VT 102 CROSS SECTIONS (1)

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|---|---|
| PROJECT NAME: | CANAAN |
| PROJECT NUMBER: | ER ST 0271(16) |

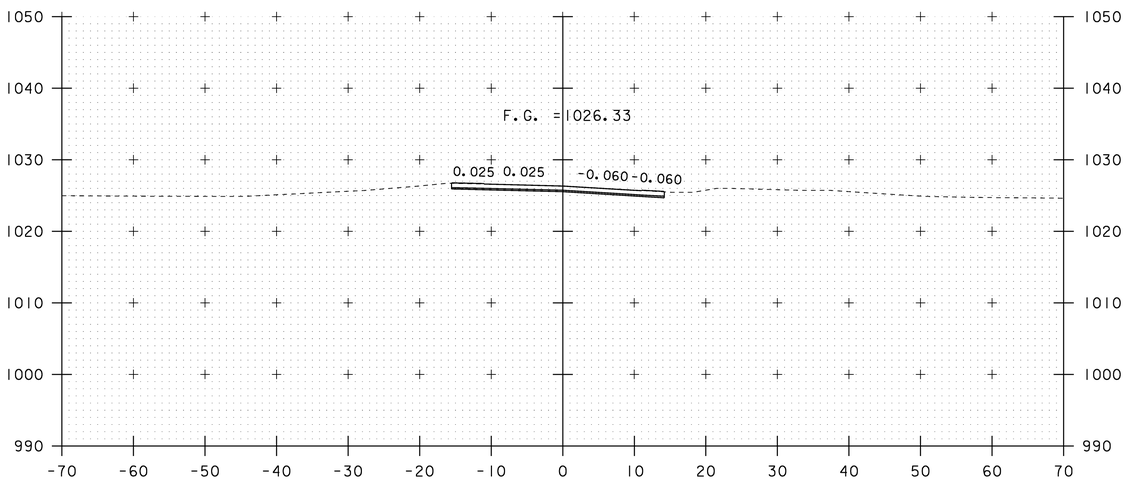
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| FILE NAME: | /str2/04c098/x04c098xs.dgn | PLOT DATE: | 18-AUG-2008 |
| PROJECT LEADER: | EVANS-MONGEON | DRAWN BY: | HUSK |
| DESIGNED BY: | SCRIBNER | CHECKED BY: | SCRIBNER |
| x04c098rxsl.1 | | SHEET 52 | OF 66 |




58+25

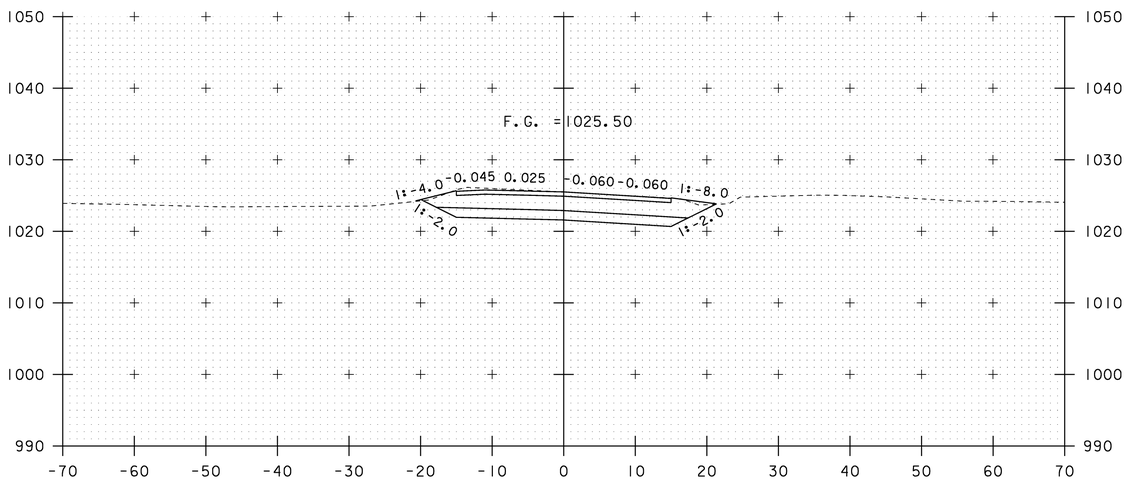



58+75




58+09

STA. 58+50
END APPROACH
BEGIN PROJECT



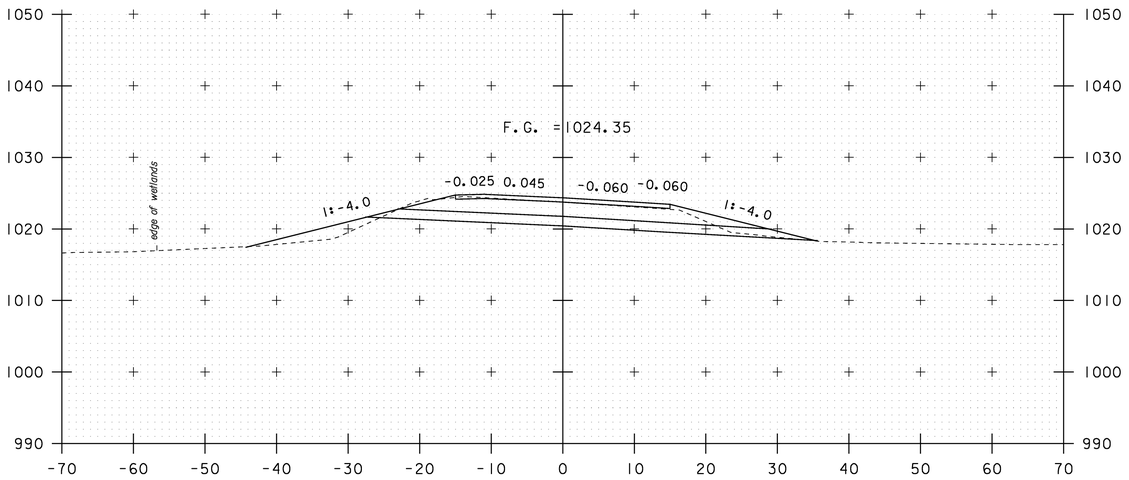

58+50

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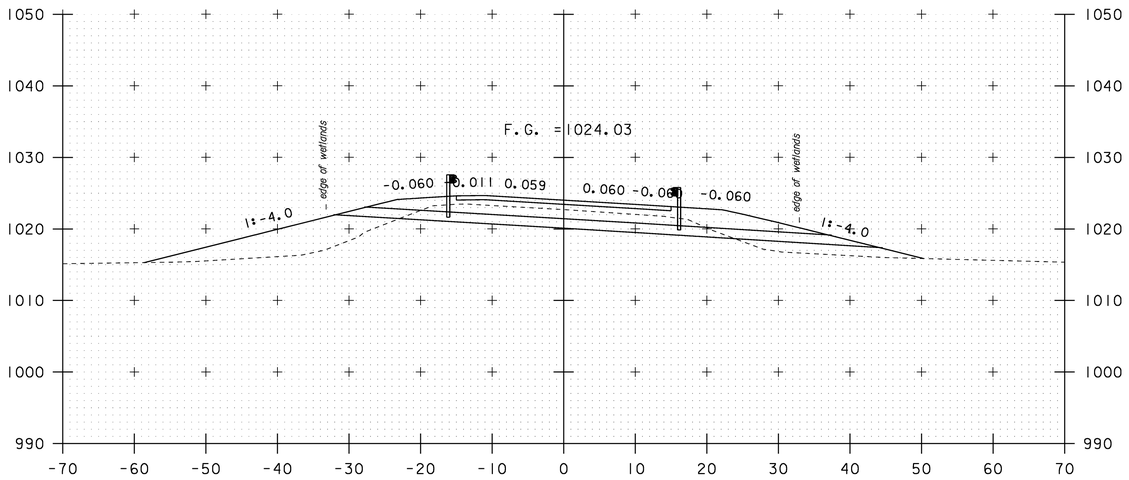
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| PROJECT NUMBER: | ER ST 0271(16) |

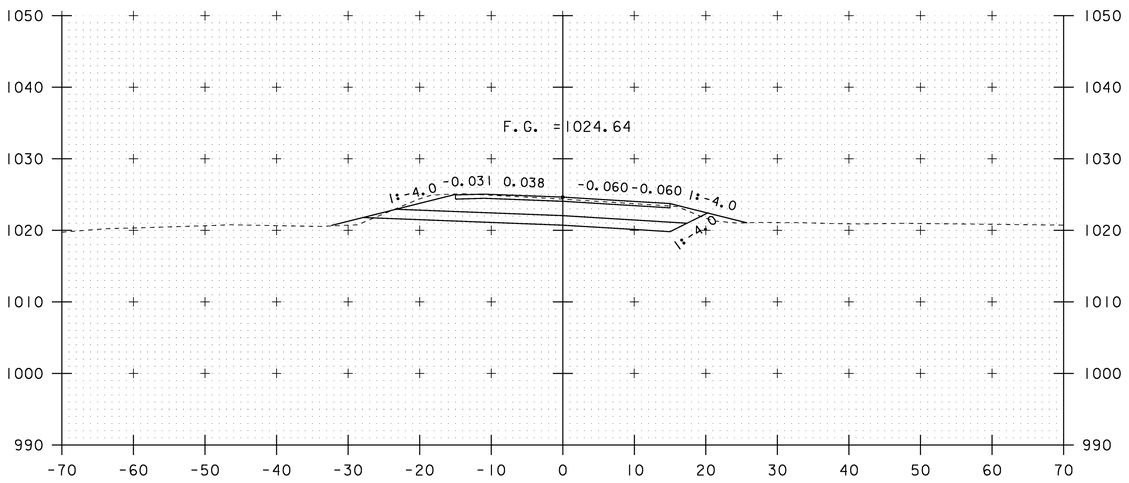
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|---|---|---|---|
| FILE NAME: /str2/04c098/x04c098bdr.dgn | | PLOT DATE: | 18-AUG-2008 |
| PROJECT LEADER: | EVANS-MONGEON | DRAWN BY: | HUSK |
| DESIGNED BY: | SCRIBNER | CHECKED BY: | SCRIBNER |
| x04c098rxs2.1 | | SHEET 53 | OF 66 |



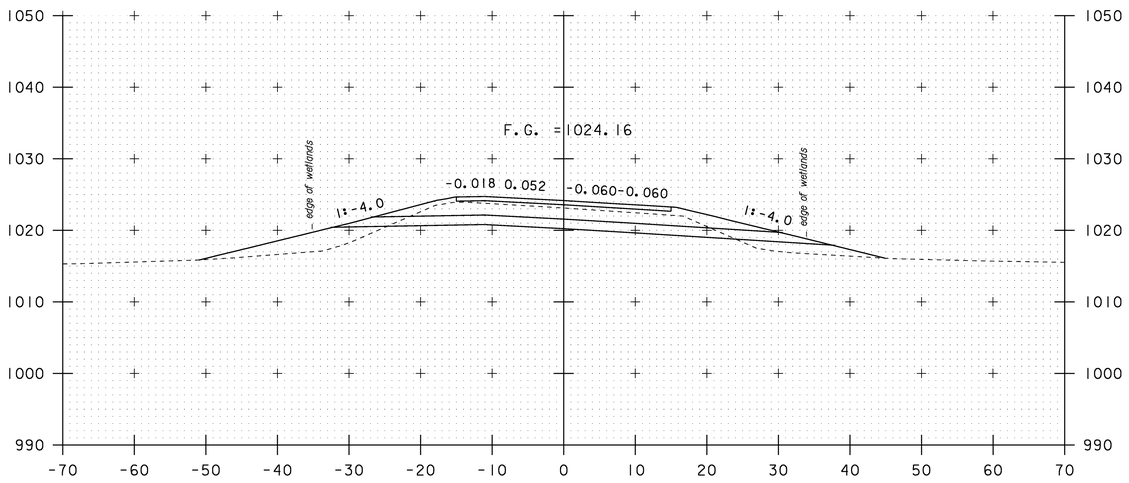

59+25




59+75




59+00



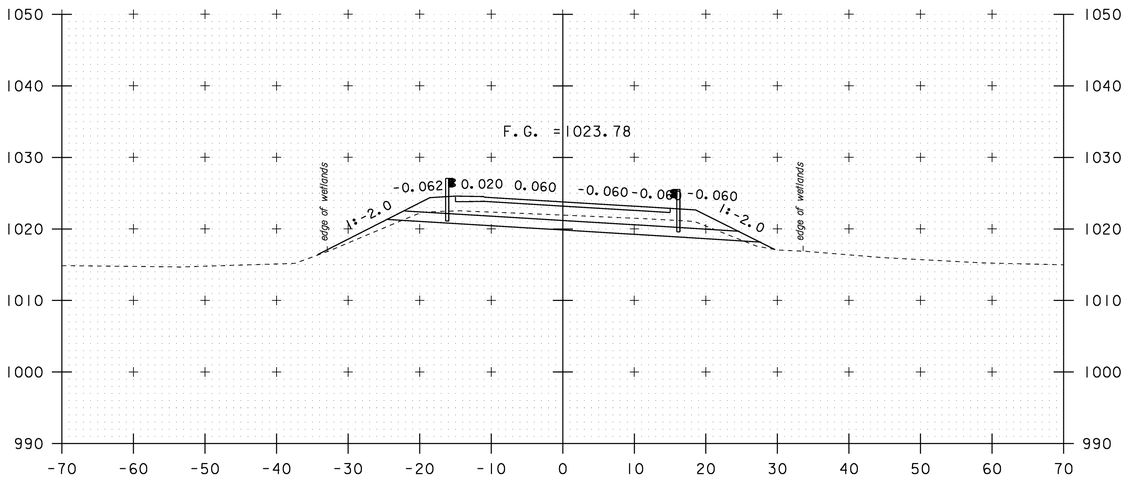

59+50

SCALE 1" = 10'-0
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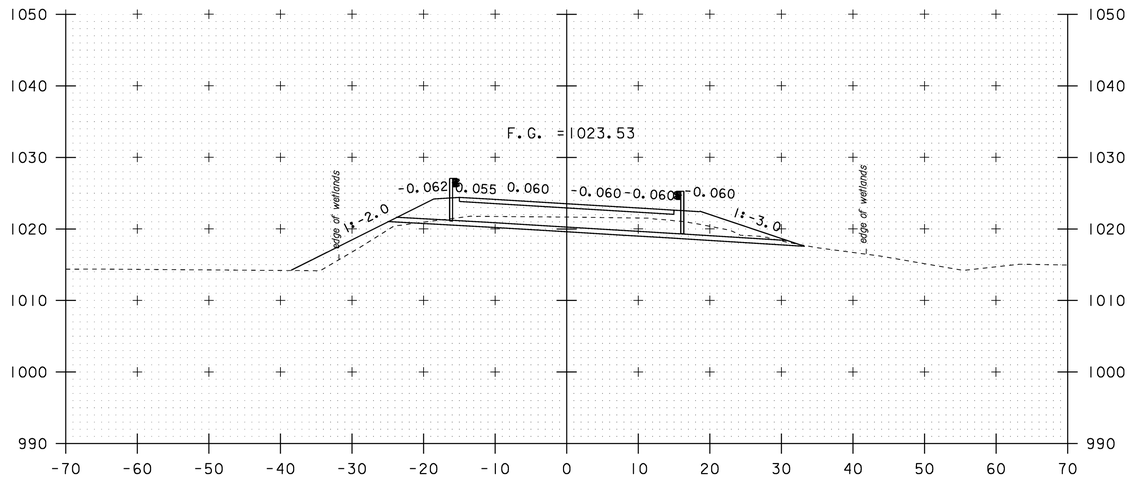
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| PROJECT NUMBER: | ER ST 0271(16) |

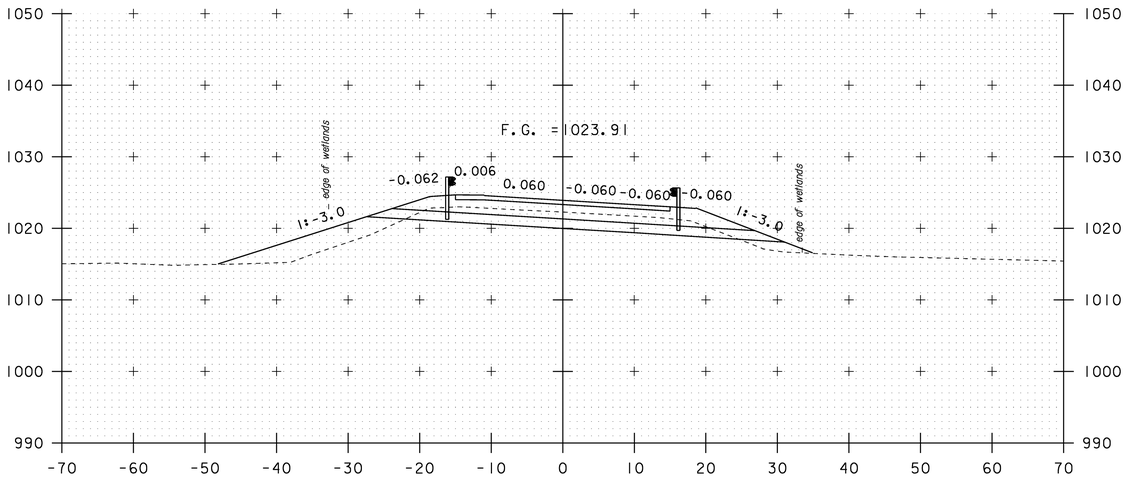
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| FILE NAME: | /str2/04c098/x04c098bdr.dgn | PLOT DATE: | 18-AUG-2008 |
| PROJECT LEADER: | EVANS-MONGEON | DRAWN BY: | HUSK |
| DESIGNED BY: | SCRIBNER | CHECKED BY: | SCRIBNER |
| x04c098rxs3.1 | | SHEET 54 | OF 66 |



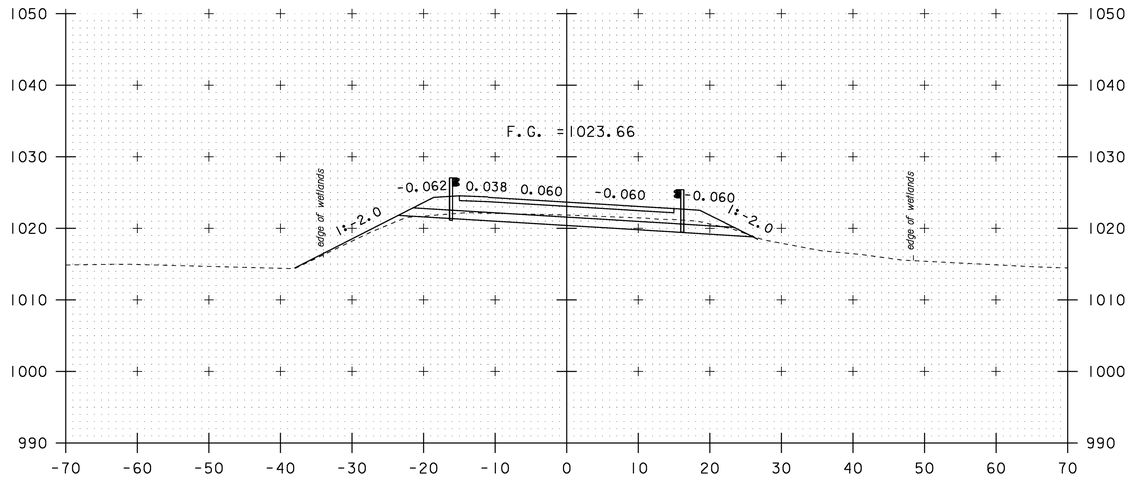

60+25




60+75




60+00



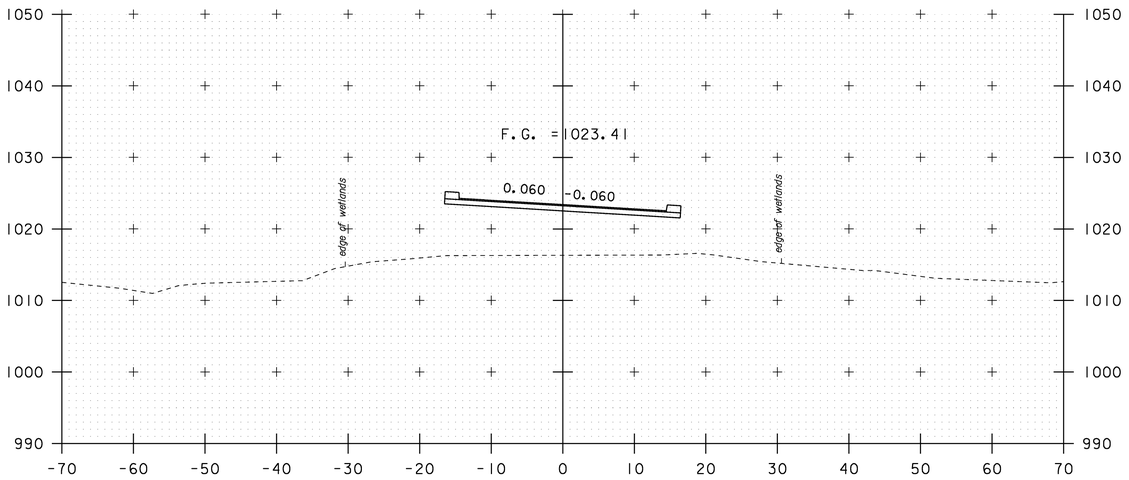

60+50

SCALE 1" = 10'-0
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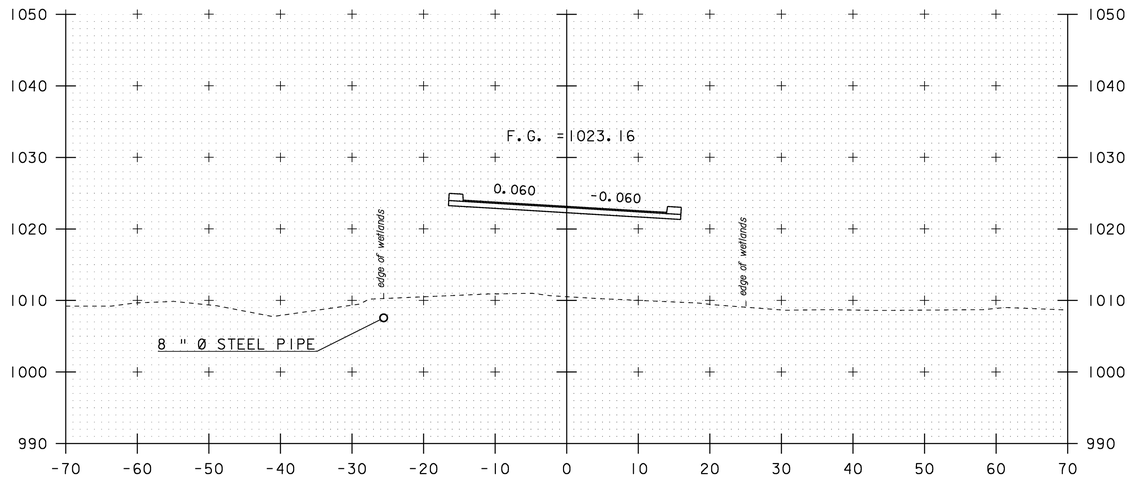
## VT 102 CROSS SECTIONS (4)

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| PROJECT NAME: | CANAAN |
| PROJECT NUMBER: | ER ST 0271(16) |

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|---|---|---|---|
| FILE NAME: /str2/04c098/x04c098bdr.dgn | | PLOT DATE: | 18-AUG-2008 |
| PROJECT LEADER: | EVANS-MONGEON | DRAWN BY: | HUSK |
| DESIGNED BY: | SCRIBNER | CHECKED BY: | SCRIBNER |
| x04c098rxs4.1 | | SHEET 55 | OF 66 |

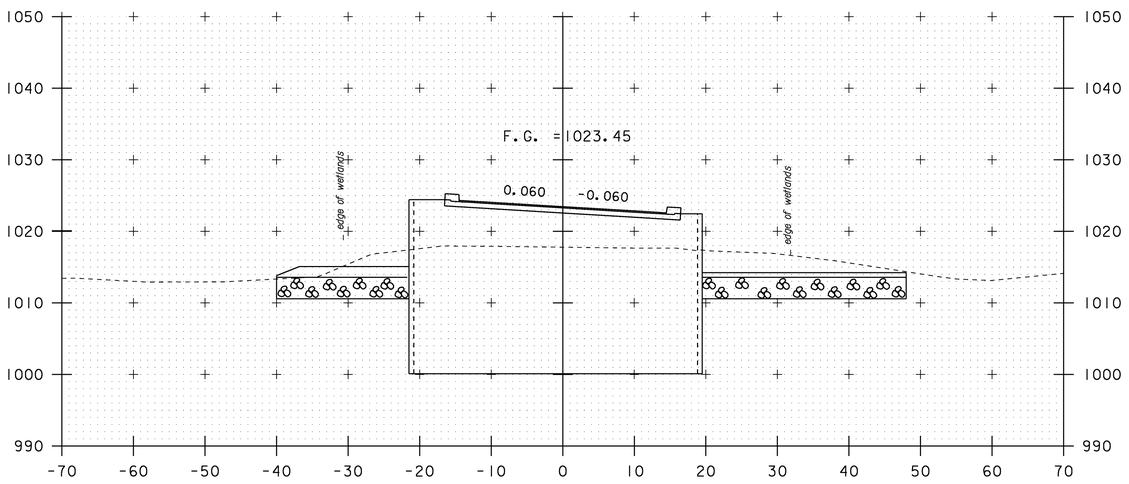



61+00



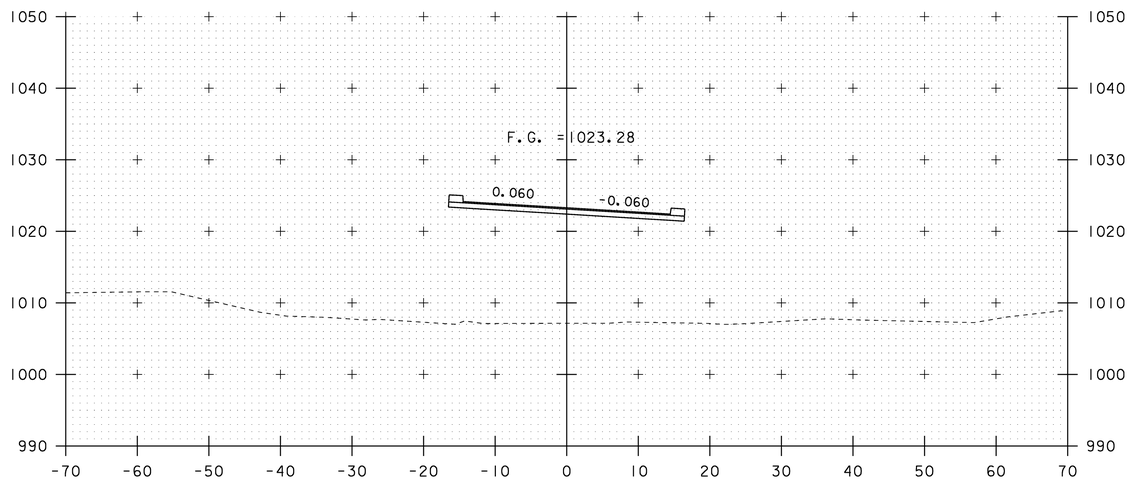

STA. 61+34 LT
BEGIN DRY HYDRANT

61+50




STA. 60+92
BEGIN BRIDGE

60+93



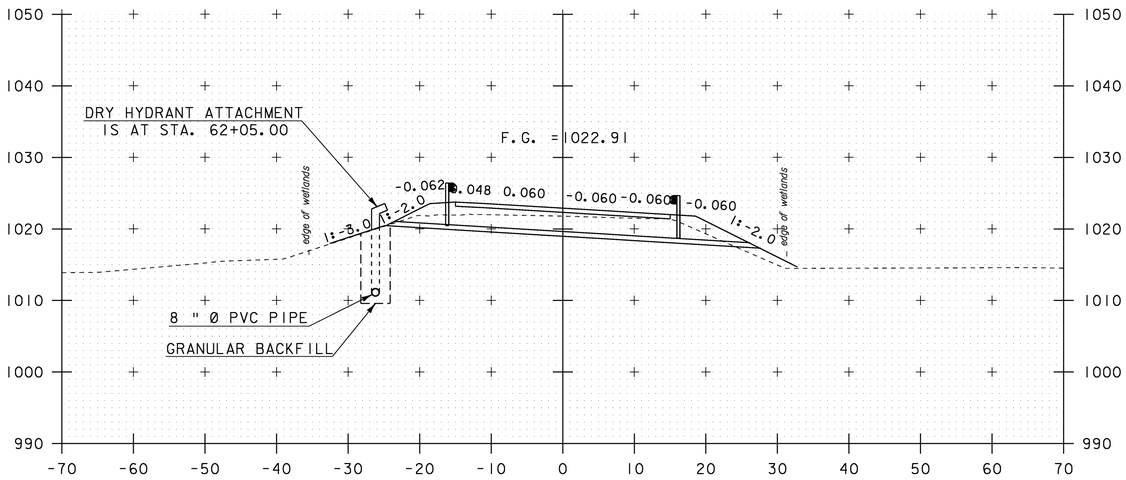

61+25

SCALE 1" = 10'-0
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## VT 102 CROSS SECTIONS (5)

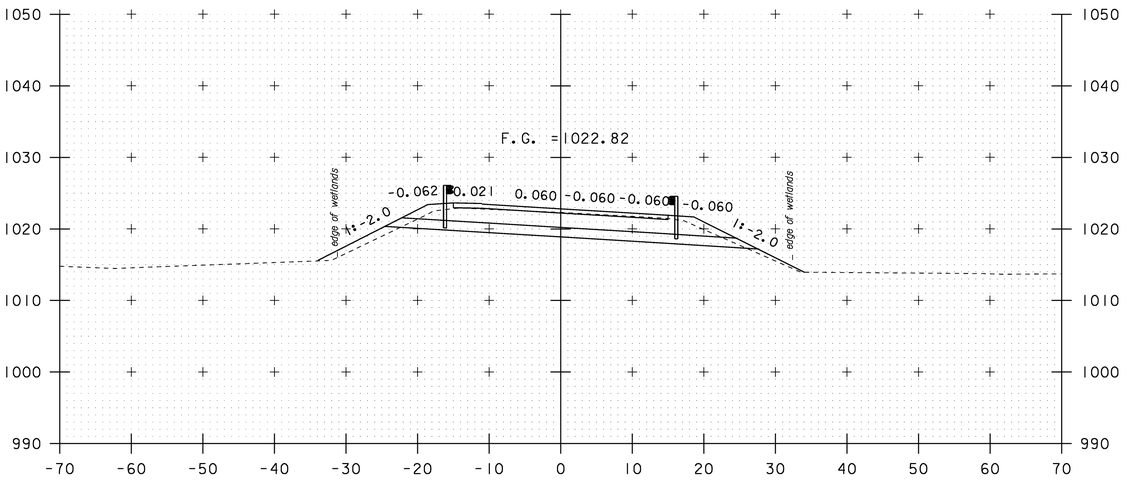
| | |
|---|---|
| PROJECT NAME: | CANAAN |
| PROJECT NUMBER: | ER ST 0271(16) |

| | | | |
|---|---|---|---|
| FILE NAME: /str2/04c098/x04c098bdr.dgn | | PLOT DATE: | 18-AUG-2008 |
| PROJECT LEADER: | EVANS-MONGEON | DRAWN BY: | HUSK |
| DESIGNED BY: | SCRIBNER | CHECKED BY: | SCRIBNER |
| x04c098rxs5.1 | | SHEET 56 | OF 66 |

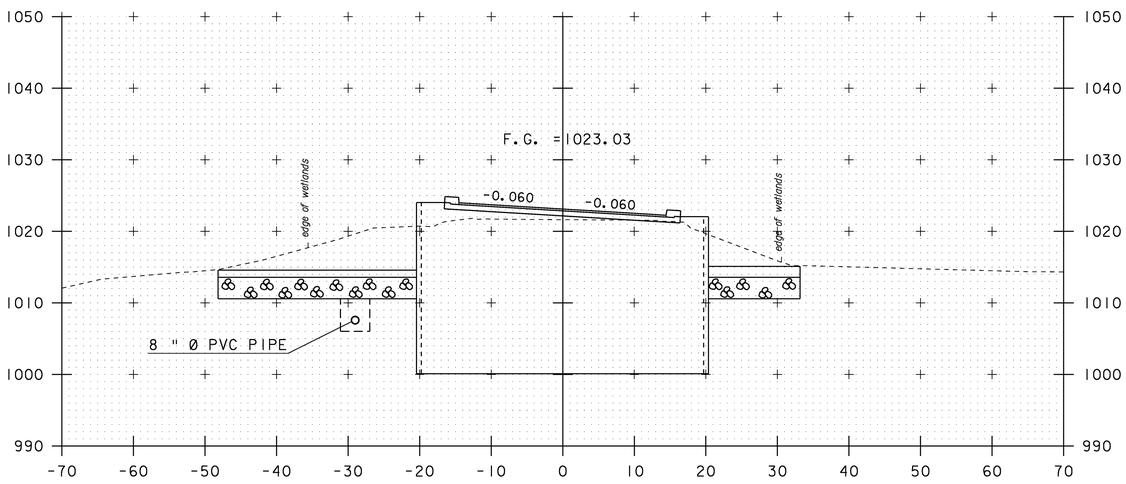



STA. 62+05 LT
END DRY HYDRANT

62+00

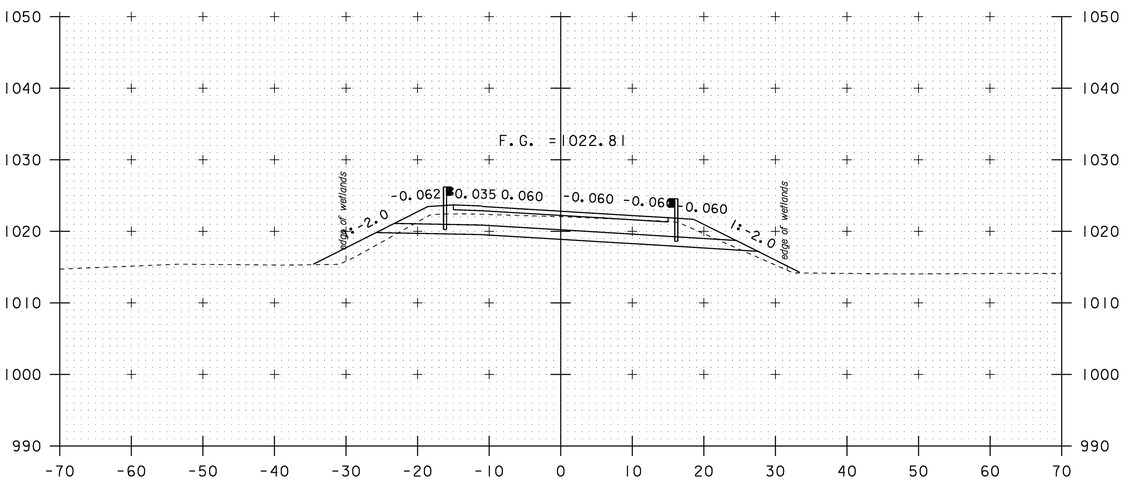



62+50




STA. 61+76
END BRIDGE

61+75



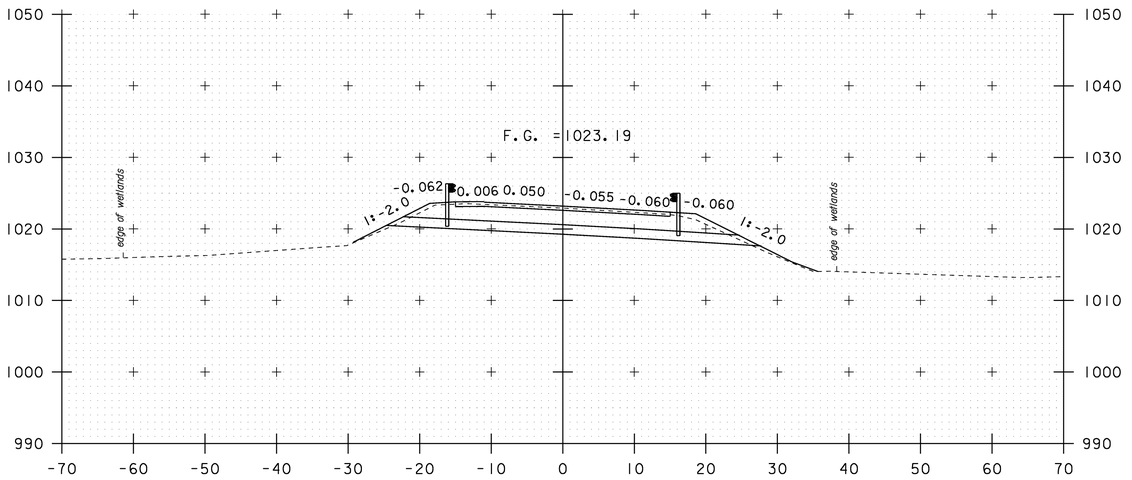

62+25

SCALE 1" = 10'-0
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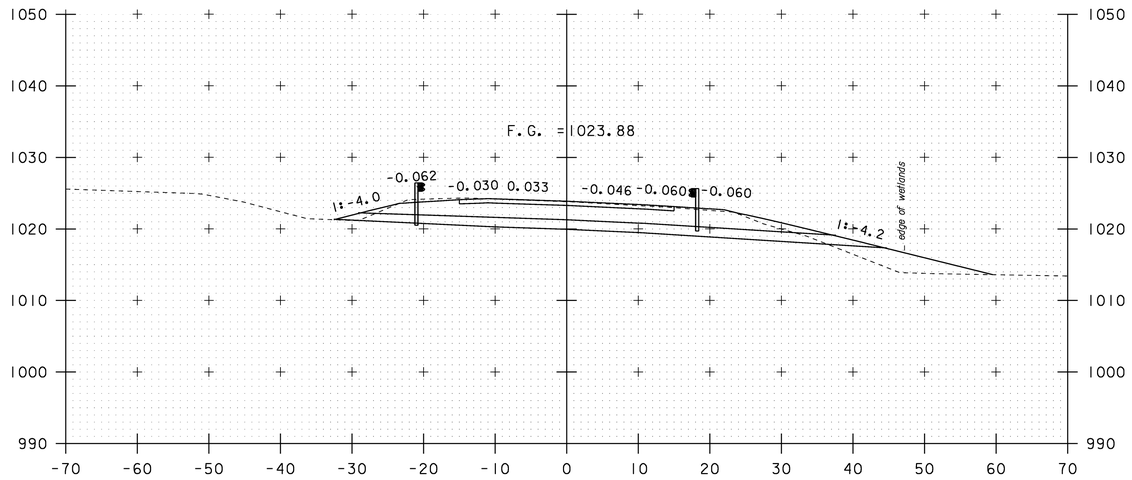
## VT 102 CROSS SECTIONS (6)

| | |
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| PROJECT NAME: | CANAAN |
| PROJECT NUMBER: | ER ST 0271(16) |

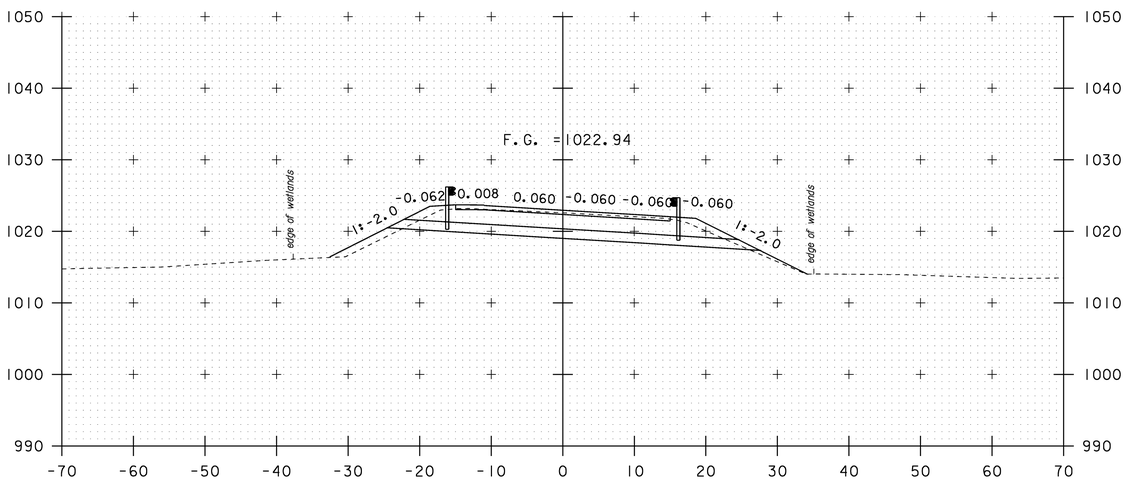
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|---|---|---|---|
| FILE NAME: /str2/04c098/x04c098bdr.dgn | | PLOT DATE: | 18-AUG-2008 |
| PROJECT LEADER: | EVANS-MONGEON | DRAWN BY: | HUSK |
| DESIGNED BY: | SCRIBNER | CHECKED BY: | SCRIBNER |
| x04c098rxs6.1 | | SHEET 57 | OF 66 |



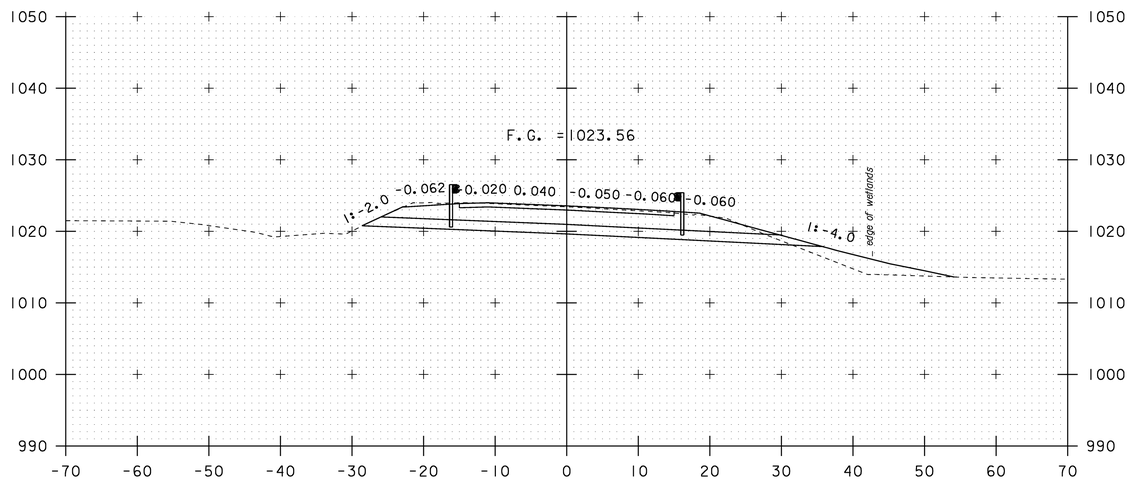

63+00




63+42




62+75



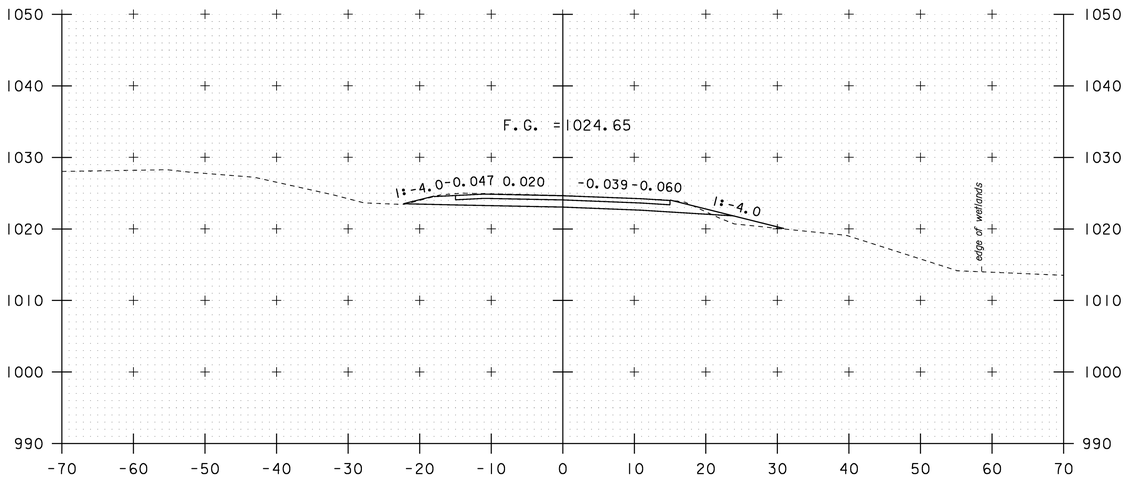

63+25

SCALE 1" = 10'-0
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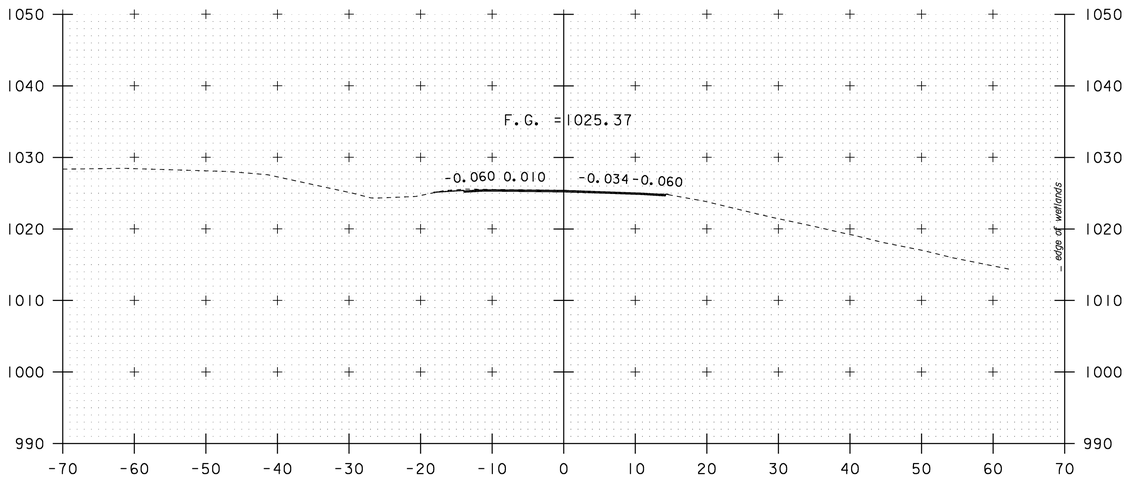
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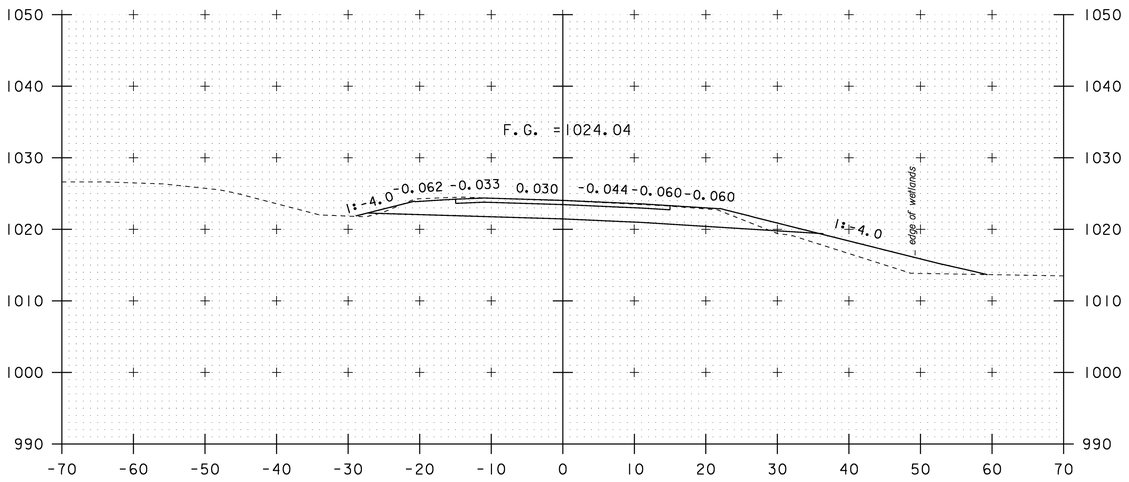
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| DESIGNED BY: | SCRIBNER | CHECKED BY: | SCRIBNER |
| x04c098rxs7.1 | | SHEET 58 | OF 66 |




63+75

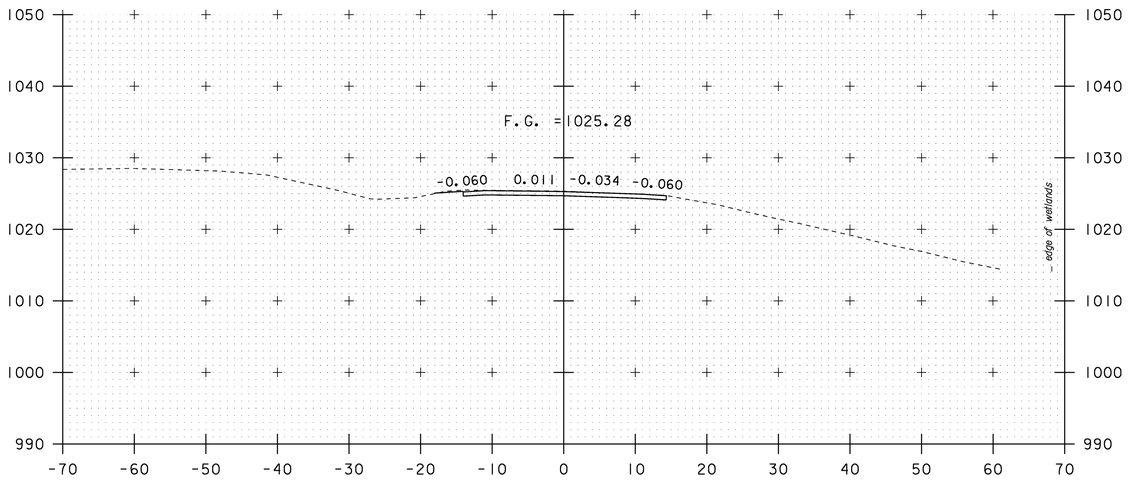



64+00




63+50

STA. 63+50
END PROJECT
BEGIN APPROACH



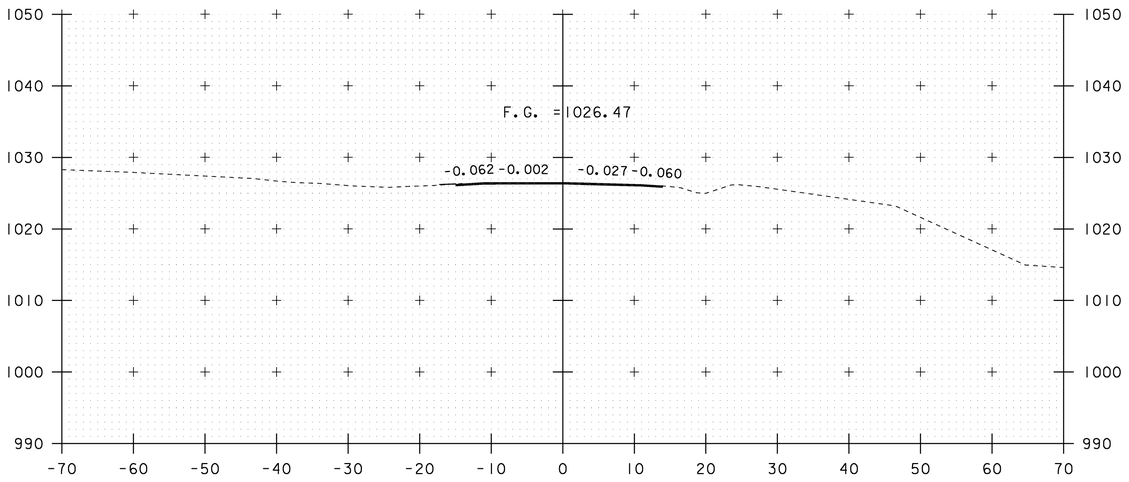

63+97

SCALE 1" = 10'-0
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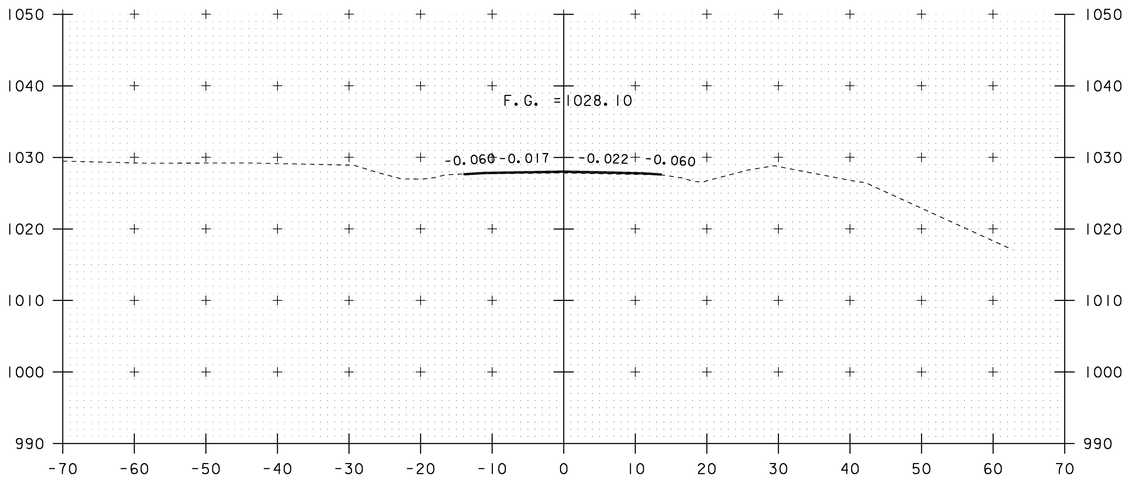
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| | |
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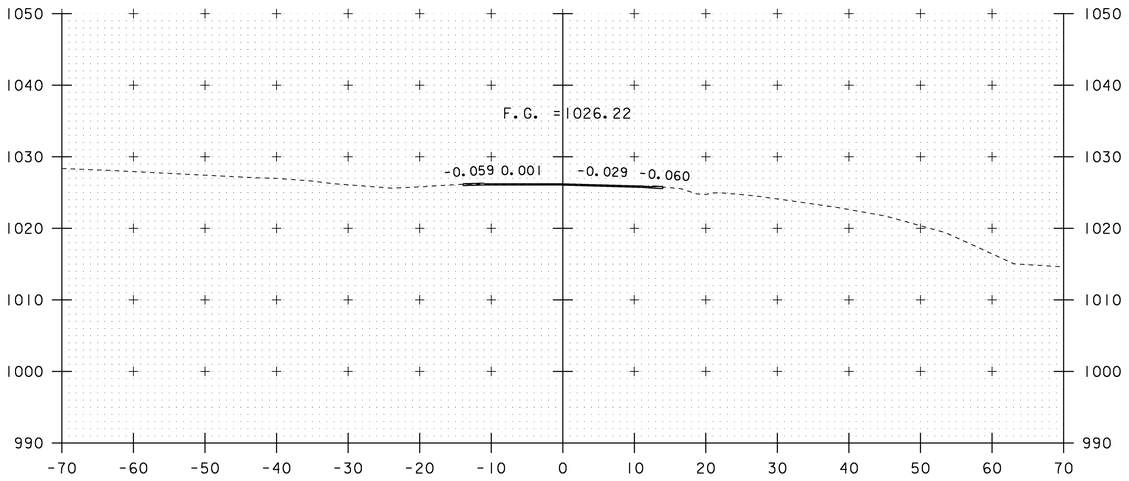
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|---|---|---|---|
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| PROJECT LEADER: | EVANS-MONGEON | DRAWN BY: | HUSK |
| DESIGNED BY: | SCRIBNER | CHECKED BY: | SCRIBNER |
| x04c098rxs8.1 | | SHEET 59 | OF 66 |



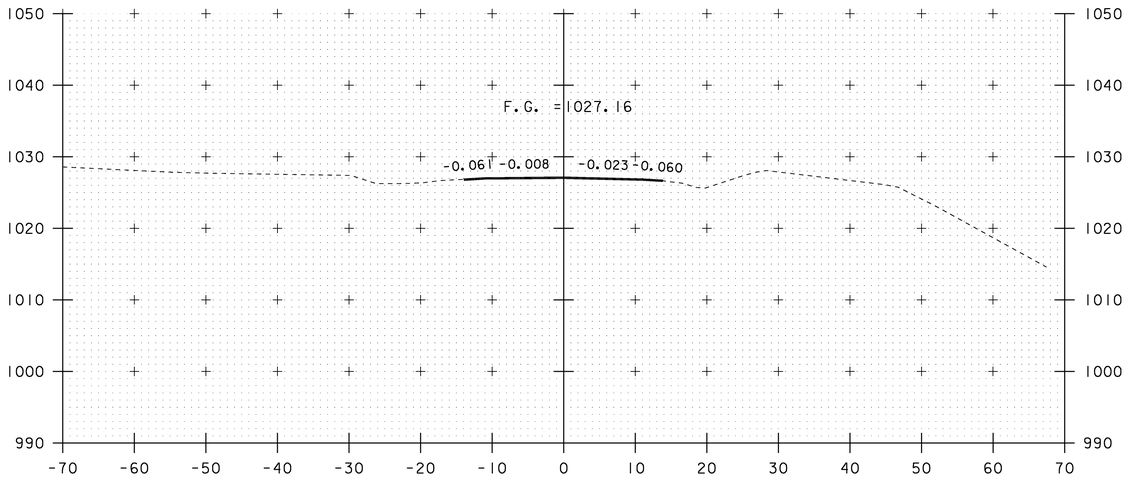

64+32




64+75




64+25




64+50

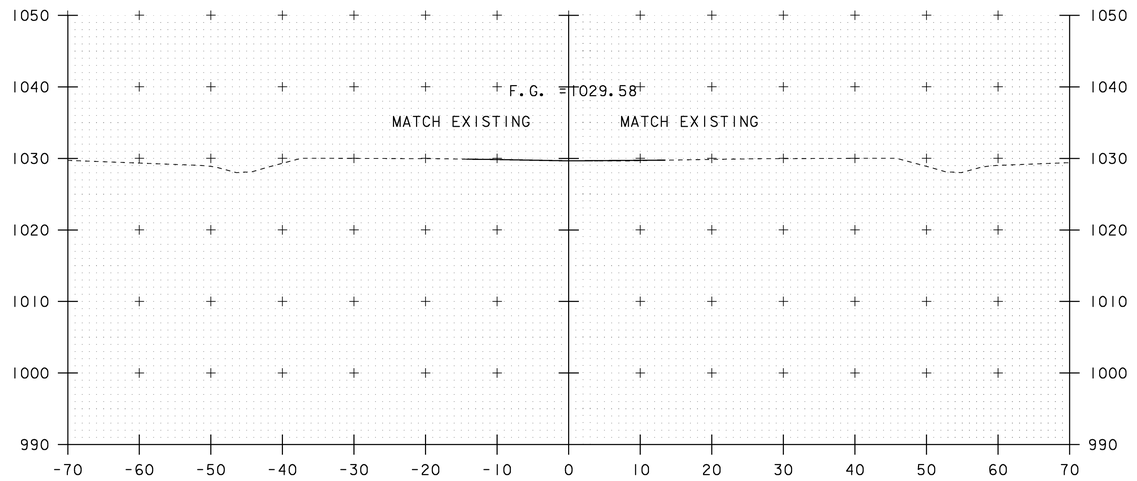
SCALE 1" = 10'-0

10 0 10

## VT 102 CROSS SECTIONS (9)

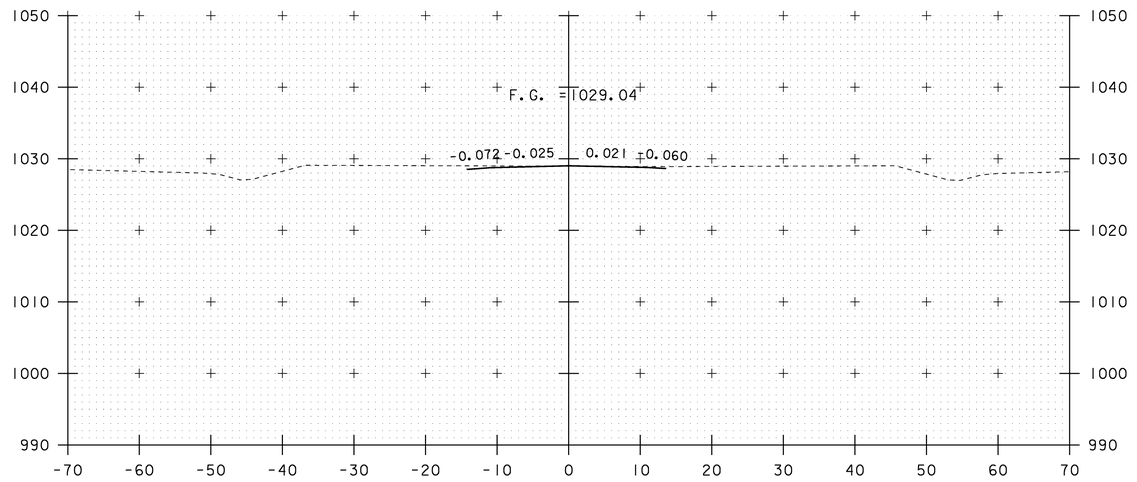
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|---|---|
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| PROJECT NUMBER: | ER ST 0271(16) |

| | | | |
|---|---|---|---|
| FILE NAME: /str2/04c098/x04c098bdr.dgn | | PLOT DATE: | 18-AUG-2008 |
| PROJECT LEADER: | EVANS-MONGEON | DRAWN BY: | HUSK |
| DESIGNED BY: | SCRIBNER | CHECKED BY: | SCRIBNER |
| x04c098rxs9.1 | | SHEET 60 | OF 66 |




STA. 65+15
END APPROACH
MATCH EXISTING GRADE AND BANKING

65+15




65+00

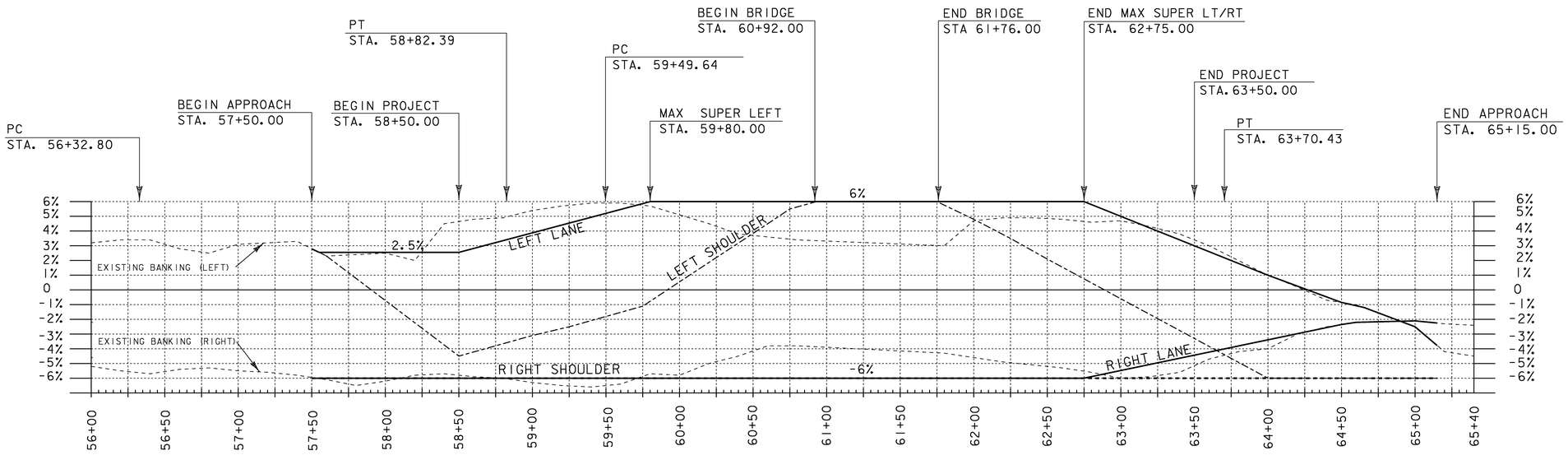
SCALE 1" = 10'-0
10 0 10

## VT 102 CROSS SECTIONS (10)

| | |
|---|---|
| PROJECT NAME: | CANAAN |
| PROJECT NUMBER: | ER ST 0271(16) |

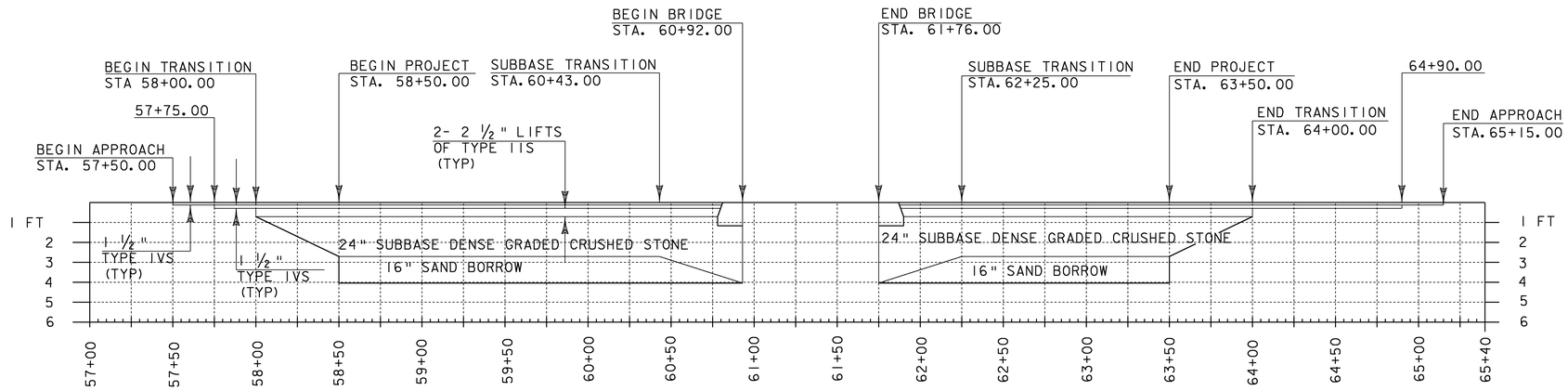
| | | | |
|---|---|---|---|
| FILE NAME: /str2/04c098/x04c098bdr.dgn | | PLOT DATE: | 18-AUG-2008 |
| PROJECT LEADER: | EVANS-MONGEON | DRAWN BY: | HUSK |
| DESIGNED BY: | SCRIBNER | CHECKED BY: | SCRIBNER |
| x04c098rxsl0.1 | | SHEET 61 | OF 66 |

# BANKING DIAGRAM




40 SCALE

# MATERIAL TRANSITIONS

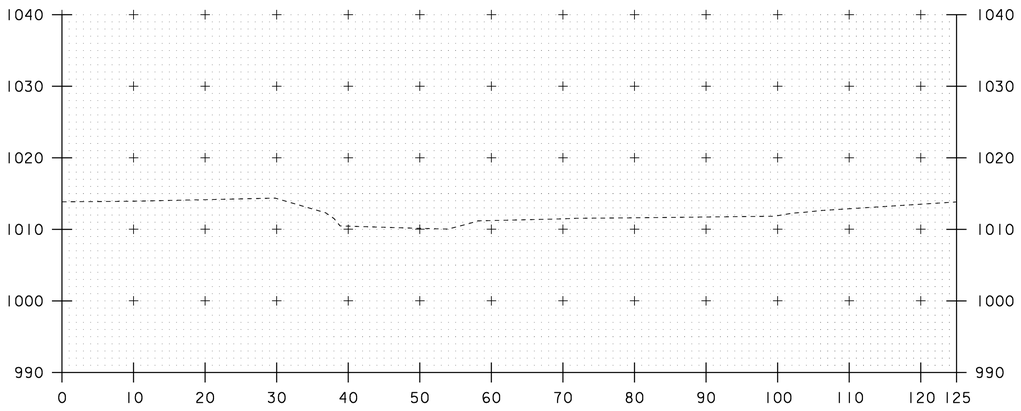



40 SCALE

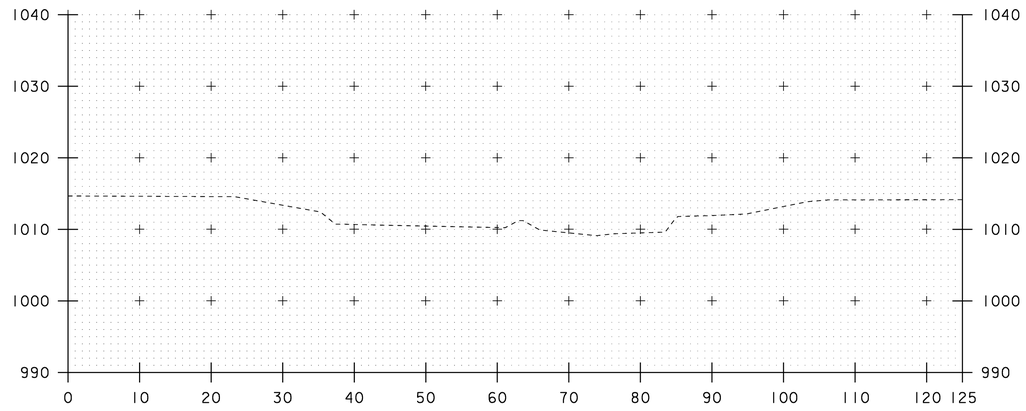
**BANKING DIAGRAM & MATERIAL TRANSITION**

| | |
|---|---|
| PROJECT NAME: | CANAAN |
| PROJECT NUMBER: | ER ST 0271(16) |

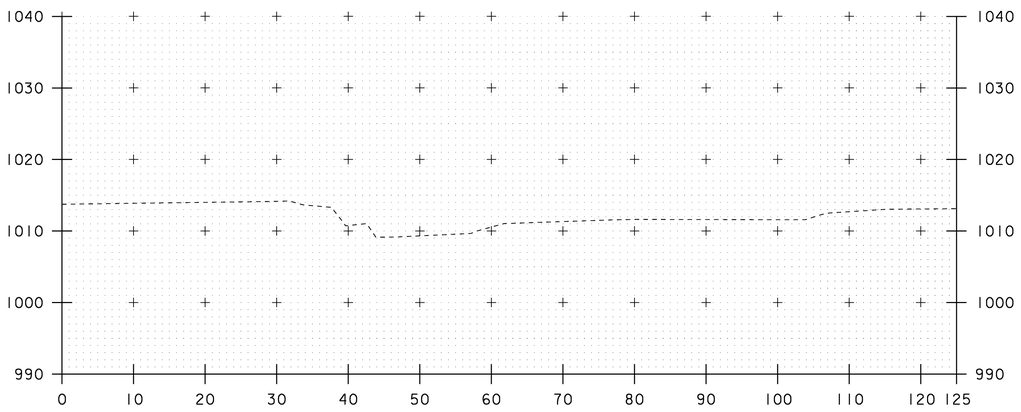
| | | | |
|---|---|---|---|
| FILE NAME: /str2/04c098/x04c098xs.dgn | | PLOT DATE: | 02-SEP-2008 |
| PROJECT LEADER: | EVANS-MONGEON | DRAWN BY: | HUSK |
| DESIGNED BY: | SCRIBNER | CHECKED BY: | SCRIBNER |
| x04c098pfl.i | | SHEET 62 | OF 66 |



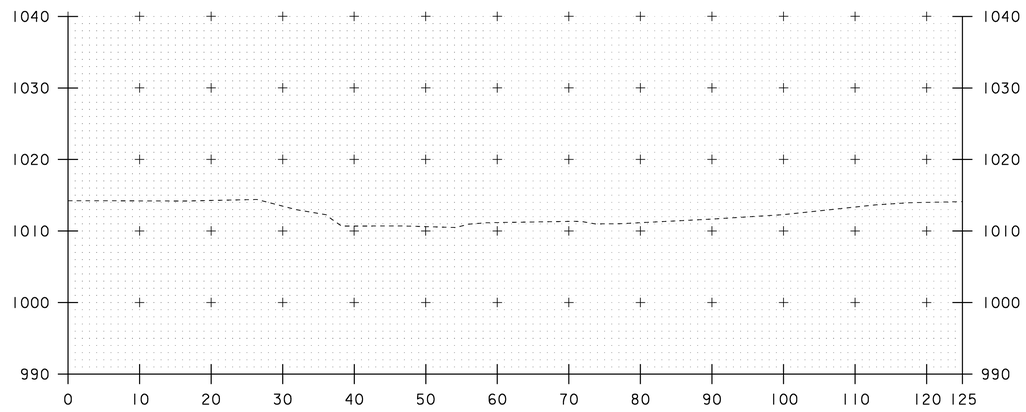

15+25




15+75




15+00



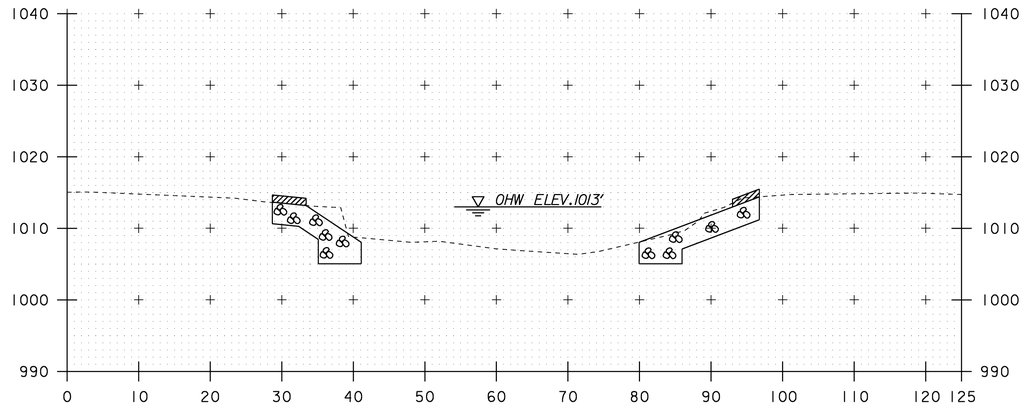

15+50

SCALE 1" = 10'-0
10 0 10

## CHANNEL CROSS SECTIONS (1)

| | |
|---|---|
| PROJECT NAME: | CANAAN |
| PROJECT NUMBER: | ER ST 0271(16) |

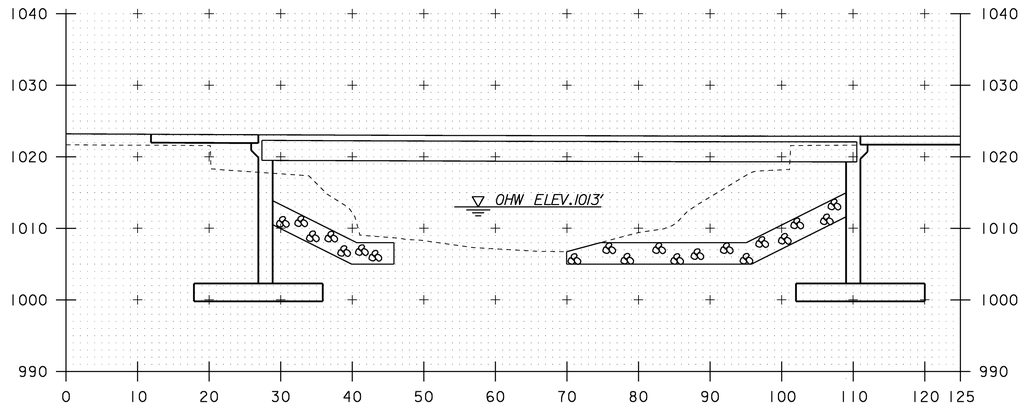
| | | | |
|---|---|---|---|
| FILE NAME: | /str2/04c098/x04c098bdr.dgn | PLOT DATE: | 18-AUG-2008 |
| PROJECT LEADER: | EVANS-MONGEON | DRAWN BY: | HUSK |
| DESIGNED BY: | SCRIBNER | CHECKED BY: | SCRIBNER |
| x04c098cxsl.1 | | SHEET 63 | OF 66 |




STA. 16+25 ABUT #2
BEGIN UNCLASSIFIED CHANNEL EXCAVATION
BEGIN STONE FILL, TYPE III
BEGIN GEOTEXTILE UNDER STONE FILL
BEGIN GRUBBING MATERIAL

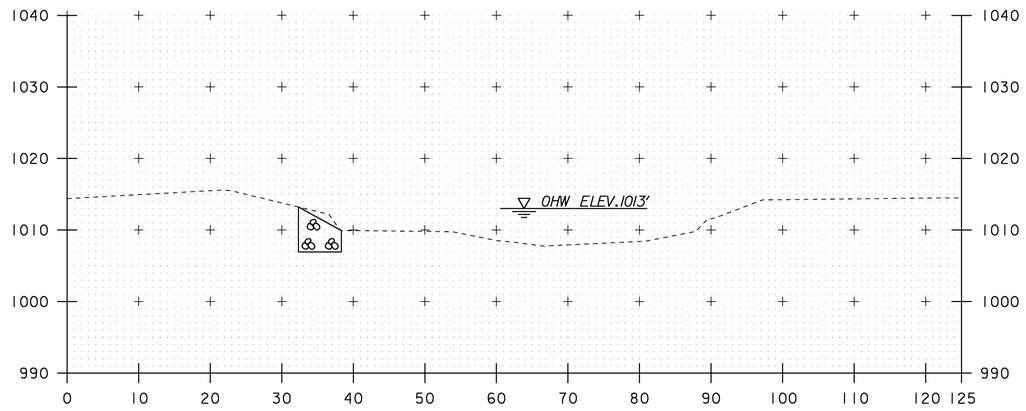
STA. 16+25 ABUT #1
BEGIN GRUBBING MATERIAL

16+25



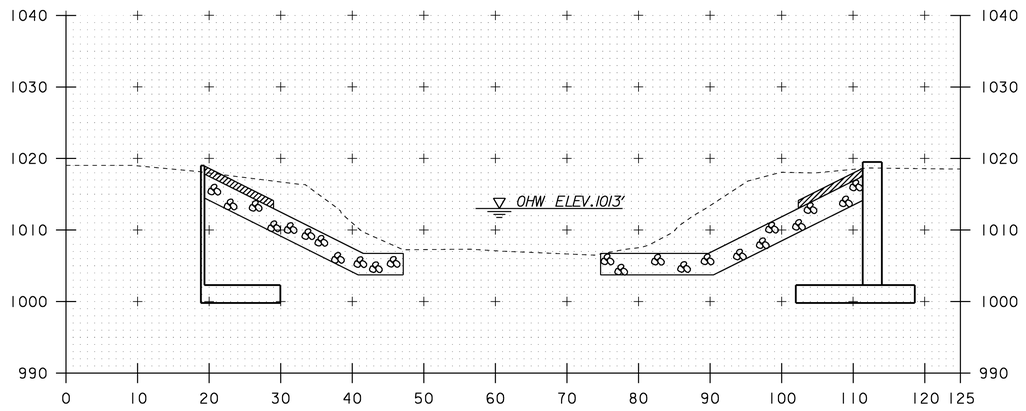

STA. 16+60 ABUT #1 & #2
END GRUBBING MATERIAL

16+75




STA. 16+00 ABUT #1
BEGIN UNCLASSIFIED CHANNEL EXCAVATION
BEGIN STONE FILL, TYPE III
BEGIN GEOTEXTILE UNDER STONE FILL

16+00




STA. 16+41 ABUT #1
BEGIN COFFERDAM EXCAVATION EARTH
BEGIN LIGHTWEIGHT
BACKFILL PRODUCT

STA. 16+40 ABUT #2
BEGIN COFFERDAM EXCAVATION EARTH
BEGIN LIGHTWEIGHT
BACKFILL PRODUCT

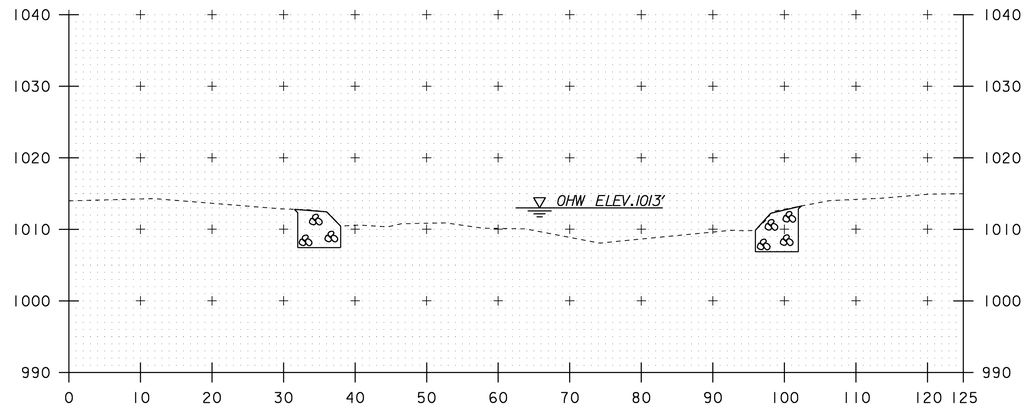
16+50

SCALE 1" = 10'-0
10 0 10

## CHANNEL CROSS SECTIONS (2)

| | |
|---|---|
| PROJECT NAME: | CANAAN |
| PROJECT NUMBER: | ER ST 0271(16) |

| | | | |
|---|---|---|---|
| FILE NAME: /str2/04c098/x04c098bdr.dgn | | PLOT DATE: | 18-AUG-2008 |
| PROJECT LEADER: | EVANS-MONGEON | DRAWN BY: | HUSK |
| DESIGNED BY: | SCRIBNER | CHECKED BY: | SCRIBNER |
| x04c098cxs2.1 | | SHEET 64 | OF 66 |

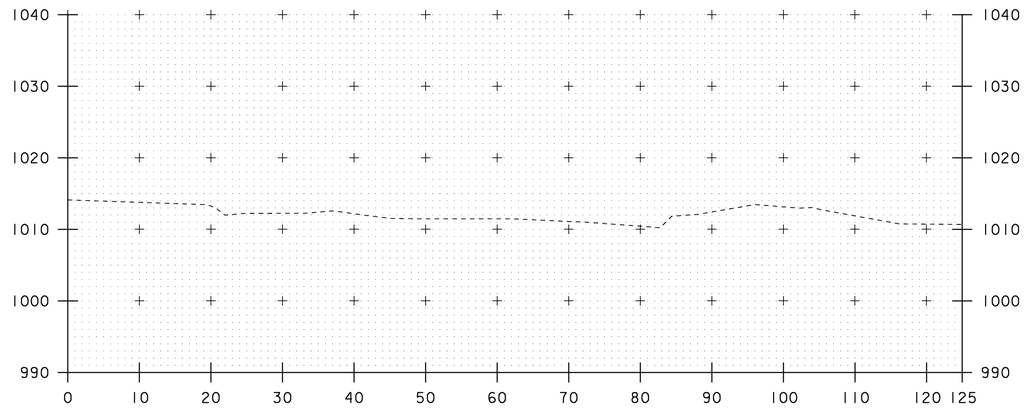



17+25

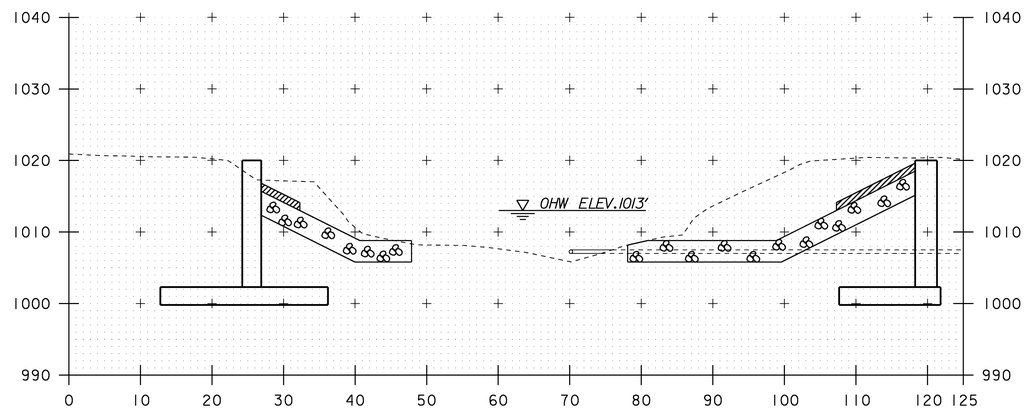
STA. 17+25 ABUT #1 & #2
END GRUBBING MATERIAL
END GEOTEXTILE UNDER STONE FILL
END UNCLASSIFIED CHANNEL EXCAVATION
END STONE FILL, TYPE III

STA. 17+12 ABUT #1
END COFFERDAM EXCAVATION EARTH
END LIGHTWEIGHT
BACKFILL PRODUCT

STA. 17+08 ABUT #2
END COFFERDAM EXCAVATION EARTH
END LIGHTWEIGHT
BACKFILL PRODUCT

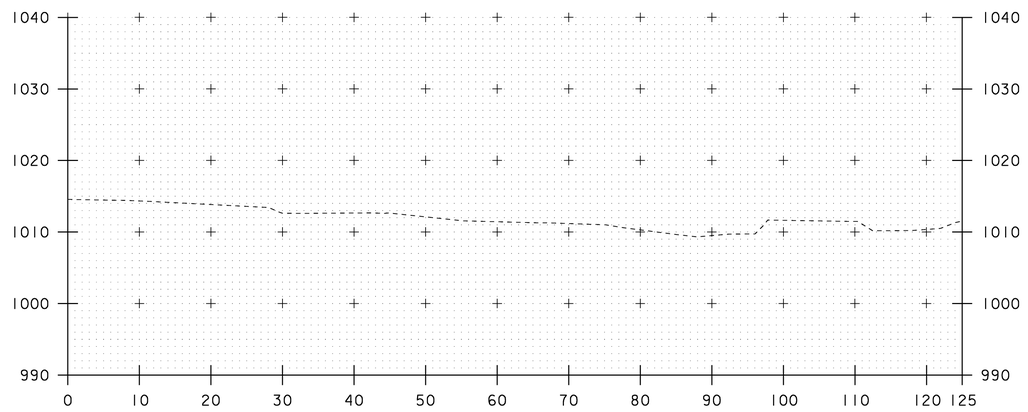



17+75




17+00

STA. 16+95 ABUT #1 & #2
BEGIN GRUBBING MATERIAL



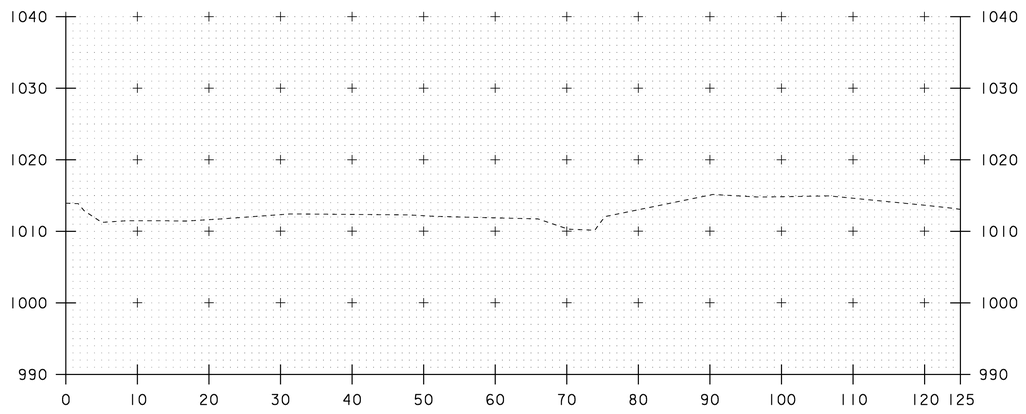

17+50

SCALE 1" = 10'-0
10 0 10

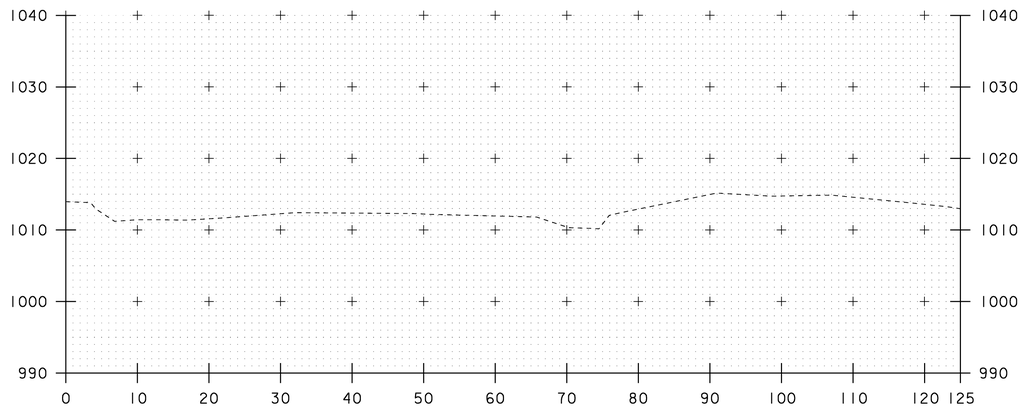
## CHANNEL CROSS SECTIONS (3)

| | |
|---|---|
| PROJECT NAME: | CANAAN |
| PROJECT NUMBER: | ER ST 0271(16) |

| | | | |
|---|---|---|---|
| FILE NAME: /str2/04c098/x04c098bdr.dgn | | PLOT DATE: | 18-AUG-2008 |
| PROJECT LEADER: | EVANS-MONGEON | DRAWN BY: | HUSK |
| DESIGNED BY: | SCRIBNER | CHECKED BY: | SCRIBNER |
| x04c098cxs3.1 | | SHEET 65 | OF 66 |




18+02




18+00

SCALE 1" = 10'-0

10 0 10

## CHANNEL CROSS SECTIONS (4)

| | |
|---|---|
| PROJECT NAME: | CANAAN |
| PROJECT NUMBER: | ER ST 0271(16) |

| | | | |
|---|---|---|---|
| FILE NAME: /str2/04c098/x04c098bdr.dgn | | PLOT DATE: | 18-AUG-2008 |
| PROJECT LEADER: | EVANS-MONGEON | DRAWN BY: | HUSK |
| DESIGNED BY: | SCRIBNER | CHECKED BY: | SCRIBNER |
| x04c098cxs4.1 | | SHEET 66 | OF 66 |

VERMONT

**State of Vermont**
**PDD/Structures Design Section**
National Life Building – Drawer 33
Montpelier, VT 05633-5001
**www.aot.state.vt.us**

*Agency of Transportation*

[phone] 802-828-2621
[fax] 802-828-2566
[tttd] 800-253-0191

**See next sheet for instructions**

**DS Brown Company**
300 East Cherry Street
North Baltimore, Ohio 45872

**DATE: February 6, 2009**

**Project Name: Canaan** **Project #: ER ST 0271 (16)**

**Structure Identification: VT 102, BR # 16, over the Willard Stream**

The following Expansion bearing details Item # 531.11, Bearing Device Assembly, Elastomeric Pad for the above project Vendor's Job #25217 transmitted with your letter dated January 290, 2009 have been reviewed and are being returned herewith.

Sheets: GN1, 01, 02
**are approved [X]**

Sheets: _____
Are to be reconsidered (note comments in red) and resubmitted for final approval.

There shall be no fabrication done until all drawings and welding procedures are approved. You must provide notice to our fabrication inspector, Jeff Clark, as to the date fabrication represented by these drawings will begin. That notice must be received and acknowledged at least seven days prior to that date, as per Specification 506.03. Jeff may be contacted by phone at (802)828-0044 or email at jeff.clark@state.vt.us. Any material fabricated prior to the notification date is subject to rejection without further cause.

Sincerely,

Martha Evans-Mongeon
Project Manager

Attachments
cc: [X] Resident Engineer w/prints, Doug Bumps
[X] Shop Inspector w/prints, Jeff Clark
[X] Contractor w/prints, Winterset, Inc.
[ ] Subcontractor – letter only _____
[X] Construction Divison – letter only
[X] Materials & Research Section (C&IA Unit) – letter only
[X] Files (Structures & Central)

DSBROWN

# Production Joint Welding Procedure Specification (D1.5-02)

Procedure No: B-FF-01 Date Issued: 3-28-08 Revision No: 0 Rev. Date: _____

Contractor (Fabricator) D. S. Brown Company Prepared by: Brad Streeter, Quality Assurance Manager

1. Non-Fracture Critical [X] Fracture Critical [ ] WPS Expiration Date: 3-6-13
2. Qualified in accordance with: AWS D1.5- 2002 (5.13)
   Referenced PQR No(s). PQR-FCAW-01-(08) __ , __ , ____
   Referenced FWST No(s). N/A , N/A , __ , __ , ____
3. Material specification(s) ASTM A709 Gr. 36, 50, 50W
4. Material Thickness (es) Unlimited
5. Welding process FCAW
6. Manual [ ] , machine [ ] , or semiautomatic [X]
7. Position(s) of welding 1F, 2F
8. Filler metal specification AWS A5.20
9. Filler metal class and brand name E71T-1CH8 (UltraCore71C)
10. Flux class & brand N/A , Type N/A
11. Shielding gas 100% CO2 Flow rate 45 CFH
12. Single pass [X] Or multiple pass [X]
13. Single arc [X] Or multiple arc [ ]
14. Welding Current DCEP
15. Polarity Reverse
16. Welding progression stringers
17. Root treatment Clean to bright sound metal or per AWS D1.5 (3.2.1 & 3.11)
18. Postheat treatment N/A
19. Calculated Heat Input (KJ/In) Min 32.2 Kj/in Max 45.8 Kj/in
20. Electrode extension (electrical stickout) 3/4"

For DOT Approval

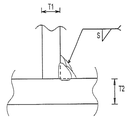
VTRANS

JWC

01/09/09

| Weld size (in) | Pass No(s). | Electrode Size (in) | Welding Process Variables AMPS/WFS* | VOLTS | Travel Speed (IPM) |
|---|---|---|---|---|---|
| **1/4" | 1 | 1/16" | 257-295 | 26.1-29.5 | 11.4-12.5 |
| 5/16" | 1 | 1/16" | 257-295 | 26.1-29.5 | 11.4-12.5 |
| 3/8" | 2-3 | 1/16" | 257-295 | 26.1-29.5 | 11.4-12.5 |
| 7/16" | 3-5 | 1/16" | 257-295 | 26.1-29.5 | 11.4-12.5 |
| 1/2" | 4-6 | 1/16" | 257-295 | 26.1-29.5 | 11.4-12.5 |
| 5/8" | 5-7 | 1/16" | 257-295 | 26.1-29.5 | 11.4-12.5 |
| 3/4" | 6-8 | 1/16" | 257-295 | 26.1-29.5 | 11.4-12.5 |

Joint Detail (Fillet)
Show all dimensions, weld sizes, passes, and AWS symbols




**T1 = Varies**
**T2 = Varies**
**S = Weld Size**

**** T1 & T2 equal to or less than 3/4" for 1/4" welds.**

* Wire feed speed may be used along with amperage (include chart)

Prepared By: _____ DSB QA Manager

Project: _____

DSB Job: 25217-1104

Preheat and Interpass Temperature Chart

| Base Metal Thickness range | Minimum Preheat (°F) | Max Preheat & Interpass (°F) |
|---|---|---|
| ≤3/4" | 50°F | 450°F |
| >3/4" to ≤1.5" | 70°F | 450°F |
| >1.5" to ≤2.5" | 150°F | 450°F |
| >2.5" | 225°F | 450°F |

Note: When this procedure is used for A709Gr50W materials, it shall be limited to 5/16" single pass or material be coated.

DSBROWN

# Production Joint Welding Procedure Specification (D1.5-02)

Procedure No: A-(MC)GF-01 Date Issued: 9-28-04 Revision No: 0 Rev. Date: _____

Contractor (Fabricator) D. S. Brown Company Prepared by: James R. Connor, Quality Assurance Manager

1. Non-Fracture Critical [X] Fracture Critical [ ] WPS Expiration Date: _____
2. Qualified in accordance with: AWS D1.5- 2002 (5.12.1)
   Referenced PQR No(s). PQR-(MC)GMAW-01(04) __ , __ , ____
   Referenced FWST No(s). PQR-(MC)GMAW-FWST-01A(04) , PQR-(MC)GMAW-FWST-01B(04) , __ , __
3. Material specification(s) ASTM A709 Gr. 36, 50, 50W
4. Material Thickness (es) Unlimited
5. Welding process GMAW
6. Manual [ ] , machine [X] , or semiautomatic [X]
7. Position(s) of welding 1F, 2F
8. Filler metal specification AWS A5.18
9. Filler metal class and brand name E70C-6M Corex Metal-Core Maxim
10. Flux class & brand N/A , Type N/A
11. Shielding gas 75% Ar / 25% CO2 Flow rate 45 CFH
12. Single pass [X] Or multiple pass [X]
13. Single arc [X] Or multiple arc [ ]
14. Welding Current DCEP
15. Polarity Reverse
16. Welding progression stringers
17. Root treatment Clean to bright sound metal or per AWS D1.5 (3.2.1 & 3.11)
18. Postheat treatment N/A
19. Calculated Heat Input (KJ/In) Min 30.6 Kj/in Max 51.1 Kj/in
20. Electrode extension (electrical stickout) 3/4"

For DOT Approval

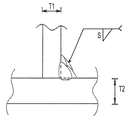
VTRANS

JCVC

01/09/09

| Weld size (in) | Pass No(s) | Electrode Size (in) | Welding Process Variables AMPS/WFS* | VOLTS | Travel Speed (IPM) |
|---|---|---|---|---|---|
| **1/4" | 1 | .052" | 265-320 | 31-34.5 | 13-16 |
| 5/16" | 1 | .052" | 265-320 | 31-34.5 | 13-16 |
| 3/8" | 1-3 | .052" | 265-320 | 31-34.5 | 13-16 |
| 7/16" | 2-4 | .052" | 265-320 | 31-34.5 | 13-16 |
| 1/2" | 4-6 | .052" | 265-320 | 31-34.5 | 13-16 |
| 5/8" | 5-7 | .052" | 265-320 | 31-34.5 | 13-16 |
| 3/4" | 6-8 | .052" | 265-320 | 31-34.5 | 13-16 |

Joint Detail (Fillet)
Show all dimensions, weld sizes, passes, and AWS symbols




**T1 = Varies**
**T2 = Varies**
**S = Weld Size**

**** T1 & T2 equal to or less than 3/4" for 1/4" welds.**

* Wire feed speed may be used along with amperage (include chart)

Prepared By: James R. Connor DSB QA Manager

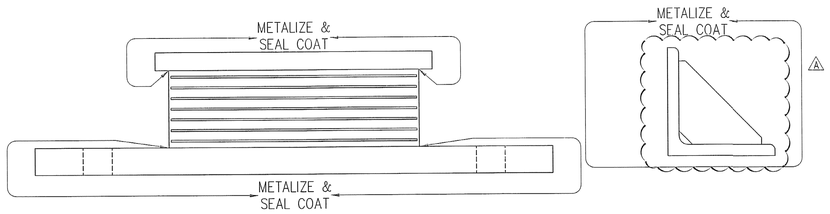
Project: _____

DSB Job: 25217-1104

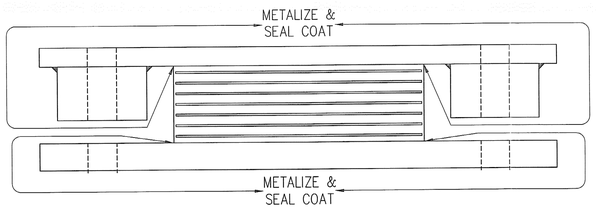
Preheat and Interpass Temperature Chart

| Base Metal Thickness range | Minimum Preheat (°F) | Max Preheat & Interpass (°F) |
|---|---|---|
| ≤3/4" | 50°F | 450°F |
| >3/4" to ≤1.5" | 70°F | 450°F |
| >1.5" to ≤2.5" | 150°F | 450°F |
| >2.5" | 225°F | 450°F |

Note: When this procedure is used for A709Gr50W materials, it shall be limited to 5/16" single pass or material be coated.




EXPANSION BEARING COATING LIMITS




FIXED BEARING COATING LIMITS

## GENERAL NOTES:

1. PAD AND MATERIALS SHALL CONFORM TO STATE OF VERMONT, AGENCY OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION, DATED 2006 AND THE LATEST REVISIONS, AND THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, FOURTH EDITION, DATED 2007, AND ITS LATEST REVISIONS, CONTRACT PLANS, AND THE SPECIAL PROVISIONS. GENERAL SHOP PRACTICES, STRUCTURAL FABRICATION, WELDING AND ASSEMBLY SHALL BE GOVERNED BY ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE. A

2. THESE SHOP DRAWINGS ARE PREPARED IN ACCORDANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS. THE D.S. BROWN COMPANY DOES NOT ACCEPT LIABILITY FOR THE DESIGN OF THE PRODUCTS DETAILED IN THESE SHOP DRAWINGS.

3. THE D.S. BROWN COMPANY TO SUPPLY ONLY THE PARTS SHOWN ON THESE DRAWINGS.

4. ALL STEEL SHALL BE PRODUCED IN THE UNITED STATES OF AMERICA.

5. THE BEARING SHALL BE SUBJECT TO RANDOM IN-HOUSE ELASTOMER TESTING AND IN-HOUSE PROOF LOAD TESTING IN ACCORDANCE WITH AASHTO DIVISION I, SECTION 14 (METHOD "A") AND AASHTO DIVISION II, SECTION 18.

6. THE TEMPERATURE OF THE STEEL ADJACENT TO THE ELASTOMER SHALL NOT EXCEED 93°C (200°F). TEMPERATURE SHALL BE CONTROLLED BY THE USE OF A TEMPERATURE INDICATING CRAYON OR OTHER DEVICES APPROVED BY THE ENGINEERS.

7. ALL CORNERS AND EDGES OF STEEL PLATES SHALL BE GROUND TO A 0.063" RADIUS.

8. ALL STRUCTURAL STEEL SURFACES TO BE METALIZED SHALL BE CLEANED IN ACCORDANCE WITH SSPC-SP5.

9. ALL SPECIFIED STEEL TO BE ZINC METALIZED IN ACCORDANCE WITH AWS C 2.18 SPECIFICATIONS TO A MINIMUM DRY FILM THICKNESS OF 6 MILS. THE ZINC METALIZED SHALL CONSIST OF 99.9% ZINC. EXTERIOR SURFACES SHALL BE SEALED WITH CARBOLINE SEALER "RUSTABOND" WITH A MINIMUM DRY FILM THICKNESS 2 MILS. SEE COATING LIMITS FOR LOCATIONS.

11. A

| TOLERANCE TABLE | |
|---|---|
| DESCRIPTION (ELASTOMER) | TOLERANCE |
| OVERALL VERTICAL DIMENSION | + 1/8", -0 |
| ELASTOMERIC BEARING DESIGN THICKNESS > 1.250" | + 1/4", -0 |
| ELASTOMERIC BEARING PLAN ≤ 36" | + 1/4", -0 |
| ELASTOMERIC COVER TOP & BOTTOM | + 1/8", -0 |
| ELASTOMERIC COVER SIDES | + 1/8", -0 |
| | |
| THICKNESS OF INDIVIDUAL LAYERS OF ELASTOMER (LAMINATED BEARINGS | |
| ONLY) AT ANY POINT WITHIN THE BEARING | ± 1/8" |
| | |
| VARIATION FROM A PLANE PARALLEL TO THE THEORETICAL SURFACE | |
| (AS DETERMINED BY MEASUREMENTS AT THE EDGE OF THE BEARINGS) | |
| TOP | 0.005 RAD |
| SIDES | ± 1/4" |
| | |
| POSITION OF EXPOSED CONNECTION MEMBERS | ± 1/8" |
| EDGE COVER OF EMBEDDED LAMINATES OF CONNECTION MEMBERS | + 1/8", -0 |
| SIZE OF HOLES, SLOTS, OR INSERTS | ± 1/8" |
| POSITION OF HOLES, SLOTS, OR INSERTS | ± 1/8" |

| | |
|---|---|
| MASONRY PL. PLAN DIMENSIONS | ±1/4" |
| MASONRY PL. UNDERSIDE SURFACE FLATNESS | CLASS C |
| MASONRY PL. UPPERSIDE SURFACE FLATNESS | CLASS A |
| MASONRY PL. THICKNESS | ±1/16" |
| HOLE LOCATION | ±1/16" |
| SOLE PL. PLAN DIMENSIONS | (±1/16") A |
| SOLE PL. UNDERSIDE SURFACE FLATNESS | CLASS A |
| SOLE PL. UPPERSIDE SURFACE FLATNESS | CLASS C |
| SOLE PL. BEVEL SLOPE | ± 0.002 RAD |
| SOLE PL THICKNESS | ±1/16" |
| MASONRY & SOLE PLATE SURFACE FINISH (BEARING SIDE) | 125 RMS |

| FLATNESS TOLERANCE | |
|---|---|
| CLASS | X NOM. DIM. |
| A | 0.0005 |
| B | 0.001 |
| C | 0.002 |

RECEIVED
CK'D BY sss CK'D BY mfm
FEB 17
APPROVED
DATE 2/3/09

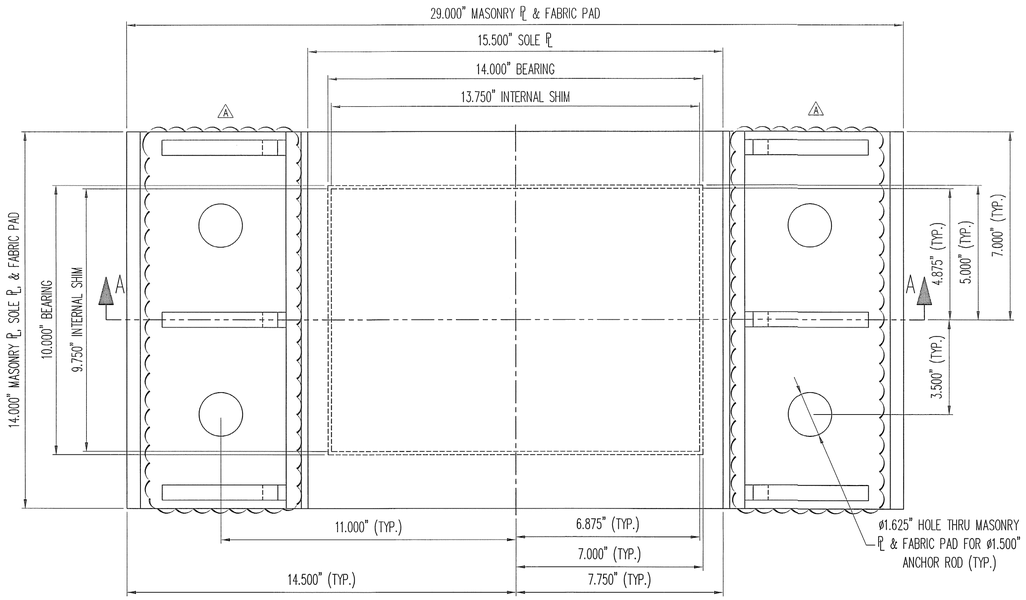
| REV. | DESCRIPTION | DATE | DET. | CKD. |
|---|---|---|---|---|
| A | REVIEWERS COMMENTS | 1/27/09 | DA | DAE |

D.S. BROWN
THE D.S. BROWN COMPANY
300 E. CHERRY STREET
NORTH BALTIMORE, OHIO 45872
419.257.3561
FAX: 419.257.0332
WWW.DSBROWN.COM

| | ITEM | QUANTITY |
|---|---|---|
| LOCATION — VT 102 (MAJOR COLLECTOR) | – | – |
| PROJECT NO. — ER ST 0271 (16) | – | – |
| BRIDGE — 16 | – | – |
| — | – | – |
| — | – | – |
| P.O. NO. — C2223 | – | – |
| DESIGNER — VT DOT | – | – |
| CUSTOMER — WINTERSET INC. | – | – |

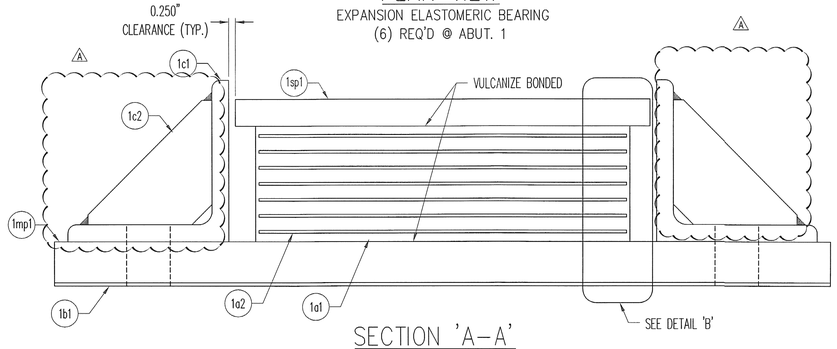
DESCRIPTION: GENERAL NOTES & COATING LIMITS
ESSEX CO., VT

| SCALE: | DRAWN BY: | CHECKED BY: | DATE: | |
|---|---|---|---|---|
| N.T.S. | DA | DAE | 12/15/08 | – |
| PROJECT NUMBER | PRODUCT CODE | RELEASE | SHEET | |
| 25217 | 1104 | 1 | GN1 | |

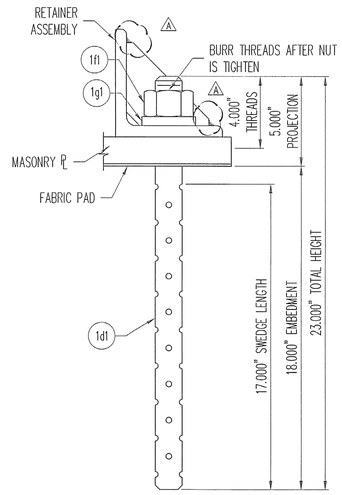



## PLAN VIEW

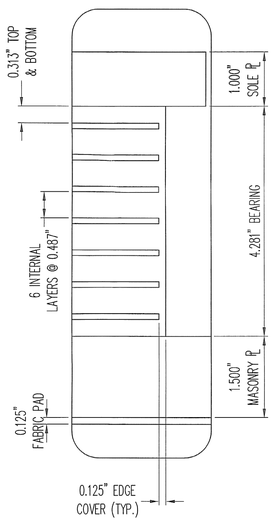
EXPANSION ELASTOMERIC BEARING
(6) REQ'D @ ABUT. 1



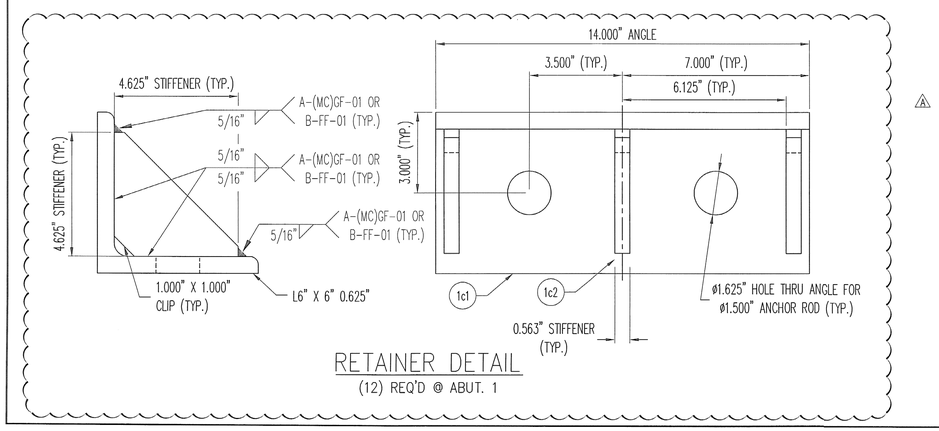

## SECTION 'A–A'




## ANCHOR ROD DETAIL




## DETAIL 'B'




## RETAINER DETAIL

(12) REQ'D @ ABUT. 1

| MK | QTY | DESCRIPTION | MATERIAL | LENGTH | REMARKS | REV |
|---|---|---|---|---|---|---|
| 1A | 6 | ELASTOMERIC BEARING | | | | - |
| 1a1 | 6 | 4.281" X 14.000" | NATURAL RUBBER | 10.000" | 60+/-5 DURO GR.4 | - |
| 1a2 | 42 | 12 GA. X 13.750" | A1011 GR 36 | 9.750" | PLAIN | - |
| 1mp1 | 6 | 1.500" X 29.000" | A709 GR 50 | 14.000" | METALIZE, SEAL | A |
| 1sp1 | 6 | 1.000" X 15.500" | A709 GR 50 | 14.000" | METALIZE, SEAL | A |
| | | | | | | |
| 1B | 6 | FABRIC PAD | | | | - |
| 1b1 | 6 | 0.125" X 29.000" | AASHTO (LRFD) 18.10.2 | 14.000" | HOLES | - |
| | | | | | | |
| 1C | 12 | RETAINER | | | | - |
| 1c1 | 12 | L6 X 6 X 5/8 | A709 GR 50 OR A992 | 14.000" | 1.625"ø HOLES; METALIZE, SEAL | A |
| 1c2 | 36 | 0.563" X 4.625" | A709 GR 50 OR A992 | 4.625" | CLIPPED; METALIZE, SEAL | A |
| | | | | | | |
| 1D | 24 | SWEDGE ROD | | | | - |
| 1d1 | 24 | Ø1.500" X 23.000" SWEDGED ROD | A449 | | 4" THREADS, 17" SWEDGE; A153-HDG | - |
| | | | | | | |
| 1F | 24 | HEAVY HEX NUT | | | | - |
| 1f1 | 24 | Ø1.500" HEX NUT | A563-DH OR A194-2H | | A153-HDG | - |
| | | | | | | |
| 1G | 24 | WASHER PLATE | | | | - |
| 1g1 | 24 | 0.500" X 3.000" | A709 GR 50 | 3.000" | 1.563"ø HOLE @ CENTER; A123-HDG | A |
| | | | | | 1/28/09 11:18:46 AM | |

RECEIVED
OK'D BY SSS OK'D BY MJM
2/3/09

SEE SHT. GN1 FOR GENERAL NOTES & COATING LIMITS.

| REV. | DESCRIPTION | DATE | DET. | CKD. |
|---|---|---|---|---|
| 1 | REVIEWERS COMMENTS | 1/27/09 | DA | DAE |

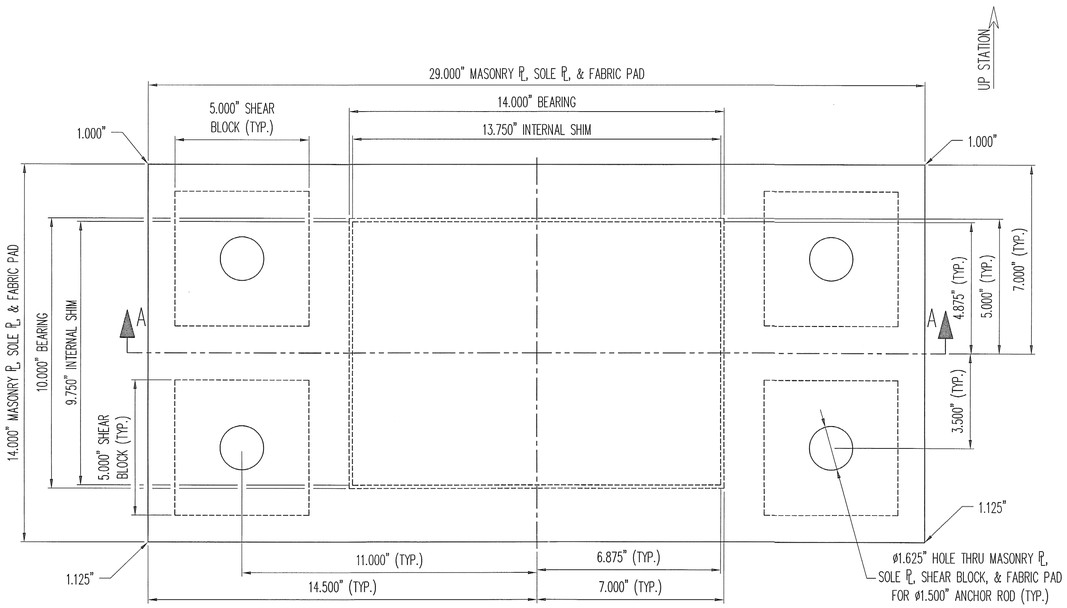

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300 E. CHERRY STREET
NORTH BALTIMORE, OHIO 45872
419.257.3561
FAX: 419.257.0332
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| | ITEM | QUANTITY |
|---|---|---|
| LOCATION — VT 102 (MAJOR COLLECTOR) | 25217–1104–1 | 6 OF 6 |
| PROJECT NO. — ER ST 0271 (16) | – | – |
| BRIDGE — 16 | – | – |
| — | – | – |
| — | – | – |
| P.O. NO. — C2223 | – | – |
| DESIGNER — VT DOT | – | – |
| CUSTOMER — WINTERSET INC. | – | – |

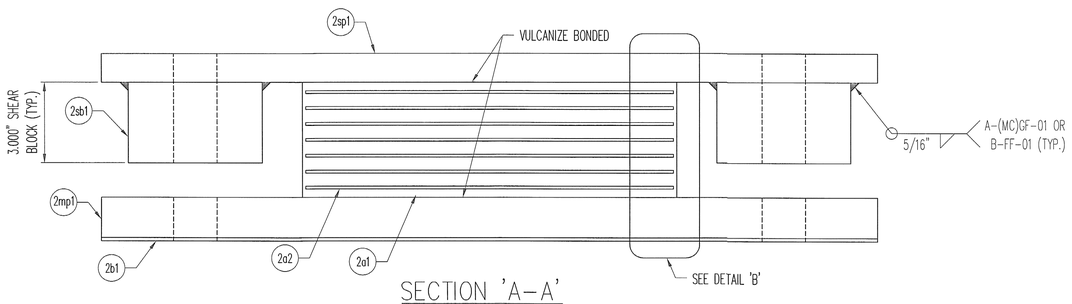
DESCRIPTION: VERSIFLEX ELASTOMERIC BEARING
ESSEX CO., VT

| SCALE: | DRAWN BY: | CHECKED BY: | DATE: | |
|---|---|---|---|---|
| N.T.S. | DA | DAE | 12/15/08 | – |
| PROJECT NUMBER | PRODUCT CODE | RELEASE | SHEET | |
| 25217 | 1104 | 1 | 01 | |

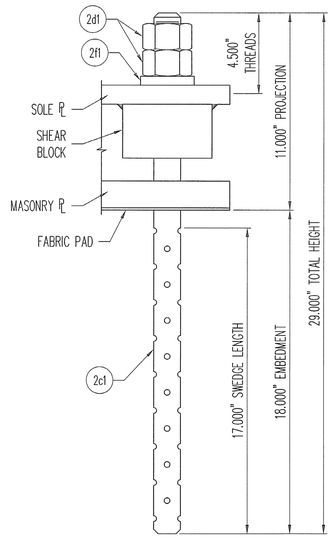
| MK | QTY | DESCRIPTION | MATERIAL | LENGTH | REMARKS | REV |
|---|---|---|---|---|---|---|
| 2A | 6 | ELASTOMERIC BEARING | | | | - |
| 2a1 | 6 | 4.281" X 14.000" | NATURAL RUBBER | 10.000" | 60+/-5 DURO GR.4 | - |
| 2a2 | 42 | 12 GA. X 13.750" | A1011 GR 36 | 9.750" | PLAIN | - |
| 2mp1 | 6 | 1.500" X 29.000" | A709 GR 50 | 14.000" | METALIZE, SEAL | A |
| 2sb1 | 12 | 3.000" X 5.000" | A709 GR 50 | 5.000" | METALIZE, SEAL | A |
| 2sp1 | 6 | 1.125" X 29.000" | A709 GR 50 | 14.000" | METALIZE, SEAL | A |
| | | | | | | |
| 2B | 6 | FABRIC PAD | | | | - |
| 2b1 | 6 | 0.125" X 29.000" | AASHTO (LRFD) 18.10.2 | 14.000" | HOLES | - |
| | | | | | | |
| 2C | 24 | SWEDGE ROD | | | | - |
| 2c1 | 24 | Ø1.500" X 29.000" SWEDGED ROD | A449 | | 4.5" THREADS, 17" SWEDGE; A153-HDG | - |
| | | | | | | |
| 2D | 48 | HEAVY HEX NUT | | | | - |
| 2d1 | 48 | Ø1.500" HEX NUT | A563-DH OR A194-2H | | A153-HDG | - |
| | | | | | | |
| 2F | 24 | ELASTOMERIC WASHER | | | | - |
| 2f1 | 24 | 0.500" X 3.000" | NATURAL RUBBER | 3.000" | 60 MIN. DURO GR.3; 1.563"ø HOLE @ CENTER | - |
| | | | | | 1/27/2009 10:05:23 AM | |



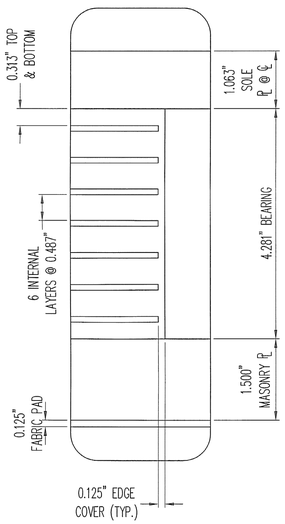

PLAN VIEW
FIXED ELASTOMERIC BEARING
(6) REQ'D @ ABUT. 2




SECTION 'A-A'




ANCHOR ROD DETAIL




DETAIL 'B'

RECEIVED
BY SSS DATE 2/3/09

SEE SHT. GN1 FOR GENERAL NOTES & COATING LIMITS.

| REV. | DESCRIPTION | DATE | DET. | CKD. |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| 1 | REVIEWERS COMMENTS | 1/27/09 | DA | DAE |


D.S. BROWN

THE D.S. BROWN COMPANY
300 E. CHERRY STREET
NORTH BALTIMORE, OHIO 45872
419.257.3561
FAX: 419.257.0332
WWW.DSBROWN.COM


| | ITEM | QUANTITY |
|---|---|---|
| LOCATION — VT 102 (MAJOR COLLECTOR) | 25217-1104-2 | 6 OF 6 |
| PROJECT NO. — ER ST 0271 (16) | - | - |
| BRIDGE — 16 | - | - |
| — | - | - |
| — | - | - |
| P.O. NO. — C2223 | - | - |
| DESIGNER — VT DOT | - | - |
| CUSTOMER — WINTERSET INC. | - | - |

DESCRIPTION:
VERSIFLEX ELASTOMERIC BEARING
ESSEX CO., VT

| SCALE: | DRAWN BY: | CHECKED BY: | DATE: | |
|---|---|---|---|---|
| N.T.S. | DA | DAE | 12/15/08 | - |
| PROJECT NUMBER | PRODUCT CODE | RELEASE | SHEET | |
| 25217 | 1104 | 1 | 02 | |

VERMONT

*Agency of Transportation*

**State of Vermont**
**PDD/Structures Design Section**
National Life Building – Drawer 33
Montpelier, VT 05633-5001
**www.aot.state.vt.us**

[phone] 802-828-2621
[fax] 802-828-3566
[ttd] 800-253-0191

3476

**Foster Precise**
**3 Farm Lane**
**Georgetown, MA 01833**

**DATE: January 29, 2009**

**Project Name: Canaan** **Project #: ER ST 0271 (16)**

**Structure Identification: Bridge #16, VT 102 over the Willard Stream**

The following Structural Steel details, Item # 506.50, Structural Steel, Rolled Beam for the above project (Vendor's Job # 3476 ) transmitted with your letter dated 01/19/2009 have been reviewed and are being returned herewith.

Sheets: GN1, E1, 1-7, and X1
**are approved**

Sheets: _____
**are approved "as noted"**

You must provide notice to our fabrication inspector, Jeff Clark, as to the date fabrication represented by these drawings will begin. Jeff must receive and acknowledge your notice at least seven days prior to that date, as per Specification 506.03. You may contact Jeff by phone at (802)828-0044 or email at jeff.clark@state.vt.us. Any material fabricated prior to the notification date is subject to rejection without further cause.

Please submit extended weights for our approval.
**Partial payment for this item will be withheld until extended weights are received and approved.**

Sincerely,

Martha Evans-Mongeon, P.E.
Project Manager

RECEIVED
FEB - 2 2009
FOSTER-PRECISE
Division of L.B. Foster Company

Attachments
cc: [X] Resident Engineer w/prints, Doug Bumps
[X] Shop Inspector w/prints, Jeff Clark
[X] Contractor w/prints, Winterset
[X] Construction Division – letter only
[X] Materials & Research Section (C&IA Unit) – letter only
[X] Files (Structures & Central)

**********

LB Foster — SHIPPING LIST — PAGE 1

JOB: 3476 - ER ST 0271 (16) Canaan — CONTRACT:

PROJECT: — DATE: 2/2/2009

REMARKS:

**********

| PIECE # | MARK | QTY. | TYPE | DESCRIPTION | LENGTH | MILL MARK | GRADE | CAMBER | REMARKS | WEIGHT ONE ITEM | WEIGHT LINE TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1) | 1A | 1 | W | 36 x 135 | 83'- 6 11/16 | | C 50 | | cvn bevel | 11280.23 | 11280.23 |
| 2) | pcn1 | 1 | PL | 1/2 x 5 | 2'- 9 7/8 | | G 50 | | | 24.01 | 24.01 |
| 3) | pbr1 | 3 | PL | 1/2 x 5 | 2'- 9 7/8 | | G 50 | | | 24.01 | 72.04 |
| 4) | pgs1 | 3 | PL | 1/2 x 5 | 2'- 9 7/8 | | G 50 | | | 24.01 | 72.04 |
| 5) | pbs1 | 1 | PL | 1/4 x 2 13/16 | 0'- 8 5/16 | | G 50 | | | 1.66 | 1.66 |
| WEIGHT OF ALL PIECES 1A: | | | | 11449.98 LBS. | | WEIGHT OF 1 PIECE: | | | | 11449.98 LBS. | |
| 6) | 2A | 1 | W | 36 x 135 | 83'- 6 11/16 | | C 50 | | cvn bevel | 11280.23 | 11280.23 |
| 7) | pan1 | 7 | PL | 1/2 x 5 | 2'- 9 7/8 | | G 50 | | | 24.01 | 168.10 |
| 8) | pcn1 | 7 | PL | 1/2 x 5 | 2'- 9 7/8 | | G 50 | | | 24.01 | 168.10 |
| WEIGHT OF ALL PIECES 2A: | | | | 11616.43 LBS. | | WEIGHT OF 1 PIECE: | | | | 11616.43 LBS. | |
| 9) | 3A | 1 | W | 36 x 135 | 83'- 6 11/16 | | C 50 | | cvn bevel | 11280.23 | 11280.23 |
| 10) | pan1 | 7 | PL | 1/2 x 5 | 2'- 9 7/8 | | G 50 | | | 24.01 | 168.10 |
| 11) | pcn1 | 7 | PL | 1/2 x 5 | 2'- 9 7/8 | | G 50 | | | 24.01 | 168.10 |
| WEIGHT OF ALL PIECES 3A: | | | | 11616.43 LBS. | | WEIGHT OF 1 PIECE: | | | | 11616.43 LBS. | |
| 12) | 4A | 1 | W | 36 x 135 | 83'- 6 11/16 | | C 50 | | cvn bevel | 11280.23 | 11280.23 |
| 13) | pan1 | 7 | PL | 1/2 x 5 | 2'- 9 7/8 | | G 50 | | | 24.01 | 168.10 |
| 14) | pcn1 | 7 | PL | 1/2 x 5 | 2'- 9 7/8 | | G 50 | | | 24.01 | 168.10 |
| WEIGHT OF ALL PIECES 4A: | | | | 11616.43 LBS. | | WEIGHT OF 1 PIECE: | | | | 11616.43 LBS. | |
| 15) | 5A | 1 | W | 36 x 135 | 83'- 6 11/16 | | C 50 | | cvn bevel | 11280.23 | 11280.23 |
| 16) | pan1 | 7 | PL | 1/2 x 5 | 2'- 9 7/8 | | G 50 | | | 24.01 | 168.10 |
| 17) | pbr1 | 1 | PL | 1/2 x 5 | 2'- 9 7/8 | | G 50 | | | 24.01 | 24.01 |
| 18) | pcn1 | 3 | PL | 1/2 x 5 | 2'- 9 7/8 | | G 50 | | | 24.01 | 72.04 |
| 19) | pdr1 | 3 | PL | 1/2 x 5 | 2'- 9 7/8 | | G 50 | | | 24.01 | 72.04 |
| WEIGHT OF ALL PIECES 5A: | | | | 11616.42 LBS. O.K. | | WEIGHT OF 1 PIECE: | | | | 11616.42 LBS. O.K. | |
| 20) | 6A | 1 | W | 36 x 135 | 83'- 6 11/16 | | C 50 | | cvn bevel | 11280.23 | 11280.23 |
| 21) | pan1 | 7 | PL | 1/2 x 5 | 2'- 9 7/8 | | G 50 | | | 24.01 | 168.10 |
| 22) | pbs1 | 1 | PL | 1/4 x 2 13/16 | 0'- 8 5/16 | | G 50 | | | 1.66 | 1.66 |
| WEIGHT OF ALL PIECES 6A: | | | | 11449.99 LBS. | | WEIGHT OF 1 PIECE: | | | | 11449.99 LBS. | |
| 23) | 7A | 35 | MC | 18 x 42.7 | 5'- 1 3/8 | | G 50 | | | 218.39 | 7643.74 |
| WEIGHT OF ALL PIECES 7A: | | | | 7643.74 LBS. | | WEIGHT OF 1 PIECE: | | | | 218.39 LBS. | |

**********

LB Foster

JOB: 3476 - ER ST 0271 (16) Canaan

PROJECT:

REMARKS:

SHIPPING LIST PAGE 2

CONTRACT:

DATE: 2/2/2009

**********

*** JOB SUMMARY ***

| ITEM COUNT | MATERIAL TYPE | MATERIAL WEIGHT | STEEL SURFACE AREA | STAINLESS SURFACE AREA | ALUMINUM SURFACE AREA |
|---|---|---|---|---|---|
| 6 | W SHAPE | 67692 LBS. | 4869 SQ. FT. | 0 SQ. FT. | 0 SQ. FT. |
| 35 | MC SHAPE | 7644 LBS. | 751 SQ. FT. | 0 SQ. FT. | 0 SQ. FT. |
| 72 | PLATE | 1685 LBS. | 182 SQ. FT. | 0 SQ. FT. | 0 SQ. FT. |
| | JOB TOTAL: | 77011 LBS. | 5822 SQ. FT. | 0 SQ. FT. | 0 SQ. FT. |

VERMONT

**State of Vermont** *Agency of Transportation*
**PDD/Structures Design Section**
National Life Building – Drawer 33 [phone] 802-828-2621
Montpelier, VT 05633-5001 [fax] 802-828-3566
**www.aot.state.vt.us** [ttd] 800-253-0191

**Foster Precise**
**3 Farm Lane**
**Georgetown, MA 01833**

**DATE: January 29, 2009**

**Project Name: Canaan** **Project #: ER ST 0271 (16)**

**Structure Identification: Bridge #16, VT 102 over the Willard Stream**

The following Structural Steel details, Item # 506.50, Structural Steel, Rolled Beam for the above project (Vendor's Job # 3476 ) transmitted with your letter dated 01/19/2009 have been reviewed and are being returned herewith.

Sheets: GN1, E1, 1-7, and X1
**are approved**

Sheets: _____
**are approved "as noted"**

You must provide notice to our fabrication inspector, Jeff Clark, as to the date fabrication represented by these drawings will begin. Jeff must receive and acknowledge your notice at least seven days prior to that date, as per Specification 506.03. You may contact Jeff by phone at (802)828-0044 or email at jeff.clark@state.vt.us. Any material fabricated prior to the notification date is subject to rejection without further cause.

Please submit extended weights for our approval.
**Partial payment for this item will be withheld until extended weights are received and approved.**

Sincerely,

Martha Evans-Mongeon, P.E.
Project Manager

Attachments
cc: [X] Resident Engineer w/prints, Doug Bumps
[X] Shop Inspector w/prints, Jeff Clark
[X] Contractor w/prints, Winterset
[X] Construction Division – letter only
[X] Materials & Research Section (C&IA Unit) – letter only
[X] Files (Structures & Central)

# LB FOSTER CO Precise Structural Products

## Welding Procedure Specification



**001 - FILLET WELD**

Material Spec. **ASTM A709 G36, G50 & G50W** **AASHTO M270 G36, G50 & G50W**

Welding Process(es) **SAW**

Position of Welding **1F & 2F**

Manual ☐ Machine ☐ Semi-Automatic ☑ Automatic ☐

Filler Metal Specification **AWS A5.23**

Filler Metal Classification **F7A2-EN1K-Ni1-H8**

Flux **LINCOLN 860**

Shielding Gas **N/A** Gas Flow Rate **N/A**

Single or Multiple Pass **BOTH**

Single or Multiple Arc **SINGLE**

Welding Current **REVERSE**

Polarity: AC ☐ DCEP ☑ DCEN ☐ Pulsed ☐

Welding Progression Up ☐ Down ☐

Root Treatment **CLEAN AS TO REMOVE CONTAMINANTS**

Preheat Temperature ***** SEE PAGE 2** Interpass Temperature ***** SEE PAGE 2**

Postheat Treatment **N/A**

Heat Input Min **48.55 KILOJOULES/IN** Max **76.29 KILOJOULES/IN**

**WELDING PROCEDURE**

| Pass No. | Electrode Size | Amperes | Volts | Travel Speed Other | Joint Detail |
|---|---|---|---|---|---|
| All | 5/64 | 330-350 | 33-35 | 10-11 |  |

WTRANS
RECEIVED
CK'D BY _____ OK'D BY JWC
DEC 1 2008
R _____ APPROVED ✓
BY _____ DATE 01/05/09

This procedure may vary due to fabrication sequence, fit-up, pass size, etc., within the limitation of variables given in Section 5.

Procedure No. **001 - FILLET WELD** Contractor _____

Revision No. **01** Authorized By **WALTER J. BORKOWSKI** Date **3/14/2008**

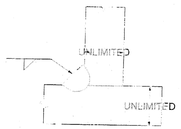
# LB FOSTER CO Precise Structural Products



## Welding Procedure Specification

**001 - FILLET WELD**

**Joint Detail**




**MEMO**

*** MINIMUM PREHEAT AND INTERPASS TEMPERATURE SHALL BE AS FOLLOWS: TO 3/4" INCL 50 DEG F, OVER 3/4" TO 1-1/2" INCL 70 DEG F, OVER 1-1/2" TO 2-1/2" INCL 150 DEG F, OVER 2-1/2" 225 DEG F.

LEG DIMENSION AS FOLLOWS: 3/16", 1/4", 5/16", 3/8" 7/16", 1/2", 9/16", 3/4".

PROCEDURE QUALIFICATION RECORD NUMBER SAW-01-2007

# LB FOSTER CO Precise Structural Products

## Welding Procedure Specification



3476-01

Material Spec. ASTM A709 G36, G50 & G50W

Welding Process(es) SMAW

Position of Welding 1F, 2F, 3F, 4F

Manual ☑ Machine ☐ Semi-Automatic ☐ Automatic ☐

Filler Metal Specification AWS A5.1

Filler Metal Classification E7018

Flux N/A

Shielding Gas N/A Gas Flow Rate N/A

Single or Multiple Pass Single

Single or Multiple Arc SINGLE

Welding Current REVERSE

Polarity: AC ☐ DCEP ☑ DCEN ☐ Pulsed ☐

Welding Progression Up ☐ Down ☐

Root Treatment CLEAN AS TO REMOVE CONTAMINANTS

Preheat Temperature N/A Interpass Temperature N/A

Postheat Treatment N/A

Heat Input Min N/A Max N/A

### WELDING PROCEDURE

| Pass No. | Electrode Size | Amperes | Volts | Travel Speed | Other |
|---|---|---|---|---|---|
| ALL | 3/32 | 120-150 | | | |
| ALL | 1/8 | 140-180 | | | |
| ALL | 5/32 | 160-210 | | | |
| ALL | 3/16 | 190-250 | | | |

Joint Detail



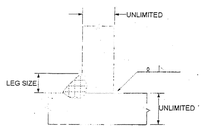
VTRANS
RECEIVED
CK'D BY JWK
DEC 1 1 2008
APPROVED
DATE 01/05/09

This procedure may vary due to fabrication sequence, fit-up, pass size, etc., within the limitation of variables given in Section 5.

Procedure No. 1 TACK WELD Contractor

Revision No. Authorized By WALTER J. BORKOWSKI Date 12/31/2008

Joint Detail




MEMO

THIS PROCEDURE APPLIES TO TACK WELDING ONLY.

TACK LEG SIZE SHALL BE 1/8" OR 3/16".

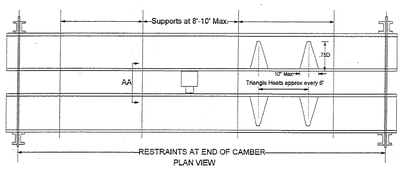
## HEAT CAMBER PROCEDURE

**Heating Equipment:** Heating shall be performed using large, approximately 1 inch diameter, multi-orifice (rosebud) heating torch operating at approximately 25 psi of propane and 125 psi oxygen. Heating shall be confined to the patterns described herein and shall be conducted to bring the steel within the planned pattern to a temperature between 1000 Deg F and 1150 Deg F as rapidly as possible without overheating the steel.

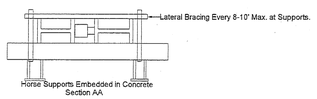
**Heat Measurement:** Heating measurements shall be made using temperature indicating crayons manufactured, for 1000 Deg F, 1100 Deg F, 1150 and 1200 Deg F. Heat measurements shall be made after heating flame is removed.

**Order of Events:**

1. Stringer flanges shall be supported in the no load position (web horizontal). Stringers are to be place on steel horses. Steel horses are approximately every 8' to 10 '.
2. Stringers are to be laid back to back (flange to flange). Two stringers shall be heat cambered simultaneously.
3. Triangular heating patterns shall be marked onto the webs and flanges as required, to achieve specified camber. See sketch below.
4. Maximum 20,000-psi compressive stress shall be induced. One ram shall be used to accomplish specified camber at each location. Ram shall have a calibrated pressure gauge. Once specified camber is achieved the ram is repositioned to the next location.
5. Heating shall begin at the apex of the triangle and progress to the base and across the full width of the flange. Temperature shall be brought between 1000 Deg F and 1150 Deg F as rapidly as possible. Temperature exceeding 1200 Deg F shall be cause for rejection.
6. Stringers are to be cooled in still air. Quenching with water or water and air will not be performed.
7. Cambers are checked in the unloaded position accordance with the approved shop drawing(s).



PLAN VIEW



Section AA

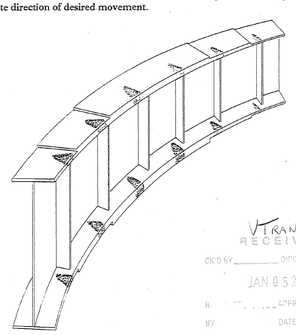
VTRANS
RECEIVED
CK'D BY_____OK'D BY JUC
JAN 05 2009
R_____APPROVED_____
BY DATE 01/06/09

## HEAT STRAIGHTENING AND SWEEP PROCEDURE

Heat straightening and sweep of rolled sections were the radius is less than 1,000 feet.

1) Heating V type patterns shall be marked on flange as required to obtain desired curvature. The truncated triangle shall have an included angle of approximately 15 to 30 degrees. The apex of the truncated triangle shall terminate just before the juncture of the web. The base of the truncated triangle shall not exceed 10 inches (Typically 3" to 5"). See Detail Below.
2) Heating shall be performed using large, approximately 1 inch diameter, multioroifice (rosebud) heating torch. Approximately 25 psi propane and 126 psi oxygen.
3) Heating operation shall begin at the apex of the truncated triangle and progress to the base (Do not heat the apex once heating progresses to base). Heating both inside and outside of flange surfaces concurrently is required when the flange thickness is greater than 1 ¼".
4) Maximum heating temperature shall be 1150 degrees F as verified with temperature indicating crayons. 1000, 1100, 1150, 1200 degrees F temperature indicating crayons shall be allied after heat is removed. Temperature exceeding 1,200 degrees F shall be cause for rejection.
5) Particular attention shall be placed on unwanted web distortion.
6) Cooling shall be performed in still dry air.
7) Stringer sweep shall be re-inspected, with the web in the vertical position.
8) Operation shall be performed in accordance with AASHTO Div 2 11.4.12.2.

Diagram below depicts typical sweep type procedure. For heat straightening the V heats are applied on the outside of the curve. It is understood that the apex of the triangles, are pointed in the opposite direction of desired movement.



VTRANS
RECEIVED
OK'D BY _____ OK'D BY JWC
JAN 05 2009
R _____ APPROVED √
BY _____ DATE 01/06/09

**WINTERSET INCORPORATED**
P.O BOX 968
LYNDONVILLE, VERMONT 05851

(802) 626-9330 FAX (802) 626-8933

# LETTER OF TRANSMITTAL

DATE 11/28/2009 JOB NO.

ATTENTION Martha Evans-Mongeon

RE: Canaan
ER ST 6271(16)

TO State of Vermont
Agency of Transportation

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

| COPIES | DATE | NO. | DESCRIPTION |
|---|---|---|---|
| 1 | 12/31/08 | 1 | Welding Procedure Specifications (2) |

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☑ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

COPY TO _____

SIGNED: Alex Thompson
Winterset Inc

*If enclosures are not as noted, kindly notify us at once.*

# L.B.Foster Co.

**Foster Precise**

3 Farm Lane • Georgetown • MA • 01833 • Ph:(978) 352-2591 • Fax:(978) 352-2182

## Letter Of Transmittal

**Project Number:** 3476
**Project Name:** VT AOT - VT 102 Bridge Project Canaan

**LOT No.:** 2
**Date:** 12/31/08 10:08 AM

**To:**
**Alex Thompson, PE**
Winterset, Inc.
PO Box 968
128 Winterset Drive
Lyndonville, VT 05851
Ph: (802) 626-9330
Fax: (802) 626-8933

**CC:** None

**Subject:** WELDING PROCEDURE SPECIFICATIONS (2)

We are sending you the following 13 page(s) via

Please return the following by:

☐Shop Drawings ☐Contract Drawings ☑Miscellaneous Other:

**Purpose of Transmittal:** For Approval

**Items:**

| Copies | Date | Rev # | Description |
|---|---|---|---|
| 1 | 12/31/2008 | | SMAW TACK PROCEDURE |
| Sheets: 2 | | | |
| 1 | 11/20/2007 | | SAW PROCEDURE QUALIFICATION |
| Sheets: 9 | | | |
| 1 | 3/14/2008 | | SAW FILLET WELD PROCEDURE SPECIFICATION |
| Sheets: 2 | | | |

**Remarks:**

Gentlemen,

Please find attached welding procedure specifications for consideration by the Vermont Agency of Transportation.

Please feel free to call with any questions.

**Respectfully,**

*Walter Borkowski Ext.14*

**FOSTER PRECISE**

# LB FOSTER CO Precise Structural Products

## Welding Procedure Specification



001 - FILLET WELD

Material Spec. ASTM A709 G36, G50 & G50W — AASHTO M270 G36, G50 & G50W

Welding Process(es) SAW

Position of Welding 1F & 2F

Manual ☐ Machine ☐ Semi-Automatic ☑ Automatic ☐

Filler Metal Specification AWS A5.23

Filler Metal Classification F7A2-ENi1K-Ni1-H8

Flux LINCOLN 860

Shielding Gas N/A — Gas Flow Rate N/A

Single or Multiple Pass BOTH

Single or Multiple Arc SINGLE

Welding Current REVERSE

Polarity: AC ☐ DCEP ☑ DCEN ☐ Pulsed ☐

Welding Progression Up ☐ Down ☐

Root Treatment CLEAN AS TO REMOVE CONTAMINANTS

Preheat Temperature *** SEE PAGE 2 — Interpass Temperature *** SEE PAGE 2

Postheat Treatment N/A

Heat Input Min 48.55 KILOJOULES/IN — Max 75.29 KILOJOULES/IN

**WELDING PROCEDURE**

| Pass No. | Electrode Size | Amperes | Volts | Travel Speed | Other | Joint Detail |
|---|---|---|---|---|---|---|
| All | 5/64 | 330-350 | 33-35 | 10-11 | |  |

This procedure may vary due to fabrication sequence, fit-up, pass size, etc., within the limitation of variables given in Section 5.

Procedure No. 001 - FILLET WELD — Contractor

Revision No. 01 — Authorized By WALTER J. BORKOWSKI — Date 3/14/2008

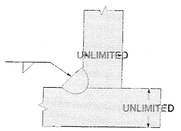
## LB FOSTER CO Precise Structural Products

**Welding Procedure Specification**



**001 - FILLET WELD**

**Joint Detail**




**MEMO**

*** MINIMUM PREHEAT AND INTERPASS TEMPERATURE SHALL BE AS FOLLOWS: TO 3/4" INCL 50 DEG F, OVER 3/4" TO 1-1/2" INCL 70 DEG F, OVER 1-1/2" TO 2-1/2" INCL 150 DEG F, OVER 2-1/2" 225 DEG F.

LEG DIMENSION AS FOLLOWS: 3/16", 1/4", 5/16", 3/8" 7/16", 1/2", 9/16", 3/4".

PROCEDURE QUALIFICATION RECORD NUMBER SAW-01-2007

# PROCEDURE QUALIFICATION RECORD - SAW-01-2007

Contractor: *L.B. Foster Company* | Test Date: *November 20, 2007*
Process: *Submerged Arc Welding (SAW)* | Filler Metal: *A5.23*
Position: *Flat (1G)*
Electrode(s) Mfg. Designation: *Lincoln LA-75* | AWS Specification: *A5.23*
Flux Mfg. Designation: *not available* | AWS Classification: *F7A2-EN1K-N1-H8*
Electrode Extension: *1.25 inches*

| | | Diameter | Current | IPM* | Voltage | Current & Polarity |
|---|---|---|---|---|---|---|
| **Electrode** | (1) | *5/64 inches* | *340* | *10* | *34* | *DCEP* |
| | (2) | | | | | |
| | (3) | | | | | |

Calculated Heat Input: *69.36* *kilojoules / inch* (See 5.12)
Shielding Gas: *not applicable* | Flow Rate: *not applicable*
Dew Point: *not available* | Travel Speed: *10 IPM*
Base Metal Specification & Thickness: *AASHTO M270, grade 50W, 1 inches thick*
(Attach Certified Copy of Mill Test Report)

Preheat Temp.: *200° F* Interpass Temp. Min.: *200° F* Max.: *400° F*

| SPECIMEN | | TEST RESULTS | |
|---|---|---|---|
| All Weld Metal Tension (AWMT) | | Tensile Strength (PSI) | *76,334* |
| | | Yield Strength (PSI) | *59,675* |
| | | Elongation in 2 inches (%) | *30.9* |
| | | Reduction in Area (%) | *69.8* |
| Side Bend | 1. *acceptable* 2. *acceptable* | 3. *acceptable* | 4. *acceptable* |
| Reduced Section Tension | Tensile Strength (PSI) 1. *82,220* 2. *85,789* | Location of Break 1. *base metal* 2. *base metal* | |
| Charpy V-notch Impact Toughness of Weld Metal SMAW, SAW, GMAW 5 required ESW & EGW - 8 required | ( *56* , *44* , *36* , *68* , *24* ) average ft - lbs ** *45.33* @ *- 20* degrees F. ( *NA* , *NA* , *NA* , *NA* ) average ft - lbs ** *NA* @ *NA* degrees F. | | |

** Discard the highest and lowest values and average the remaining values.

Chemistry of Deposited Weld Metal When required by Contract Documents: C *NA* Mn *NA* Si *NA* P *NA* S *NA* Ni *NA* Cr *NA* Mo *NA* V *NA* Cu *NA*

REMARKS: Visual *acceptable* Radiographic Test *acceptable*

* Wire feed may be used in lieu of current when a correlation curve is provided for the same electrode diameter and same electrode extension.

Test Witness: *Derek Crowe* Agency: *Mass Highway Department*
Results Reviewed: State Acceptance: Date:

A B C Testing Inc.

95 FIRST STREET • P.O. BOX 868 • BRIDGEWATER, MASSACHUSETTS 02324
TELEPHONE 508 - 697 - 6068 • FAX # 508 - 697 - 6154

# MECHANICAL TEST REPORT

ABC Testing number: 117907 Date December 10, 2007
Customer: L.B. Foster Company Purchase order: per transmittal - W. Borkowski
Code or Standard: ASTM E - 8, ASTM E - 23, AWS D1.5 & NYSSDM
POR #, Heat #, or other SAW-01-2007
Material & Dimensions: 1 inch thick plate [AST M A709, Grade 50W]
Remarks: Impact tests: -20 degrees F

## BEND TESTS

| Type and Figure | Result |
|---|---|
| Transverse Side - Figure 5.11 | Acceptable |
| Transverse Side - Figure 5.11 | Acceptable |
| Transverse Side - Figure 5.11 | Acceptable |
| Transverse Side - Figure 5.11 | Acceptable |

## TENSILE TESTS

Type & Figure Transverse Rectangular - Figure 5.10

| Specimen | Width (inches) | Thickness (inches) | Area (sq. in.) | Ultimate Load (pounds) | Ultimate Strength (PSI) | Type of Failure |
|---|---|---|---|---|---|---|
| A | 0.993 | 0.997 | 0.990 | 81,400 | 82,220 | Duct - BM |
| B | 0.993 | 0.992 | 0.916 | 78,600 | 85,789 | Duct - BM |

Type & Figure Round [all weld metal] - Figure 5.9

| Specimen | Diameter (inches) | Area (sq. inches) | Yield Load (pounds) | Tensile Load (pounds) | Yield Strength (PSI) | Tensile Strength (PSI) |
|---|---|---|---|---|---|---|
| WM1 | 0.506 | 0.201 | 12,000 | 18,350 | 59,675 | 76,334 |
| WM2 | 0.505 | 0.200 | 12,000 | 18,150 | 59,911 | 75,638 |
| | Gage length (inches) | New length (inches) | % elongation | New diameter (inches) | Reduced Area (sq. inches) | % RA |
| WM1 | 2.014 | 2.637 | 30.93 | 0.278 | 0.051 | 69.82 |
| WM2 | 2.014 | 2.660 | 32.08 | 0.275 | 0.059 | 70.35 |

## IMPACT TESTS

Type & Figure Type A - Figure 5.13

| Specimen | 1 | 2 | 3 | 4 | 5 | average ** |
|---|---|---|---|---|---|---|
| | (ft - lbs) | (ft - lbs) | (ft - lbs) | (ft - lbs) | (ft - lbs) | (ft - lbs) |
| Value | 58 | 44 | 36 | 68 | 24 | 46.33 |

** discard the highest and lowest values and average the remaining values

All tests were conducted in accordance with the referenced standard.

By: James E. Harrington Jr.

*A B C Testing Inc.*

**95 FIRST STREET • P.O. BOX 868 • BRIDGEWATER, MASSACHUSETTS 02324**
**TELEPHONE 508 - 697 - 6068 • FAX # 508 - 697 - 6154**

# RECORD OF RADIOGRAPHIC EXAMINATION

TO *L. B. Foster Company*
*3 Farm Lane*
*Georgetown, MA 01833-1843*

Client's Order No. *verbal(W.Borkowski)*
ABC Project No. *117907*
Date *November 29, 2007*
Drawing No.
Contract No.

Location Involved *ABC Testing Labotatory* Date *November 29, 2007*
Object or Part Radiographed *PQR plate* Approved proc. No. *RT 1/3* rev. *2*
Joint Type *long. butt* Coverage *full* Penetrameter Location *source side*
Type of Material *steel* Group No. *1* Penetrameter *#20* Group No. *1*
Wall Thickness *1 in* Total Exposure Thickness *1 in* Shim(s)/Reinforcement *0*
Source of Radiation *X-ray* Curies *NA* No of Exp *2* per weld *2* Total
Focal Spot *4.0 mm* KV *300* MA *10* Angle of Source *90* Degrees
Mfr of Machine *Philips* Exposure Type *single* wall Location of Markers *source side*
Standard *AWS D1.5* Object to Film Distance *1 in* Film to source Distance *36 inches*
Time of Exposure *0.8 minutes* Type of film *Agfa D5* No. of film *1* Screens *Pb. .010x.010 in.*
Acceptance Standard *AWS D1.5* Radiograph Status *original* View Type *single*
Remarks:

| Serial and Film Number | Acceptable | Rejectable | Cracks | Lack of Pent. | Lack of Fusion | Slag Inclusion | Porosity | Slack - up | Burn Through | Undercutting | Tungsten | Film Artifacts | 2-2t Sensitivity | Retake | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A-B | X | | | | | | | | | | | | X | | |
| B-C | X | | | | | | | | | | | | X | | film scratch |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

Radiographed By *Jeffrey Rodrigues*

Reported By *Jeffrey Rodrigues, Level II*

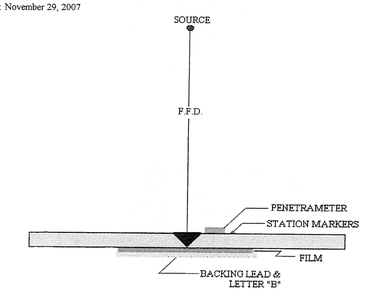
Owner / Manufacturers Review
By Date:

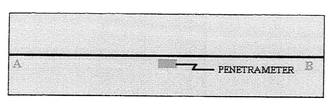
*A B C Testing Inc.*

**95 FIRST STREET • P.O. BOX 868 • BRIDGEWATER, MASSACHUSETTS 02324**
**TELEPHONE 508 - 697 - 6068 • FAX # 508 - 697 - 6154**

## ***Radiographic Shooting Sketch***

Client: L.B. Foster Company
Purchase order: verbal(Walter Borkowski)
Object: PQR plate
R.T date: November 29, 2007




## ***Technique variables data***

Source: X-ray
Penetrameter: #20
Film type: Agfa D5
Focal Film distance: 36 inches
Shim: 0

GnSteel USA
INCORPORATED
4001 PHILADELPHIA PIKE
CLAYMONT, DELAWARE 19703 U.S.A.

# MATERIAL TEST REPORT

SOLD TO:
FOSTER PRECISE FABRICATING
DIVSION OF L.B. FOSTER COMPANY
3 FARM LANE

GEORGETOWN, MA

SPECIFICATION
ASTM A709-00a Grade 50 W T Type A Zone 2

| MILL ORDER | BILL OF LADING | CUSTOMER P.O. NO. | DATE |
|---|---|---|---|
| 156112 | 185898 | 106808-3059 | 04/28/03 |

Unless otherwise specified, the following conditions apply: 1. Material is 100% melted and manufactured in the USA. 2. Mercury, radium or alpha source materials have not been used. 3. Test piece serial # represents actual plate tested, not necessarily plate shipped (except PW3 where every plate is tested).

CHEMICAL ANALYSIS

| HEAT | C | Mn | P | S | Si | Cu | Ni | Cr | Mo | Sn | Al | V | Nb | N | Acid Soluble Al | Ti | T.i |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1H071 | 0.13 | 0.90 | 0.009 | 0.015 | 0.38 | 0.30 | 0.21 | 0.61 | 0.061 | 0.020 | 0.007 | 0.046 | 0.003 | 0.010 | 0.006 | 0.002 | |

| HEAT | DIMENSION NO. PCS | GAUGE (IN) | WIDTH (IN) | LENGTH (IN) | TEST PIECE SERIAL # | NORM | TENSILE TESTS TENSILE (KSI) | YIELD (KSI) | ELONG % IN | BEND | TEST TEMP (F) | IMPACT TESTS FT-LBS 1 | 2 | 3 | MILS LAT EXP 1 | 2 | 3 | % SHEAR 1 | 2 | 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1H071 | 2 | 1.0000 | 60.0000 | 240.000 | 0662506 | | 79.0 | 60.0 | 23 | | | | | | | | | | | |
| | Part Number: 106808-3059 | | | | | | | | | | | | | | | | | | | |
| 1H071 | - | 1.0000 | 60.0000 | 240.000 | 0662558 | | 80.0 | 55.0 | 27 | | | | | | | | | | | |
| 1H071 | - | 1.0000 | 60.0000 | 240.000 | 0662558 | | | | | | 25 | 98.0 | 98.0 | 98.0 | 80.0 | 78.0 | 76.0 | 75.0 | 68.0 | 65 |

NOTARY SEAL
NAME: Ann Marie Leininger

OTHER TESTS / INFORMATION
MD DC 11/6/04

I CERTIFY THE ABOVE RESULTS TO BE CORRECT AS CONTAINED IN THE RECORDS OF THE CORPORATION
D. J. Cernava
DAVID J. CERNAVA
CHIEF METALLURGIST

CS-1035M ISO 2392QF (8/02)

CHAPEL STEEL CO.

PO/Rel

QUALITY CONTROL APPROVED
Attn

**Certificate of Mill Test Results**
PHL-000000-000



PART NO.

Chapel Steel USA
INCORPORATED
4001 PHILADELPHIA PIKE
CLAYMONT, DELAWARE 19703 U.S.A.

# MATERIAL TEST REPORT

SOLD TO:
CHAPEL STEEL COMPANY

P.O. BOX 1000

SPRING HOUSE, PA

SPECIFICATION
ASTM A588-94 GRADE A, 1995 ED.
ASTM A588-94 GRADE B, 1995 ED.

| MILL ORDER | BILL OF LADING | CUSTOMER P.O. NO. | DATE |
|---|---|---|---|
| 176948 | 220029 | PHL-5954 | 09/21/05 |

Unless otherwise specified, the following conditions apply: 1. Material is 100% melted and manufactured in the USA. 2. Mercury, radium or alpha source materials have not been used. 3. Test piece serial # represents actual plate tested, not necessarily plate shipped (except PTQ where every plate is tested).

CHEMICAL ANALYSIS

| HEAT | C | Mn | P | S | Si | Cu | Ni | Cr | Mo | Sn | Al | V | Nb | N | Sol. Acid Al | Ti | B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1U318 | 0.14 | 0.89 | 0.007 | 0.022 | 0.39 | 0.29 | 0.11 | 0.52 | 0.029 | 0.028 | 0.009 | 0.032 | 0.004 | 0.011 | 0.008 | 0.002 | 0.0006 |
| 1U324 | 0.14 | 0.88 | 0.005 | 0.013 | 0.40 | 0.27 | 0.13 | 0.52 | 0.031 | 0.021 | 0.008 | 0.041 | 0.003 | 0.010 | 0.008 | 0.003 | 0.0006 |
| 1U345 | 0.15 | 0.89 | 0.010 | 0.017 | 0.38 | 0.31 | 0.12 | 0.56 | 0.031 | 0.023 | 0.011 | 0.041 | 0.005 | 0.010 | 0.008 | 0.003 | 0.0006 |

DIMENSION

| HEAT | NO PCS | GAUGE (IN) | WIDTH (IN) | LENGTH (IN) | TEST PIECE SERIAL # | NORM |
|---|---|---|---|---|---|---|
| 1U318 | 2 | 0.3750 | 96.0000 | 480.0000776630 | | |
| 1U324 | 2 | 0.3750 | 96.0000 | 480.0000776024 | | |
| 1U324 | - | 0.3750 | 96.0000 | 480.0000776141 | | |
| 1U345 | 3 | 0.3750 | 96.0000 | 480.0000776836 | | |
| 1U345 | - | 0.3750 | 96.0000 | 480.0000777136 | | |

TENSILE TESTS

| TENSILE (KSI) | YIELD (KSI) | ELONG % IN | BEND |
|---|---|---|---|
| 86 | 71 | 17 | 8 |
| 85 | 71 | 18 | 8 |
| 81 | 55 | 28 | 2 |
| 83 | 69 | 20 | 8 |
| 80 | 62 | 25 | 2 |

IMPACT TESTS

| TEST TEMP (F) | FT-LBS 1 | FT-LBS 2 | FT-LBS 3 | MILS LAT EXP 1 | MILS LAT EXP 2 | MILS LAT EXP 3 | % SHEAR 1 | % SHEAR 2 | % SHEAR 3 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |

OTHER TESTS / INFORMATION

I CERTIFY THE ABOVE RESULTS TO BE CORRECT AS CONTAINED IN THE RECORDS OF THE CORPORATION

D. J. Cermava

DAVID J. CERMAVA
CHIEF METALLURGIST

# Certified Test Report

**LABORATORY TESTING INC.**
2331 Topaz Drive, Hatfield, PA 19440
Phone: 800-219-9095 • Fax: 800-219-9096

CSC002-05-11-29581-1

CHARPY APPROVED

ISO/IEC 17025 Materials Testing Laboratory NDT (PT, MT, UT)

**SOLD TO**
Chapel Steel Company
Attn: Tara Townsend
P.O. Box 1000
Spring House, PA 19477

**SHIP TO**
Chapel Steel Company
Building 2E, Suite 106
191 South Keim Street
Pottstown, PA 19464
**ATTN**: Gary Halteman

| CUSTOMER P.O. | CERTIFICATION DATE | SHIP VIA |
|---|---|---|
| 73911 | 11/7/05 | FAX AND MAIL |

**DESCRIPTION**

2 pcs 5" x 7" Test Samples, 1pc .3/4" Thick and 1pc 3/8" Thick ASTM A709-01b, Gr *50WT2, Heat #1U345
Reference: Customer #11686, Customer PO #13331-3059, Chapel W.O. #73911

***AMENDED CERTIFICATION (12/07/2005)**

Longitudinal Charpy V-Notch Impact testing at 40° F was performed on (2) sets of the submitted Test Specimens and (2) sets were found to be in conformance to ASTM A709-01b[S3] and Customer's Requirements with the following results:

| SAMPLE SIZE REQUIRED | PIECE NO. | FT-LBS. 15 MIN. AVG. | LAT. EXP. | % SHEAR |
|---|---|---|---|---|
| | - - - | | - - - | - - - |
| 3/4" | 1 | 79 | .066" | 65 |
| | 2 | 74 | .062" | 65 |
| | 3 | 75 | .063" | 65 |
| 3/8" | 1 | 76 | .083" | 100 |
| | 2 | 76 | .079" | 100 |
| | 3 | 77 | .078" | 100 |

**NOTE:** Sub-size (9mm x 10mm) charpy specimens were used for testing 3/8" sample.
"This clarification is in response is to Chapel Steel's request to explain why LTI used the average energy (Yield) to determine the temperature to perform the Charpy Notch Test. Chapel Steel Work Order # 73911 identified the heat as 1U345.

ASTM A709-1b Table S1-2 Notes:
Note A states "The CVN-Impact testing shall be "H" heat frequency testing in accordance with Specification A673/A 673M."

Note B states "If the yield point of the material exceeds 65 Ksi (450 MPa), the testing temperature for the minimum average energy required shall be reduced by 15°F (8°C) for each increment of 10 Ksi (70 MPa). The yield point is the value given on the certified "Mill Test Report".

Chapel Steel identified that LTI use the requirements from ASTM A709/A 709 M 50WT2 Specification. Using the Notes in Table S1-2 for the Grade that was identified on the Work Order we determined that as long as the same heat is being tested than we could average the Yield on the Citisteel Material Test Report, which gave two Yields for the same heat. (69 & 62 Ksi - Ave. 65.5 Ksi)

The services performed above were done in accordance with LTI's Quality System Program Manual Revision 17 dated 12/3/04 and ISO/IEC 17025. These results relate only to the items tested and this report shall not be reproduced, except in full, without the written approval of Laboratory Testing, Inc. L.T.I. is accredited by NADCAP to ISO/IEC 17025, Material's Testing and NDT (MT, PT and UT).

**MERCURY CONTAMINATION:** During the testing and inspection, the product did not come in direct contact with mercury or any of its compounds nor with any mercury containing devices employing a single boundary of containment.

**NOTE:** The recording of false, fictitious or fraudulent statements or entries on this document may be punished as a felony under Federal Statutes.

Donald J. DiFilippo
QA Manager

By: _____
Authorized Signature

The Lincoln Electric Company
22801 St. Clair Avenue
Cleveland, Ohio 44117-1199

# CERTIFICATE OF CONFORMANCE
(APPLIES ONLY TO U.S. PRODUCTS)

LINCOLN ELECTRIC

[1 Year]

Product: Lincolnweld® 860 Flux / LA-75 Electrode
Classification: F7A2-EN1K-Ni1-H8
Specification: AWS A5.23-97, ASME SFA-5.23
Test Completed: July 26, 2007

This is to certify that the product named above and supplied on the referenced order number is of the same classification, manufacturing process, and material requirements as the material which was used for the test that was conducted on the date shown, the results of which are shown below. All tests required by the specifications shown for classification were performed at that time and the material tested met all requirements. It was manufactured and supplied according to the Quality System Program of the Lincoln Electric Company, Cleveland, Ohio, U.S.A., which meets the requirements of ISO9001, NCA3800, ANSI/AWS A5.01, JIS Z9902, and other specification and Military requirements, as applicable. The Quality System Program has been approved by ASME, ABS, and VdTUV.

| Operating Settings | AWS/ASME Requirements | Results |
|---|---|---|
| Electrode Size | 5/32 inch | 5/32 inch |
| Polarity | | DC+ |
| Voltage, V | 27 - 30 | 28 |
| Wire Feed Speed, cm/min (in/min) | | 112 (44) |
| Current, amps | 475 - 575 | 525 |
| Contact Tip to Work Distance, mm (in.) | (1 - 1 1/2) | 32 (1 1/4) |
| Travel Speed, cm/min (in./min) | (15 - 17) | 41 (16) |
| Passes/Layers | | 17/8 |
| Preheat Temp, °C (°F) | (275 - 325) | 150 (300) |
| Interpass Temp, °C (°F) | (275 - 325) | 150 (300) |
| **Mechanical properties of the weld deposits (in the as-welded condition)** | | |
| Tensile Strength, MPa (ksi) | (70 - 95) | 580 (80) |
| Yield Strength, 0.2% offset MPa (ksi) | (58 min.) | 450 (66) |
| Elongation, % | 22 min | 32 |
| Average Hardness Rockwell B | Not Required | 87 |
| Avg. Charpy V-notch Impact Properties Joules @ -29 °C (ft/lbf @ -20 °F) | (20 min.) | 108 (79) |
| Diffusible Hydrogen, (ml/100g) per AWS A4.3 | 8.0 max | 96,111,112 (71,82,83) |
| Absolute Humidity (grains moisture/lb dry air) | | 4.4 |
| | | 65 |

**Chemical composition of the weld deposit and electrode**

| Analysis (weight %) | Ni1 Deposit | | EN1K Electrode | |
|---|---|---|---|---|
| | Requirements | Results | Requirements | Results |
| C | 0.12 max. | 0.04 | 0.12 max. | 0.08 |
| Mn | 1.60 max. | 1.53 | 0.80 - 1.40 | 0.98 |
| Si | 0.80 max. | 0.47 | 0.40 - 0.80 | 0.55 |
| S | 0.025 max. | 0.011 | 0.020 max. | 0.006 |
| P | 0.030 max. | 0.018 | 0.020 max. | 0.006 |
| Cr | 0.15 max. | 0.03 | Not Required | 0.02 |
| Ni | 0.75 - 1.10 | 0.76 | 0.75 - 1.25 | 0.87 |
| Mo | 0.35 max. | 0.01 | Not Required | 0.02 |
| V+Ti+Zr | 0.05 max. | 0.01 | Not Required | 0.00 |
| Cu (total) | 0.35 max. | 0.09 | 0.35 max. | 0.08 |

This certificate complies to the requirements of EN 10204, Type 2.2.
Radiographic Test: Met requirements.
Test assembly constructed of ASTM A516 Grade 70 steel.

Results below the detection limits of the instrument or lower than the precision required by specification are reported as zero.
Strength values in SI units are reported to the nearest 10 MPa converted from actual data. Preheat and interpass temperature values in SI units are reported to the nearest 5 degrees.

Phillip J. Woodrow, Certification Supervisor — July 26, 2007 (Date)

David A. Fink, Manager, Compliance Engineering, Consumable R&D Department — 27JUL07 (Date)



Cert. No. 46760

L.B. FOSTER COMPANY
PRECISE STRUCTURAL PRODUCTS

**SAW MACROETCH TEST REPORT**

Test Date: 3/27/2008

Test conducted in accordance with AWS D1.5 Section 5.10 FIGURE 5.8
Plate Thinckness: T1 & T2 = 1" HEAT NUMBER T0371

Position: FLAT
Maximum Single-Pass: 3/8" NO REJECTABLE INDICATION - PASS
Smallest Multi-Pass: 7/16" NO REJECTABLE INDICATION – PASS

Position: HORIZONTAL
Maximum Single-Pass: 5/16" NO REJECTABLE INDICATION - PASS
Smallest Multi-Pass: 7/16" NO REJECTABLE INDICATION – PASS

Test Conducted By: Walter J. Borkowski & Michael Morelli
L.B. FOSTER COMPANY
QUALITY DEPARTMENT

Preparation and testing witnessed by Mr. Derek Crowe Massachusetts Highway Department

Derek Crowe 4/7/2008

# LB FOSTER CO Precise Structural Products

## Welding Procedure Specification



3476-01

Material Spec. **ASTM A709 G36, G50 & G50W**

Welding Process(es) **SMAW**

Position of Welding **1F, 2F, 3F, 4F**

Manual ☒ Machine ☐ Semi-Automatic ☐ Automatic ☐

Filler Metal Specification **AWS A5.1**

Filler Metal Classification **E7018**

Flux **N/A**

Shielding Gas **N/A** Gas Flow Rate **N/A**

Single or Multiple Pass **Single**

Single or Multiple Arc **SINGLE**

Welding Current **REVERSE**

Polarity: AC ☐ DCEP ☒ DCEN ☐ Pulsed ☐

Welding Progression Up ☐ Down ☐

Root Treatment **CLEAN AS TO REMOVE CONTAMINANTS**

Preheat Temperature **N/A** Interpass Temperature **N/A**

Postheat Treatment **N/A**

Heat Input Min **N/A** Max **N/A**

**WELDING PROCEDURE**

| Pass No. | Electrode Size | Amperes | Volts | Travel Speed | Other | Joint Detail |
|---|---|---|---|---|---|---|
| ALL | 3/32 | 120-150 | | | | |
| ALL | 1/8 | 140-180 | | | | |
| ALL | 5/32 | 160-210 | | | | |
| ALL | 3/16 | 190-250 | | | | |



This procedure may vary due to fabrication sequence, fit-up, pass size, etc., within the limitation of variables given in Section 5.

Procedure No. **1 TACK WELD** Contractor

Revision No. Authorized By **WALTER J. BORKOWSKI** Date **12/31/2008**

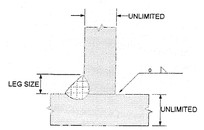
## LB FOSTER CO Precise Structural Products

**Welding Procedure Specification**



**3476-01**

**Joint Detail**




**MEMO**

THIS PROCEDURE APPLIES TO TACK WELDING ONLY.

TACK LEG SIZE SHALL BE 1/8" OR 3/16".

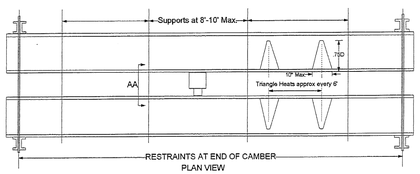
## HEAT CAMBER PROCEDURE

**Heating Equipment:** Heating shall be performed using large, approximately 1 inch diameter, multi-orifice (rosebud) heating torch operating at approximately 25 psi of propane and 125 psi oxygen. Heating shall be confined to the patterns described herein and shall be conducted to bring the steel within the planned pattern to a temperature between 1000 Deg F and 1150 Deg F as rapidly as possible without overheating the steel.

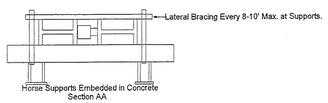
**Heat Measurement:** Heating measurements shall be made using temperature indicating crayons manufactured, for 1000 Deg F, 1100 Deg F, 1150 and 1200 Deg F. Heat measurements shall be made after heating flame is removed.

**Order of Events:**

1. Stringer flanges shall be supported in the no load position (web horizontal). Stringers are to be place on steel horses. Steel horses are approximately every 8' to 10 '.
2. Stringers are to be laid back to back (flange to flange). Two stringers shall be heat cambered simultaneously.
3. Triangular heating patterns shall be marked onto the webs and flanges as required, to achieve specified camber. See sketch below.
4. Maximum 20,000-psi compressive stress shall be induced. One ram shall be used to accomplish specified camber at each location. Ram shall have a calibrated pressure gauge. Once specified camber is achieved the ram is repositioned to the next location.
5. Heating shall begin at the apex of the triangle and progress to the base and across the full width of the flange. Temperature shall be brought between 1000 Deg F and 1150 Deg F as rapidly as possible. Temperature exceeding 1200 Deg F shall be cause for rejection.
6. Stringers are to be cooled in still air. Quenching with water or water and air will not be performed.
7. Cambers are checked in the unloaded position accordance with the approved shop drawing(s).



PLAN VIEW



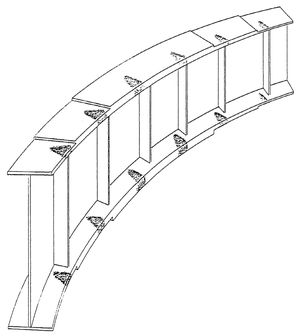
Section AA

**HEAT STRAIGHTENING AND SWEEP PROCEDURE**

Heat straightening and sweep of rolled sections were the radius is less than 1,000 feet.

1) Heating V type patterns shall be marked on flange as required to obtain desired curvature. The truncated triangle shall have an included angle of approximately 15 to 30 degrees. The apex of the truncated triangle shall terminate just before the juncture of the web. The base of the truncated triangle shall not exceed 10 inches (Typically 3" to 5"). See Detail Below.
2) Heating shall be performed using large, approximately 1 inch diameter, multiorofice (rosebud) heating torch. Approximately 25 psi propane and 126 psi oxygen.
3) Heating operation shall begin at the apex of the truncated triangle and progress to the base (Do not heat the apex once heating progresses to base). Heating both inside and outside of flange surfaces concurrently is required when the flange thickness is greater than 1 ¼".
4) Maximum heating temperature shall be 1150 degrees F as verified with temperature indicating crayons. 1000, 1100, 1150, 1200 degrees F temperature indicating crayons shall be allied after heat is removed. Temperature exceeding 1,200 degrees F shall be cause for rejection.
5) Particular attention shall be placed on unwanted web distortion.
6) Cooling shall be performed in still dry air.
7) Stringer sweep shall be re-inspected, with the web in the vertical position.
8) Operation shall be performed in accordance with AASHTO Div 2 11.4.12.2.

Diagram below depicts typical sweep type procedure. For heat straightening the V heats are applied on the outside of the curve. It is understood that the apex of the triangles, are pointed in the opposite direction of desired movement.



# GENERAL NOTES

## SPECIFICATIONS

ALL MATERIAL AND CONSTRUCTION SHALL CONFORM TO STATE OF VERMONT, AGENCY OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION, DATED 2006, AND ITS LATEST REVISIONS AND AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, FOURTH EDITION, DATED 2007 AND ITS LATEST REVISIONS.

ALL WELDING SHALL BE IN ACCORDANCE WITH THE CURRENT STRUCTURAL WELDING CODE ANSI/AASHTO/AWS D1.5. AND THR PROVISIONS OF SUBSECTION 506.10

## MATERIAL SPECIFICATIONS

ALL STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M270 GR 50 (U.O.N.).

ALL BOLTS FOR THIS PROJECT SHALL BE HIGH STRENGTH HEX HEAD BOLTS AND CONFORM TO ASTM A325 TYPE 1.

## FABRICATION

CVN- INDICATES CHARPY V-NOTCH TESTED FOR ZONE 2, IN ACCORDANCE WITH SUBSECTION 714.01 OF THE STANDARD SPECIFICATIONS.

MAIN LOAD CARRYING MEMBERS ARE ALL STRINGER BEAMS.

THE BOTTOM FLANGE OF STEEL BEAMS AT BEARING AREAS SHALL BE SHOP STRAIGHTENED AS NECESSARY TO PROVIDE UNIFORM CONTACT BETWEEN THE BEAM FLANGE & THE BEARING AT THE BRIDGE SEAT.

REMOVE SURFACE OF FLAME HARDENED STEEL BY GRINDING TO EXTENT NECESSARY TO ACHIEVE THE SPECIFIED SURFACE PROFILE.

## ERECTION NOTES

ALL CONNECTION ARE BEING MADE WITH HIGH STRENGTH BOLTS NOTED ABOVE WITH ONE (1) HARDENED WASHER (ASTM F436 TYPE 1) TO BE PLACED UNDER THE TURNED ELEMENT.

SHIPPING MARK NUMBER WILL BE LOCATED AS SHOWN ON ERECTION PLANS.

## CLEANING

ALL STEEL SHALL BE CLEANED IN ACCORDANCE WITH SSPC-SP10 BLAST CLEANING.

## PAINT

DRY FILM THICKNESS:

PRIMER: 2-3 MILS MIN. U.N.------CAR80 859

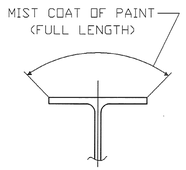
INTERMEDIATE: 4-6 MILS------CARBOLINE 888

FINISH: 3-5 MILS------CARBOTHANE 133HB ALIPHATIC POLYURETHANE
COLOR 20059 (BROWN) OF FEDERAL STANDARD 595B.

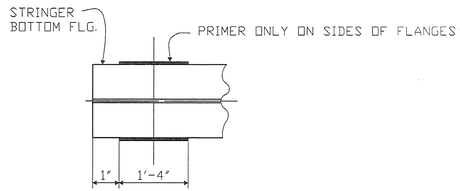
PAINTED AREAS:

FAYING AREAS WITHIN 3" OF OPEN HOLES SHALL BE GIVEN A COAT OF PRIMER PAINT ONLY.

THE TOP OF TOP FLANGE OF BEAMS WHICH ARE TO RECEIVE FIELD WELDED STUDS SHALL BE GIVEN A MIST COAT (1-1½ MILS) OF PRIMER PAINT ONLY.
(SEE DETAIL 1 BELOW)




DETAIL 1




SOLE PL WELD PREP

TYPICAL ALL BEAMS EACH END

| ITEM NO. | DESCRIPTION | |
|---|---|---|
| 506.50 | Structural Steel, Rolled Beam | PER LB |
| 513.25 | Structural Steel Paint Shop Applied | LS |
| 513.40 | Surface Preparation Shop | LS |

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BY DATE 1/26/09

| REV.NO | DATE | REVISION |
|---|---|---|
| 3 | | |
| 2 | | |
| 1 | 1/9/09 | APPROVER COMMENTS |

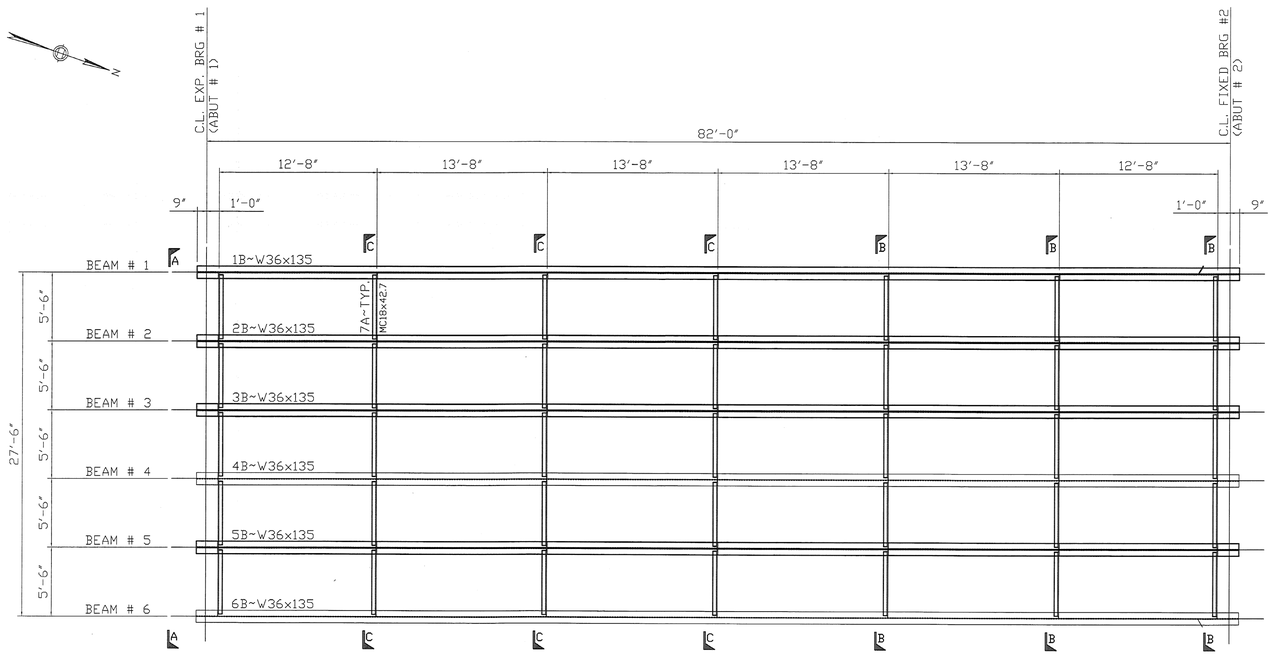
GENERAL NOTES

VT.102 (MAJOR COLLETOR) BRIDGE #16 CANAAN, VT
PROJECT NUMBER ER ST 0271 (16)

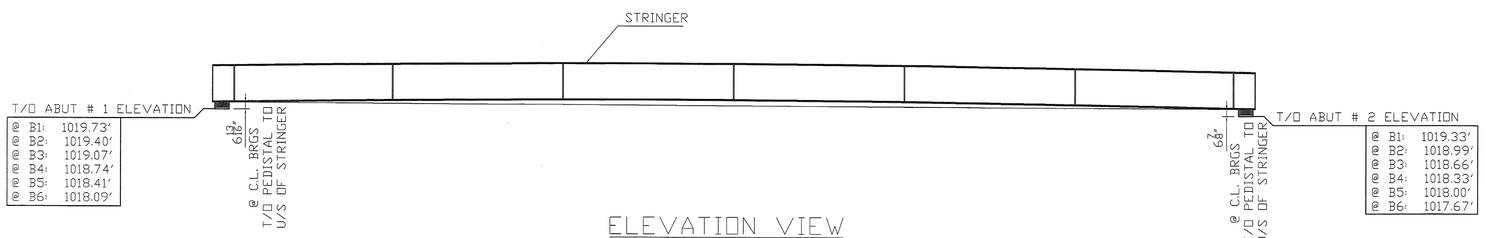
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3 FARM LANE GEORGETOWN, MA 01833
978-352-2591 FAX 978-352-2182

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CONTRACTOR: WINTEREST INC.

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|---|---|---|---|---|---|---|
| KC 11/23/08 | WL 11/30/08 | | | | 3476 | GN1 |




FRAMING PLAN




ELEVATION VIEW

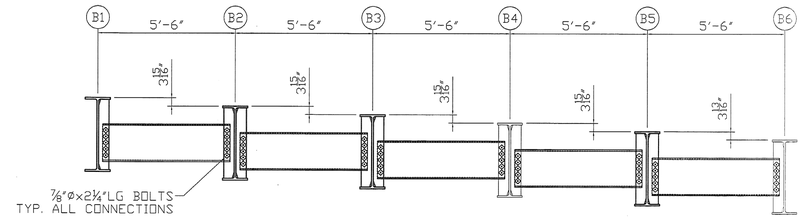
FIELD NOTE: BEARING ASSEMBLY & ANCHORS BY OTHERS

| FIELD BOLT LIST | | | | | | | ASTM M164M (ASTM A325) TYPE 1 BOLTS U.N.O. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LINE | ACTUAL No. REQ'D | BOLT DIAM | BOLT LENGTH | BOLTS / CONN. | # OF CONNS. | GRIP | THICKNESS OF PCS. CONNECTED | | | WASHER CODE | REMARKS |
| 1 | 350 | ⅞ | 2¼" | 70 | 5 | 1⅝" | ⅞" | ½" | | 1 | DIAPHRAGM TO BEAM CONNECTION |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |

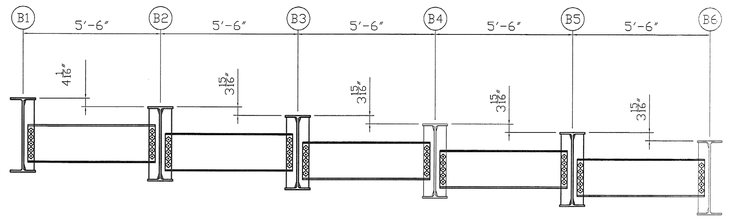
WASHER CODES
1 - 1 FLAT WASHER | 2 - 2 FLAT WASHERS | 3 - 1 BEVEL WASHERS

| FIELD BOLT SUMMARY | | | | | | NOTE: 4% ADDITIONAL BOLTS ADDED + 3 FOR TESTING |
|---|---|---|---|---|---|---|
| LINE | No. OF BOLTS | BOLT DIAM | TYPE | BOLT LENGTH | ACTUAL COUNT | REMARKS |
| 1 | 367 | ⅞ | ASTM - A325 TYPE 1 | 2¼" | 350 | w / 1 FLAT WASHER |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |

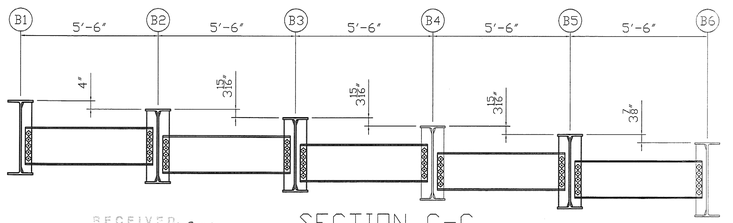
TOTAL WT.




SECTION A-A




SECTION B-B




SECTION C-C

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DATE 1/26/09
OK'D BY SSS OK'D BY MEM

NOTE:
1. FOR GENERAL NOTES SEE GN1

## SHOP NOTES

HOLES 15/16"Ø (U.N.)
BOLTS NONE
PAINT SEE GN DWG
WELDS TO BE MADE USING E80-NIL ELECTRODES
MATERIAL M270 Gr.50

| REV.NO | DATE | REVISION |
|---|---|---|
| 3 | | |
| 2 | | |
| 1 | - | - |

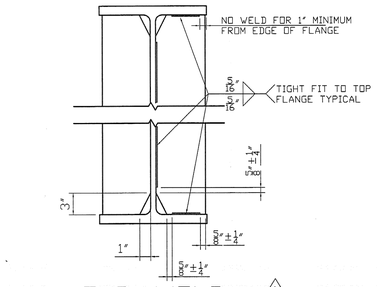
ERECTION DRAWING

VT.102 (MAJOR COLLETOR) BRIDGE #16 CANAAN, VT
PROJECT NUMBER ER ST 0271 (16)

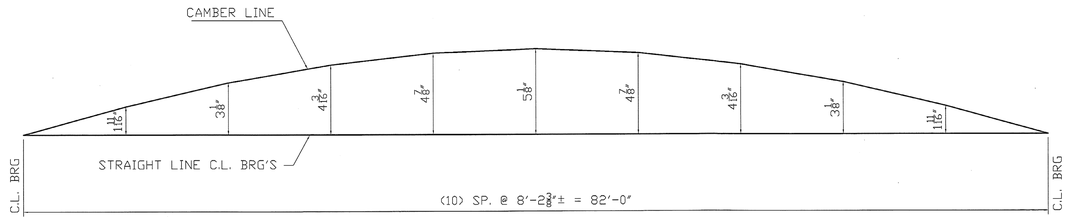
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OWNER: STATE OF VERMONT AGENCY OF TRANSPORTATION
CONTRACTOR: WINTERSET INC

| DRAWN BY | CHECKED BY | | | | JOB NO. | SHEET NO. |
|---|---|---|---|---|---|---|
| KC 11/23/08 | WL 11/30/08 | | | | 3476 | E1 |

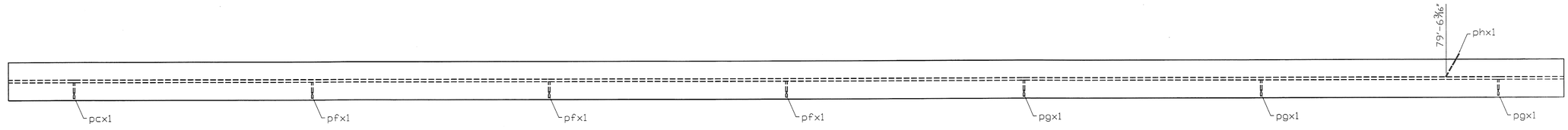


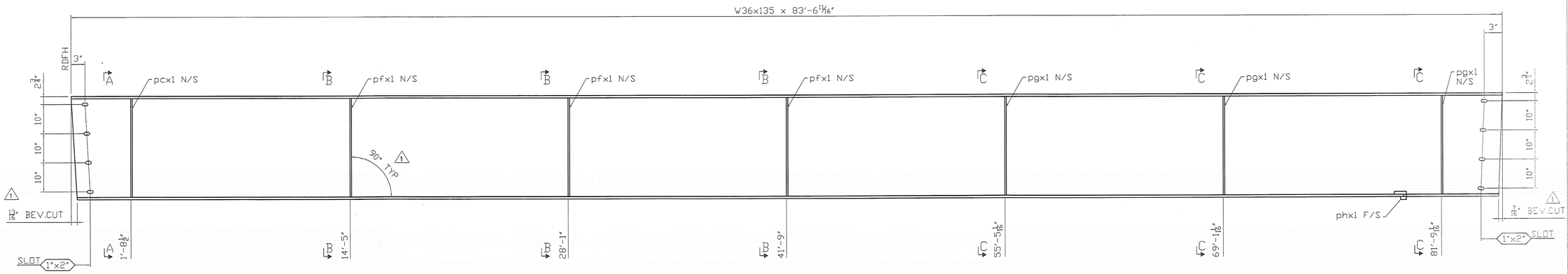

TYP. WELD ⚠1 TERMINATION DETAIL

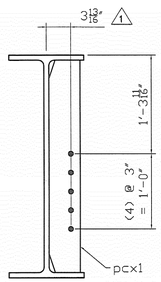



CAMBER DIAGRAM FOR BEAM 1

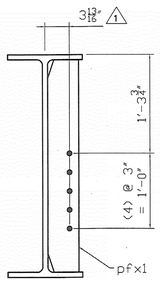
| SHIPPER | | BILL OF MATERIAL | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | MARK | NO. | MARK | SIZE | LENGTH | REMARKS | | WEIGHT |
| 1 | 1A | | | W36X135 | 83'-6 11/16" | CVN/BEVEL | | -- |
| | | 1 | pcx1 | PL 1/2x5 | 2'-9 7/8" | | | -- |
| | | 3 | pfx1 | PL 1/2x5 | 2'-9 7/8" | | | -- |
| | | 3 | pgx1 | PL 1/2x5 | 2'-9 7/8" | | | -- |
| | | 1 | phx1 | PL 1/2x2 13/16 | 0'-8 5/16" | | | -- |



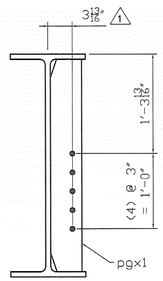



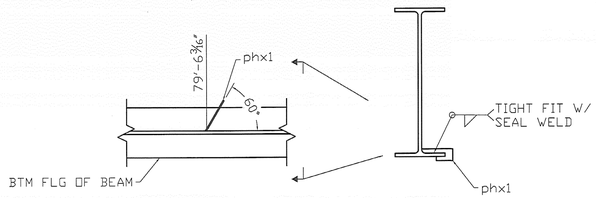

SECTION A-A




SECTION B-B




SECTION C-C




PLAN DRIP PLATE

RECEIVED
OK'D BY SSS OK'D BY MSM
JAN 28 '09
APPROVED ✓
BY DATE 1/26/09

NOTE:
1. FOR GENERAL NOTES SEE GN1

## SHOP NOTES

HOLES 15/16"ø (U.N.)
BOLTS NONE
PAINT SEE GN DWG
WELDS TO BE MADE USING ER80-NIL ELECTRODES
MATERIAL M270 Gr.50

| REV.NO | DATE | REVISION |
|---|---|---|
| 3 | | |
| 2 | | |
| 1 | 1/9/09 | APPROVER COMMENTS |

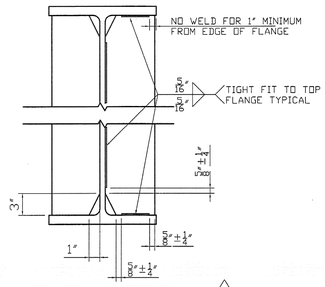
BEAM DETAIL B1

VT.102 (MAJOR COLLETOR) BRIDGE #16 CANAAN, VT
PROJECT NUMBER ER ST 0271 (16)

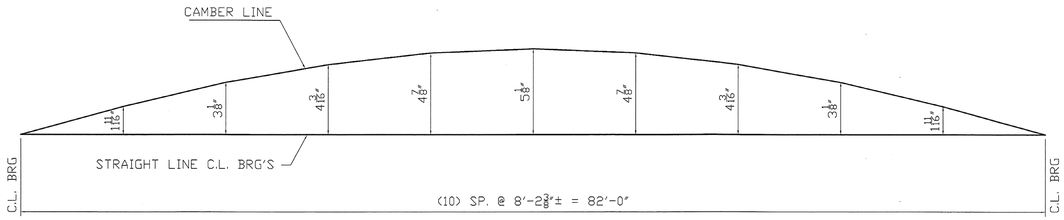

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OWNER: STATE OF VERMONT AGENCY OF TRANSPORTATION
CONTRACTOR: WINTERSET INC.

| DRAWN BY | CHECKED BY | | | | JOB NO. | SHEET NO. |
|---|---|---|---|---|---|---|
| KC 11/23/08 | WL 11/30/08 | | | | 3476 | 1 |

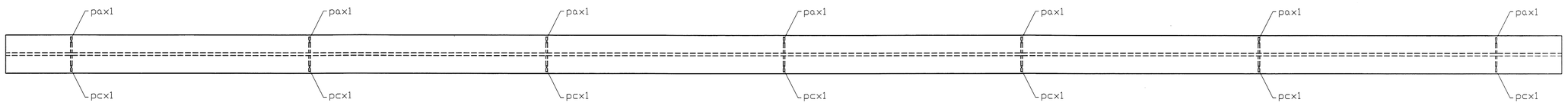


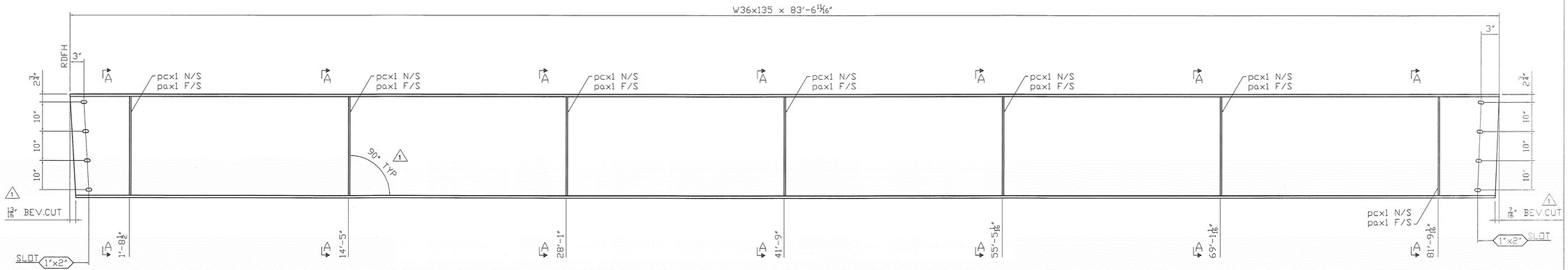

TYP. WELD TERMINATION DETAIL ⚠1

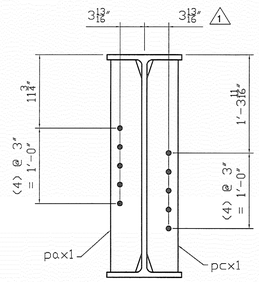



CAMBER DIAGRAM FOR BEAM 2

| SHIPPER | | BILL OF MATERIAL | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | MARK | NO. | MARK | SIZE | LENGTH | REMARKS | | WEIGHT |
| 1 | 2A | | | W36X135 | 83'-6 11/16" | CVN/BEVEL | | -- |
| | | 7 | pax1 | PL 1/2x5 | 2'-9 7/8" | | | -- |
| | | 7 | pcx1 | PL 1/2x5 | 2'-9 7/8" | | | -- |




SECTION A-A

RECEIVED
OK'D BY SSS OK'D BY mzm
JAN 26
APPROVED ✓
BY Date 1/26/09

NOTE:
1. FOR GENERAL NOTES SEE GN1

SHOP NOTES
HOLES 15/16"ø (U.N.)
BOLTS NONE
PAINT SEE GN DWG
WELDS TO BE MADE USING ER80-NIL ELECTRODES
MATERIAL M270 Gr.50

| REV.NO | DATE | REVISION |
|---|---|---|
| 3 | | |
| 2 | | |
| 1 | 1/9/09 | APPROVER COMMENTS |

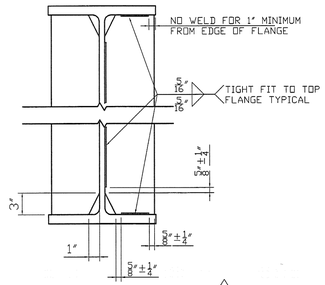
BEAM DETAIL B2

VT.102 (MAJOR COLLETOR) BRIDGE #16 CANAAN, VT
PROJECT NUMBER ER ST 0271 (16)

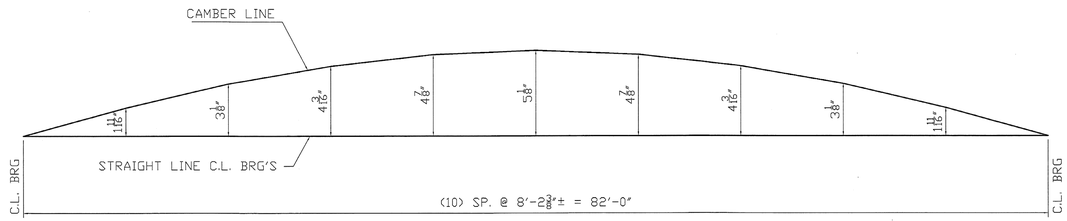
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OWNER: STATE OF VERMONT AGENCY OF TRANSPORTATION
CONTRACTOR: WINTERSET INC.

| DRAWN BY | CHECKED BY | | | | JOB NO. | SHEET NO. |
|---|---|---|---|---|---|---|
| KC 11/23/08 | WL 11/30/08 | | | | 3476 | 2 |

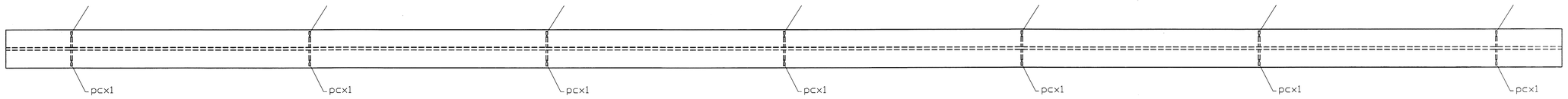


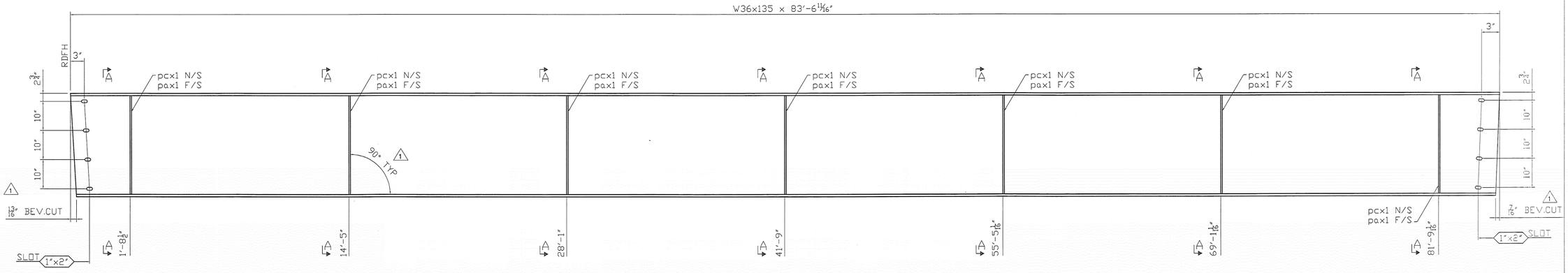

TYP. WELD TERMINATION DETAIL (1)

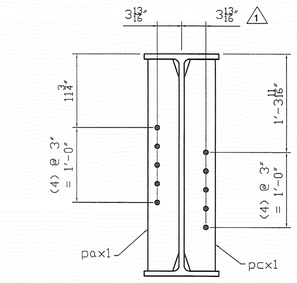



CAMBER DIAGRAM FOR BEAM 3

| SHIPPER | | BILL OF MATERIAL | | | | | |
|---|---|---|---|---|---|---|---|
| NO. | MARK | NO. | MARK | SIZE | LENGTH | REMARKS | WEIGHT |
| 1 | 3A | | | W36X135 | 83'-6 11/16" | CVN/BEVEL | -- |
| | | 7 | pax1 | PL 1/2x5 | 2'-9 7/8" | | -- |
| | | 7 | pcx1 | PL 1/2x5 | 2'-9 7/8" | | -- |




SECTION A-A

RECEIVED
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JAN
BY DATE 1/20/09

NOTE:
1. FOR GENERAL NOTES SEE GN1

## SHOP NOTES

HOLES 15/16"ø (U.N.)
BOLTS NONE
PAINT SEE GN DWG
WELDS TO BE MADE USING ER80-NIL ELECTRODES
MATERIAL M270 Gr.50

| REV.NO | DATE | REVISION |
|---|---|---|
| 3 | | |
| 2 | | |
| 1 | 1/9/09 | APPROVER COMMENTS |

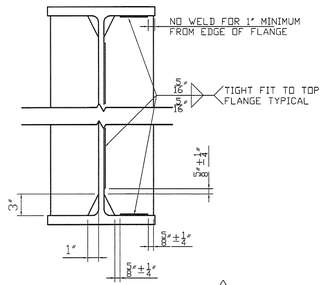
# BEAM DETAIL B3

VT.102 (MAJOR COLLETOR) BRIDGE #16 CANAAN, VT
PROJECT NUMBER ER ST 0271 (16)

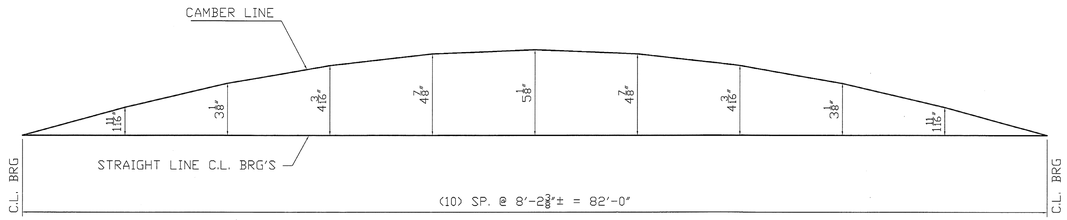

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OWNER: STATE OF VERMONT AGENCY OF TRANSPORTATION
CONTRACTOR: WINTERSET INC.

| DRAWN BY | CHECKED BY | | | | JOB NO. | SHEET NO. |
|---|---|---|---|---|---|---|
| KC 11/23/08 | WL 11/30/08 | | | | 3476 | 3 |

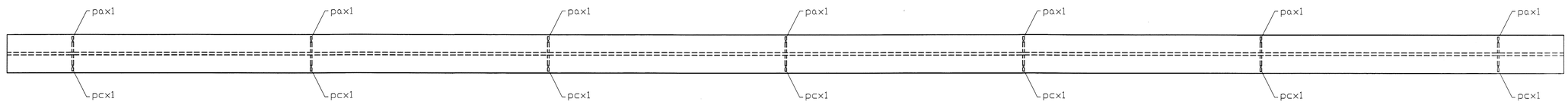


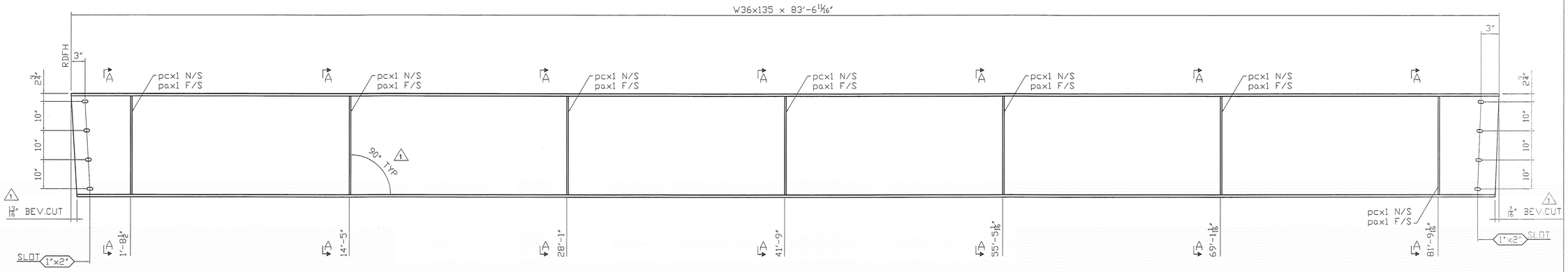

TYP. WELD TERMINATION DETAIL ⚠1

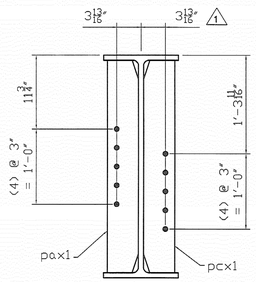



CAMBER DIAGRAM FOR BEAM 4

| SHIPPER | | BILL OF MATERIAL | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | MARK | NO. | MARK | SIZE | LENGTH | REMARKS | | WEIGHT |
| 1 | 4A | | | W36X135 | 83'-6 11/16" | CVN/BEVEL | | -- |
| | | 7 | pax1 | PL 1/2"x5" | 2'-9 7/8" | | | -- |
| | | 7 | pcx1 | PL 1/2"x5" | 2'-9 7/8" | | | -- |




SECTION A-A

RECEIVED
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JAN 26 2009
BY
1/26/09

NOTE:
1. FOR GENERAL NOTES SEE GN1

SHOP NOTES
HOLES 15/16"ø (U.N.)
BOLTS NONE
PAINT SEE GN DWG
WELDS TO BE MADE USING ERBO-NIL ELECTRODES
MATERIAL M270 Gr.50

| REV.NO | DATE | REVISION |
|---|---|---|
| 3 | | |
| 2 | | |
| 1 | 1/9/09 | APPROVER COMMENTS |

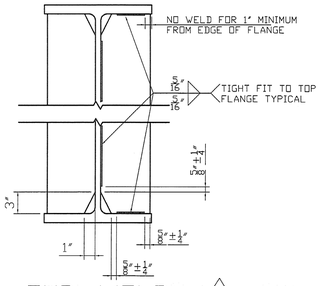
BEAM DETAIL B4

VT.102 (MAJOR COLLETOR) BRIDGE #16 CANAAN, VT
PROJECT NUMBER ER ST 0271 (16)

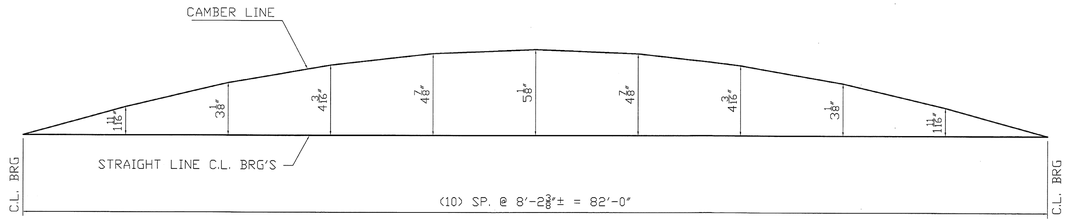
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OWNER: STATE OF VERMONT AGENCY OF TRANSPORTATION
CONTRACTOR: WINTERSET INC.

| DRAWN BY | CHECKED BY | | | | JOB NO. | SHEET NO. |
|---|---|---|---|---|---|---|
| KC 11/23/08 | WL 11/30/08 | | | | 3476 | 4 |

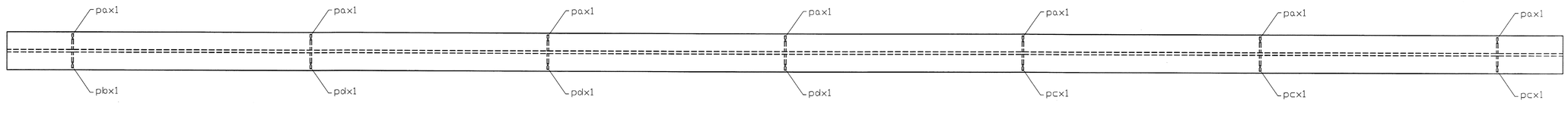


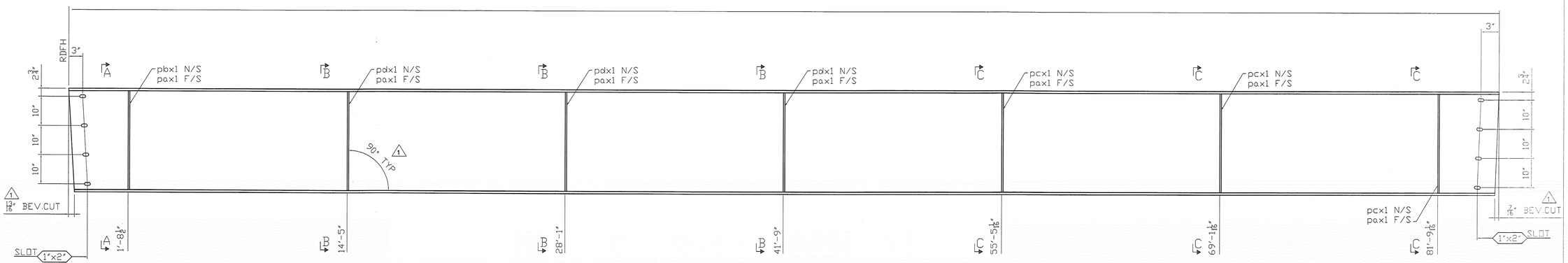

TYP. WELD TERMINATION DETAIL (1)

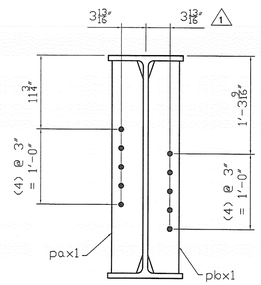



CAMBER DIAGRAM FOR BEAM 5

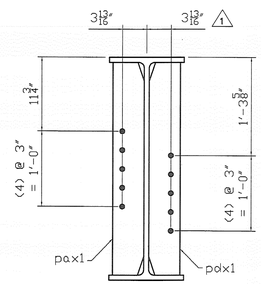
| SHIPPER | | BILL OF MATERIAL | | | | | |
|---|---|---|---|---|---|---|---|
| NO. | MARK | NO. | MARK | SIZE | LENGTH | REMARKS | WEIGHT |
| 1 | 5A | | | W36X135 | 83'-6 11/16" | CVN/BEVEL | -- |
| | | 7 | pax1 | PL 1/2x5 | 2'-9 7/8" | | -- |
| | | 1 | pbx1 | PL 1/2x5 | 2'-9 7/8" | | -- |
| | | 3 | pcx1 | PL 1/2x5 | 2'-9 7/8" | | -- |
| | | 3 | pdx1 | PL 1/2x5 | 2'-9 7/8" | | -- |



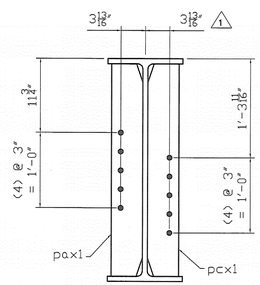




SECTION A-A




SECTION B-B




SECTION C-C

RECEIVED
OK'D BY SSS OK'D BY mjm
JAN
1/26/09

NOTE:
1. FOR GENERAL NOTES SEE GN1

## SHOP NOTES

HOLES 15/16"ø (U.N.)
BOLTS NONE
PAINT SEE GN DWG
WELDS TO BE MADE USING ER80-NIL ELECTRODES
MATERIAL M270 Gr.50

| REV.NO | DATE | REVISION |
|---|---|---|
| 3 | | |
| 2 | | |
| 1 | 1/9/09 | APPROVER COMMENTS |

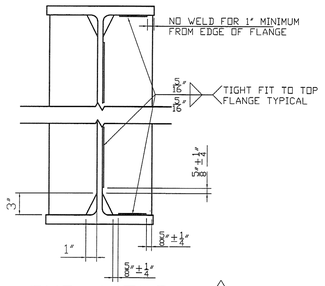
# BEAM DETAIL B5

VT.102 (MAJOR COLLETOR) BRIDGE #16 CANAAN, VT
PROJECT NUMBER ER ST 0271 (16)

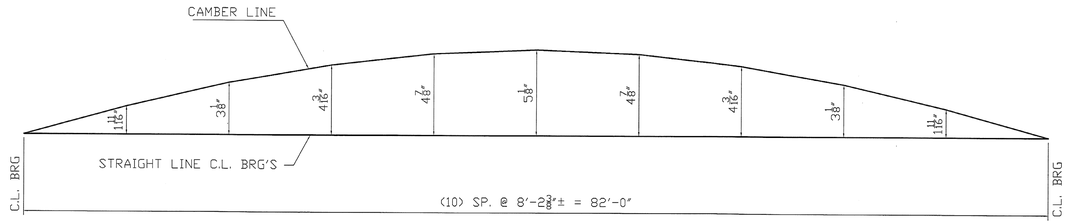
FOSTER • PRECISE
3 FARM LANE GEORGETOWN, MA 01833
978-352-2591 FAX 978-352-2182

OWNER: STATE OF VERMONT AGENCY OF TRANSPORTATION
CONTRACTOR: WINTERSET INC.

| DRAWN BY | CHECKED BY | | | | JOB NO. | SHEET NO. |
|---|---|---|---|---|---|---|
| KC 11/23/08 | WL 11/30/08 | | | | 3476 | 5 |

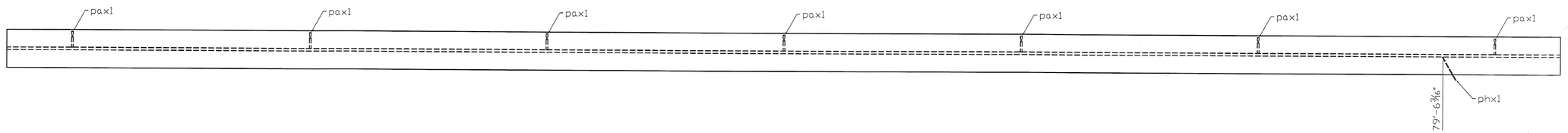


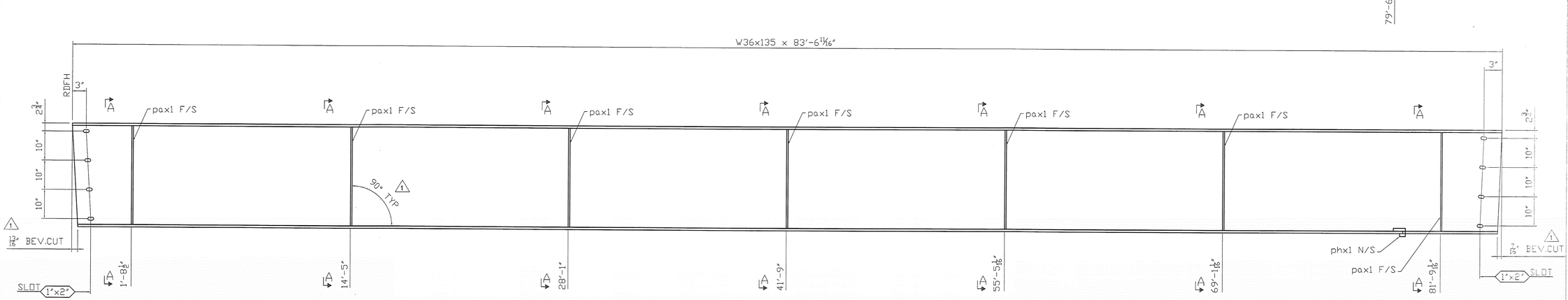

TYP. WELD TERMINATION DETAIL 1

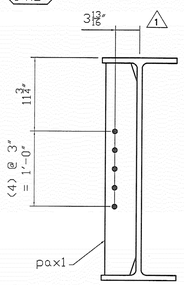



CAMBER DIAGRAM FOR BEAM 6

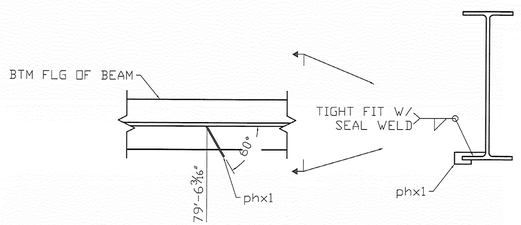
| SHIPPER | | BILL OF MATERIAL | | | | | |
|---|---|---|---|---|---|---|---|
| NO. | MARK | NO. | MARK | SIZE | LENGTH | REMARKS | WEIGHT |
| 1 | 6A | | | W36X135 | 83'-6 11/16" | CVN/BEVEL | -- |
| | | 7 | pax1 | PL 1/2"x5" | 2'-9 7/8" | | -- |
| | | 1 | phx1 | PL 1/4"x2 13/16" | 0'-8 5/16" | | -- |




SECTION A-A




PLAN DRIP PLATE

SSS mgm 1/26/09

NOTE:
1. FOR GENERAL NOTES SEE GN1

## SHOP NOTES

HOLES 15/16"Ø (U.N.)
BOLTS NONE
PAINT SEE GN DWG
WELDS TO BE MADE USING ERBO-NIL ELECTRODES
MATERIAL M270 Gr.50

| REV.NO | DATE | REVISION |
|---|---|---|
| 3 | | |
| 2 | | |
| 1 | 1/9/09 | APPROVER COMMENTS |

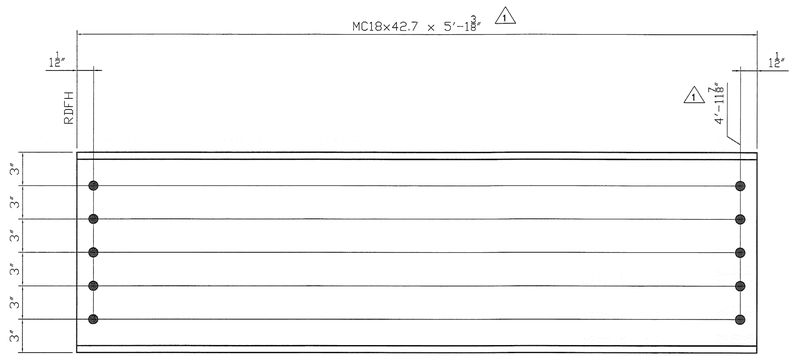
# BEAM DETAIL B6

VT.102 (MAJOR COLLETOR) BRIDGE #16 CANAAN, VT
PROJECT NUMBER ER ST 0271 (16)


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OWNER: STATE OF VERMONT AGENCY OF TRANSPORTATION
CONTRACTOR: WINTERSET INC.

| DRAWN BY | CHECKED BY | | | | JOB NO. | SHEET NO. |
|---|---|---|---|---|---|---|
| KC 11/23/08 | WL 11/30/08 | | | | 3476 | 6 |




35 REQ'D ~ DIAPHRAGMS ~ 7A

| SHIPPER | | BILL OF MATERIAL | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | MARK | NO. | MARK | SIZE | LENGTH | REMARKS | | WEIGHT |
| 1 35 | 7A | | | MC18x42.7 | 5'-1 3/8" | | | -- |

SSS mjm 1/26/09

NOTE:
1. FOR GENERAL NOTES SEE GN1

SHOP NOTES
HOLES 15/16"ø (U.N.)
BOLTS NONE
PAINT SEE GN DWG
WELDS TO BE MADE USING ER80-NIL ELECTRODES
MATERIAL M270 GR50

| REV.NO | DATE | REVISION |
|---|---|---|
| 3 | | |
| 2 | | |
| 1 | 1/9/09 | APPROVER COMMENTS |

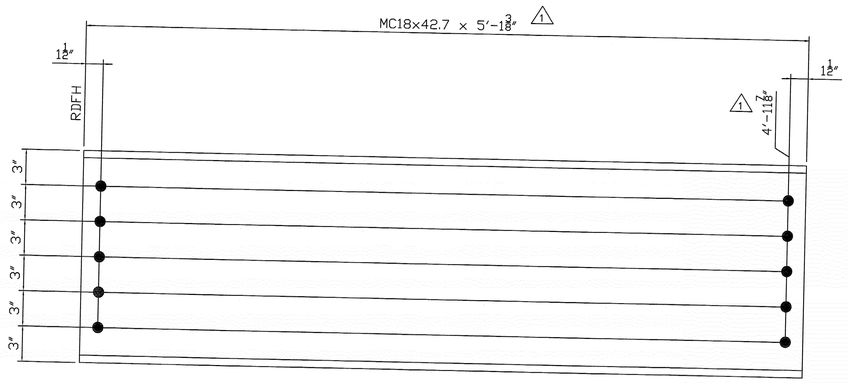
DIAPHRAM DETAIL

VT.102 (MAJOR COLLETOR) BRIDGE #16 CANAAN, VT
PROJECT NUMBER ER ST 0271 (16)

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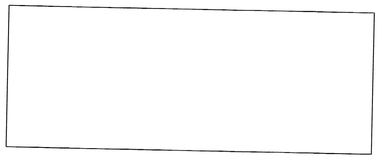
OWNER: STATE OF VERMONT AGENCY OF TRANSPORTATION
CONTRACTOR: WINTEREST INC.

| DRAWN BY | CHECKED BY | | | | JOB NO. | SHEET NO. |
|---|---|---|---|---|---|---|
| KC 11/23/08 | WL 11/30/08 | | | | 3476 | 7 |




35 REQ'D ~ DIAPHRAGMS ~ 7A

| SHIPPER | | BILL OF MATERIAL | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | MARK | NO. | MARK | SIZE | LENGTH | REMARKS | | WEIGHT |
| 35 | 7A | | | MC18x42.7 | 5'-1 3/8" | | | -- |
| | | | | | | | | |
| 12 | 7P5 | | | PL.1/4 x12 | 2'-7" | | | -- |



2 12 REQ'D ~ BLOCK OUT PLS. ~ 7P5

Approved for payment
9/28/2009 MEM

NOTE:
1. FOR GENERAL NOTES SEE GN1

SHOP NOTES
HOLES 15/16"ø (U.N.)
BOLTS NONE
PAINT SEE GN DWG
WELDS TO BE MADE USING ER80-NIL ELECTRODES
MATERIAL M270 GR50

| REV.NO | DATE | REVISION |
|---|---|---|
| 3 | | |
| 2 | 9/28/09 | ADDED BLOCK OUT STEEL |
| 1 | 1/9/09 | APPROVER COMMENTS |

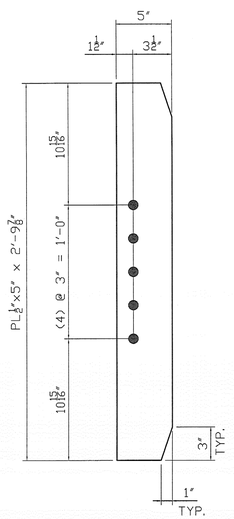
DIAPHRAM DETAIL

VT.102 (MAJOR COLLETOR) BRIDGE #16 CANAAN, VT
PROJECT NUMBER ER ST 0271 (16)

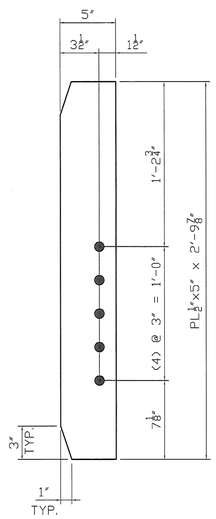
FOSTER • PRECISE
3 FARM LANE GEORGETOWN, MA 01833
978-352-2591 FAX 978-352-2182

OWNER: STATE OF VERMONT AGENCY OF TRANSPORTATION
CONTRACTOR: WINTEREST INC.

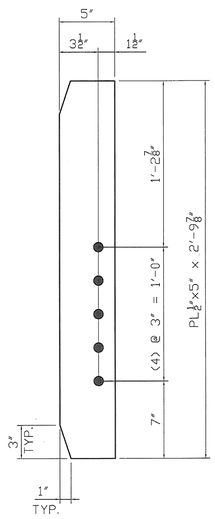
| DRAWN BY | CHECKED BY | | | | JOB NO. | SHEET NO. |
|---|---|---|---|---|---|---|
| KC 11/23/08 | WL 11/30/08 | | | | 3476 | 7 |



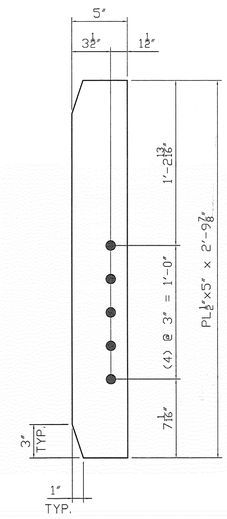

35 REQ'D ~ GUSSET ~ pax1



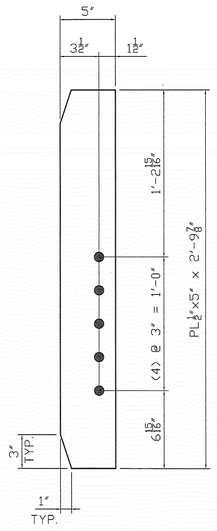

ONE REQ'D ~ GUSSET ~ pbx1



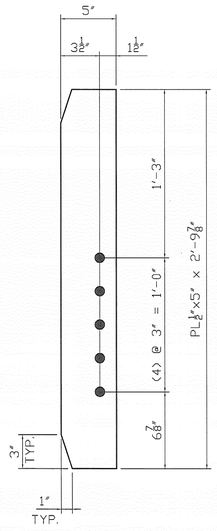

25 REQ'D ~ GUSSET ~ pcx1



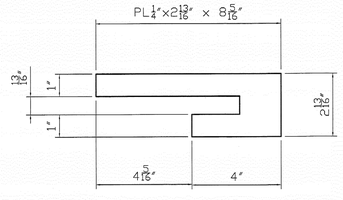

3 REQ'D ~ GUSSET ~ pdx1




3 REQ'D ~ GUSSET ~ pfx1




3 REQ'D ~ GUSSET ~ pgx1




2 REQ'D ~ GUSSET ~ phx1

NOTE:
1. FOR GENERAL NOTES SEE GN1

CHKD BY SSS DRWN BY mgm

✓
1/26/09

| REV.NO | DATE | REVISION |
|---|---|---|
| 3 | | |
| 2 | | |
| 1 | – | – |

## DIAPHRAM DETAIL

VT.102 (MAJOR COLLETOR) BRIDGE #16 CANAAN, VT
PROJECT NUMBER ER ST 0271 (16)

### SHOP NOTES

HOLES 15/16″ø (U.N.)
BOLTS NONE
PAINT SEE GN DWG
WELDS TO BE MADE USING ER80-NIL ELECTRODES
MATERIAL M270 Gr.50

FOSTER • PRECISE
3 FARM LANE GEORGETOWN, MA 01833
978-352-2591 FAX 978-352-2182

OWNER: STATE OF VERMONT AGENCY OF TRANSPORTATION
CONTRACTOR: WINTERSET INC

| DRAWN BY | CHECKED BY | | | | JOB NO. | SHEET NO. |
|---|---|---|---|---|---|---|
| KC 11/23/08 | WL 11/30/08 | | | | 3476 | X1 |

VERMONT

**State of Vermont** *Agency of Transportation*
**PDD/Structures Design Section**
National Life Building – Drawer 33 [phone] 802-828-2621
Montpelier, VT 05633-5001 [fax] 802-828-3566
**www.aot.state.vt.us** [ttd] 800-253-0191

**See next sheet for instructions**

**Highway Safety Corp.** **DATE: February 19, 2009**
P.O. Box 358
Glastonbury, CT 06033

**Project Name: Canaan** **Project #: ER ST 0271 (16)**

**Structure Identification: VT 102, BR # 16, over the Willard Stream**

The following Bridge Railing details Item # 525.33, Bridge Railing, NETC 2-Rail for the above project Vendor's Job #1684 transmitted with your letter dated February 4, 2009, have been reviewed and are being returned herewith.

Sheets: 1 of 2
**is approved [X]**

Sheets: 2 of 2
**is approved as noted [X]**

There shall be no fabrication done until all drawings and welding procedures are approved. You must provide notice to our fabrication inspector, Jeff Clark, as to the date fabrication represented by these drawings will begin. That notice must be received and acknowledged at least seven days prior to that date, as per Specification 506.03. Jeff may be contacted by phone at (802)828-0044 or email at jeff.clark@state.vt.us. Any material fabricated prior to the notification date is subject to rejection without further cause.

Sincerely,

Martha Evans-Mongeon
Project Manager

Attachments
cc: [X] Resident Engineer w/prints, Doug Bumps
[X] Shop Inspector w/prints, Jeff Clark
[X] Contractor w/prints, Winterset, Inc.
[X] Subcontractor – letter only F.R. Lafayette
[X] Construction Divison – letter only
[X] Materials & Research Section (C&IA Unit) – letter only
[X] Files (Structures & Central)

# Highway Safety Corporation

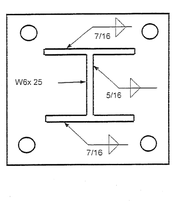
Glastonbury, CT

## Welding Procedure Specification

Material specification: A572 gr 50, A709 Gr 50
Welding process: Gas Metal Arc Welding (GMAW)
Manual, semi-automatic, or automatic: Semi-Automatic
Position of welding: Flat (1F) or Horizontal (2F)
Filler metal specification: AWS A5.18
Filler metal classification: ER70S-3
Electrode and manufacturer: Lincoln Electric Lincoln Weld L-50
Flux and manufacturer: N/A
Shielding gas: 85% Argon / 15% CO2 — Flow rate: 19-27 L / min
Single or multiple pass: Single or Multiple
Single or multiple arc: Single
Welding current: DCEP
Polarity: Reverse - electrode positive
Welding progression: Stringers
Root treatment: clean base metal
Preheat and interpass temperature: base metal up to 3/4" (50°F) ; over 3/4 thru 1-1/2" ( 150°F ) ; over 1-1/2" thru 2-1/2" (225°F)
Postheat treatment: None
Electrode extension: 3/4" ± 1/4"

### WELDING PROCEDURE

| Weld size | Pass no. | Electrode size | Welding parameters Amperes | Welding parameters Volts | Travel speed | Joint detail |
|---|---|---|---|---|---|---|
| 5/16" | 1 | 0.062" | 275 A ± 25 | 25 V ± 2 | 8-10 ipm | |
| 7/16" | 1 & 2 | 0.062" | ↓ | ↓ | 8-10 ipm | |
| | | | | | | |







This procedure may vary due to fabrication sequence, fit-up, pass size, etc. within the limitation of variables given in section 5 of latest edition AWS D1.5

WPS no.: W-1684-A
Revision no.: 0
Supporting PQR no.: Pre-Qualified
Project Name: Canaan, VT rt 102

Fabricator: Highway Safety Corporation
Authorized by: Paul Radice
Date: 2/3/09
Project Number: ER ST 0271(10)

PAUL RADICE
CWI 08070221

# Highway Safety Corporation

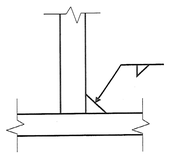
**Glastonbury, CT**

## Welding Procedure Specification

Material specification **ASTM A36, A709 Gr 36, A500 gr B, A53 gr B**
Welding process **Gas Metal Arc Welding (GMAW)**
Manual, semi-automatic, or automatic **Semi-Automatic**
Position of welding **Flat (1F) or Horizontal (2F)**
Filler metal specification **AWS A5.18**
Filler metal classification **ER70S-3**
Electrode and manufacturer **Lincoln Electric Lincoln Weld L-50**
Flux and manufacturer **N/A**
Shielding gas **85% Argon / 15% CO2** Flow rate **19-27 L / min**
Single or multiple pass **Single**
Single or multiple arc **Single**
Welding current **DCEP**
Polarity **Reverse - electrode positive**
Welding progression **Stringers**
Root treatment **clean base metal**
Preheat and interpass temperature **base metal up to 3/4" (50ºF) ; over 3/4 thru 1-1/2" ( 150ºF ) : over 1-1/2" thru 2-1/2" (225ºF)**
Postheat treatment **None**
Electrode extension **3/4" ± 1/4"**

### WELDING PROCEDURE

| Weld size | Pass no. | Electrode .size | Welding parameters Amperes | Volts | Travel speed | Joint detail |
|---|---|---|---|---|---|---|
| **1/8"** | **1** | **0.045"** | **300 A ± 30** | **29 V ± 2** | **28 ipm ± 2** | **TYPICAL ALL FILLET WELDS** |
| **3/16"** | **1** | **0.045"** | **300 A ± 30** | **29 V ± 2** | **14 ipm ± 2** | |



VTRANS RECEIVED
DKD BY ____ DKD BY
FEB 03 2009
APPROVED
DATE 01/13/09

This procedure may vary due to fabrication sequence, fit-up, pass size, etc. within the limitation of variables given in section 5 of latest edition AWS D1.1 / D1.5

WPS no. **W-1684-B**
Revision no. **0**
Supporting PQR no. **Pre-Qualified**
Project Name **Canaan, VT rt 102**

Fabricator **Highway Safety Corporation**
Authorized by **Paul Radice**
Date **2/3/09**
Project Number **ER ST 0271(10)**

PAUL RADICE
CWI 7001223
EXP 7/31/10

# Highway Safety Corporation

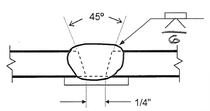
Glastonbury, CT

## Welding Procedure Specification

Material specification **ASTM A500 Gr B**
Welding process **Shielded Metal Arc Welding (SMAW)**
Manual, semi-automatic, or automatic **Manual**
Position of welding **Flat (1G)**
Filler metal specification **AWS A5.1**
Filler metal classification **ER7018**
Electrode and manufacturer **Lincoln Electric Jet LH 78 MR**
Flux and manufacturer **N/A**
Shielding gas **N/A** Flow rate **N/A**
Single or multiple pass **Multiple**
Single or multiple arc **Single**
Welding current **AC**
Polarity **N/A**
Welding progression **Stringers**
Root treatment **clean base metal**
Preheat and interpass temperature **50°F (min)**
Postheat treatment **None**
Electrode extension **N/A**

### WELDING PROCEDURE

| Weld size | Pass no. | Electrode size | Welding parameters Amperes | Welding parameters Volts | Travel speed | Joint detail |
|---|---|---|---|---|---|---|
| | ALL | 5/32" | 150 A to 220 A | | VARIES | B-U2a |

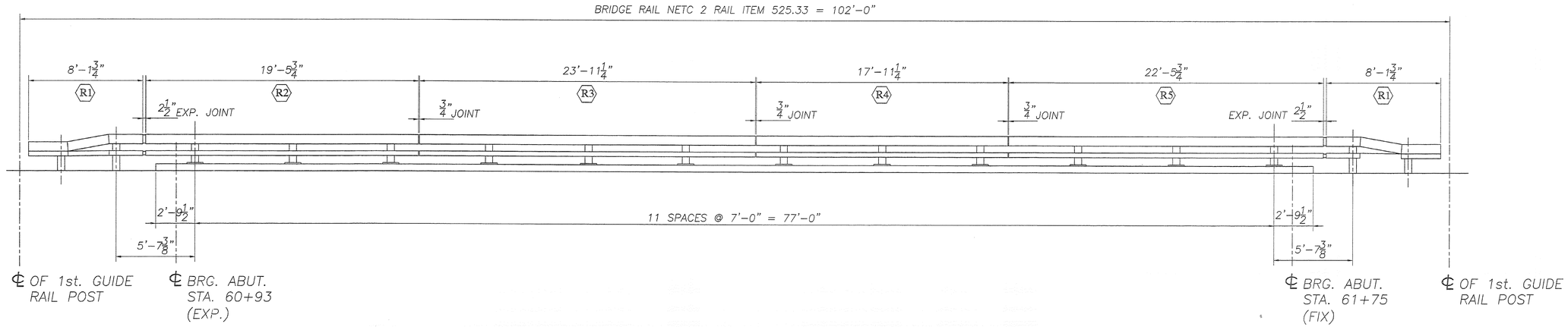



VTRANS RECEIVED FEB 02 2009 DIST. ENGR.
OK'D BY _____ OK'D BY Jlw
APPROVED A/S Noted
BY DATE 02/13/09

This procedure may vary due to fabrication sequence, fit-up, pass size, etc. within the limitation of variables given in section 5 of latest edition AWS D1.1

WPS no. **W-1684-C**
Revision no. **0**
Supporting PQR no. **Pre-Qualified**
Project Name **Canaan, VT rt 102**

Fabricator **Highway Safety Corporation**
Authorized by **Paul Radice**
Date **2/3/09**
Project Number **ER ST 0271(10)**




WEST RAIL ELEVATION
(EAST ELEVATION SIMILAR)

| BILL OF MATERIAL (BOTH SIDES OF BRIDGE) | | | |
|---|---|---|---|
| Mark # | Qty. | Description | Material |
| | 24 | W6x25 POST W/BASEPLATE (2'-0.375") OAL | A709 Gr. 50 |
| | 4 | W6x25 DRIVEN POST (7'-0") OAL | A709 Gr. 50 |
| | 4 | W6x25 DRIVEN POST (6'-5") OAL | A709 Gr. 50 |
| R1 | 4 | DROP END TOP RAIL TS 8 x 4 x 0.313" (8'-1.750") OAL | A500 Gr. B |
| | 4 | BOTTOM RAIL TS 4 x 4 x 0.25" (8'-1.750") OAL | A500 Gr. B |
| R2 | 2 | TOP RAIL TS 8 x 4 x 0.313" (19'-5.750") OAL | A500 Gr. B |
| | 2 | BOTTOM RAIL TS 4 x 4 x 0.25" (19'-5.750") OAL | A500 Gr. B |
| R3 | 2 | TOP RAIL TS 8 x 4 x 0.313" (23'-11.250") OAL | A500 Gr. B |
| | 2 | BOTTOM RAIL TS 4 x 4 x 0.25" (23'-11.250") OAL | A500 Gr. B |
| R4 | 2 | TOP RAIL TS 8 x 4 x 0.313" (17'-11.750") OAL | A500 Gr. B |
| | 2 | BOTTOM RAIL TS 4 x 4 x 0.25" (17'-11.750") OAL | A500 Gr. B |
| R5 | 2 | DROP END TOP RAIL TS 8 x 4 x 0.313" (22'-5.750") OAL | A500 Gr. B |
| | 2 | BOTTOM RAIL TS 4 x 4 x 0.25" (22'-5.750") OAL | A500 Gr. B |
| | 10 | TS 7 x 3 x .375" SPLICE TUBE 20" LONG | A500 Gr. B |
| | 10 | TS 3 x 3 x .25" SPLICE TUBE 20" LONG | A500 Gr. B |
| | 24 | .125" BEARING PAD | NEOPRENE |
| | 4 | BACK UP PLATE | A709 Gr. 36 |
| | 4 | TERMINAL CONNECTOR | M180 B2 |
| | 152 | .75"ø ROUND HEAD BOLT, 6" LONG | M164 |
| | 152 | .75"ø HEX NUT | A563 DH |
| | 152 | .75"ø WASHER | F436 |
| | 80 | .625"ø SPLICE BOLT, 1.75" LONG | M164 |
| | 80 | .625"ø PLAIN HARDENED WASHER | F436 |
| | 40 | .625"ø NUT WELDED TO SPLICE TUBE | A563A |
| | 40 | .75"ø x .5" SCH. 40 PIPE SPACER | A53 Gr. B |
| | 96 | 1"ø ANCHOR STUD, 12" LONG | A449 |
| | 96 | 1"ø WASHER | F436 |
| | 96 | 1"ø JAMB NUT | A563 DH |
| | 192 | 1"ø HEX NUT | A563 DH |
| | 24 | SPACER PLATE | A36 |

* 

NOTES:
1. ITEMS MARKED "*" ARE NOT SUPPLIED BY HIGHWAY SAFETY CORPORATION, AND THEY ARE SHOWN ONLY FOR REFERENCE.

| REVISIONS | | |
|---|---|---|
| No. | Remarks | Date |
| 0 | Initial submittal | 2/4/09 |
| | | |
| | | |

RECEIVED
CKD BY SSS CKD BY
FEB 11 '09
BY
AS NOTED
DATE 2/11/09

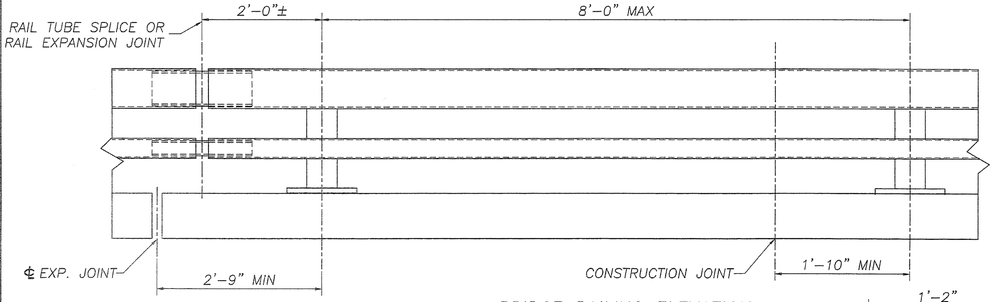
# HIGHWAY SAFETY CORP.
GLASTONBURY, CT

ITEM 525.33 – BRIDGE RAILING–NETC 2 RAIL
PROJECT No. ER ST 0271(10)
TOWN OF CANAAN COUNTY OF ESSEX
ROUTE No. VT 102
BRIDGE NO. : 16

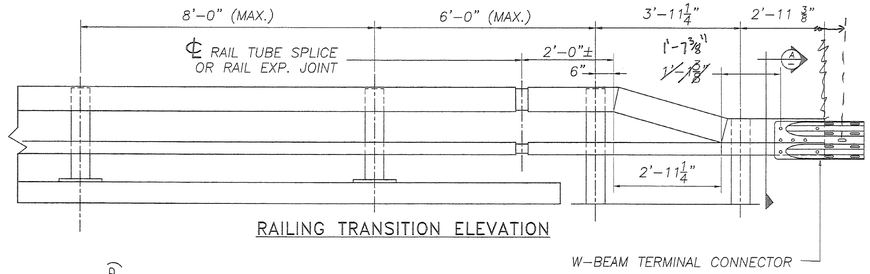
GENERAL CONTRACTOR

SUB CONTRACTOR
F.R. LAFAYETTE, INC.

| | |
|---|---|
| DRAWN | RWL |
| CHECKED | P Radice |
| DATE | 2/2/09 |
| SCALE | NONE |
| HSC REFERENCE NO. | 1684 |
| SIZE | D |
| REVISION | 0 |
| SHEET NO. | 1 of 2 |



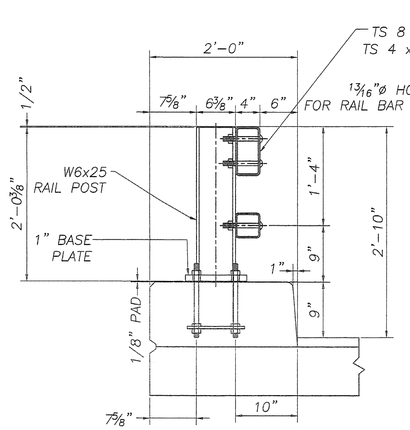

BRIDGE RAILING ELEVATION



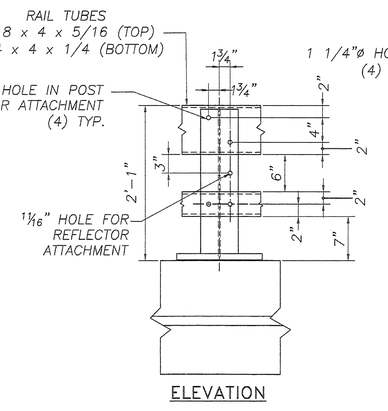

RAILING TRANSITION ELEVATION

**NOTES:**

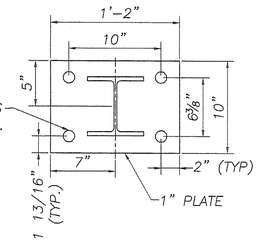
1. ALL RAILINGS AND MATERIALS SHALL CONFORM TO THE PROVISION OF SECTION 525
2. PRIOR TO GALVANIZING, ALL EXPOSED CUT OR SHEARED EDGES SHALL BE ROUNDED TO A 1/16" RADIUS AND BE FREE OF BURRS.
3. RAIL POSTS SHALL BE SET NORMAL TO GRADE.
4. SECTIONS OF RAIL TUBE SHALL BE ATTACHED TO A MINIMUM OF TWO (2) RAIL POSTS AND PREFERABLY TO AT LEAST FOUR (4) POSTS.
5. RAIL TUBE EXPANSION JOINT SHALL BE PROVIDED IN ANY RAIL BAY SPANNING A SUPERSTRUCTURE EXPANSION JOINT. EXPANSION JOINT WIDTH SHALL BE "X" AT 45°F AND WILL BE ADJUSTED IN THE FIELD BY THE ENGINEER FOR OTHER TEMPERATURES.
6. ALL PARTS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH AASHTO M111, EXCEPT HARDWARE, WHICH SHALL MEET THE REQUIREMENTS OF AASHTO M232.
7. RAIL POST ANCHORING NUTS SHALL BE TIGHTENED TO A SNUG FIT AND GIVEN AN ADDITIONAL ONE–EIGHTH TURN.
8. RAIL TUBES SHALL BE ATTACHED USING 3/4" FULL DIAMETER BODY AASHTO M164 (TYPE 1) ROUND HEAD BOLT INSERTED THROUGH THE FACE OF THE TUBE. HOLES IN POSTS SHALL BE 1/16" LARGER THAN THE BOLT SIZE.
9. HOLES IN RAILS FOR RAIL TUBE ATTACHMENT MAY BE FIELD–DRILLED. HOLES SHALL BE COATED WITH AN APPROVED ZINC–RICH PAINT PRIOR TO ERECTION.
10. ANY BENDING OF RAIL SHALL BE BY SHOP PROCEDURE ONLY.
11. THE FABICATOR SHALL SUBMIT SHOP DRAWINGS, INCLUDING WELDING PROCEDURES TO THE STRUCTURES SECTION FOR APPROVAL IN ACCORDANCE WITH SUBSECTION 525.03. ALL WELDING SHALL CONFORM WITH SUBSECTION 506.10.
12. RAIL POSTS AND BASE PLATES SHALL BE TESTED FOR IMPACT PROPERTIES IN ACCORDANCE WITH ASTM A–370 CHARPY IMPACT TESTING USING TYPE A SPECIMEN.



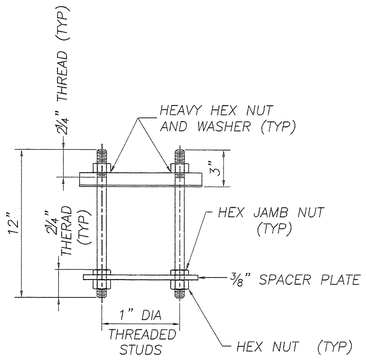

TYPICAL SECTION



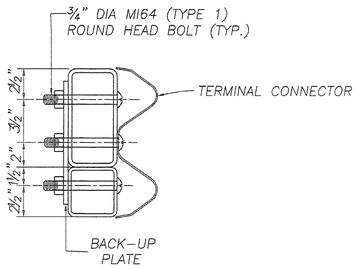

ELEVATION

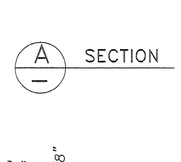


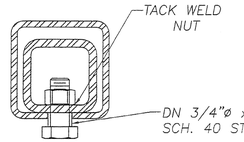

POST AND BASE PLATE




RAIL AND POST ANCHORAGE



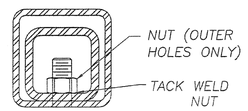



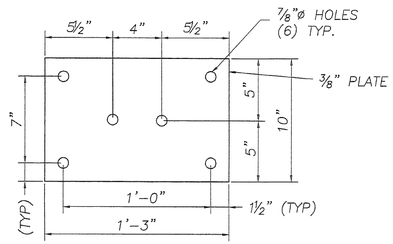

5/8"ø TAPPED HOLE IN SPLICE TUBE
AND 1 1/8" x 'C' SLOT IN RAIL TUBE FOR
BOLT AND PLAIN HARDENED WASHER

EXPANSION JOINT SECTION

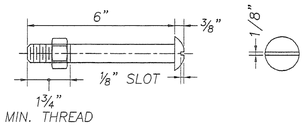
FOR DETAILS NOT SHOWN,
SEE "RAIL TUBE SPLICE SECTION."




5/8"ø TAPPED HOLE IN SPLICE TUBE &
3/4"ø HOLE IN RAIL TUBE FOR BOLT &
PLAIN HARDENED WASHER

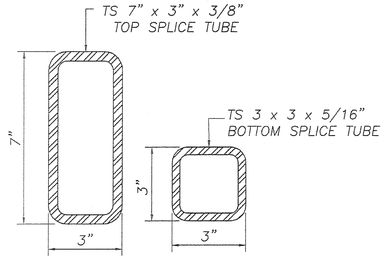



BACK–UP PLATE

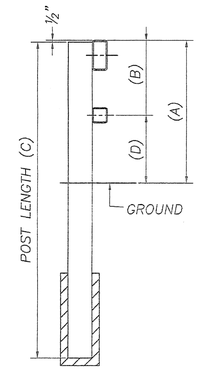



3/4" DIA. M164 (TYPE 1)
ROUND HEAD BOLT

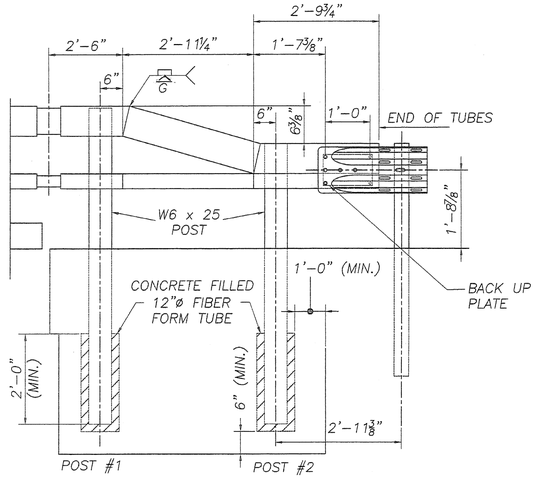
(WITH WASHER AND PREVAILING TORQUE TYPE LOCK NUT)
(SEE NOTE #9)
ONLY FULL DIAMETER BODY BOLTS WILL BE ALLOWED.



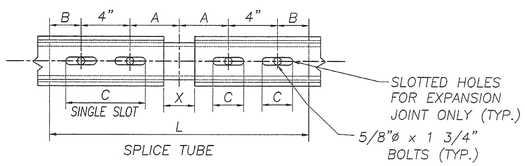

RAIL TUBE SPLICE SECTION




TYPICAL SECTION

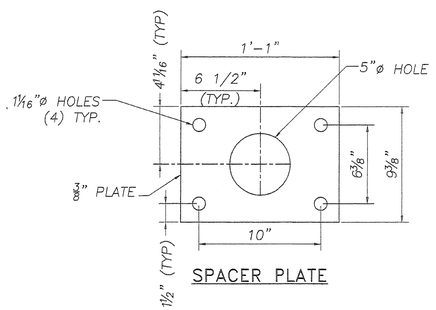



ELEVATION

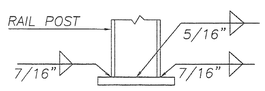



SPLICE TUBE

RAIL TUBE SPLICE AND RAIL
EXPANSION JOINT DETAIL




SPACER PLATE




BASE WELD DETAIL

MATERIALS
RAIL TUBES.....ASTM A500, GRADE B OR ASTM A501
RAIL POSTS AND BASE PLATES.....ASTM A709A709M, GRADE 50 SP
AALL OTHER SHAPRE AND PLATES.....ASTM A709/A709M, GARDE 36
ANCHOR STUDS.....ASTM A449
ALL OTHER BOLTS (UNLESS NOTED).....AASHTO M164, TYPE1 SP

NUTS FOR AASHTO M164 BOLTS AND FOR ANCHOR STUDS SHALL COMPLY WITH AASTHO M291 (ASTM A563).

WASHERS SHALL COMPLY WITH AASHTO M293 (ASTM F436) SPECIFCATIONS.

1/8" PAD SHALL COMPLY WITH STANDARD SPECIFICATION SUBSECTION 731.01 OR 731.02.

| POST NUMBER | RAIL HEIGHT (A) | RAIL SPACING (B) | POST LENGTH (C) | RAIL HEIGHT (D) |
|---|---|---|---|---|
| 1 | 2'–10" | 1'–4" | 7'–0" | 1'–6" |
| 2 | 2'–3 5/8" | 10" | 6'–5" | 1'–5 5/8" |

| SPLICE TABLE | | | | | |
|---|---|---|---|---|---|
| T | A | B | C | L | X |
| N/A | 4" | 2" | –– | 20" | 3/4" |
| EXPANSION JOINT TABLE | | | | | |
| <4" | 4" | 2" | 2 1/2" | 20" | 2 1/2" |

T = TOTAL MOVEMENT BETWEEN BRIDGE EXPANSION JOINTS. SEE NOTE 6

| REVISIONS | | |
|---|---|---|
| No. | Remarks | Date |
| 0 | Initial submittal | 2/4/09 |
| | | |
| | | |

RECEIVED
FEB 11 2009
AS NOTED
2/11/09

HIGHWAY SAFETY CORP.
GLASTONBURY, CT

ITEM 525.33 – BRIDGE RAILING–NETC 2 RAIL
PROJECT No. ER ST 0271(16)
TOWN OF CANAAN COUNTY OF ESSEX
ROUTE No. VT 102
BRIDGE NO. : 16

GENERAL CONTRACTOR

SUB CONTRACTOR
F.R. LAFAYETTE, INC.

| | |
|---|---|
| DRAWN | RWL |
| CHECKED | P Radice |
| DATE | 2/2/09 |
| SCALE | NONE |
| HSC REFERENCE NO. | 1684 |
| SIZE | D |
| REVISION | 0 |
| SHEET NO. | 2 of 2 |