

STATE OF VERMONT AGENCY OF TRANSPORTATION



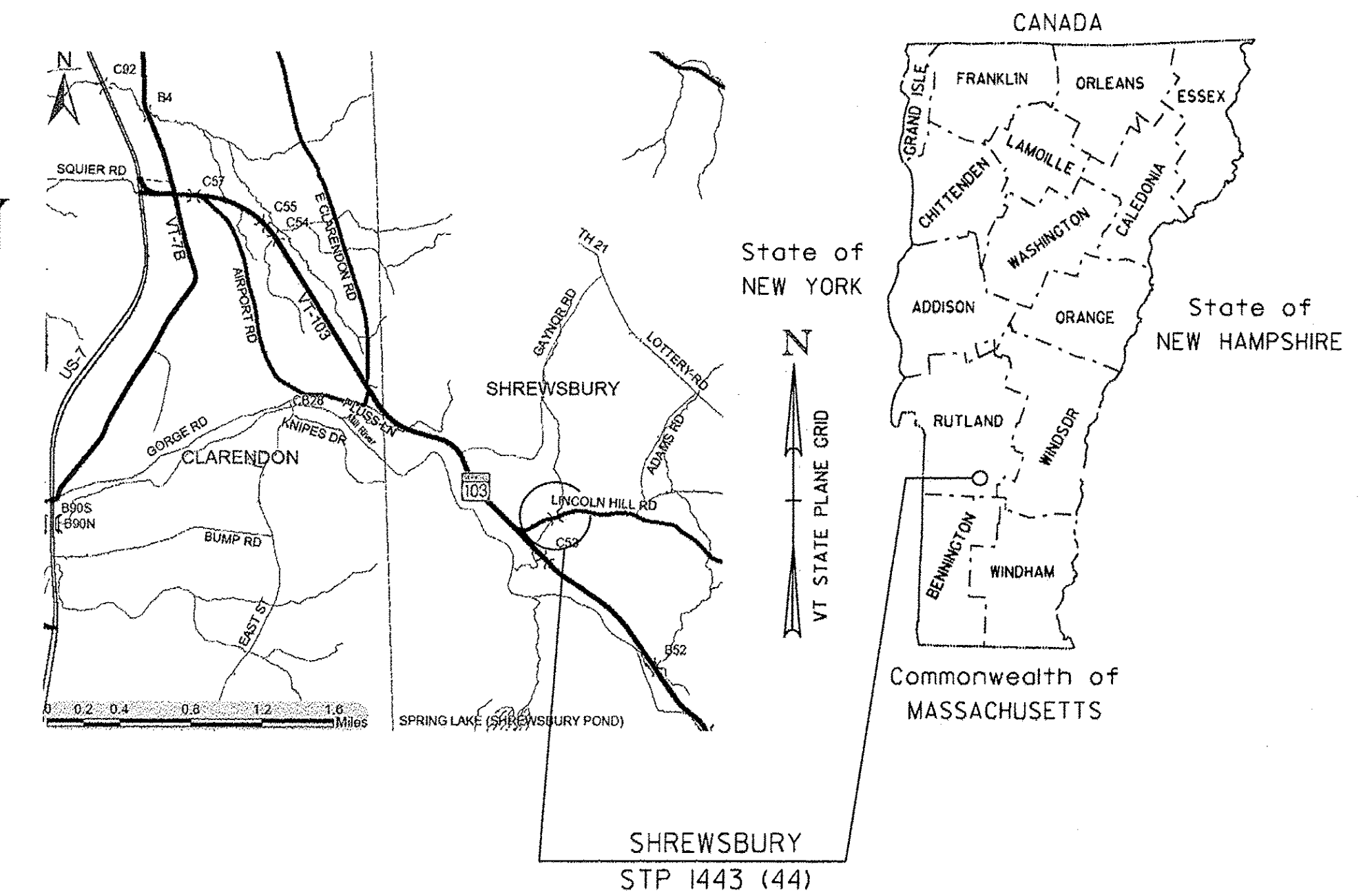
PROPOSED IMPROVEMENT BRIDGE PROJECT TOWN OF SHREWSBURY COUNTY OF RUTLAND

ROUTE NO : TH 4 (CLASS 2 LOCAL ROAD) BRIDGE NO : 37

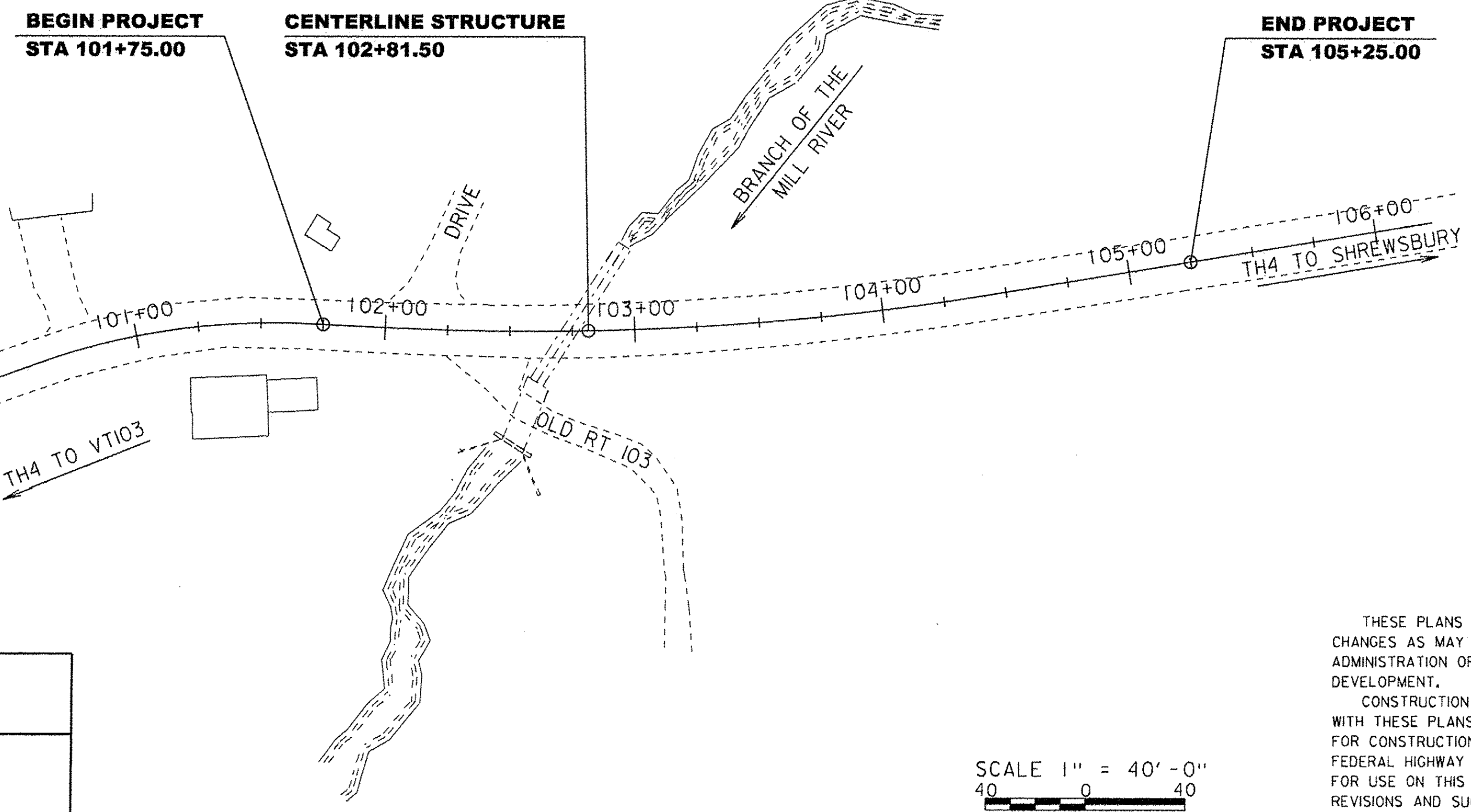
PROJECT LOCATION : TH 4 (LINCOLN HILL ROAD), SHREWSBURY, VERMONT.
APPROXIMATELY 0.25 MILES EASTERLY OF THE INTERSECTION OF TOWN
HIGHWAY 4 AND VERMONT ROUTE 103.

PROJECT DESCRIPTION : WORK TO BE PERFORMED UNDER THIS PROJECT
INCLUDES REPLACEMENT OF EXISTING STRUCTURE (BRIDGE #37) WITH
A NEW STRUCTURE WITH MINIMAL APPROACH ROADWAY AND CHANNEL WORK.

LENGTH OF STRUCTURE : 12 FOOT WIDE BURIED STRUCTURE
LENGTH OF ROADWAY : 350 FEET
LENGTH OF PROJECT : 350 FEET



RECORD PLANS	
CONTRACTOR:	CASELLA CONSTRUCTION, INC. - MENDON, VT
RESIDENT ENGINEER:	TIM POKETTE
CONSTRUCTION BEGAN:	APRIL 14, 2015
CONSTRUCTION COMPLETE:	AUGUST 28, 2015
RECORD PLANS BY:	TIM POKETTE & AARON JAMES
I HEREBY CERTIFY THAT ALL THE CONSTRUCTION REQUIRED BY THIS SET OF DRAWINGS HAS BEEN ACCOMPLISHED AS INDICATED HEREIN.	
BY:	<i>Tim Pokette</i> RESIDENT ENGINEER
DATE:	09-12-2016
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.	



QUALITY ASSURANCE PROGRAM: LEVEL 2

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	
TOP OF CUT	
TOE OF SLOPE	

SURVEYED BY : R. D. GILMAN
SURVEYED DATE : NOV. 1995

DATUM
VERTICAL NAVD 88
HORIZONTAL NAD 83 (92)

SCALE 1" = 40'-0"
40 0 40

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 2011, AS APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION ON JULY 20, 2011 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: <i>Carolyn Carlson</i>	DATE: 5-22-17
PROJECT MANAGER : CAROLYN CARLSON P. E.	
PROJECT NAME :	SHREWSBURY
PROJECT NUMBER :	STP 1443 (44)
SHEET 1 OF 36 SHEETS	

PRELIMINARY INFORMATION SHEET -- (BRIDGE)

LRFD

INDEX OF SHEETS

FINAL HYDRAULIC REPORT

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STANDARDS LIST

D-1	PRECAST REINFORCED CONCRETE DROP INLET DETAILS	06-01-1994
D-6	REINFORCED CONCRETE DROP INLET W/GRATE (DITCHES)	06-01-1994
D-8	REINFORCED CONCRETE DROP INLET WITH PRECAST COVER & GRATE	01-03-2000
D-11	STEEL OR IRON GRATES & COVERS (TYPE A)	06-01-1994
D-16	DRAINAGE DETAILS INCLUDING DROP INLETS, IRON GRATE TYPE B&C, CONC END	06-01-1994
E-134	BRIDGE NUMBER PLAQUE	08-08-1995
E-193	PAVEMENT MARKING DETAILS	08-18-1995
G-1	STEEL BEAM GUARDRAIL DETAILS (POST, DELINEATOR, TYPICALS)	02-10-2014
G-1D	STEEL BEAM GUARDRAIL DETAILS (END TERMINAL, ANCHOR, MEDIAN)	02-10-2014
J-1	PROJECT AND BOUNDARY MARKERS	06-01-1994
J-3	MAIL BOX SUPPORT DETAILS	08-07-1995
T-1	TRAFFIC CONTROL GENERAL NOTES	08-06-2012
T-10	CONVENTIONAL ROADS CONSTRUCTION APPROACH SIGNING	08-06-2012
T-28	CONSTRUCTION SIGN DETAILS	08-06-2012
T-29	CONSTRUCTION SIGN DETAILS	08-06-2012
T-30	CONSTRUCTION SIGN DETAILS	08-06-2012
T-31	CONSTRUCTION SIGN DETAILS	08-06-2012
T-45	SQUARE TUBE SIGN POST AND ANCHOR	01-02-2013

STRUCTURAL DETAIL SHEETS

SD-501.00	CONCRETE DETAILS AND NOTES	5/7/2010
SD-502.00	CONCRETE DETAILS AND NOTES	5/7/2010

HYDROLOGIC DATA

Date: March 2011

DRAINAGE AREA : 1.2 sq. mi.
 CHARACTER OF TERRAIN : Rural, mostly forested, steep
 STREAM CHARACTERISTICS : Sinuous, incised, steep
 NATURE OF STREAMBED : Cobbles and gravel

PEAK FLOW DATA

Q 2.33 =	80 cfs	Q 50 =	300 cfs
Q 10 =	185 cfs	Q 100 =	350 cfs
Q 25 =	250 cfs	Q 500 =	490 cfs

DATE OF FLOOD OF RECORD : Unknown
 ESTIMATED DISCHARGE : Unknown
 WATER SURFACE ELEV. : Unknown
 NATURAL STREAM VELOCITY : @ Q25 = 17.6 cfs
 ICE CONDITIONS : Moderate to heavy
 DEBRIS : Moderate
 DOES THE STREAM REACH MAXIMUM HIGHWATER ELEV. RAPIDLY? No
 IS ORDINARY RISE RAPID? No
 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 : 6' diameter CMP extended with 10' span by 10' rise concrete arch
 YEAR BUILT :
 CLEAR SPAN(NORMAL TO STREAM): 6'
 VERTICAL CLEARANCE ABOVE STREAMBED: 6'
 WATERWAY OF FULL OPENING: 28 sq. ft.
 DISPOSITION OF STRUCTURE: Dispose and replace
 TYPE OF MATERIAL UNDER SUBSTRUCTURE: See borings

WATER SURFACE ELEVATIONS AT:

Q2.33 =	1006.6'	VELOCITY =	10.9 fps
Q10 =	1009.3'	"	12.6 fps
Q25 =	1010.8'	"	13.2 fps
Q50 =	1011.9'	"	13.6 fps
Q100 =	1014.0'	"	14.0 fps

LONG TERM STREAMBED CHANGES: None noted
 IS THE ROADWAY OVERTOPPED BELOW Q100: No
 FREQUENCY: N/A
 RELIEF ELEVATION: 1019.9'
 DISCHARGE OVER ROAD @Q100: N/A

UPSTREAM STRUCTURE

TOWN: N/A DISTANCE:
 HIGHWAY #: STRUCTURE #:
 CLEAR SPAN: CLEAR HEIGHT:
 YEAR BUILT: FULL WATERWAY:
 STRUCTURE TYPE:

DOWNSTREAM STRUCTURE

TOWN: Shrewsbury DISTANCE: 1000'
 HIGHWAY #: VT 103 STRUCTURE #: BR 53
 CLEAR SPAN: 12' CLEAR HEIGHT: 9'
 YEAR BUILT: 1949 FULL WATERWAY: 112 sq. ft.
 STRUCTURE TYPE: Reinforced concrete box

LRFR LOAD RATING FACTORS

LOADING LEVELS	TRUCK					
	HL-93	3S2	6 AXLE	3A. STR.	4A. STR.	5A. SEMI
TONNAGE	20	36	66	30	34.5	38
INVENTORY						
POSTING						
OPERATING						
COMMENTS:						

AS BUILT "REBAR" DETAIL

LEVEL I	LEVEL II	LEVEL III
TYPE:	TYPE:	TYPE:
GRADE:	GRADE:	GRADE:

TRAFFIC DATA

YEAR	ADT	DHV	% D	% T	ADTT	20 year ESAL for flexible pavement from 2001 to 2021 : 124000
2001	430	60	60	<1.0	15	40 year ESAL for flexible pavement from 2001 to 2041 : 284000
2021	580	80	60	<1.0	20	Design Speed : 25 mph

PROPOSED STRUCTURE

STRUCTURE TYPE: Precast Concrete Arch
 CLEAR SPAN(NORMAL TO STREAM): 12'
 VERTICAL CLEARANCE ABOVE STREAMBED: 6'
 WATERWAY OF FULL OPENING: 65 cf

WATER SURFACE ELEVATIONS AT:

Q2.33 =	1004.8'	VELOCITY=	9.2 fps
Q10 =	1006.2'	"	12.0 fps
Q25 =	1006.9'	"	12.8 fps
Q50 =	1007.4'	"	13.3 fps
Q100 =	1007.9'	"	13.7 fps

IS THE ROADWAY OVERTOPPED BELOW Q100: No
 FREQUENCY: N/A
 RELIEF ELEVATION: 1019.9'
 DISCHARGE OVER ROAD @Q100: N/A

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 1009.2'
 VERTICAL CLEARANCE: @ Q25 = 2.3'

SCOUR: Contraction scour 0' up to Q500
 REQUIRED CHANNEL PROTECTION: Stone Fill, Type IV

PERMIT INFORMATION

AVERAGE DAILY FLOW:	3 cfs	DEPTH OR ELEVATION:	
ORDINARY LOW WATER:	2 cfs		0.5'
ORDINARY HIGH WATER:	35 cfs		1.5'

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: None required
 CLEAR SPAN (NORMAL TO STREAM):
 VERTICAL CLEARANCE ABOVE STREAMBED:
 WATERWAY AREA OF FULL OPENING:

ADDITIONAL INFORMATION

TRAFFIC MAINTENANCE NOTES

1. MAINTAIN TRAFFIC ON AN OFF SITE DETOUR. SEE PROJECT NOTES SHEET - NOTE 23.
2. TRAFFIC SIGNALS ARE NOT NECESSARY.
3. SIDEWALKS ARE NOT NECESSARY

DESIGN VALUES

1. DESIGN LIVE LOAD	HL-93
2. FUTURE PAVEMENT	d _p : 3.0 INCH
3. DESIGN SPAN	L: 12.00 FT
4. MIN. MID-SPAN POS. CAMBER @ RELEASE (PRESTRESSED UNITS)	Δ: ---
5. PRESTRESSING STRAND	f _y : ---
6. PRESTRESSED CONCRETE STRENGTH	f' _c : ---
7. PRESTRESSED CONCRETE RELEASE STRENGTH	f' _{cr} : ---
8. CONCRETE, HIGH PERFORMANCE CLASS AA	f' _c : ---
9. CONCRETE, HIGH PERFORMANCE CLASS A	f' _c : ---
10. CONCRETE, HIGH PERFORMANCE CLASS B	f' _c : ---
11. CONCRETE, CLASS C	f' _c : ---
12. REINFORCING STEEL	f _y : 60 KSI
13. STRUCTURAL STEEL AASHTO M270	f _y : ---
14. SOIL UNIT WEIGHT	γ: 0.140 KCF
15. NOMINAL BEARING RESISTANCE OF SOL	q _n : 7.2 KSF
16. SOL BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	φ: ---
17. NOMINAL BEARING RESISTANCE OF ROCK	q _n : ---
18. ROCK BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	φ: ---
19. NOMINAL AXIAL PILE RESISTANCE	q _p : ---
20. PILE YIELD STRENGTH ASTM A572	f _y : ---
21. PILE SIZE	---
22. EST. PILE LENGTH	L _p : ---
23. PILE RESISTANCE FACTOR	φ: ---
24. LATERAL PILE DEFLECTION	Δ: ---
25. BASIC WIND SPEED	V _{3s} : ---
26. MINIMUM GROUND SNOW LOAD	p _g : ---
27. SEISMIC DATA	PGA: --- S _s : --- S ₁ : ---

PROJECT NAME: **SHREWSBURY**
 PROJECT NUMBER: **STP 1443 (44)**
 FILE NAME: s94j154pi.xls PLOT DATE: 5/12/2014
 PROJECT LEADER: C. CARLSON DRAWN BY: M. LONGSTREET
 DESIGNED BY: N. VAN DEN BERG CHECKED BY: J. LACROIX
PRELIMINARY INFORMATION SHEET SHEET 2 OF 36

GENERAL INFORMATION

SYMBOLY LEGEND NOTE

THE SYMBOLY ON THIS SHEET IS INTENDED TO COVER STANDARD CONVENTIONAL SYMBOLY. THE SYMBOLY IS USED FOR EXISTING & PROPOSED FEATURES WITH HEAVIER LINEWEIGHT, IN COMBINATION WITH PROJECT ANNOTATION, AS NOTED ON PROJECT PLAN SHEETS. THIS LEGEND SHEET COVERS THE BASICS. SYMBOLY ON PLANS MAY VARY, PLAN ANNOTATIONS AND NOTES SHOULD BE USED TO CLARIFY AS NEEDED.

R.O.W. ABBREVIATIONS (CODES) & SYMBOLS

POINT CODE	DESCRIPTION
CH	CHANNEL EASEMENT
CONST	CONSTRUCTION EASEMENT
CUL	CULVERT EASEMENT
D&C	DISCONNECT & CONNECT
DIT	DITCH EASEMENT
DR	DRAINAGE EASEMENT
DRIVE	DRIVEWAY EASEMENT
EC	EROSION CONTROL
HWY	HIGHWAY EASEMENT
I&M	INSTALL & MAINTAIN EASEMENT
LAND	LANDSCAPE EASEMENT
R&RES	REMOVE & RESET
R&REP	REMOVE & REPLACE
SR	SLOPE RIGHT
UE	UTILITY EASEMENT
(P)	PERMANENT EASEMENT
(T)	TEMPORARY EASEMENT
■	BNDNS BOUND SET
▣	BNDNS BOUND TO BE SET
●	IPNS IRON PIN SET
⊙	IPNS IRON PIN TO BE SET
⊠	CALC EXISTING ROW POINT
○	PROW PROPOSED ROW POINT
[LENGTH]	LENGTH CARRIED ON NEXT SHEET

COMMON TOPOGRAPHIC POINT SYMBOLS

POINT CODE	DESCRIPTION
⊕	APL BOUND APPARENT LOCATION
○	BM BENCH MARK
□	BND BOUND
▣	CB CATCH BASIN
⊕	COMB COMBINATION POLE
▣	DITHR DROP INLET THROATED DNC
⊕	EL ELECTRIC POWER POLE
○	FPOLE FLAGPOLE
○	GASFIL GAS FILLER
○	GP GUIDE POST
×	GSO GAS SHUT OFF
○	GUY GUY POLE
○	GUYW GUY WIRE
×	GV GATE VALVE
⊕	H TREE HARDWOOD
△	HCTRL CONTROL HORIZONTAL
▲	HVCTRL CONTROL HORIZ. & VERTICAL
◇	HYD HYDRANT
●	IP IRON PIN
●	IPIPE IRON PIPE
⊕	LI LIGHT - STREET OR YARD
♫	MB MAILBOX
○	MH MANHOLE (MH)
□	MM MILE MARKER
●	PM PARKING METER
□	PMK PROJECT MARKER
○	POST POST STONE/WOOD
⊕	RRSIG RAILROAD SIGNAL
⊕	RRSL RAILROAD SWITCH LEVER
⊕	S TREE SOFTWOOD
⊕	SAT SATELLITE DISH
⊕	SHRUB SHRUB
⊕	SIGN SIGN
⊕	STUMP STUMP
⊕	TEL TELEPHONE POLE
○	TIE TIE
⊕	TSIGN SIGN W/DOUBLE POST
⊕	VCTRL CONTROL VERTICAL
○	WELL WELL
×	WSO WATER SHUT OFF

THESE ARE COMMON VAOT SURVEY POINT SYMBOLS FOR EXISTING FEATURES, ALSO USED FOR PROPOSED FEATURES WITH HEAVIER LINEWEIGHT, IN COMBINATION WITH PROPOSED ANNOTATION.

PROPOSED GEOMETRY CODES

CODE	DESCRIPTION
PC	POINT OF CURVATURE
PI	POINT OF INTERSECTION
CC	CENTER OF CURVE
PT	POINT OF TANGENCY
PCC	POINT OF COMPOUND CURVE
PRC	POINT OF REVERSE CURVE
POB	POINT OF BEGINNING
POE	POINT OF ENDING
STA	STATION PREFIX
AH	AHEAD STATION SUFFIX
BK	BACK STATION SUFFIX
D	CURVE DEGREE OF (100FT)
R	CURVE RADUIS OF
T	CURVE TANGENT LENGTH
L	CURVE LENGTH OF
E	CURVE EXTERNAL DISTANCE

UTILITY SYMBOLY

UNDERGROUND UTILITIES

— UGU —	UTILITY (GENERIC-UNKNOWN)
— UT —	TELEPHONE
— UE —	ELECTRIC
— UC —	CABLE (TV)
— UEC —	ELECTRIC+CABLE
— UET —	ELECTRIC+TELEPHONE
— UCT —	CABLE+TELEPHONE
— UECT —	ELECTRIC+CABLE+TELEP.
— G —	GAS LINE
— W —	WATER LINE
— S —	SANITARY SEWER (SEPTIC)

ABOVE GROUND UTILITIES (AERIAL)

— AGU —	UTILITY (GENERIC-UNKNOWN)
— T —	TELEPHONE
— E —	ELECTRIC
— C —	CABLE (TV)
— EC —	ELECTRIC+CABLE
— ET —	ELECTRIC+TELEPHONE
— AER E&T —	ELECTRIC+TELEPHONE
— CT —	CABLE+TELEPHONE
— ECT —	ELECTRIC+CABLE+TELEP.
—	UTILITY POLE GUY WIRE

PROJECT CONSTRUCTION SYMBOLY

PROJECT DESIGN & LAYOUT SYMBOLY

— — — — CZ — — — —	CLEAR ZONE
— — — — — — — —	PLAN LAYOUT MATCHLINE

PROJECT CONSTRUCTION FEATURES

▲ — — — — ▲	TOP OF CUT SLOPE
○ — — — — ○	TOE OF FILL SLOPE
⊕ — — — — ⊕	STONE FILL
⊕ — — — — ⊕	BOTTOM OF DITCH
— — — — — — — —	CULVERT PROPOSED
— — — — — — — —	STRUCTURE SUBSURFACE
PDF — — — — PDF	PROJECT DEMARCATION FENCE
BF — — — — BF	BARRIER FENCE
⊗ — — — — ⊗	TREE PROTECTION ZONE (TPZ)
/// — — — — ///	STRIPING LINE REMOVAL
~~~~~	SHEET PILES

**CONVENTIONAL BOUNDARY SYMBOLY**

**BOUNDARY LINES**

— — — — — — — —	TOWN BOUNDARY LINE
— — — — — — — —	COUNTY BOUNDARY LINE
— — — — — — — —	STATE BOUNDARY LINE
— — — — — — — —	PROPOSED STATE R.O.W. (LIMITED ACCESS)
— — — — — — — —	PROPOSED STATE R.O.W.
— — — — — — — —	STATE ROW (LIMITED ACCESS)
— — — — — — — —	STATE ROW
— — — — — — — —	TOWN ROW
— — — — — — — —	PERMANENT EASEMENT LINE (P)
— — — — — — — —	TEMPORARY EASEMENT LINE (T)
— — — — — — — —	SURVEY LINE
— — — — — — — —	PROPERTY LINE (P/L)
— — — — — — — —	SLOPE RIGHTS
6f — — — — 6f	6F PROPERTY BOUNDARY
4f — — — — 4f	4F PROPERTY BOUNDARY
HAZ — — — — HAZ	HAZARDOUS WASTE

**EPSC LAYOUT PLAN SYMBOLY**

**EPSC MEASURES**

ONNOONNOONNO	FILTER CURTAIN
— — — — — — — —	SILT FENCE
— — — — — — — —	SILT FENCE WOVEN WIRE
— — — — — — — —	CHECK DAM
— — — — — — — —	DISTURBED AREAS REQUIRING RE-VEGETATION
— — — — — — — —	EROSION MATTING

**ENVIRONMENTAL RESOURCES**

— — — — — — — —	WETLAND BOUNDARY
— — — — — — — —	RIPARIAN BUFFER ZONE
— — — — — — — —	WETLAND BUFFER ZONE
— — — — — — — —	SOIL TYPE BOUNDARY
— — — — — — — —	T&E THREATENED & ENDANGERED SPECIES
— — — — — — — —	HAZ HAZARDOUS WASTE AREA
— — — — — — — —	AG AGRICULTURAL LAND
— — — — — — — —	HABITAT FISH & WILDLIFE HABITAT
— — — — — — — —	FLOOD PLAIN FLOOD PLAIN
— — — — — — — —	OHW ORDINARY HIGH WATER (OHW)
— — — — — — — —	STORM WATER
— — — — — — — —	USDA FOREST SERVICE LANDS
— — — — — — — —	WILDLIFE HABITAT SUIT/CONN

**ARCHEOLOGICAL & HISTORIC**

— — — — — — — —	ARCH ARCHEOLOGICAL BOUNDARY
— — — — — — — —	HISTORIC DIST HISTORIC DISTRICT BOUNDARY
— — — — — — — —	HISTORIC HISTORIC AREA
Ⓜ	HISTORIC STRUCTURE

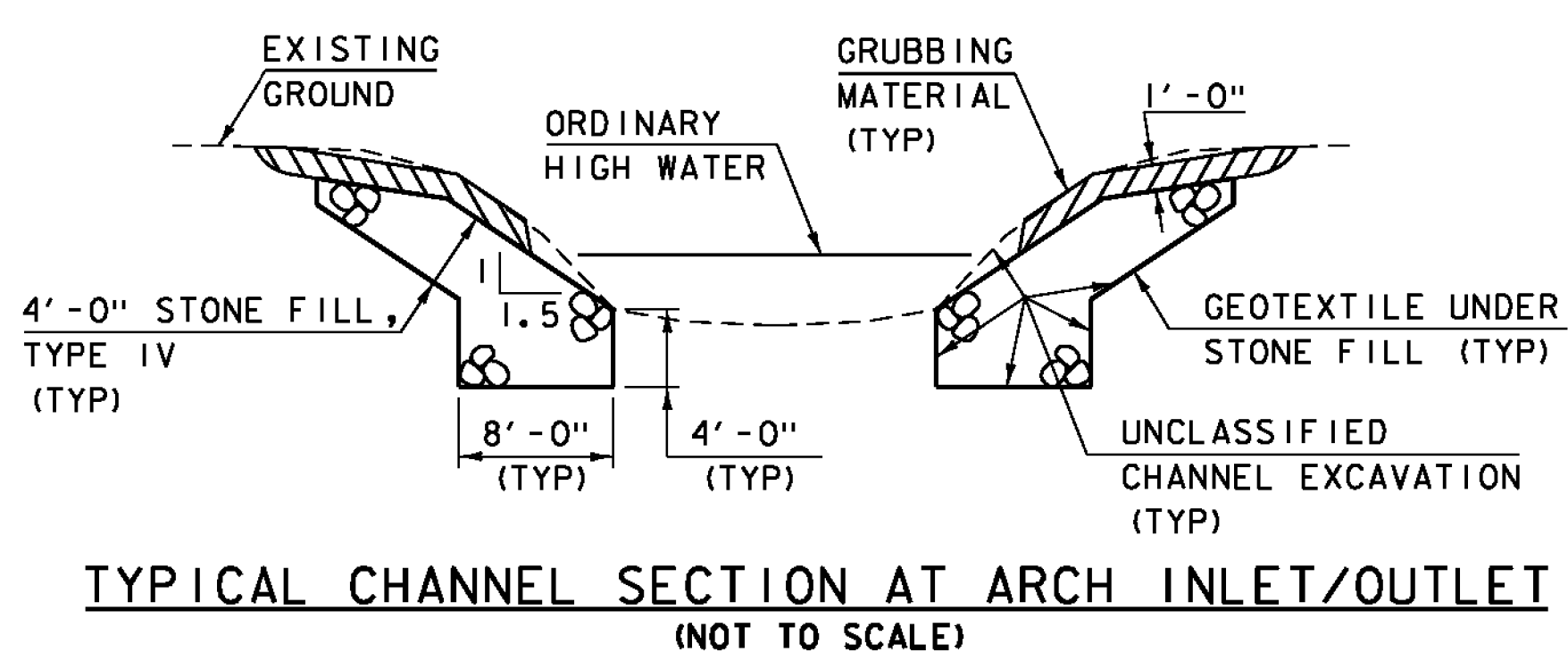
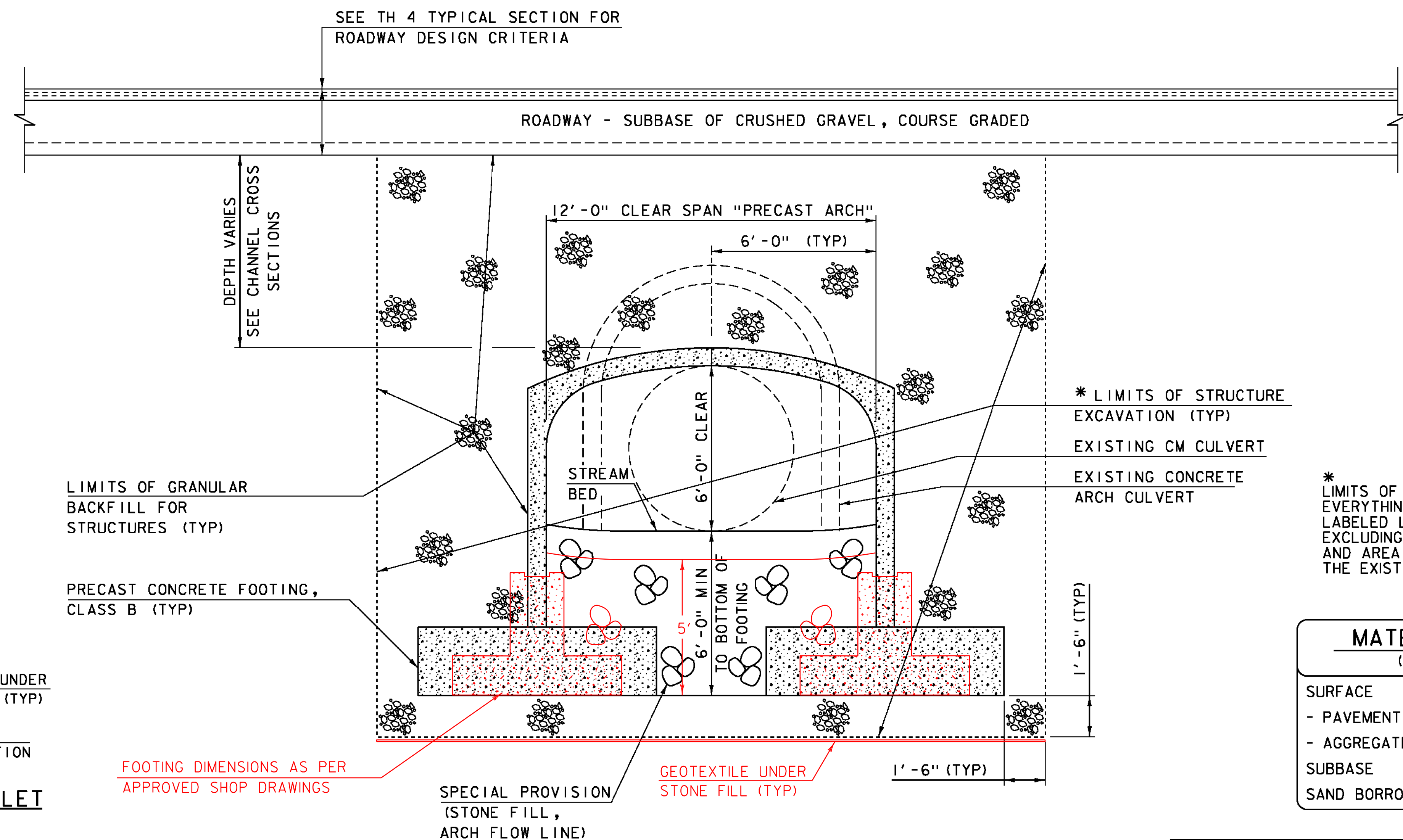
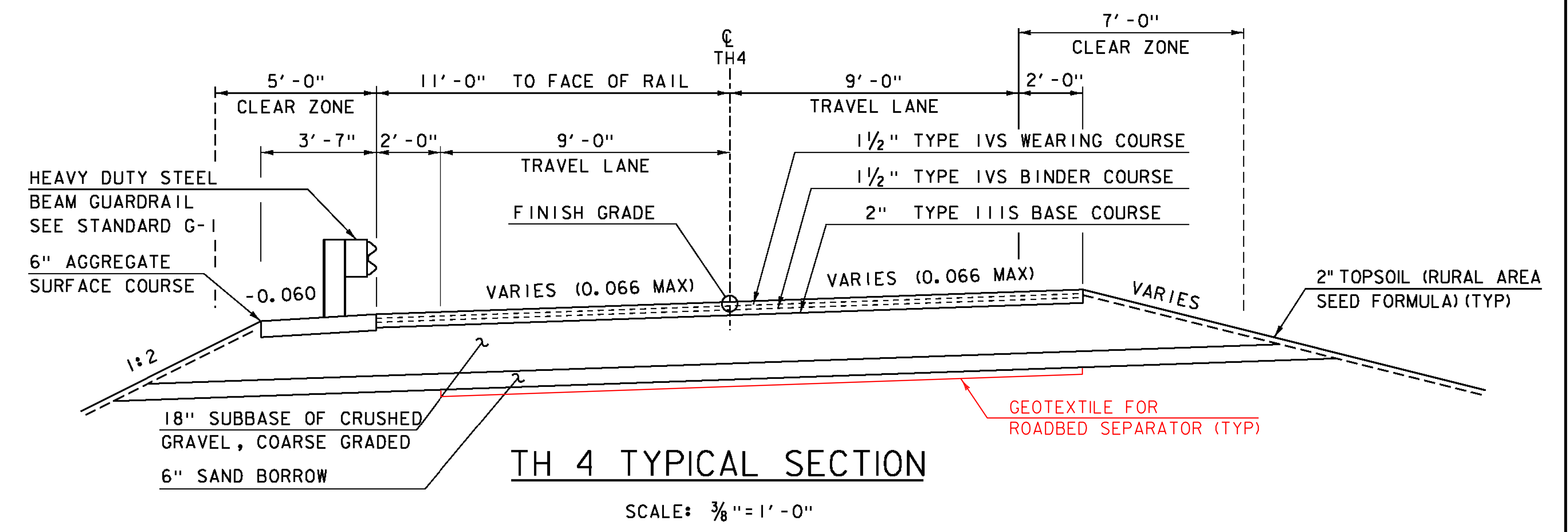
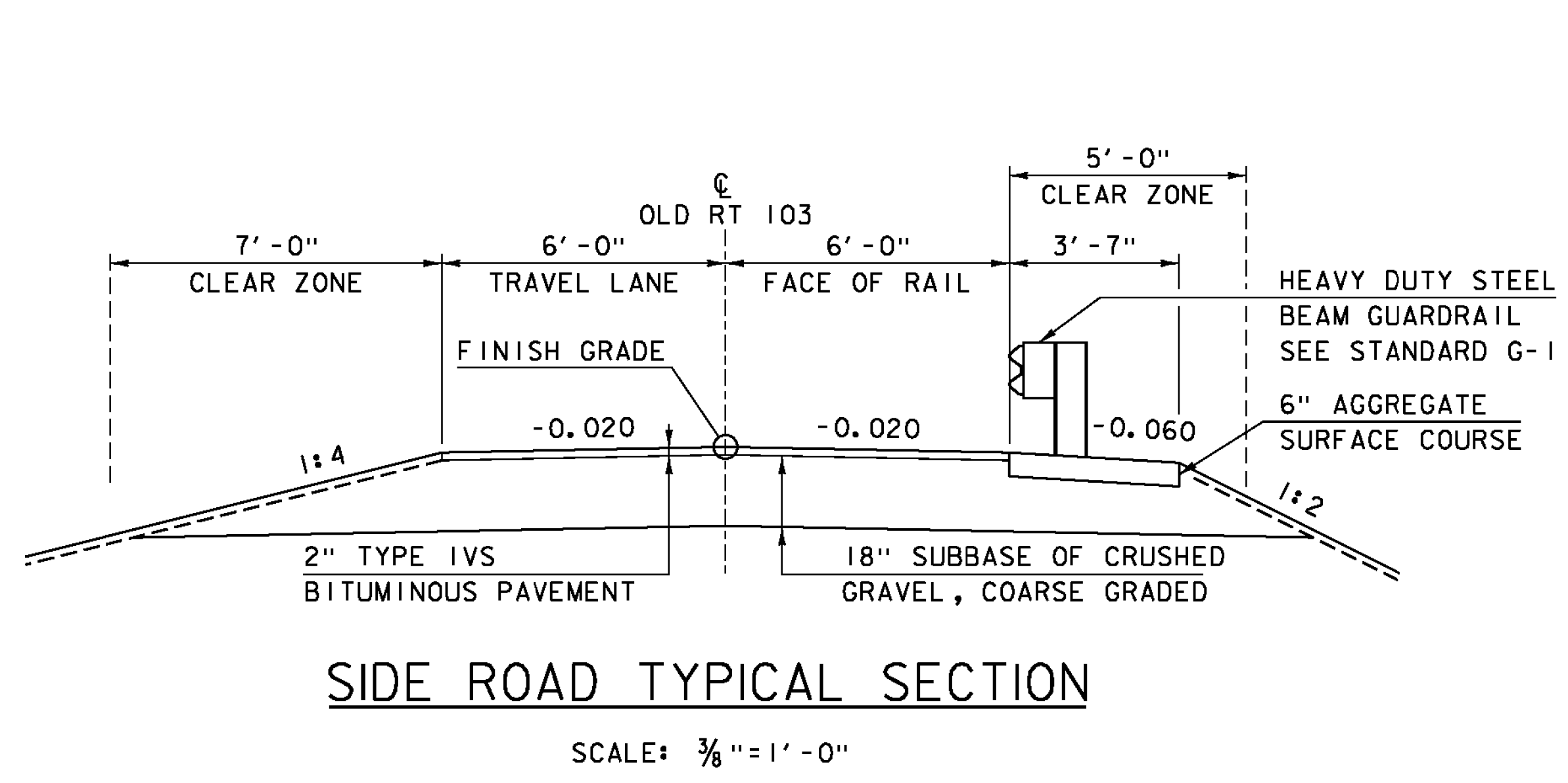
**CONVENTIONAL TOPOGRAPHIC SYMBOLY**

**EXISTING FEATURES**

— — — — — — — —	ROAD EDGE PAVEMENT
— — — — — — — —	ROAD EDGE GRAVEL
— — — — — — — —	DRIVEWAY EDGE
— — — — — — — —	DITCH
— — — — — — — —	FOUNDATION
— — — — — — — —	FENCE (EXISTING)
— — — — — — — —	FENCE WOOD POST
— — — — — — — —	FENCE STEEL POST
— — — — — — — —	GARDEN
— — — — — — — —	ROAD GUARDRAIL
— — — — — — — —	RAILROAD TRACKS
— — — — — — — —	CULVERT (EXISTING)
— — — — — — — —	STONE WALL
— — — — — — — —	WALL
— — — — — — — —	WOOD LINE
— — — — — — — —	BRUSH LINE
— — — — — — — —	HEDGE
— — — — — — — —	BODY OF WATER EDGE
— — — — — — — —	LEDGE EXPOSED

PROJECT NAME: SHREWSBURY  
PROJECT NUMBER: STP 1443 (44)

FILE NAME: s94j154forms.dgn PLOT DATE: 12-MAY-2014  
PROJECT LEADER: C. CARLSON DRAWN BY: M. LONGSTREET  
DESIGNED BY: N. VANDENBERG CHECKED BY: J. LACROIX  
SYMBOLY LEGEND SHEET 3 OF 36

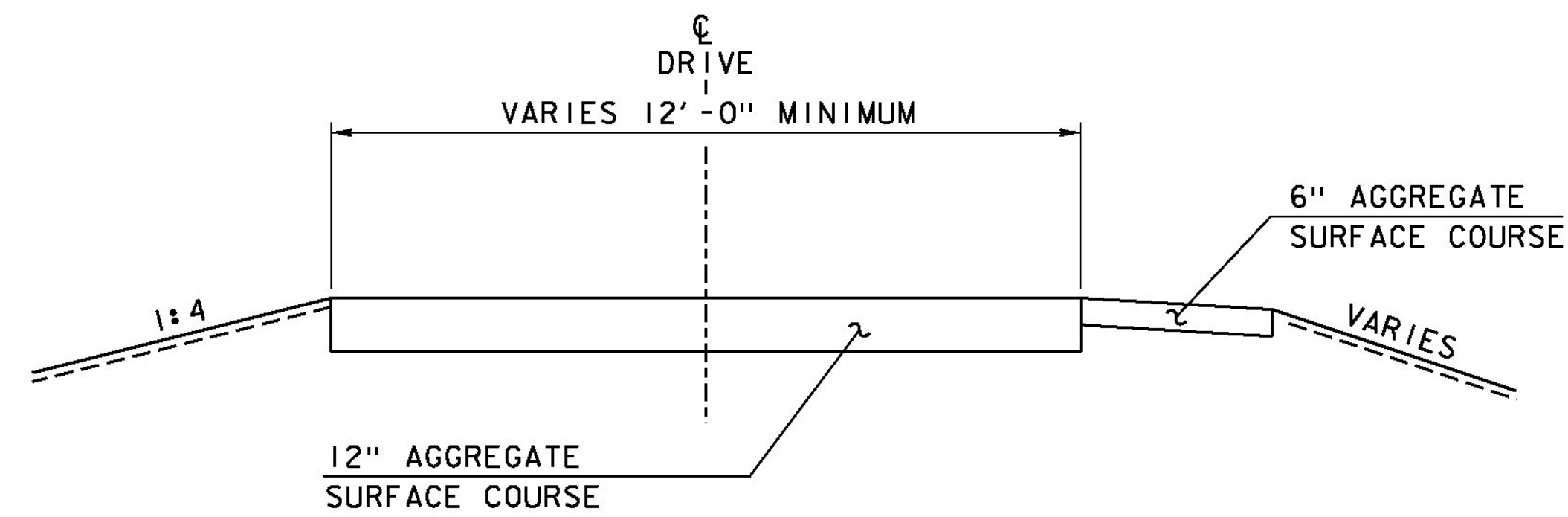


* LIMITS OF STRUCTURE EXCAVATION INCLUDES EVERYTHING INSIDE THE DASHED LINE, LABELLED LIMIT OF STRUCTURE EXCAVATION, EXCLUDING EXISTING CONCRETE ARCH CULVERT AND AREA INSIDE EXISTING ARCH AND INSIDE THE EXISTING 6 FT DIAMETER +/- CULVERT.

MATERIAL TOLERANCES (IF USED ON PROJECT)	
SURFACE	
- PAVEMENT (TOTAL THICKNESS)	+/- 1/4"
- AGGREGATE SURFACE COURSE	+/- 1/2"
SUBBASE	+/- 1"
SAND BORROW	+/- 1"

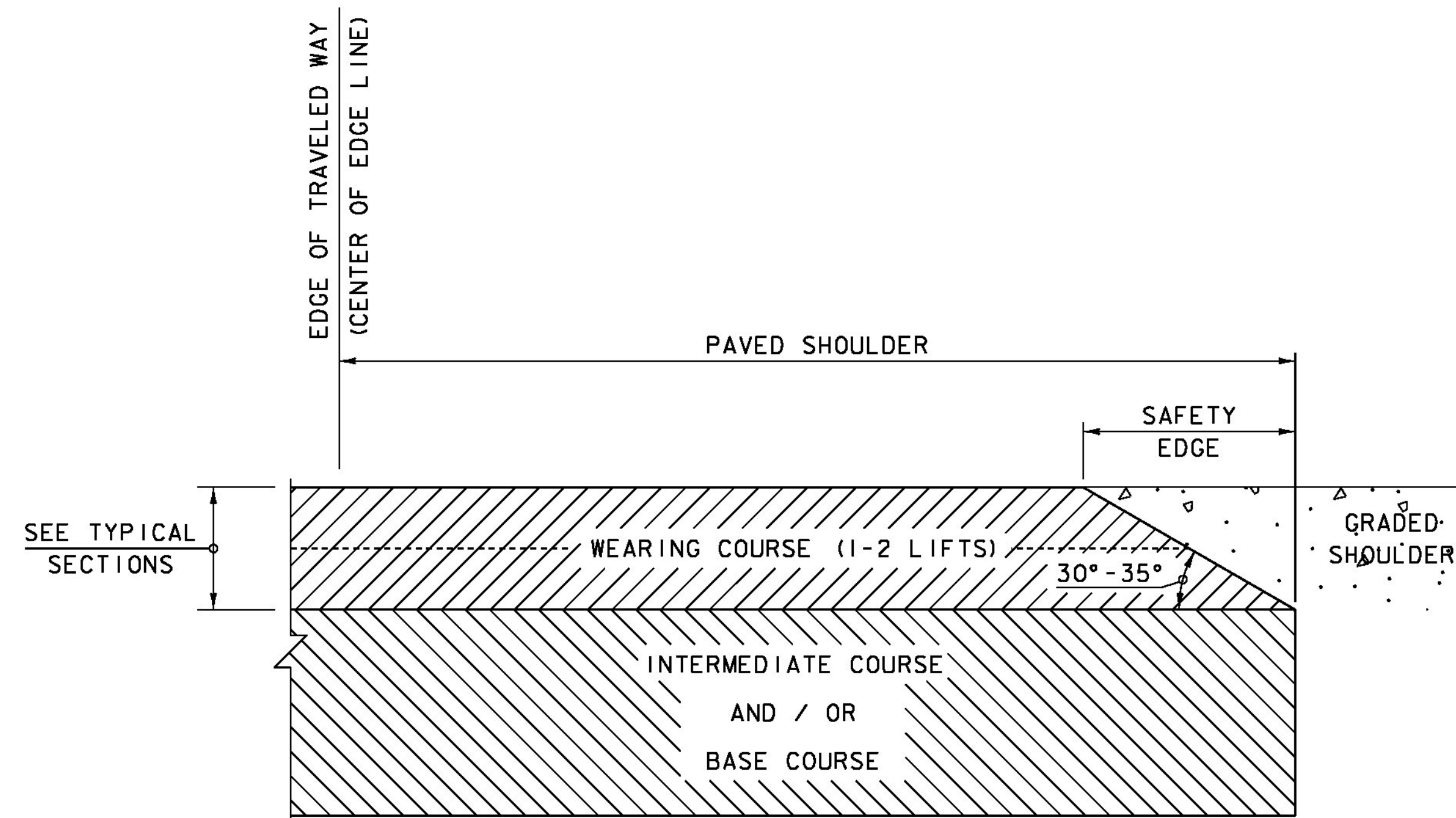
PROJECT NAME: SHREWSBURY  
PROJECT NUMBER: STP 1443 (44)  
FILE NAME: s94j54typ.dgn  
PROJECT LEADER: C. CARLSON  
DESIGNED BY: N. VANDENBERG  
TYPICAL SECTIONS SHEET 1  
PLOT DATE: 12-MAY-2014  
DRAWN BY: M. LONGSTREET  
CHECKED BY: J. LACROIX  
SHEET 4 OF 36

FABRICATOR TO DETERMINE ALL FINAL STRUCTURE DIMENSIONS NOT SHOWN HERE



**DRIVE TYPICAL SECTION**

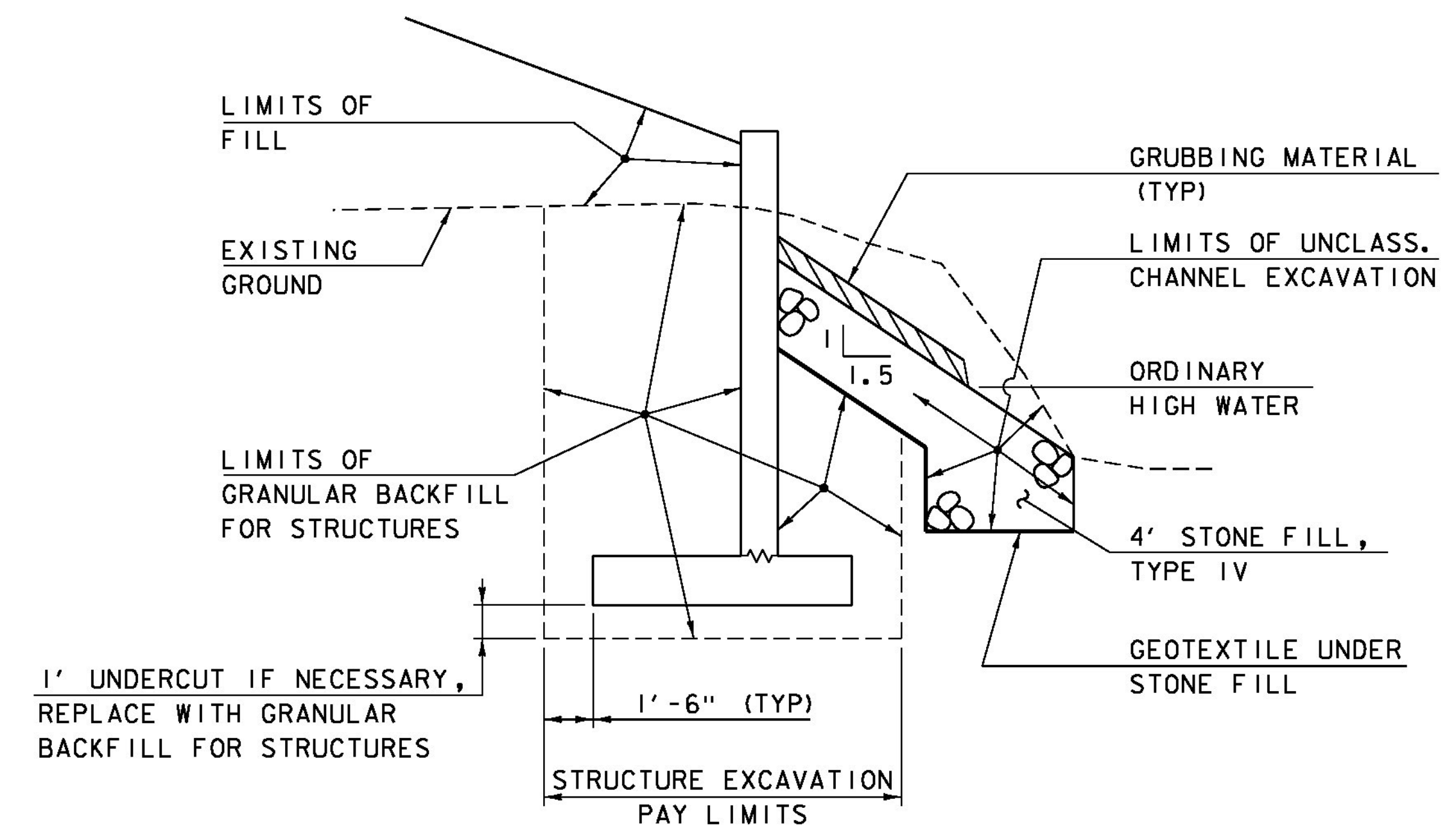
SCALE: 3/8" = 1'-0"



**SAFETY EDGE DETAIL**

NOT TO SCALE

- NOTES:
1. LEVELING COURSE MAY INCLUDE THE "SAFETY EDGE" AT THE CONTRACTOR'S CHOICE.
  2. THE EDGE OF PAVEMENT SHALL BE FORMED IN SUCH A WAY THAT THE BITUMINOUS CONCRETE PAVEMENT IS EXTRUDED OR COMPRESSED TO FORM THE 30 TO 35 DEGREE ANGLE. DEVICES THAT SIMPLY STRIKE-OFF THE MIX WITHOUT PROVIDING ANY COMPACTIVE EFFORT WILL NOT BE ALLOWED.
  3. THE PAVED SHOULDER EXTENDS FROM THE EDGE OF TRAVELED WAY TO THE EDGE OF THE WEARING COURSE, INCLUDING THE "SAFETY EDGE".



**TYPICAL WINGWALL SECTION**

(NOT TO SCALE)

ACTUAL LIMITS OF STRUCTURE EXCAVATION SHALL BE DETERMINED BY THE CONTRACTOR. HOWEVER, ONLY THE EXCAVATION BETWEEN THE LIMITS SHOWN WILL BE PAID FOR UNDER THE ITEM 204.25, "STRUCTURE EXCAVATION". EXCAVATION BY THE CONTRACTOR OUTSIDE OF THESE LIMITS WILL BE AT THE EXPENSE OF THE CONTRACTOR.

PROJECT NAME: SHREWSBURY  
PROJECT NUMBER: STP 1443 (44)

FILE NAME: s94j154typ.dgn  
PROJECT LEADER: C. CARLSON  
DESIGNED BY: N. VANDENBERG  
TYPICAL SECTIONS SHEET 2

PLOT DATE: 12-MAY-2014  
DRAWN BY: M. LONGSTREET  
CHECKED BY: J. LACROIX  
SHEET 5 OF 36

**GENERAL**

- 1. THE CONTRACTOR WILL BE ALLOWED TO CLOSE THE ROAD TO TRAFFIC FOR A MAXIMUM OF 4 CONSECUTIVE WEEKS FOR INSTALLATION OF THE NEW STRUCTURE. SEE SPECIAL PROVISIONS.
- 2. ALL DESIGN, MATERIALS, AND CONSTRUCTION SHALL CONFORM TO THE STATE OF VERMONT AGENCY OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION DATED 2011, AND ITS LATEST REVISIONS, THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS 2012, AND ITS LATEST REVISIONS, AND THE VTRANS STRUCTURES DESIGN MANUAL.
- 3. THE SOIL PROPERTIES AND DESIGN PARAMETERS TO BE USED ARE AS FOLLOWS:

DESIGN LIVE LOAD:	HL - 93
FILL OVER THE STRUCTURE:	6 INCHES MINIMUM
DEPTH OF FOOTINGS BELOW STREAM BED:	6 FEET
MINIMUM CLEAR SPAN:	12 FEET
MINIMUM VERTICAL WATERWAY OPENING:	6 FEET
MAXIMUM ALLOWABLE SETTLEMENT:	
OF WHOLE STRUCTURE:	1 INCH
BETWEEN PRECAST UNITS:	.25 INCH

**FOUNDATION SOIL PARAMETERS**

UNIT WEIGHT:	130 PCF
FRICTION ANGLE:	36 DEGREES
COEFFICIENT OF FRICTION:	
FORMED CONCRETE AGAINST SOIL	0.40

**FACTORED BEARING RESISTANCE:**

STRENGTH LIMIT STATE	
VARYING LINEARLY FROM 10 KSF AT 4' EFFECTIVE FOOTING WIDTH TO 16.5 KSF AT 12'	
EXTREME LIMIT STATE	
VARYING LINEARLY FROM 7 KSF AT 4' EFFECTIVE FOOTING WIDTH TO 21 KSF AT 12'	

**RETAINED SOIL PARAMETERS**

UNIT WEIGHT:	140 PCF
FRICTION ANGLE:	34 DEGREES
COEFFICIENT OF FRICTION:	
CONCRETE CAST AGAINST SOIL	0.55
FORMED CONCRETE AGAINST SOIL	0.49

- 4. ALL DIMENSIONS SHOWN IN THE PLANS ARE HORIZONTAL OR VERTICAL AND ARE GIVEN AT 68 DEGREES FAHRENHEIT, UNLESS NOTED OTHERWISE.
- 5. ITEM 529.15 "REMOVAL OF STRUCTURE" SHALL BE USED FOR REMOVAL OF THE EXISTING PIPE, ARCH, AND WINGWALLS.
- 6. DEWATERING SHALL BE INCLUDED IN ITEM 900.645 "TEMPORARY RELOCATION OF STREAM".
- 7. THE DESIGN SHALL INCLUDE THE EFFECTS OF ALL LOADS, NOT LIMITED TO LIVE LOAD, EARTH SURCHARGE AND HYDROSTATIC PRESSURE.
- 8. ITEM 900.645 "MAINTENANCE OF EXISTING WATER FLOWS" SHALL BE FULL COMPENSATION FOR INSTALLATION AND MAINTENANCE OF TEMPORARY WATER SERVICE AS INDICATED ON THE PLANS. TAKE NOTE THERE ARE TWO POTABLE WATERLINES IN THE VICINITY OF THE PROJECT, ONE IS TO BE TEMPORARILY RELOCATED AND THE OTHER LEFT UNDISTURBED. SEE R.O.W. LAYOUT FOR DETAILS. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THIS WATER LINE THROUGHOUT THE DURATION OF THE PROJECT AND FOR COORDINATING WORK ON THE LINE WITH ITS OWNER TO MINIMIZE DISRUPTION OF SERVICE. SEE SPECIAL PROVISIONS.

**CONCRETE**

- 9. THE RIGID FRAME OR ARCH, HEADWALLS, WINGWALLS, AND FOOTINGS SHALL BE PRECAST CONCRETE CONFORMING TO SECTION 540 OF THE SPECIFICATIONS AND SHALL MEET PLAN DIMENSIONS WHERE REQUIRED. ALL PRECAST COMPONENTS OF THE STRUCTURE WILL BE PAID FOR UNDER ITEMS:
  - 540.10 "PRECAST CONCRETE STRUCTURE (12'-0" X 12'-0" X 120'-0" FRAME OR ARCH TYPE)"
  - 540.10 "PRECAST CONCRETE STRUCTURE (WINGWALL #1)"
  - 540.10 "PRECAST CONCRETE STRUCTURE (WINGWALL #2)"
  - 540.10 "PRECAST CONCRETE STRUCTURE (WINGWALL #3)"
  - 540.10 "PRECAST CONCRETE STRUCTURE (WINGWALL #4)"
- 10. DESIGN OF ALL ELEMENTS, ANCHORAGE, AND CONNECTIONS OF THE PRECAST STRUCTURES ARE THE RESPONSIBILITY OF THE PRECAST SUPPLIER. THIS DESIGN SHALL ALSO INCLUDE BUT NOT BE LIMITED TO DESIGN OF ALL EXCAVATIONS, INSTALLATION PROCEDURES, AND BACKFILLING REQUIREMENTS. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE FABRICATOR'S APPROVED DESIGN. THE CONTRACTOR SHALL SUBMIT FABRICATION DRAWINGS FOR THE PRECAST RIGID FRAME OR ARCH IN ACCORDANCE WITH SECTION 105. ALL DESIGN AND SUPPORTING CALCULATIONS SHALL BE SIGNED, STAMPED AND DATED BY A PROFESSIONAL ENGINEER LICENSED TO PRACTICE ENGINEERING IN THE STATE OF VERMONT. NOTE THAT THE FABRICATOR ASSUMES ALL LIABILITY FOR THE ADEQUACY AND ACCURACY OF THE RIGID FRAME OR ARCH DESIGN, INCLUDING ALL EXCAVATION, INSTALLATION, AND BACKFILLING DESIGN.
- 11. WATER REPELLENT, SILANE SHALL BE FURNISHED IN ACCORDANCE WITH SECTION 514 AND SHALL BE SHOP APPLIED TO ALL EXPOSED CONCRETE SURFACES, EXCEPT THE UNDERSIDE OF THE STRUCTURE BETWEEN THE INLET AND OUTLET. ALL WORK IS INCIDENTAL TO THE 540.10 "PRECAST CONCRETE STRUCTURE" BID ITEMS.
- 12. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1" x 1".

- 13. REINFORCING STEEL COVER SHALL BE 3". PLACEMENT TOLERANCES SHALL BE:
  - SPACING: +/- 1 INCH
  - CLEARANCE: +/- 1/4 INCH

- 14. PRECAST TOLERANCES:
  - HEIGHT/WIDTH: +/- 1/2 INCH
  - LENGTH: +/- 1 INCH

- 15. ALL REINFORCING STEEL SHALL MEET THE REQUIREMENTS OF SECTION 507 FOR LEVEL 1 REINFORCING STEEL. REINFORCING STEEL WILL BE INCLUDED FOR PAYMENT UNDER APPROPRIATE SECTION 540 CONTRACT ITEM.

- 16. THE PROPOSED STRUCTURE SHALL BE A THREE-SIDED RIGID FRAME OR ARCH WITH A MINIMUM CLEAR SPAN OF 12'. THE LUMP SUM COST FOR ITEM 540.10 "PRECAST CONCRETE STRUCTURE (12'-0" X 12'-0" X 120'-0" FRAME OR ARCH TYPE)" SHALL INCLUDE THE PRECAST RIGID FRAME OR ARCH, HEADWALLS, FOOTINGS, MECHANICAL CONNECTIONS AND JOINT WATERPROOFING MEASURES AND ALL RELATED ENGINEERING DESIGN WORK.

- 17. THE LUMP SUM COST FOR EACH ITEM 540.10 "PRECAST CONCRETE STRUCTURE (WINGWALL #)" SHALL INCLUDE THE PRECAST WINGWALL, FOOTINGS AND MECHANICAL CONNECTIONS.

- 18. THE PRECAST STRUCTURE DETAILS ARE SHOWN FOR REFERENCE ONLY. THE ACTUAL CONFIGURATION WILL BE DEPENDENT ON THE FABRICATOR. THE FINAL SPAN, CLEAR OPENING, AND LENGTH ARE TO BE AS DIMENSIONED IN THESE PLANS.

- 19. NO HOLES SHALL BE DRILLED IN THE RIGID FRAME OR ARCH WITHOUT THE APPROVAL OF THE FABRICATOR AND THE AGENCY.

- 20. THE USE OF EQUIPMENT AND THE METHOD OF BACKFILLING AROUND THE BURIED STRUCTURE SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION. CARE SHALL BE TAKEN WHEN BACKFILLING AGAINST JOINT WATERPROOFING MATERIALS.

- 21. JOINTS BETWEEN ALL ABUTTING PRECAST UNITS SHALL BE WATERTIGHT AND MECHANICALLY CONNECTED. THE COMPLETED STRUCTURE SHALL BE FREE OF WATER LEAKS AND CRACKS.

**TRAFFIC CONTROL**

- 22. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND INSTALLATION OF A SITE SPECIFIC TRAFFIC CONTROL PLAN FOR ALL STAGES OF CONSTRUCTION. THE PLAN SHALL CLEARLY DETAIL HOW TRAFFIC WILL BE MAINTAINED PRIOR TO, DURING, AND AFTER THE CLOSURE PERIOD. THE CONTRACTOR SHALL SUBMIT DETAILED TRAFFIC CONTROL PLANS TO THE ENGINEER FOR APPROVAL PER SUBSECTION 105.03. ALL COSTS SHALL BE INCLUDED IN ITEM 900.645 SPECIAL PROVISION (TRAFFIC CONTROL, ALL-INCLUSIVE).
- 23. THE TOWN SHALL BE RESPONSIBLE FOR THE INSTALLATION AND MAINTAINANCE OF ALL OFF PROJECT DETOUR SIGNAGE.

PROJECT NAME: SHREWSBURY  
PROJECT NUMBER: STP 1443 (44)

FILE NAME: s94j154gen.dgn	PLOT DATE: 19-AUG-2014
PROJECT LEADER: C. CARLSON	DRAWN BY: M. LONGSTREET
DESIGNED BY: N. VANDENBERG	CHECKED BY: J. LACROIX
PROJECT NOTES	SHEET 6 OF 36

# QUANTITY SHEET 1

SUMMARY OF ESTIMATED QUANTITIES										TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES		
						ROADWAY	EROSION CONTROL	BRIDGE	FULL C.E. ITEMS	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
						1				1		LS	CLEARING AND GRUBBING, INCLUDING INDIVIDUAL TREES AND STUMPS	201.10				<b>EARTHWORK SUMMARY</b>
						1500				1500		CY	COMMON EXCAVATION	203.15				1500 CY COMMON EXCAVATION (1500 x 1.0)
								520		520		CY	UNCLASSIFIED CHANNEL EXCAVATION	203.27				390 CY CHANNEL EXCAVATION (520 x 0.75)
						240				240		CY	SAND BORROW	203.31				1823 CY STRUCTURE EXCAVATION (2430 x 0.75)
						50				50		CY	TRENCH EXCAVATION OF EARTH	204.20				3713 CY SUB TOTAL
						1				1		CY	TRENCH EXCAVATION OF EARTH, EXPLORATORY (N.A.B.I.)	204.22				2 CY ROUND
								2430		2430		CY	STRUCTURE EXCAVATION	204.25				3715 CY TOTAL FILL AVAILABLE
								1880		1880		CY	GRANULAR BACKFILL FOR STRUCTURES	204.30				196 CY TOTAL FILL REQUIRED (170*1.15)
						370				370		SY	COLD PLANING, BITUMINOUS PAVEMENT	210.10				3519 CY TOTAL WASTE
						740				740		CY	SUBBASE OF CRUSHED GRAVEL, COARSE GRADED	301.25				
						30				30		CY	AGGREGATE SURFACE COURSE	401.10				
						3				3		CWT	EMULSIFIED ASPHALT	404.65				
						1				1		LU	PRICE ADJUSTMENT, ASPHALT CEMENT (N.A.B.I.)	406.50				
								1		1		EACH	REMOVAL OF STRUCTURE (6' X 65' CMP AND 10' X 10' X 26' CONCRETE ARCH)	529.15				
								1		1		LS	PRECAST CONCRETE STRUCTURE (12'-0" X 12'-0" X 120'-0" FRAME OR ARCH TYPE)	540.10				
								1		1		LS	PRECAST CONCRETE STRUCTURE (WINGWALL #1)	540.10				
								1		1		LS	PRECAST CONCRETE STRUCTURE (WINGWALL #2)	540.10				
								1		1		LS	PRECAST CONCRETE STRUCTURE (WINGWALL #3)	540.10				
								1		1		LS	PRECAST CONCRETE STRUCTURE (WINGWALL #4)	540.10				
													BEGIN OPTION AA					
						61.5				61.5		LF	18" CAAP .105 (2-2/3 X 1/2)	601.0217				
						61.5				61.5		LF	18" PCCSP .079 (2-2/3 X 1/2)	601.0416				
						61.5				61.5		LF	18" CPEP	601.0915				
													END OPTION AA					
						1				1		EACH	PRECAST REINFORCED CONCRETE DROP INLET WITH CAST IRON GRATE	604.18				
						1				1		MGAL	DUST CONTROL WITH WATER	609.10				
								30		30		CY	STONE FILL, TYPE I	613.10				
								450		450		CY	STONE FILL, TYPE IV	613.13				
						1				1		EACH	RELOCATE MAILBOX, SINGLE SUPPORT	617.10				
						456				456		LF	HD STEEL BEAM GUARDRAIL, GALVANIZED	621.21				
						4				4		EACH	ANCHOR FOR STEEL BEAM RAIL	621.60				
						326				326		LF	REMOVAL AND DISPOSAL OF GUARDRAIL	621.80				
						350				350		LF	PLASTIC WATER PIPE, FLEXIBLE (2" DIAMETER)	629.32				
						1				1		LS	TRANSFER TO NEW SYSTEM, WATER SYSTEM	629.42				
						500				500		HR	FLAGGERS	630.15				
									1	1		LS	FIELD OFFICE, ENGINEERS	631.10				
									1	1		LS	TESTING EQUIPMENT, BITUMINOUS	631.17				
									2000	2000		DL	FIELD OFFICE TELEPHONE (N.A.B.I.)	631.26				
						1				1		LS	MOBILIZATION/DEMobilIZATION	635.11				
						1060				1060		LF	4 INCH YELLOW LINE	646.21				

PROJECT NAME: SHREWSBURY  
PROJECT NUMBER: STP 1443 (44)

FILE NAME: s94j154q+ty.dgn  
PROJECT LEADER: C. CARLSON  
DESIGNED BY: N. VANDENBERG  
QUANTITY SHEET 1

PLOT DATE: 19-AUG-2014  
DRAWN BY: M. LONGSTREET  
CHECKED BY: J. LACROIX  
SHEET 7 OF 36

# QUANTITY SHEET 2

SUMMARY OF ESTIMATED QUANTITIES										TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES			
							ROADWAY	EROSION CONTROL	BRIDGE	FULL C.E. ITEMS	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
							80				80		EACH	LINE STRIPING TARGETS	646.76				
									420		420		SY	GEOTEXTILE UNDER STONE FILL	649.31				
								85			85		SY	GEOTEXTILE FOR SILT FENCE	649.51				
								114			114		SY	GEOTEXTILE FOR SILT FENCE, WOVEN WIRE REINFORCED	649.515				
								30			30		LB	SEED	651.15				
								30			30		LB	SEED, WINTER RYE	651.17				
								200			200		LB	FERTILIZER	651.18				
								1			1		TON	AGRICULTURAL LIMESTONE	651.20				
								1			1		TON	HAY MULCH	651.25				
							200				200		CY	TOPSOIL	651.35				
									350		350		SY	GRUBBING MATERIAL	651.40				
								1			1		LS	EPSC PLAN	652.10				
								6			6		HR	MONITORING EPSC PLAN	652.20				
								1			1		LU	MAINTENANCE OF EPSC PLAN (N.A.B.I.)	652.30				
								880			880		SY	TEMPORARY EROSION MATTING	653.20				
								5			5		CY	TEMPORARY STONE CHECK DAM, TYPE I	653.25				
								15			15		CY	VEHICLE TRACKING PAD	653.35				
								350			350		LF	BARRIER FENCE	653.50				
								680			680		LF	PROJECT DEMARCATION FENCE	653.55				
							0.66				0.66		SF	TRAFFIC SIGNS, TYPE A	675.20				
							16				16		LF	SQUARE TUBE SIGN POST AND ANCHOR	675.341				
							4				4		EACH	DELINEATOR WITH STEEL POST	676.10				
											1		LU	PRICE ADJUSTMENT, FUEL (N.A.B.I.)	690.50				
									260		260		CY	SPECIAL PROVISION (STONE FILL, ARCH FLOW LINE)	900.608				
								1			1		LS	SPECIAL PROVISION (CPM SCHEDULE)	900.645				
								1			1		LS	SPECIAL PROVISION (MAINTENANCE OF EXISTING WATER FLOWS)	900.645				
									1		1		LS	SPECIAL PROVISION (TEMPORARY RELOCATION OF STREAM)	900.645				
								1			1		LS	SPECIAL PROVISION (TRAFFIC CONTROL, ALL-INCLUSIVE)	900.645				
								1			1		LU	SPECIAL PROVISION (INCENTIVE/DISINCENTIVE)(N.A.B.I.)	900.650				
								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				
							350				350		TON	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY)	900.680				

PROJECT NAME: SHREWSBURY  
PROJECT NUMBER: STP 1443 (44)

FILE NAME: s94j154qty.dgn  
PROJECT LEADER: C. CARLSON  
DESIGNED BY: N. VANDENBERG  
QUANTITY SHEET 2

PLOT DATE: 19-AUG-2014  
DRAWN BY: M. LONGSTREET  
CHECKED BY: J. LACROIX  
SHEET 8 OF 36

GPS CONTROL POINTS

**HCTRL #1**

69529 AZ MK  
 NORTH = 373076.859  
 EAST = 1526511.983

GENERAL LOCATION, 7 MI (11.3 KM) SOUTHEAST OF RUTLAND AND 14 MI (22.5 KM) NORTHWEST OF LUDLOW. TO REACH, FROM THE JUNCTION OF US ROUTE 7 AND VT ROUTE 103 IN CLARENDON PROCEED SOUTHEAST ON ROUTE 103 FOR 2.05 MI (3.30 KM) TO THE MARK ON THE LEFT (NORTHEAST). 527 FT (160.6 M) NORTHWEST OF MILEPOST 45/92 ON THE GREEN MOUNTAIN RAILROAD, 98 FT (29.9 M) NORTHEAST OF UTILITY POLE 268X/4, 66 FT (20.1 M) NORTHEAST OF AND 10 FT (3.0 M) HIGHER THAN THE CENTERLINE OF ROUTE 103, 23.5 FT (7.2 M) SOUTHWEST OF THE SOUTHWEST RAIL AND 4 FT (1.2 M) NORTHEAST OF A FIBERGLASS WITNESS POST. OWNERSHIP, GREEN MOUNTAIN RAILROAD (802) 463-4756, CALL BEFORE AND AFTER ANY OCCUPATIONS.

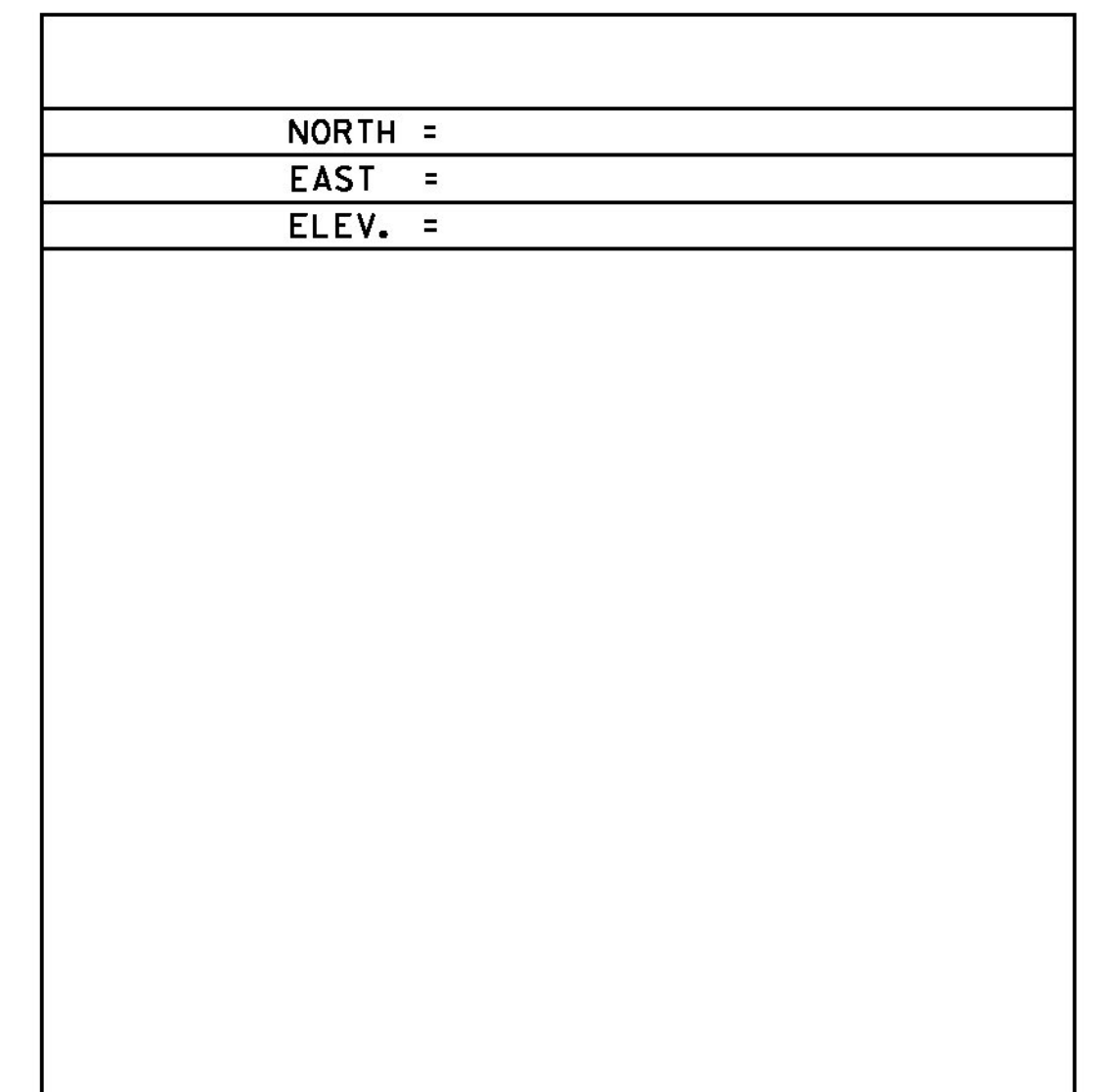
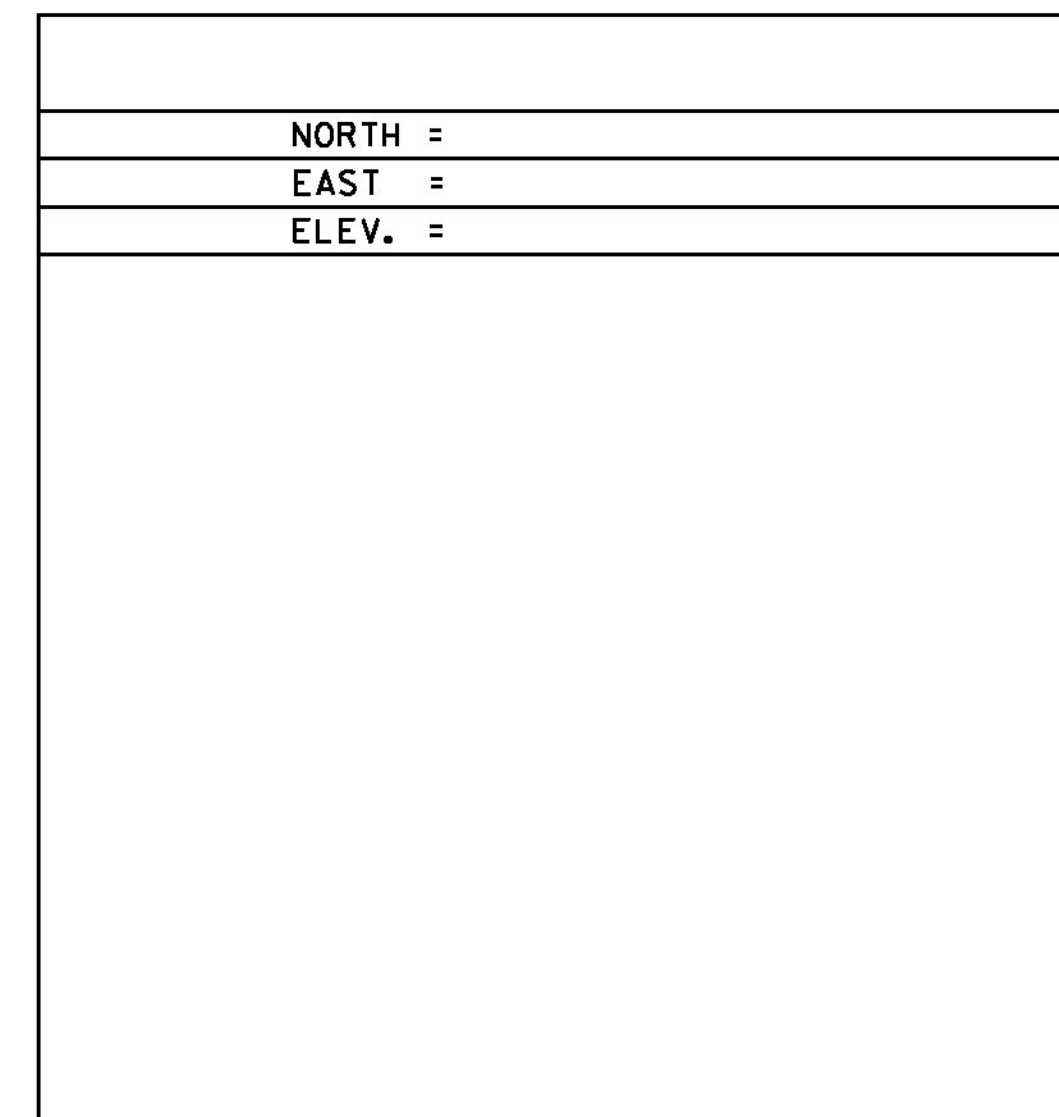
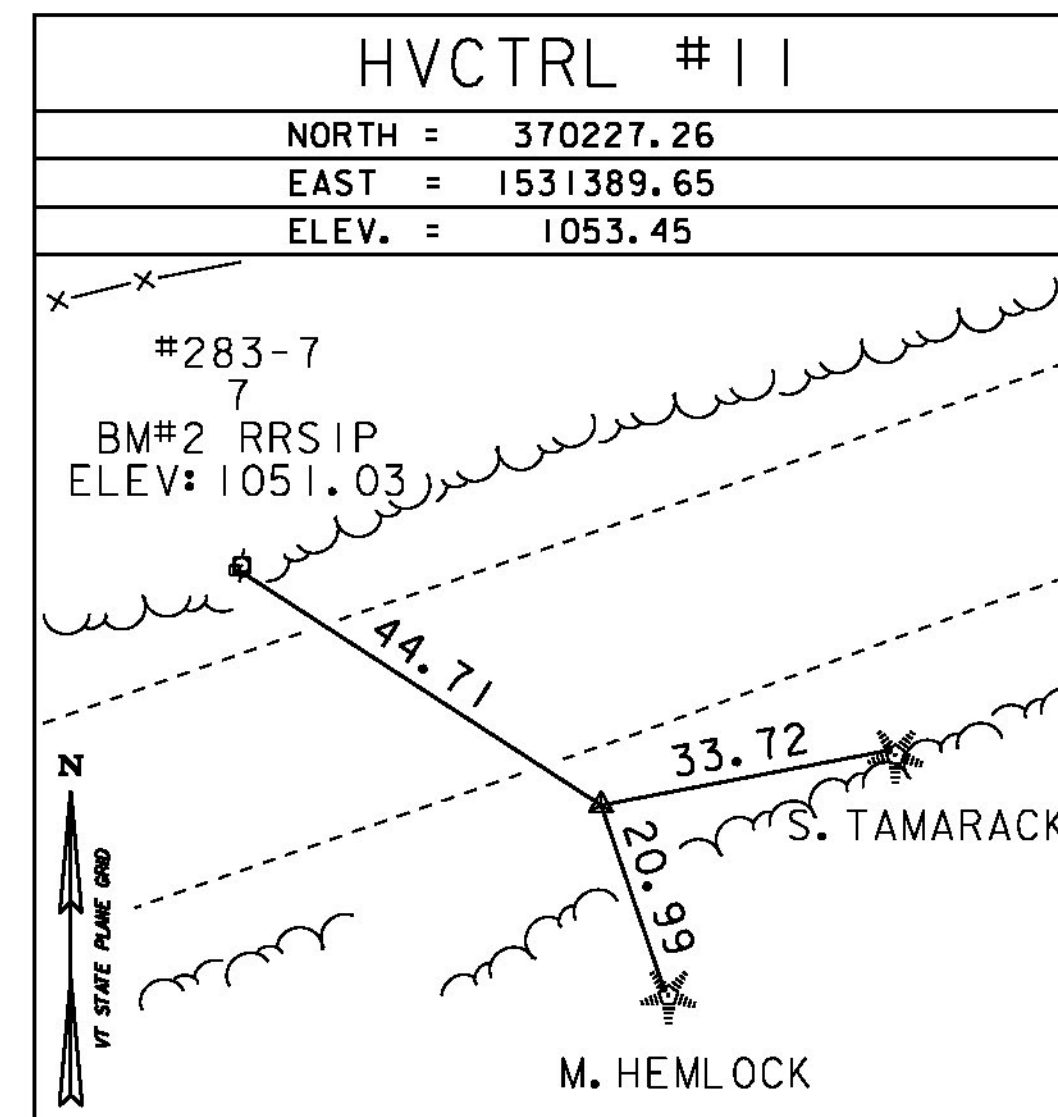
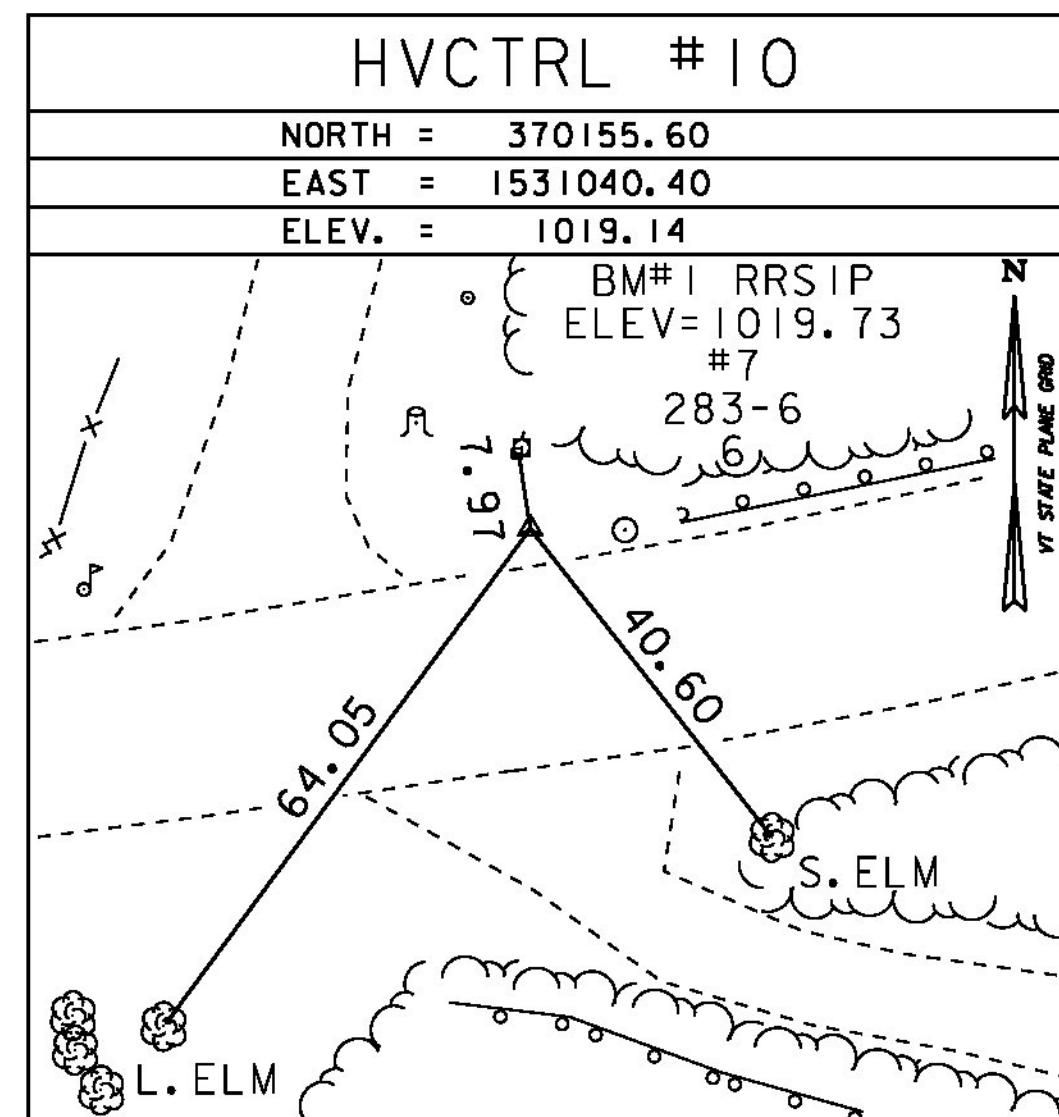
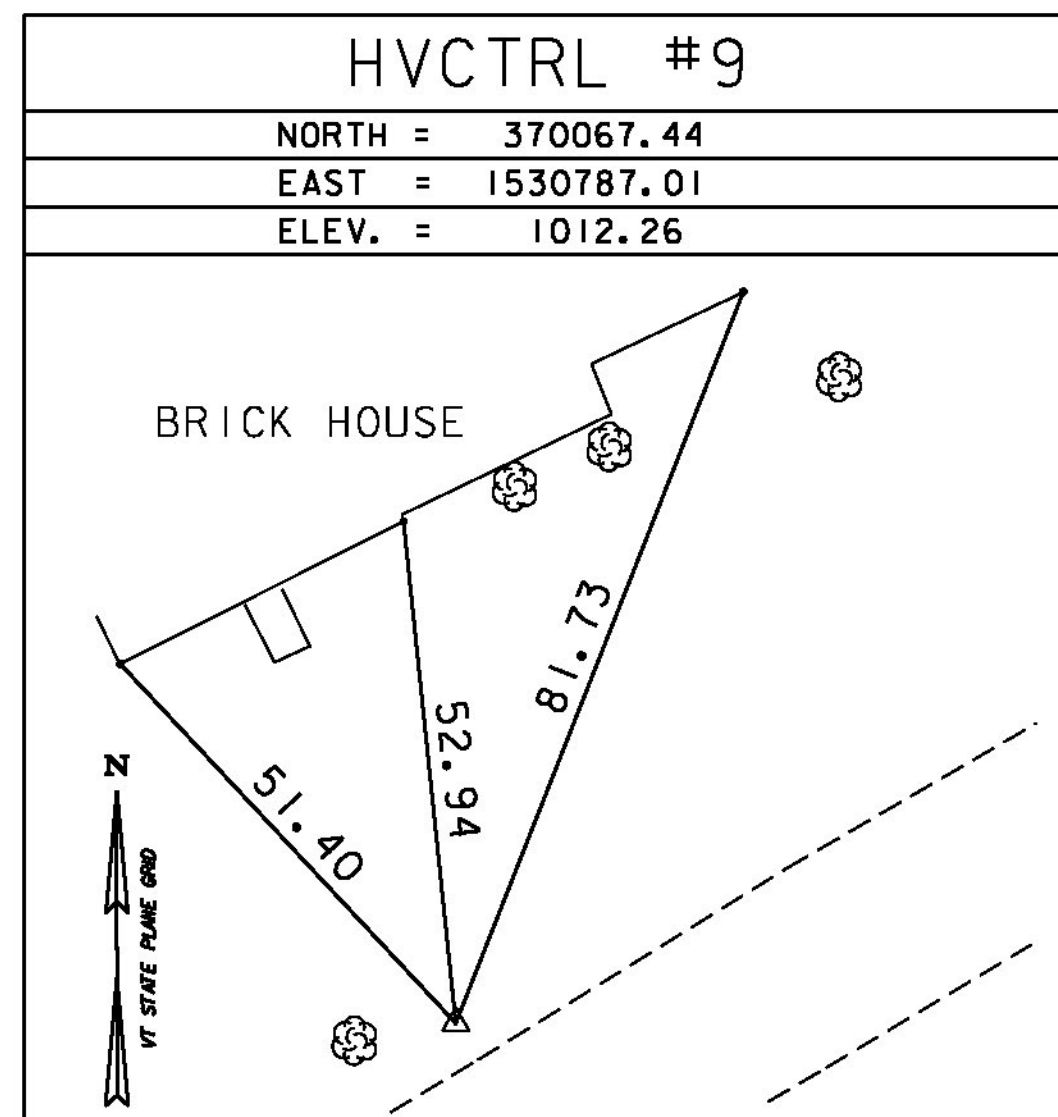
**HVCTRL #2**

69529  
 NORTH = 372469.642  
 EAST = 1527699.596  
 ELEV. = 868.476

THE STATION IS LOCATED ABOUT 9.66 KM (6.00 MI) SOUTH OF RUTLAND, 4.83 KM (3.00 MI) NORTHWEST OF CUTTINGVILLE, 4.83 KM (3.00 MI) WEST OF SHREWSBURY. OWNERSHIP--STATE OF VERMONT. TO REACH FROM THE INTERSECTION OF ROUTE 103 AND U.S. ROUTE 7 AT PIERCES CORNER IN CLARENDON, GO SOUTHEAST ALONG ROUTE 103 FOR 2.3 MI (3.7 KM) TO THE INTERSECTION OF THE GREEN MOUNTAIN RAILROAD AND SITE OF MARK ON THE RIGHT, AT THE EDGE OF A STEEP BANK. THE LONG TRAIL ALSO CROSSES ROUTE 103 AT THIS POINT. STATION MARK IS A U.S. DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY DISK SET IN THE TOP OF AN 8 FT (2.4 M) BY 5 FT (1.5 M) ROCK OUTCROP WHICH PROJECTS 1.5 FT (0.5 M) ABOVE GROUND SURFACE. LOCATED 77 FT (23.5 M) SOUTHWEST OF THE CENTERLINE OF ROUTE 103, 50 FT (15.2 M) WEST OF THE WEST RAIL OF THE GREEN MOUNTAIN RAILROAD, 41.5 FT (12.6 M) EAST-SOUTHEAST OF THE CENTER OF THE LONG TRAIL, 49 FT (14.9 M) SOUTH OF THE SOUTH CORNER OF A STEEL RAILROAD SIGNAL CONTROL BOX AND 2.5 FT (0.8 M) NORTH OF A FIBERGLASS WITNESS POST.

* Description provided by Vermont Agency of Transportation Geodetic Survey Unit

TRAVERSE TIES



* MAIN TRAVERSE COMPLETED: SEPT. 31, 1995 BY R. GILMAN P.C. & T. COMPANION

**HORIZONTAL ALIGNMENT NAME: DRIVE RIGHT**

Description: OLD Route 103  
 Report Date: 9 February 2011

Element:	STATION	NORTHING	EASTING
Linear			
POB ( 14)	300+00.00	370153.8229	1531105.8492
POE ( 15)	301+30.00	370027.6433	1531137.1335
Tangent Direction:	S 13°55'29.27" E		
Tangent Length:	130.00		

**HORIZONTAL ALIGNMENT NAME: TH4 MAINLINE**

Description: Town Highway 4 Proposed  
 Report Date: 9 February 2011

Element:	STATION	NORTHING	EASTING
Linear			
POB ( 100)	100+00.00	370066.8932	1530811.4980
PC ( 101)	100+59.33	370096.3275	1530863.0096
Tangent Direction:	N 60°15'21.22" E		
Tangent Length:	59.33		
Circular			
PC ( 101)	100+59.33	370096.3275	1530863.0096
PI ( )	101+14.71	370123.8044	1530911.0957
CC ( 102)		369853.6589	1531001.6730
PT ( 103)	101+68.68	370130.8680	1530966.0262
Radius:	279.49		
Delta:	22°24'59.65" Right		
Degree of Curvature (Arc):	20°30'00.00"		
Length:	109.35		
Tangent:	55.38		
Chord:	108.65		
Middle Ordinate:	5.33		
External:	5.43		
Tangent Direction:	N 60°15'21.22" E		
Radial Direction:	S 29°44'38.78" E		
Chord Direction:	N 71°27'51.04" E		
Radial Direction:	S 07°19'39.14" E		
Tangent Direction:	N 82°40'20.86" E		
Linear			
PT ( 103)	101+68.68	370130.8680	1530966.0262
PC ( 104)	102+04.06	370135.3808	1531001.1200
Tangent Direction:	N 82°40'20.86" E		
Tangent Length:	35.38		

**TH4 MAINLINE (CONTINUED)**

Element:	Circular			
PC ( 104)		102+04.06	370135.3808	1531001.1200
PI ( )		103+25.54	370150.8749	1531121.6108
CC ( 105)			371271.9380	1530854.9684
PT ( 106)		104+46.12	370191.2880	1531236.1747
Radius:		1145.92		
Delta:		12°06'11.11" Left		
Degree of Curvature (Arc):		05°00'00.00"		
Length:		242.06		
Tangent:		121.48		
Chord:		241.61		
Middle Ordinate:		6.39		
External:		6.42		
Tangent Direction:		N 82°40'20.86" E		
Radial Direction:		S 07°19'39.14" E		
Chord Direction:		N 76°37'15.31" E		
Radial Direction:		S 19°25'50.25" E		
Tangent Direction:		N 70°34'09.75" E		
Element:	Linear			
PT ( 106)		104+46.12	370191.2880	1531236.1747
POE ( 107)		106+23.00	370250.1293	1531402.9790
Tangent Direction:		N 70°34'09.75" E		
Tangent Length:		176.88		

DATUM	
VERTICAL	NAVD 88
HORIZONTAL	NAD 83 (92)
ADJUSTMENT	Compass

PROJECT NAME:	SHREWSBURY
PROJECT NUMBER:	STP 1443 (44)
FILE NAME:	94J154\survey\94J154et1.dgn
PROJECT LEADER:	C. CARLSON
DESIGNED BY:	N. VANDENBURG
TIE SHEET	
PLOT DATE:	12-MAY-2014
DRAWN BY:	R. Bullock
CHECKED BY:	M. LONGSTREET
SHEET	9 OF 36

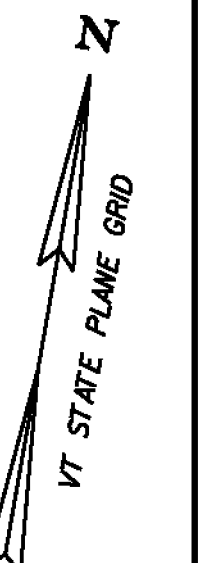
**EXISTING STRUCTURE:**  
 6' DIAMETER x 65' LONG CMP WITH  
 10' x 10' x 26' CONCRETE ARCH AT OUTFALL  
 OVERALL LENGTH: 91'  
 ROADWAY WIDTH: 21.4' OVER CMP

**CONSTRUCT DRIVE (GRAVEL)**  
 ML STA 102+13 LT

**CONSTRUCT DRIVE APRON (PAVED)**  
 ML STA 102+13 LT 5 FT

**HEAVY DUTY STEEL BEAM GUARDRAIL, GALVANIZED**  
 ML STA 102+31.23 LT - ML STA 105+27.00 LT  
 ML STA 102+04.00 RT - SL STA 300+68.00 LT

**ANCHORS FOR STEEL BEAM RAIL**  
 ML STA 102+45.00 LT  
 ML STA 105+14.00 LT  
 ML STA 102+04.00 RT  
 SL STA 300+54.96 RT



**BEGIN APPROACH**  
 STA 100+85.00

**BEGIN PROJECT**  
 STA 101+75.00

**CENTERLINE STRUCTURE**  
 ML STA 102+81.50 =  
 CHANNEL STA 201+25.00

**END PROJECT**  
 STA 105+25.00

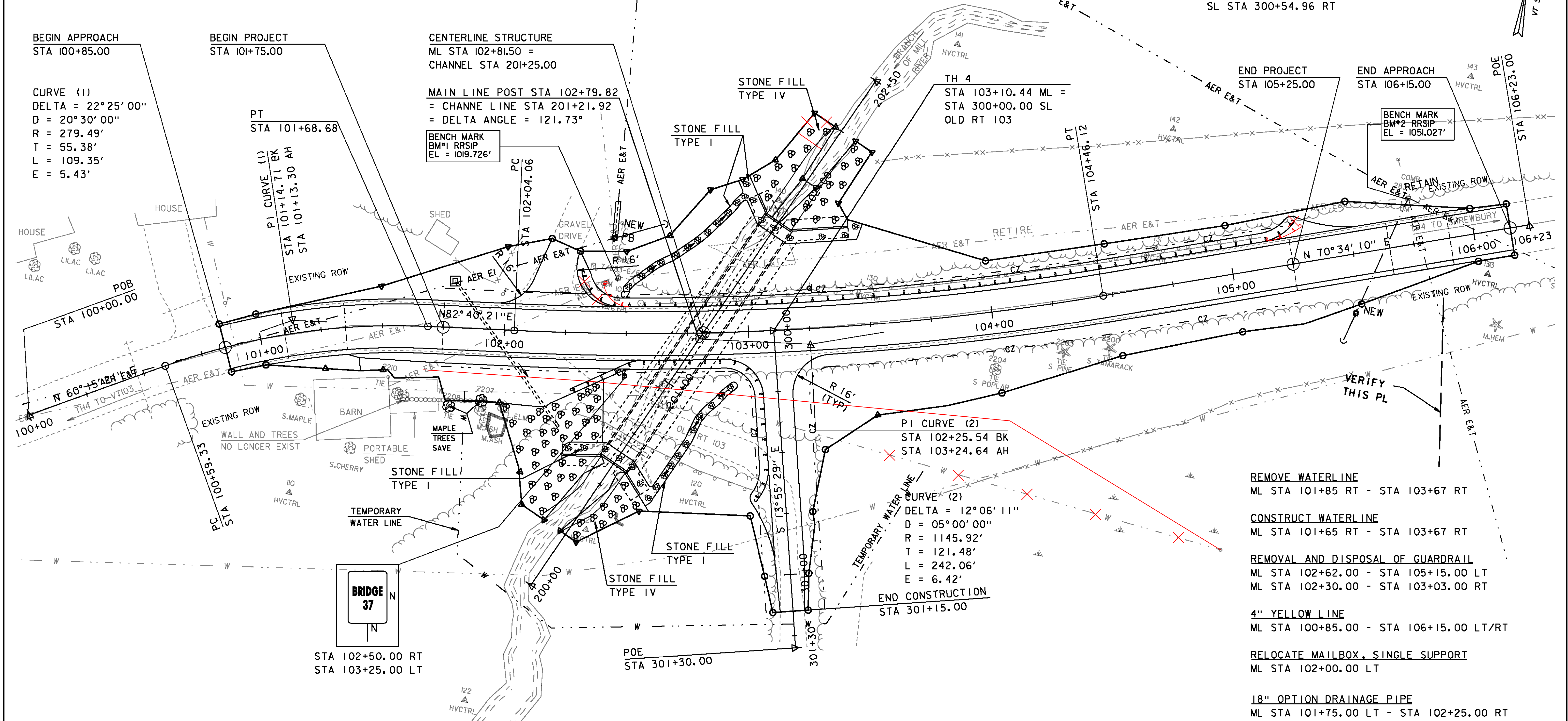
**END APPROACH**  
 STA 106+15.00

**CURVE (1)**  
 DELTA = 22° 25' 00"  
 D = 20° 30' 00"  
 R = 279.49'  
 T = 55.38'  
 L = 109.35'  
 E = 5.43'

**MAIN LINE POST** STA 102+79.82  
 = CHANNEL LINE STA 201+21.92  
 = DELTA ANGLE = 121.73°

**TH 4**  
 STA 103+10.44 ML =  
 STA 300+00.00 SL  
 OLD RT 103

**BENCH MARK**  
 BM#2 RRSIP  
 EL = 1051.027'



**PI CURVE (2)**  
 STA 102+25.54 BK  
 STA 103+24.64 AH

**CURVE (2)**  
 DELTA = 12° 06' 11"  
 D = 05° 00' 00"  
 R = 1145.92'  
 T = 121.48'  
 L = 242.06'  
 E = 6.42'

**END CONSTRUCTION**  
 STA 301+15.00

**REMOVE WATERLINE**  
 ML STA 101+85 RT - STA 103+67 RT

**CONSTRUCT WATERLINE**  
 ML STA 101+65 RT - STA 103+67 RT

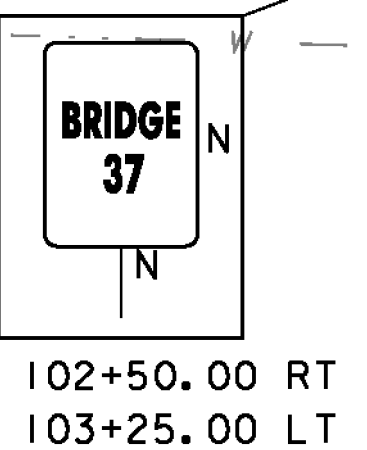
**REMOVAL AND DISPOSAL OF GUARDRAIL**  
 ML STA 102+62.00 - STA 105+15.00 LT  
 ML STA 102+30.00 - STA 103+03.00 RT

**4" YELLOW LINE**  
 ML STA 100+85.00 - STA 106+15.00 LT/RT

**RELOCATE MAILBOX, SINGLE SUPPORT**  
 ML STA 102+00.00 LT

**18" OPTION DRAINAGE PIPE**  
 ML STA 101+75.00 LT - STA 102+25.00 RT

**PRECAST REINFORCED CONCRETE DROP INLET WITH CAST IRON GRATE**  
 ML STA 101+75.00 LT



STA 102+50.00 RT  
 STA 103+25.00 LT

MILEMARKER, STATION, OR SIGN NUMBER	SIGN LEGEND	SIGN DIMENSIONS		NEW SIGN "A"	EXIST. SIGN "A"	NO. OF POSTS	NEW SIGN POSTS SQUARE STEEL (ft)				REMARKS	SIGN DETAIL			
		WIDTH	HEIGHT				L75	L88	2.0	2.5		A	B	DETAIL ON SHEET NUMBER	STD. SHEET NUMBER
102+50.00 RT	BRIDGE 37	6	8	0.33		1	8					X	VD-701	E-134	
103+25.00 LT	BRIDGE 37	6	8	0.33		1	8					X	VD-701	E-134	
<b>TOTALS</b>				0.66			16								

FINAL POST LENGTHS ARE TO BE DETERMINED IN THE FIELD. POST SIZES ARE COMPUTED BASED ON INFORMATION FURNISHED ON THE STANDARD SHEETS AND THE VTRANS "SIGN POST DESIGN GUIDELINE."

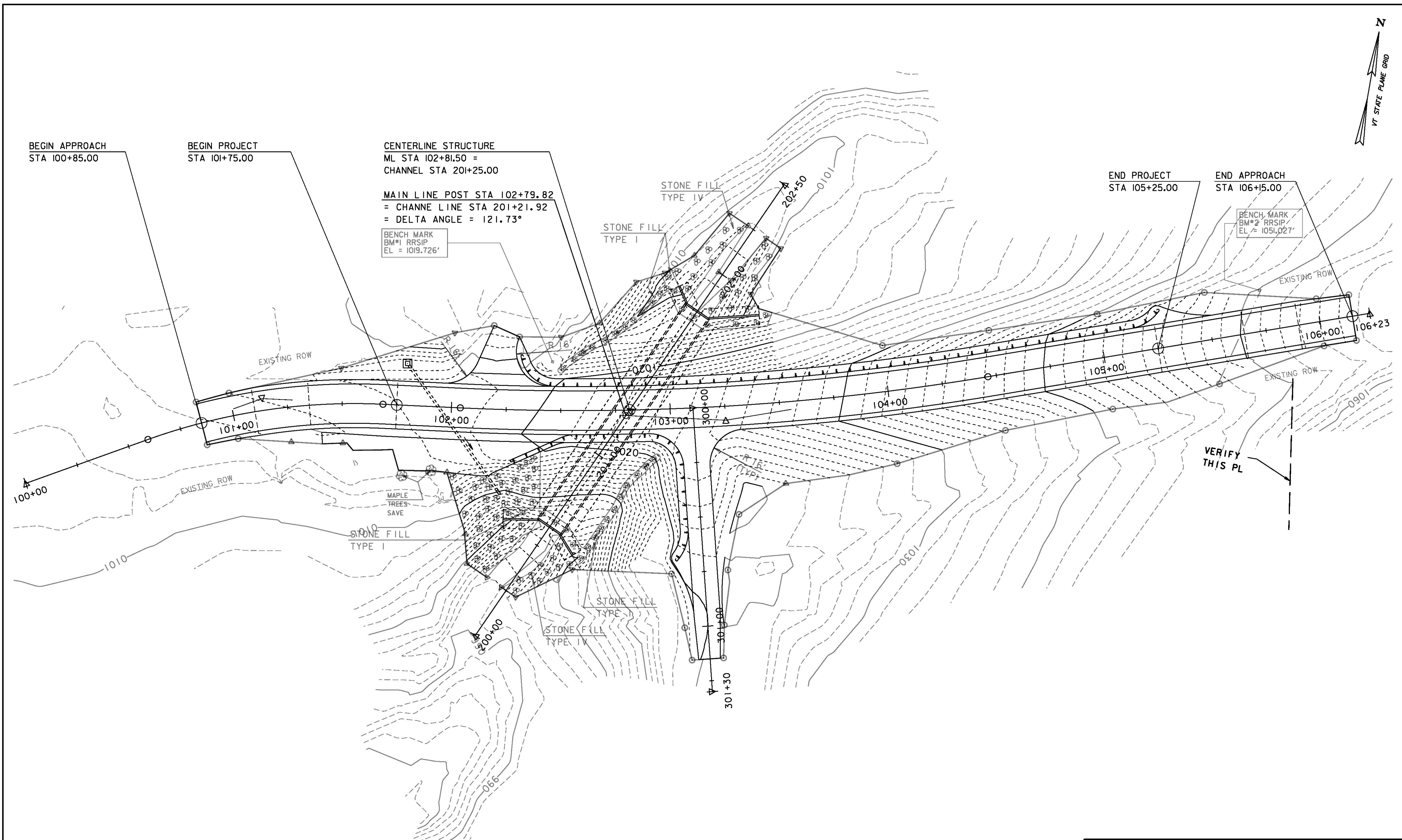
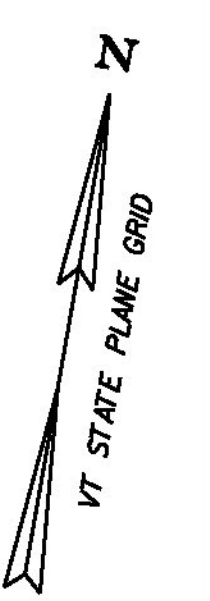
**LAYOUT PLAN**

SCALE: 1" = 20'-0"  
 20 0 20

PROJECT NAME: SHREWSBURY  
 PROJECT NUMBER: STP 1443 (44)

FILE NAME: s94j54bdr.dgn  
 PROJECT LEADER: C. CARLSON  
 DESIGNED BY: N. VANDENBERG  
 LAYOUT SHEET

PLOT DATE: 12-MAY-2014  
 DRAWN BY: M. LONGSTREET  
 CHECKED BY: J. LACROIX  
 SHEET 10 OF 36



BEGIN APPROACH  
STA 100+85.00

BEGIN PROJECT  
STA 101+75.00

CENTERLINE STRUCTURE  
ML STA 102+81.50 =  
CHANNEL STA 201+25.00

MAIN LINE POST STA 102+79.82  
= CHANNEL LINE STA 201+21.92  
= DELTA ANGLE = 121.73°

BENCH MARK  
BM#1 RRSIP  
EL = 1019.726'

END PROJECT  
STA 105+25.00

END APPROACH  
STA 106+15.00

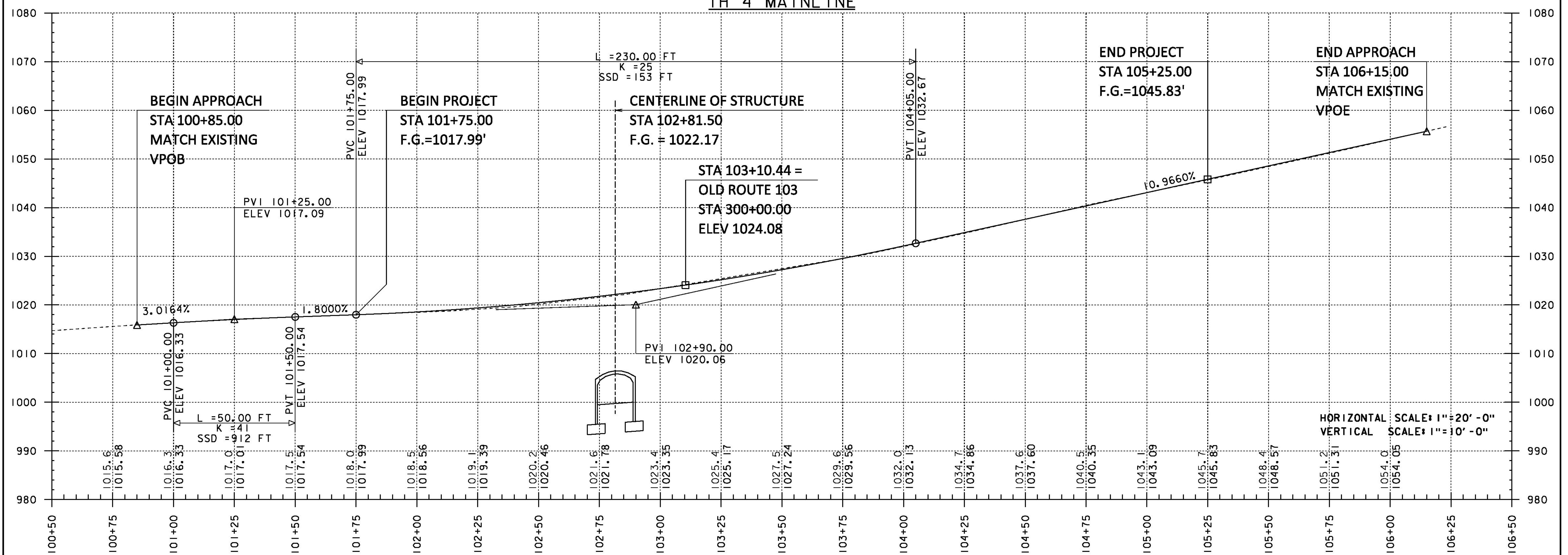
BENCH MARK  
BM#2 RRSIP  
EL = 1051.027'

### GRADING CONTOUR PLAN

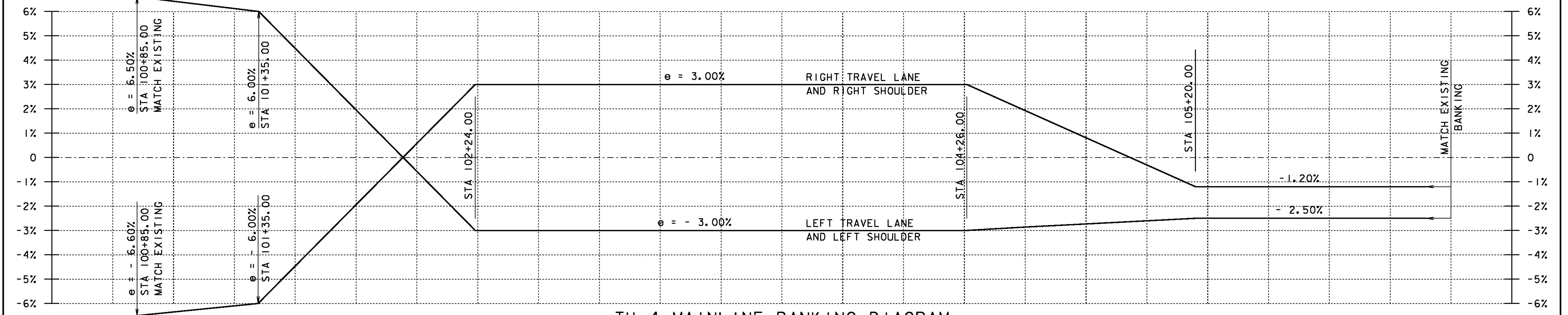
SCALE: 1" = 20'-0"  
20 0 20

PROJECT NAME: SHREWSBURY	PLOT DATE: 12-MAY-2014
PROJECT NUMBER: STP 1443 (44)	DRAWN BY: M. LONGSTREET
FILE NAME: s94j154bdr_grading.dgn	CHECKED BY: J. LACROIX
PROJECT LEADER: C. CARLSON	SHEET II OF 36
DESIGNED BY: N. VANDENBERG	
GRADING CONTOUR PLAN	

### TH 4 MAINLINE



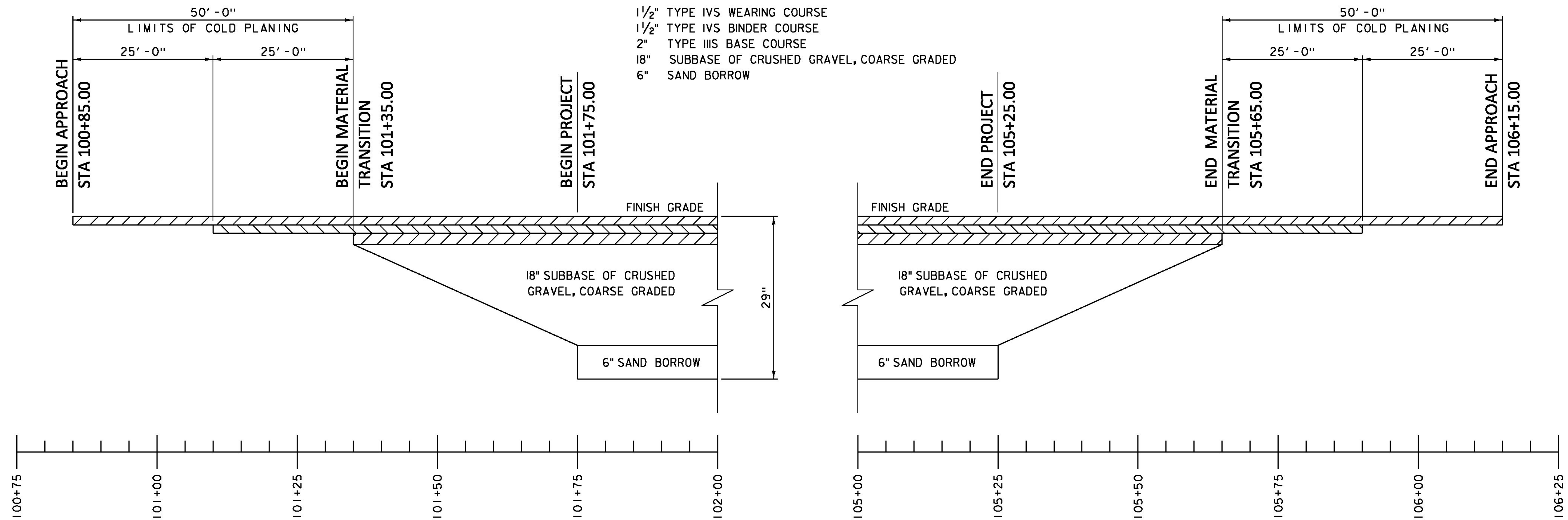
HORIZONTAL SCALE: 1"=20'-0"  
VERTICAL SCALE: 1"=10'-0"



### TH 4 MAINLINE BANKING DIAGRAM

HORIZONTAL SCALE: 1"=20'-0"  
VERTICAL SCALE: 1"=2%

PROJECT NAME: SHREWSBURY	
PROJECT NUMBER: STP 1443 (44)	
FILE NAME: s94j154xs.dgn	PLOT DATE: 12-MAY-2014
PROJECT LEADER: C. CARLSON	DRAWN BY: M. LONGSTREET
DESIGNED BY: N. VANDENBERG	CHECKED BY: J. LACROIX
TH 4 PROFILE & BANKING DIAGRAM	SHEET 12 OF 36

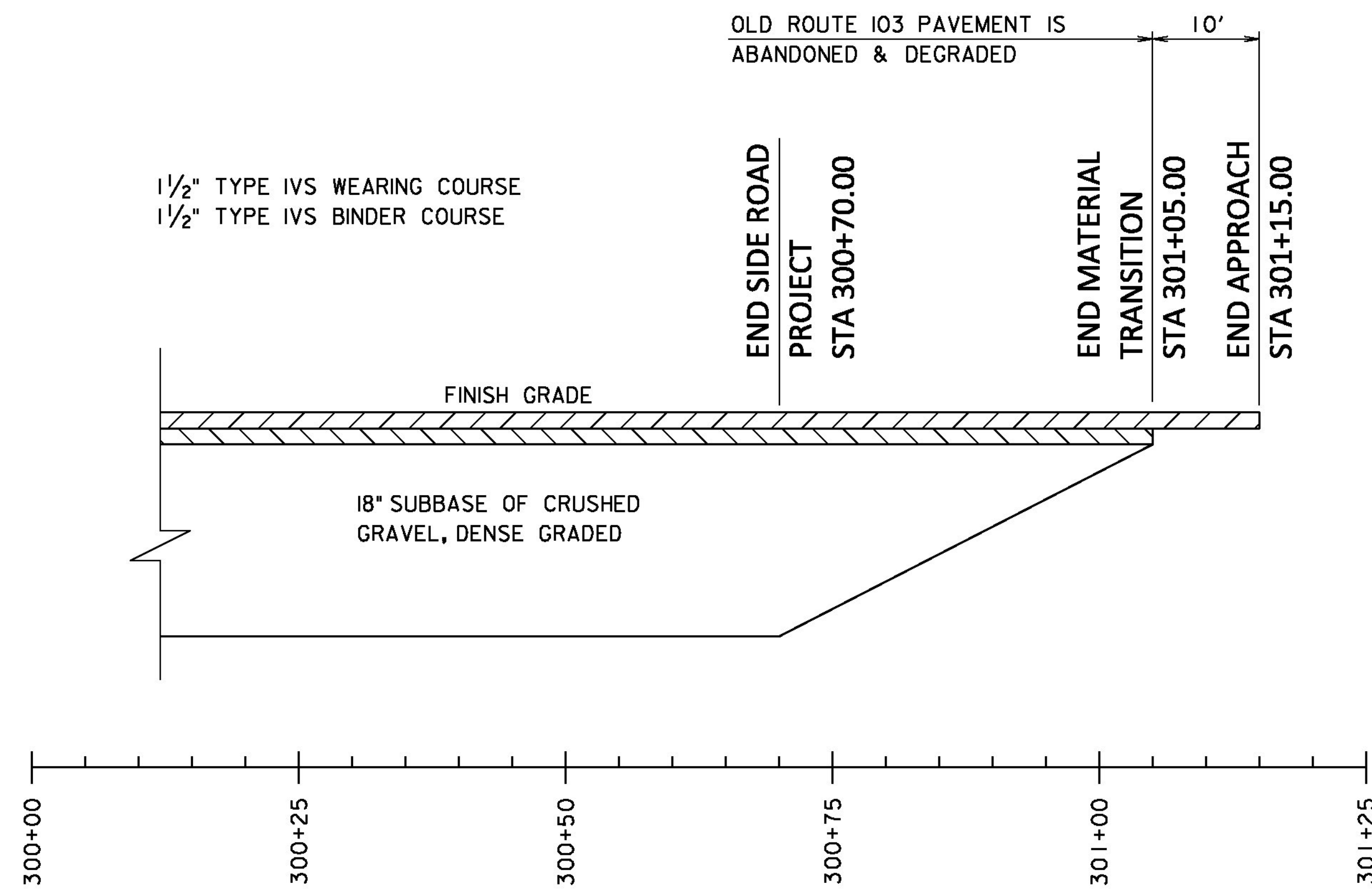


1 1/2" TYPE IVS WEARING COURSE  
 1 1/2" TYPE IVS BINDER COURSE  
 2" TYPE III BASE COURSE  
 18" SUBBASE OF CRUSHED GRAVEL, COARSE GRADED  
 6" SAND BORROW

TH 4 MATERIAL TRANSITION DETAIL

NOT TO SCALE

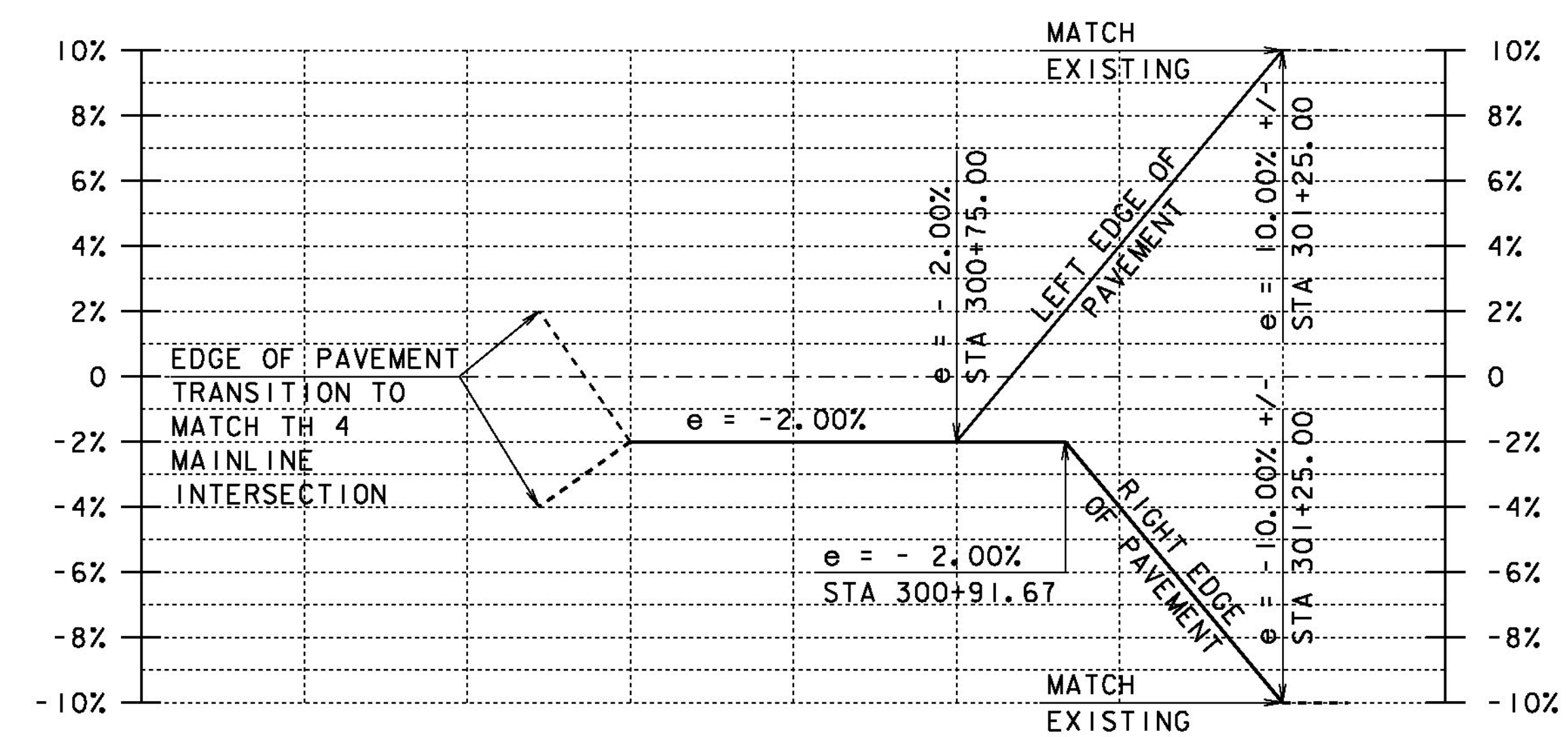
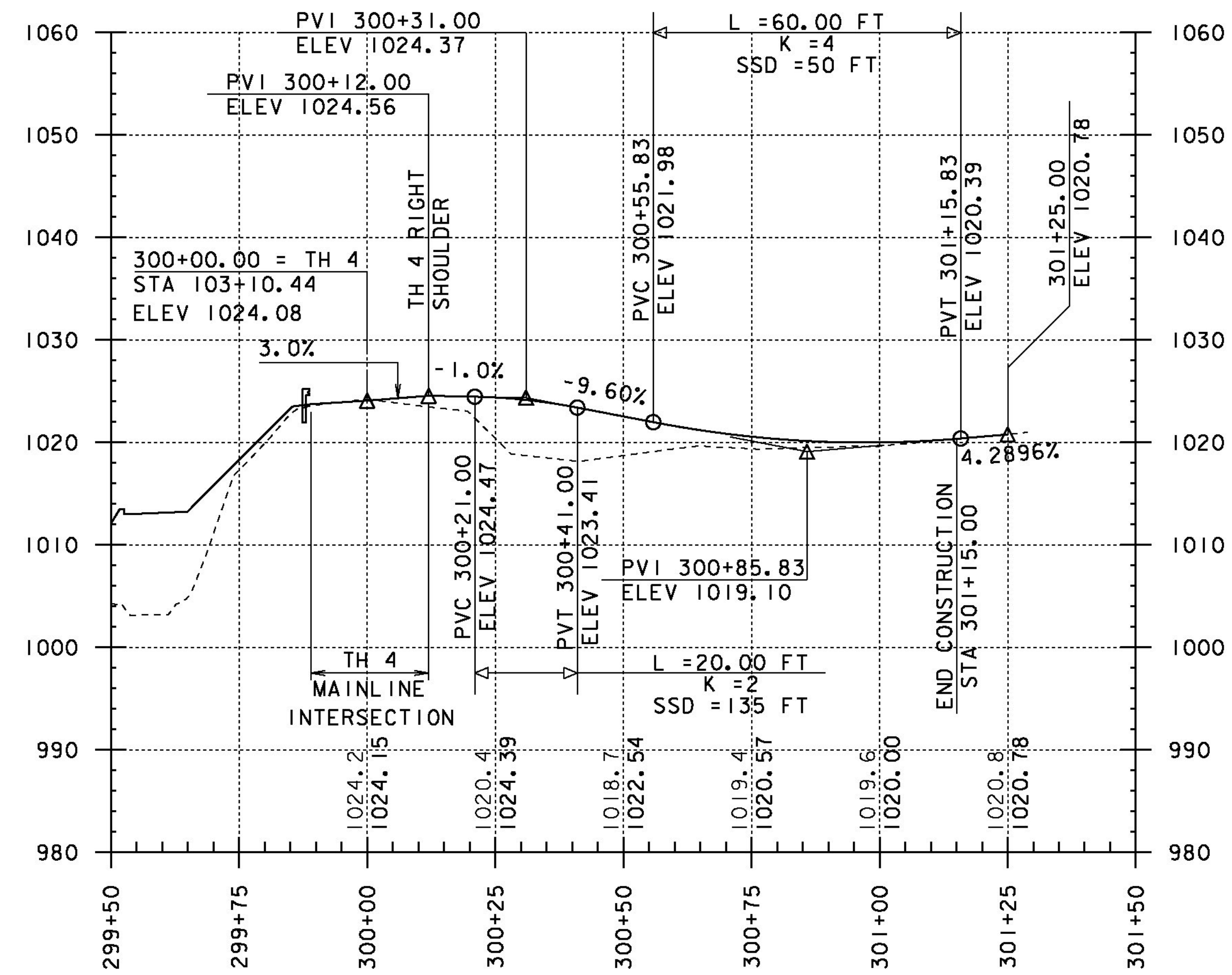
PROJECT NAME:	SHREWSBURY
PROJECT NUMBER:	STP 1443 (44)
FILE NAME:	s94j154xs.dgn
PROJECT LEADER:	C. CARLSON
DESIGNED BY:	N. VANDENBERG
MATERIAL TRANSITION DETAIL	
PLOT DATE:	12-MAY-2014
DRAWN BY:	M. LONGSTREET
CHECKED BY:	J. LACROIX
SHEET	13 OF 36



**OLD ROUTE 103 MATERIAL TRANSITION**  
NOT TO SCALE

**OLD ROUTE 103 PROFILE**

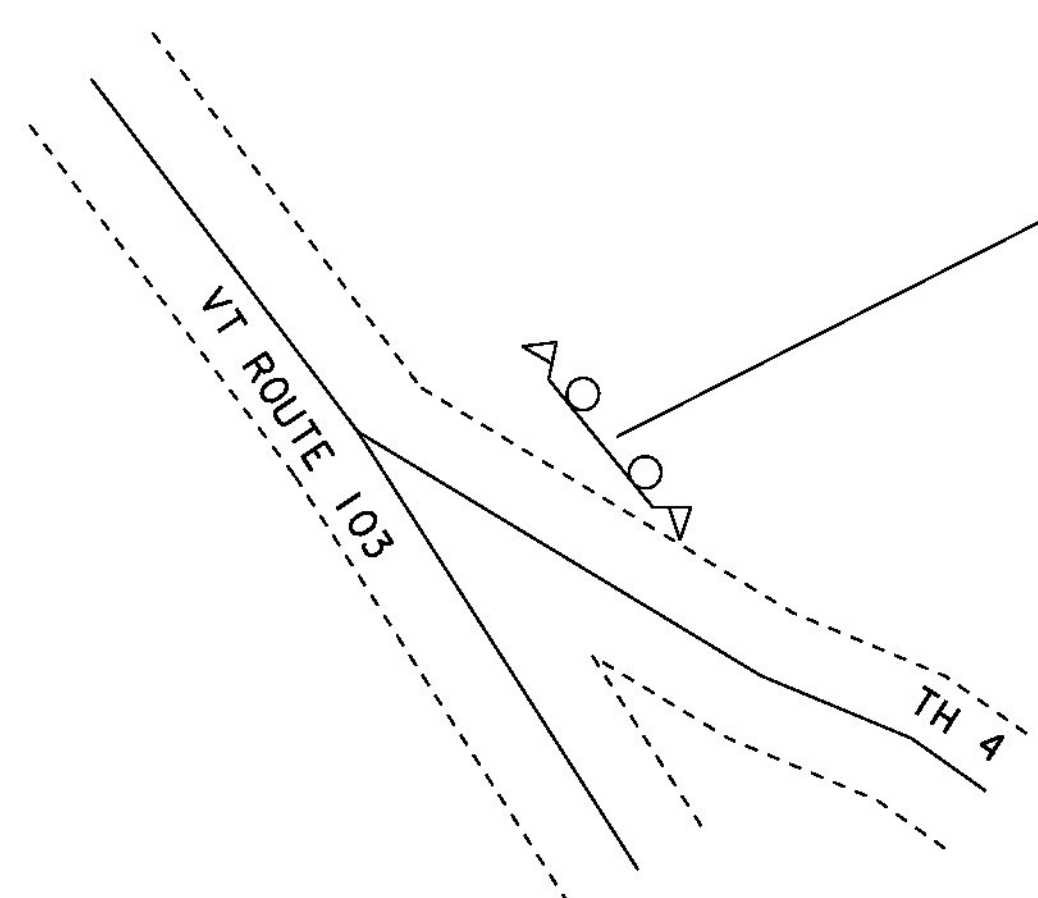
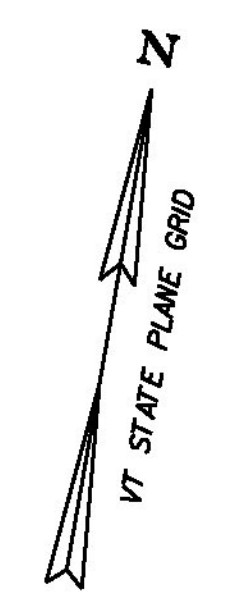
HORIZONTAL SCALE: 1"=20'-0"  
VERTICAL SCALE: 1"=10'-0"



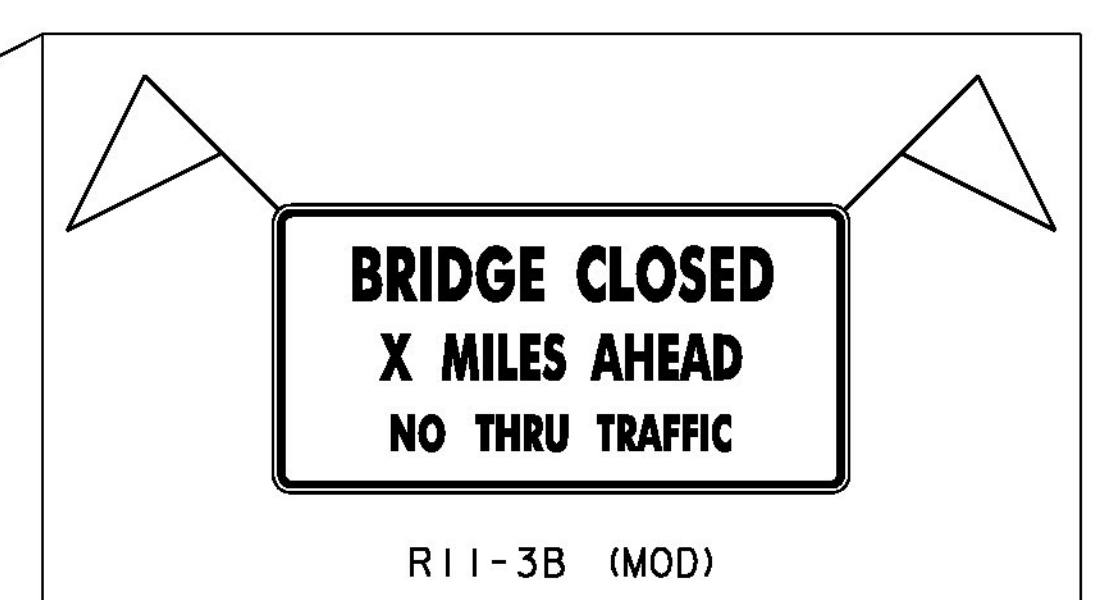
**OLD ROUTE 103 BANKING DIAGRAM**

HORIZONTAL SCALE: 1"=20'-0"  
VERTICAL SCALE: 1"=4%

PROJECT NAME:	SHREWSBURY
PROJECT NUMBER:	STP 1443 (44)
FILE NAME:	s94j154xs.dgn
PROJECT LEADER:	C. CARLSON
DESIGNED BY:	N. VANDENBERG
OLD ROUTE 103 PROFILE & DETAILS	
PLOT DATE:	19-AUG-2014
DRAWN BY:	M. LONGSTREET
CHECKED BY:	J. LACROIX
SHEET	14 OF 36



BRIDGE CLOSED LOCATION MAP



LOCATE 0.2+/- MILES WEST OF BRIDGE AT INTERSECTION OF TH 4 AND ROUTE 103 WITH APPROPRIATE MILEAGE INDICATED.



W20-3

PLACE SIGNS PER MUTCD AND VAOT STANDARD DRAWINGS ON TH 4 EAST OF BRIDGE.



W20-3



W20-3

PLACE SIGNS 1000 FT FROM THE APPROACH OR AT AN APPROXIMATE LOCATION.



VC839-A

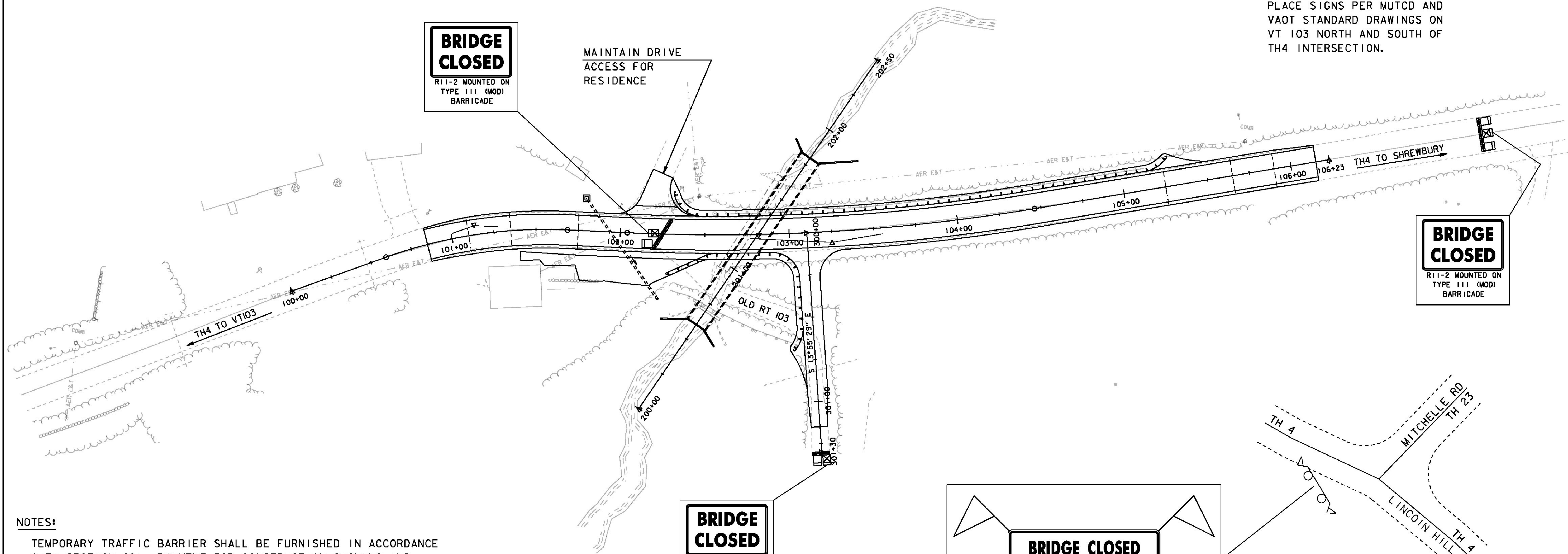


VC839-C



G20-2A

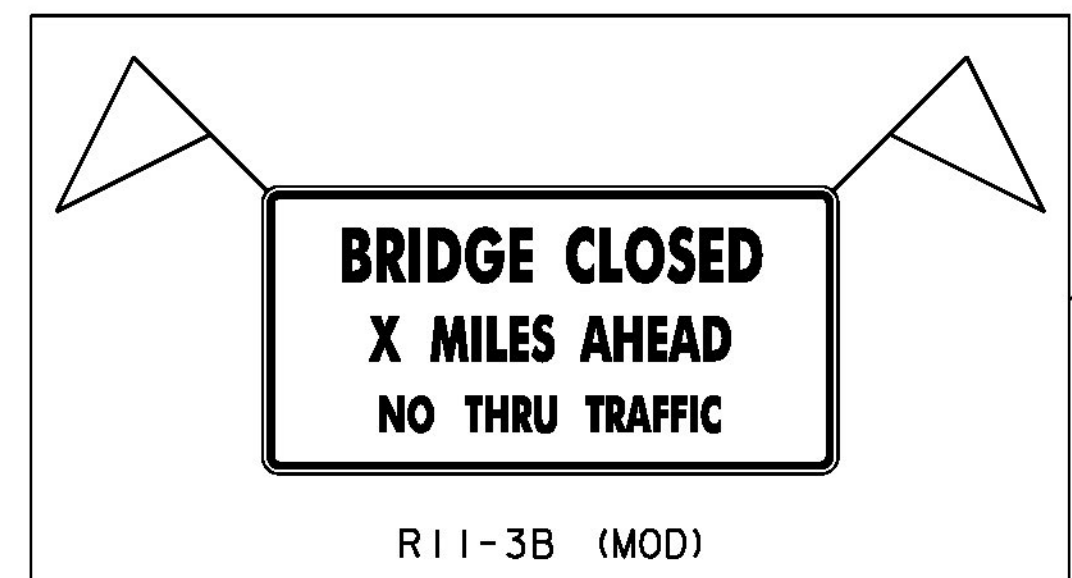
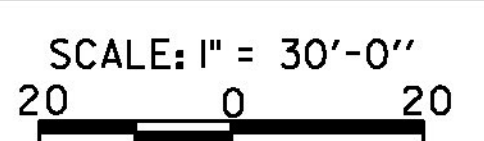
PLACE SIGNS PER MUTCD AND VAOT STANDARD DRAWINGS ON VT 103 NORTH AND SOUTH OF TH4 INTERSECTION.



**NOTES:**  
 TEMPORARY TRAFFIC BARRIER SHALL BE FURNISHED IN ACCORDANCE WITH SECTION 621. PAYMENT FOR CONSTRUCTION SIGNING AND TEMPORARY TRAFFIC BARRIER PLACEMENT AND MOVEMENT WILL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 900.645 "TRAFFIC CONTROL, ALL-INCLUSIVE".  
 SEE T-SERIES STANDARDS FOR ADDITIONAL DETAILS.

LEGEND	
	TYPE III BARRICADE
	TYPE III (MOD) BARRICADE
	TEMPORARY TRAFFIC BARRIER

TRAFFIC LAYOUT



R11-3B (MOD)

LOCATE 0.48+/- MILES EAST OF BRIDGE AT INTERSECTION OF TH 4 AND MITCHELLE RD. WITH APPROPRIATE MILEAGE INDICATED.

PROJECT NAME:	SHREWSBURY	PLOT DATE:	I2-MAY-2014
PROJECT NUMBER:	STP 1443 (44)	PROJECT LEADER:	C. CARLSON
DESIGNED BY:	N. VANDENBERG	CHECKED BY:	J. LACROIX
TRAFFIC LAYOUT		SHEET	15 OF 36

**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**

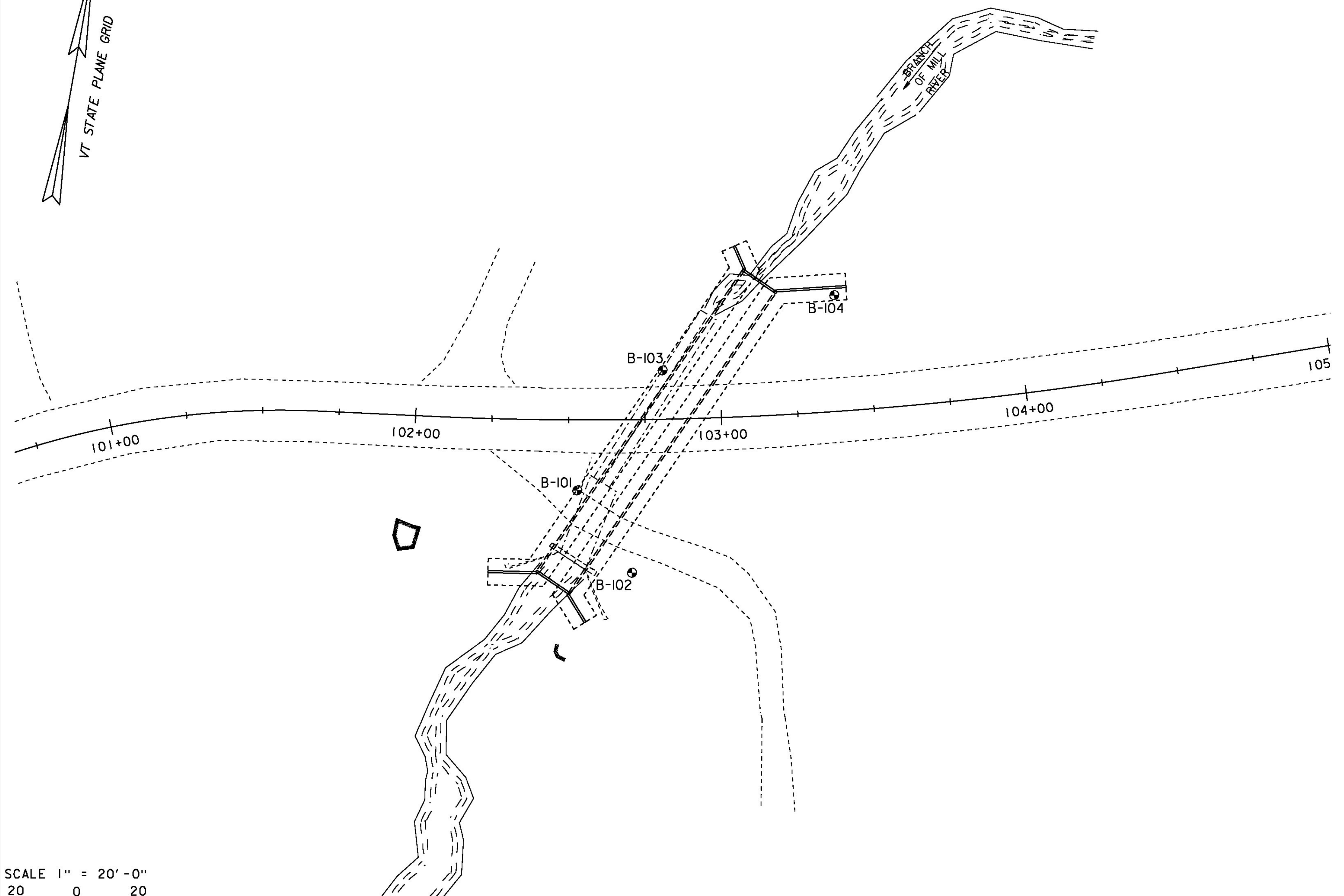
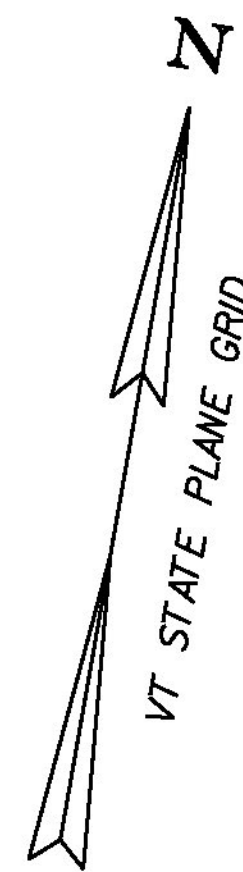
DENSITY (GRANULAR SOILS)		CONSISTENCY (COHESIVE SOILS)	
N	DESCRIPTIVE TERM	N	DESCRIPTIVE TERM
<5	Very Loose	<2	Very Soft
5-10	Loose	2-4	Soft
11-24	Med. Dense	5-8	Med. Stiff
25-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very Stiff
		31-60	Hard
		>60	Very Hard

**COMMONLY USED SYMBOLS**

- ▼ Water Elevation
- ⊙ Standard Penetration Boring
- ⊕ Auger Boring
- ⊖ Rod Sounding
- Sample
- S Standard Penetration Test
- N Blow Count Per Foot For:  
2" O.D. Sampler  
1 3/8" I.D. Sampler  
Hammer Weight Of 140 Lbs.  
Hammer Fall Of 30"
- YS 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 3/8"
- 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 Top of Ledge Or Boulder
- NR No Recovery
- Rec. Recovery
- %Rec. Percent Recovery
- ROD Rock Quality Designation
- CBR California Bearing Ratio
- < Less Than
- > Greater Than
- R Refusal (N > 100)
- VTSPG NAD83 - See Note 7

**COLOR**

blk	Black	pnk	Pink
bl	Blue	pu	Purple
brn	Brown	rd	Red
dk	Dark	tn	Tan
gr'y	Gray	wh	White
gn	Green	yel	Yellow
lt	Light	mltc	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 > 0.075" (#10 sieve).
- SAND** - Particles of rock < 0.075" (#10 sieve) and > 0.0025" (#200 sieve).
- SILT** - Soil < 0.0025" (#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.

**GENERAL NOTES**

1. The subsurface explorations shown herein were made between 04-19-11 and 05-03-11 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 judgment 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 judgment 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.
7. Northing and Easting coordinates are shown in Vermont State Plane Grid North American Datum 1983 in meters and survey feet.

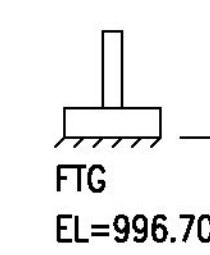
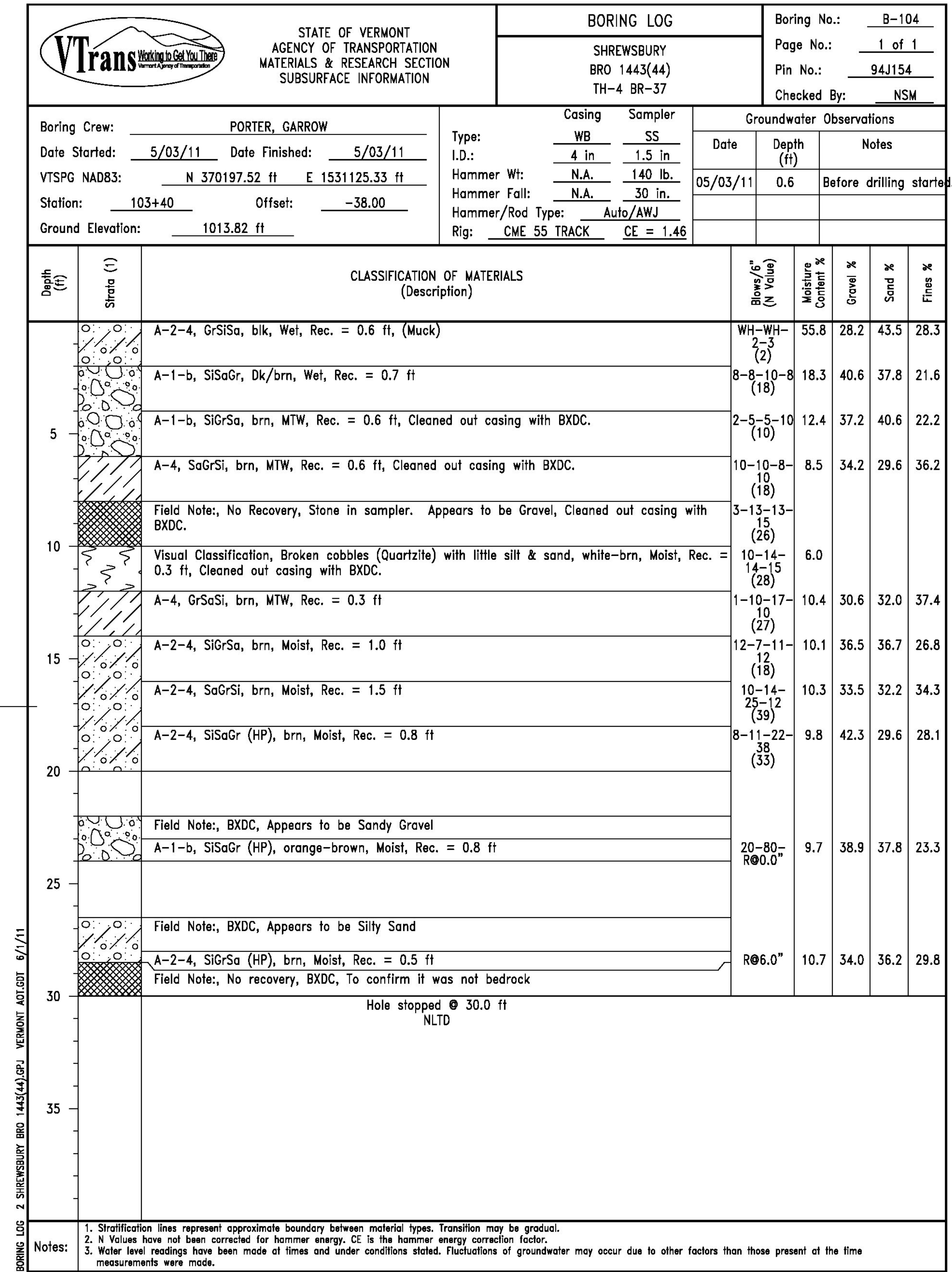
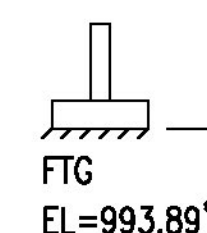
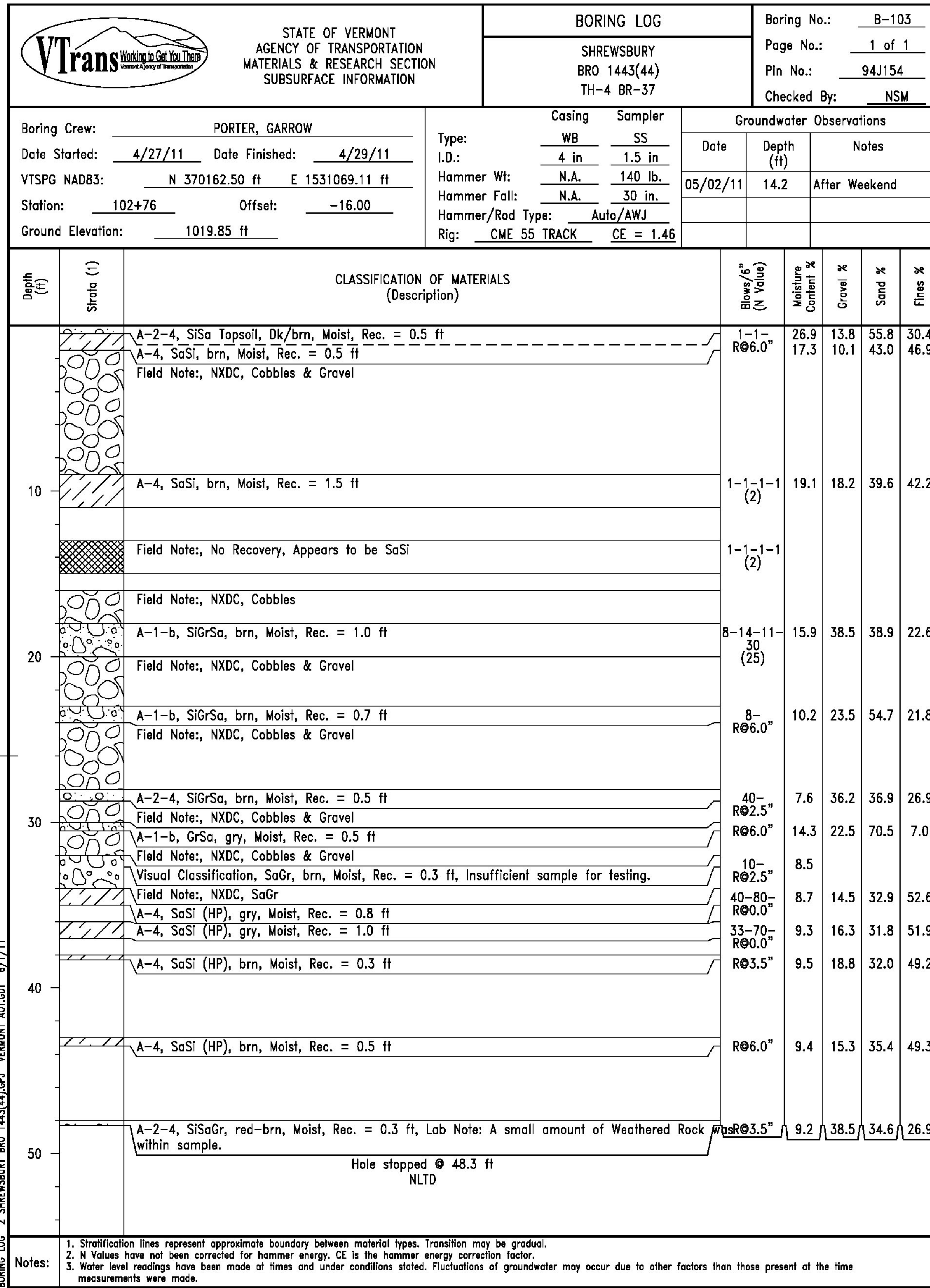
PROJECT NAME: SHREWSBURY  
PROJECT NUMBER: STP 1443 (44)

FILE NAME: s94j154boring.dgn PLOT DATE: 12-MAY-2014  
PROJECT LEADER: C. CARLSON DRAWN BY: M. LONGSTREET  
DESIGNED BY: N. VANDENBERG CHECKED BY: J. LACROIX  
BORING INFORMATION SHEET SHEET 16 OF 36

VT Trans		STATE OF VERMONT AGENCY OF TRANSPORTATION MATERIALS & RESEARCH SECTION SUBSURFACE INFORMATION		BORING LOG		Boring No.: B-101		
		SHREWSBURY BRO 1443(44) TH-4 BR-37		Page No.: 1 of 1		Pin No.: 94J154		
		Checked By: NSM						
Boring Crew: PORTER, GARROW		Casing Sampler		Groundwater Observations				
Date Started: 4/21/11 Date Finished: 4/27/11		Type: WB SS	Date Depth Notes					
VTSPG NADB3: N 370120.02 ft E 1531053.50 ft		I.D.: 4 in 1.5 in	04/27/11 19.1 AM, Before drilling.					
Station: 102+53 Offset: 23.00		Hammer Wt: N.A. 140 lb.						
Ground Elevation: 1017.74 ft		Hammer Fall: N.A. 30 in.						
		Hammer/Rod Type: Auto/AWJ						
		Rig: CME 55 TRACK CE = 1.46						
Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)		Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
0		A-1-b, GrSa, brn, Moist, Rec. = 2.0 ft		3-5-8-8 (13)	9.5	22.9	57.5	19.6
		Field Note: No Recovery		26-17-12-3 (29)				
		Field Note: NXDC, Cobbles						
10		Visual Classification, GrSa, Rec. = 0.3 ft, Insufficient sample for testing.		42-R06.0"				
		Field Note: NXDC, Cobbles & Boulders						
		Visual Classification, SaGr, Rec. = 0.3 ft, Insufficient sample for testing.		R05.0"				
		Field Note: NXDC, Cobbles & Boulders, Sleaved down to 3.0" casing.						
20		Field Note: BXDC, Cobbles & Gravel						
		A-2-4, GrSiSa, brn, Moist, Rec. = 0.8 ft		20-R06.0"	11.4	22.2	44.9	32.9
30		A-2-4, SiSa, brn, Moist, Rec. = 2.0 ft		13-29-35-48 (64)	10.4	11.7	58.1	30.2
		A-1-b, SiSa, brn, Moist, Rec. = 1.0 ft		22-34-R06.0"	10.6	17.4	61.5	21.1
		A-2-4, SaGrSi, brn, Moist, Rec. = 0.5 ft		R06.0"	10.8	33.4	31.8	34.8
		Field Note: BXDC, Gravel						
		A-4, SaSi (HP), brn, Moist, Rec. = 0.7 ft		16-R02.5"	9.0	19.0	33.5	47.5
40		A-4, SaSi (HP), brn, Moist, Rec. = 1.0 ft		30-R06.0"	10.1	12.6	34.6	52.8
		Field Note: SiSa, Roller coned ahead.						
		Visual Classification, SiSa, red-brn, Moist, Rec. = 0.5 ft, Insufficient sample for testing.		R06.0"	11.6			
		Field Note: Sa, Roller coned ahead.						
		A-2-4, GrSiSa, red-brn, Moist, Rec. = 1.0 ft		11-40-R02.5"	12.8	29.5	36.4	34.1
50		Hole stopped @ 49.2 ft NLTD						
Notes: 1. Stratification lines represent approximate boundary between material types. Transition may be gradual. 2. N Values have not been corrected for hammer energy. CE is the hammer energy correction factor. 3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.								

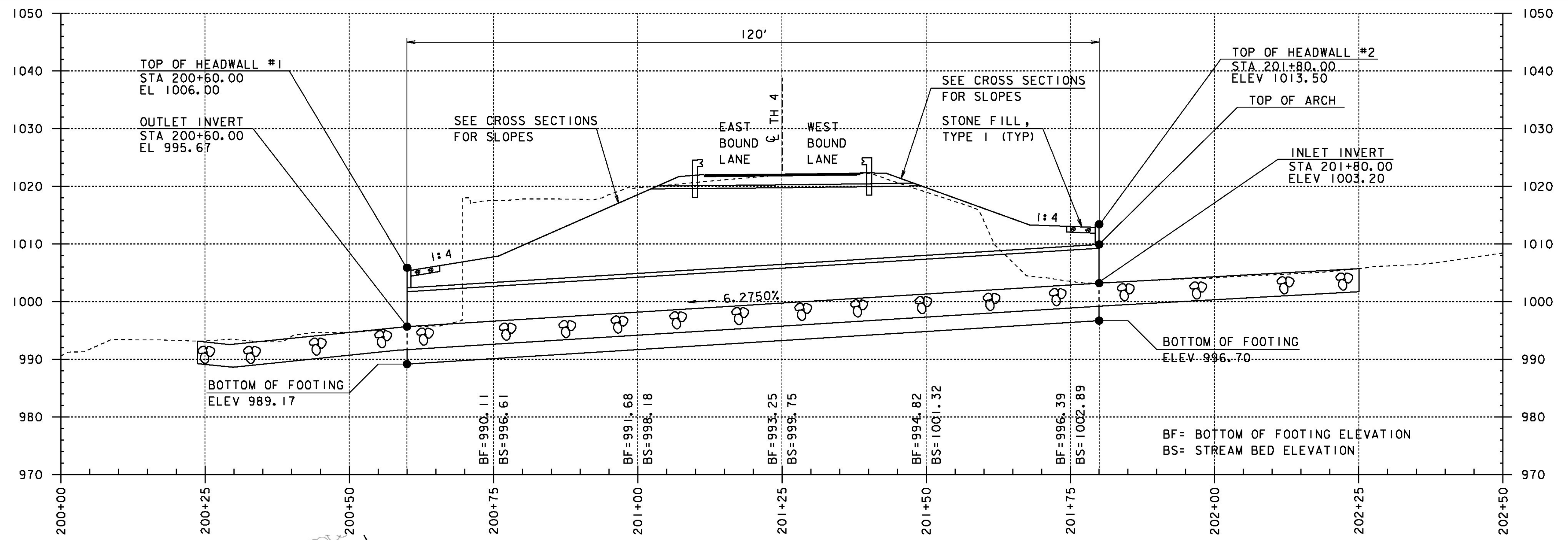
VT Trans		STATE OF VERMONT AGENCY OF TRANSPORTATION MATERIALS & RESEARCH SECTION SUBSURFACE INFORMATION		BORING LOG		Boring No.: B-102		
		SHREWSBURY BRO 1443(44) TH-4 BR-37		Page No.: 1 of 1		Pin No.: 94J154		
		Checked By: NSM						
Boring Crew: PORTER, GARROW		Casing Sampler		Groundwater Observations				
Date Started: 4/19/11 Date Finished: 4/21/11		Type: WB SS	Date Depth Notes					
VTSPG NADB3: N 370096.59 ft E 1531076.24 ft		I.D.: 4 in 1.5 in	04/20/11 9.5					
Station: 102+70 Offset: 50.00		Hammer Wt: N.A. 140 lb.	04/21/11 15.0					
Ground Elevation: 1018.33 ft		Hammer Fall: N.A. 30 in.						
		Hammer/Rod Type: Auto/AWJ						
		Rig: CME 55 TRACK CE = 1.46						
Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)		Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
0		A-1-b, SaGr, brn, Moist, Rec. = 1.4 ft		2-4-5-8 (9)	6.8	43.5	42.3	14.2
		Field Note: Cleaned out casing. Appears to be Gravel.		2-2-2-2 (4)				
		Visual Classification, GrSaSi, brn, Moist, Rec. = 0.3 ft, Insufficient sample for testing.						
		Field Note: Cobbles, Cleaned out casing.						
10		A-2-4, SiGrSa, brn, Moist, Rec. = 0.8 ft		1-1-2-1 (3)	19.8	29.9	40.2	29.9
		Field Note: Cobbles, Cleaned out casing.						
		A-1-b, GrSa, brn, Moist, Rec. = 0.5 ft		4-11-6-4 (17)	12.1	42.2	47.5	10.3
		Field Note: Boulder, Cleaned out casing.						
20		A-1-b, GrSa, brn, Moist, Rec. = 0.5 ft		4-4-5-12 (9)	15.3	32.5	53.7	13.8
		Field Note: NXDC, Boulder, Sleaved down to 3.0 in.						
		A-2-4, SiGrSa, gry, Moist, Rec. = 1.5 ft		3-10-50-30 (60)	13.1	38.4	41.2	20.4
		Field Note: BXDC, Cobbles						
30		A-1-b, GrSa, brn, Moist, Rec. = 1.7 ft		7-16-30-46 (60)	11.6	32.3	49.2	18.5
		A-1-b, SiSaGr, brn, Moist, Rec. = 1.9 ft		26-42-38-32 (60)	9.3	46.8	27.9	25.3
		A-2-4, SiGrSa, gold-brn, Moist, Rec. = 1.1 ft, Lab Note: Sample was rusty-orange colored.		17-30-R06.0"	12.5	33.2	36.3	30.5
		A-1-b, SaGr, gold-brn, Moist, Rec. = 0.7 ft, Lab Note: Sample was rusty-orange colored.		40-R02.0"	9.4	55.0	26.2	18.8
		Sample was mostly Broken Rock.						
		A-1-b, SiGrSa, brn, Moist, Rec. = 1.0 ft		52-R06.0"	13.7	30.9	48.9	20.2
40		A-2-4, SiGrSa, brn, Moist, Rec. = 2.0 ft		30-36-28-36 (64)	14.8	31.0	42.5	26.5
		A-2-4, SiGrSa, red-brn, Moist, Rec. = 1.0 ft		25-R06.0"	13.8	28.9	42.7	28.4
		Field Note: BXDC, Sandy Gravel						
50		A-1-b, SaGr, Rec. = 0.5 ft, Lab Note: Broken weathered Schist rock was within sample.		R06.0"	11.6	49.4	32.9	17.7
		Hole stopped @ 48.5 ft NLTD						
Notes: 1. Stratification lines represent approximate boundary between material types. Transition may be gradual. 2. N Values have not been corrected for hammer energy. CE is the hammer energy correction factor. 3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.								

PROJECT NAME: SHREWSBURY  
 PROJECT NUMBER: STP 1443 (44)  
 FILE NAME: s94j154boring.dgn PLOT DATE: 12-MAY-2014  
 PROJECT LEADER: C. CARLSON DRAWN BY: M. LONGSTREET  
 DESIGNED BY: N. VANDENBERG CHECKED BY: J. LACROIX  
 BORING LOG SHEET 1 SHEET 17 OF 36

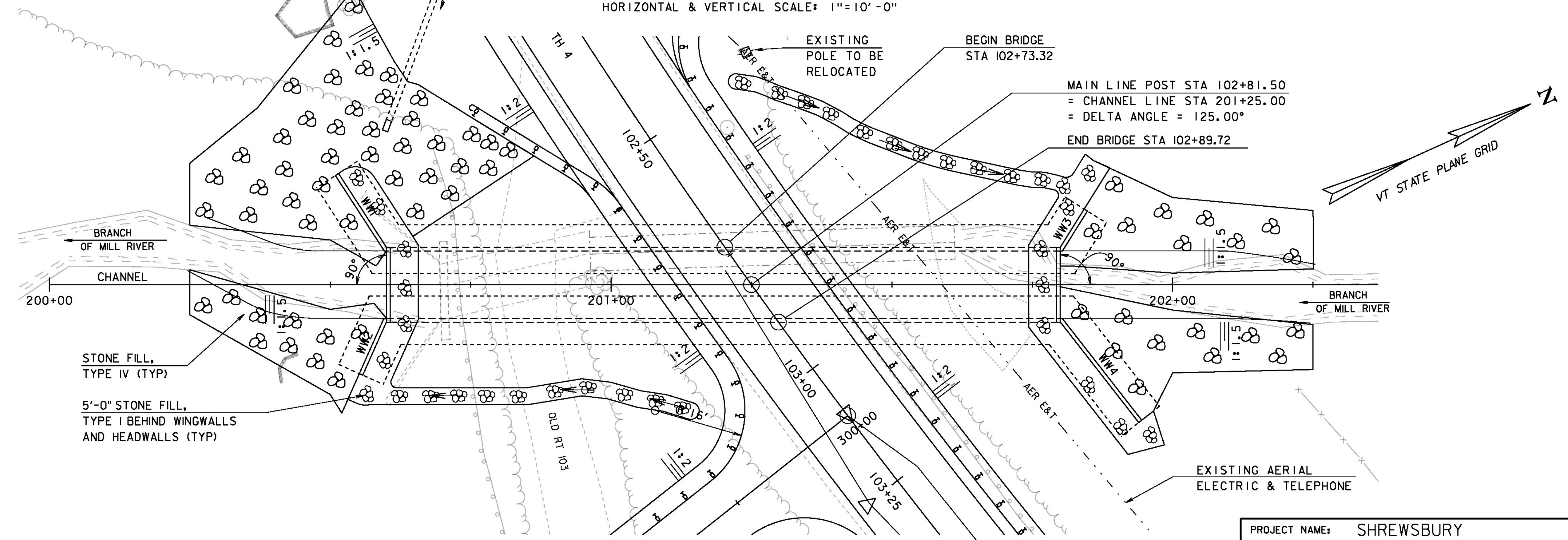


BORING LOG 2 SHREWSBURY BRO. 1443(44).GPJ VERMONT AUT.GDT 6/1/11

PROJECT NAME: SHREWSBURY  
 PROJECT NUMBER: STP 1443 (44)  
 FILE NAME: s94j154boring.dgn  
 PROJECT LEADER: C. CARLSON  
 DESIGNED BY: N. VANDENBERG  
 BORING LOG SHEET 2  
 PLOT DATE: 19-AUG-2014  
 DRAWN BY: M. LONGSTREET  
 CHECKED BY: J. LACROIX  
 SHEET 18 OF 36



**CONCRETE ARCH PROFILE**  
 HORIZONTAL & VERTICAL SCALE: 1"=10'-0"

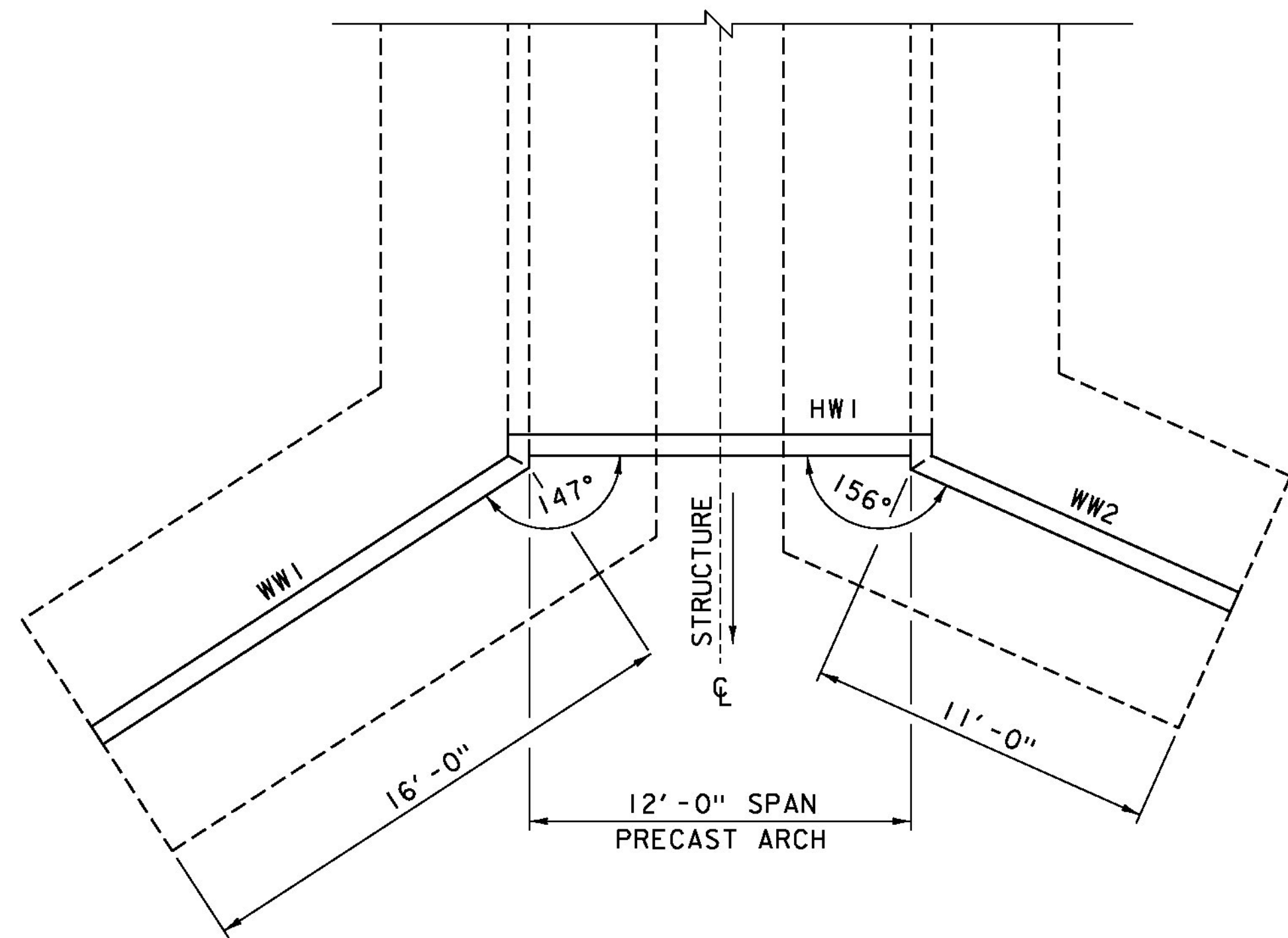


**CONCRETE ARCH PLAN**

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

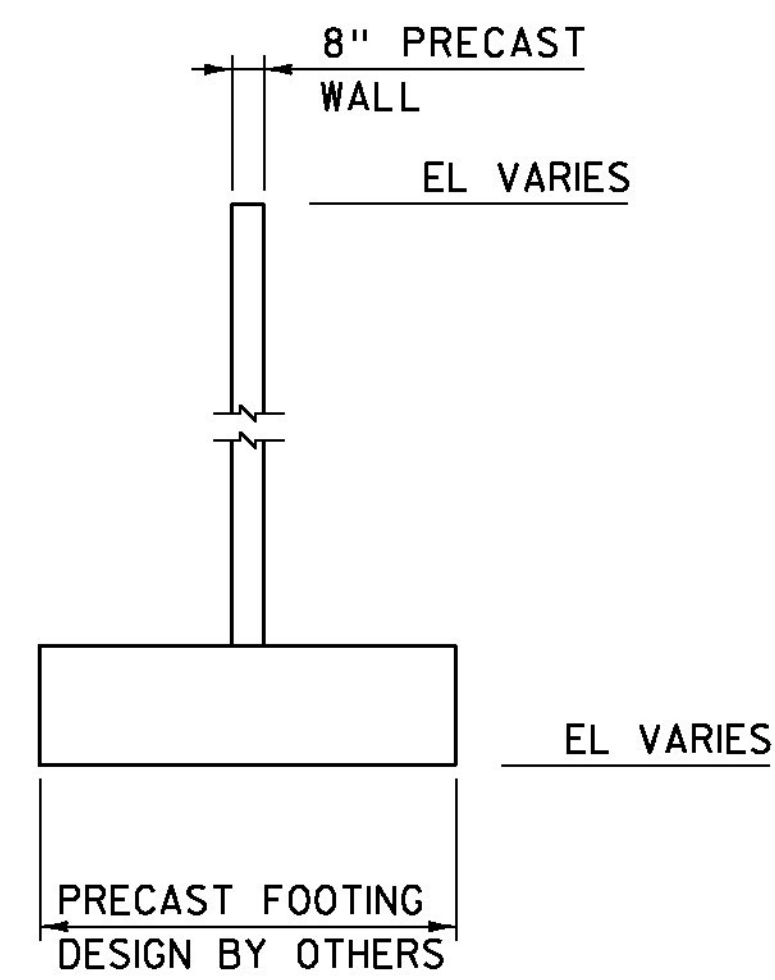
MAIN LINE POST STA 103+10.44  
 = DRIVE RT STA 300+00.00  
 = DELTA ANGLE = 92.00°

PROJECT NAME: SHREWSBURY	PLOT DATE: 12-MAY-2014
PROJECT NUMBER: STP 1443 (44)	DRAWN BY: M. LONGSTREET
FILE NAME: s94j154pp.dgn	CHECKED BY: J. LACROIX
PROJECT LEADER: C. CARLSON	SHEET 19 OF 36
DESIGNED BY: N. VANDENBERG	
CONCRETE ARCH PLAN & PROFILE	



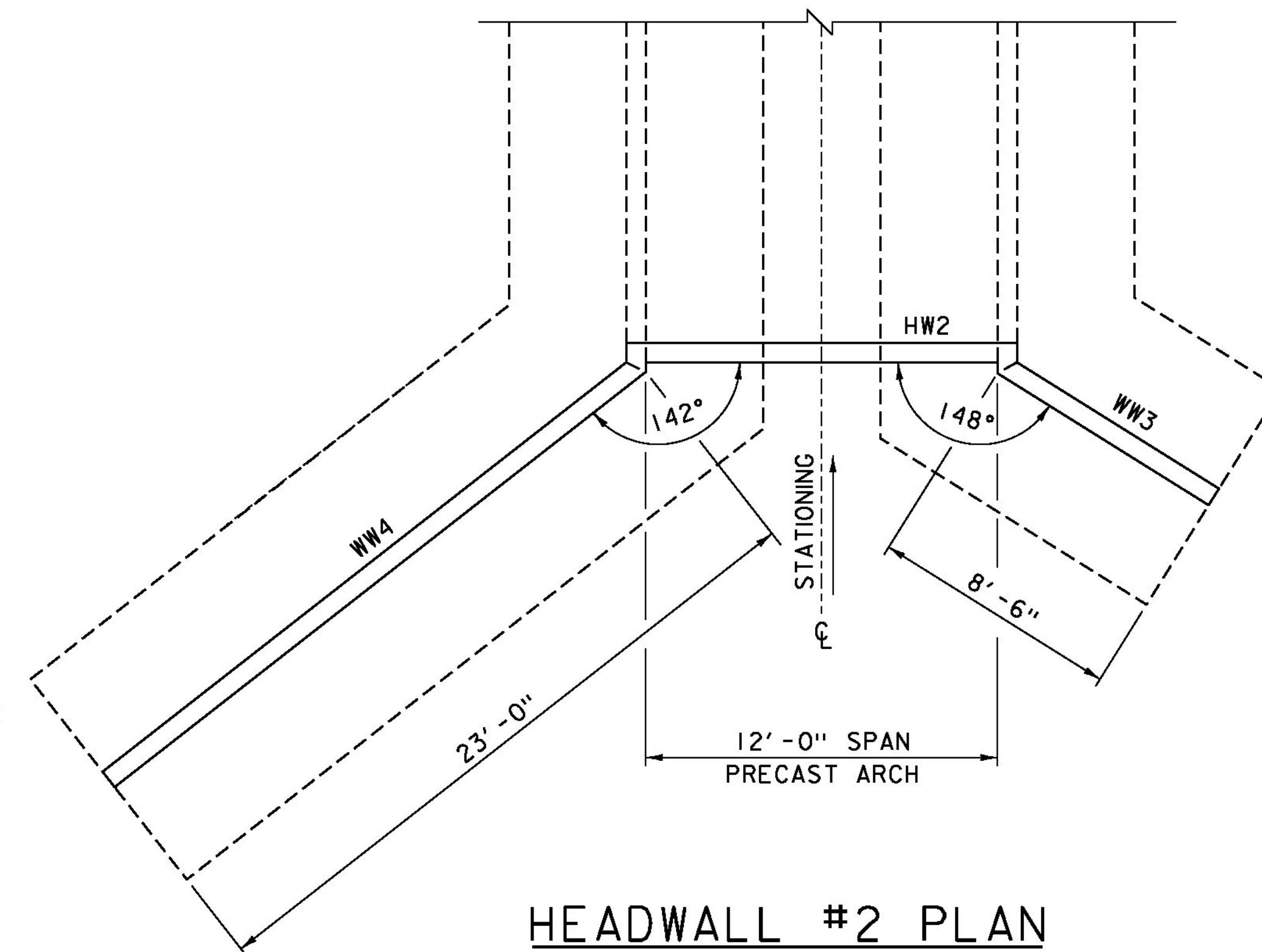
**HEADWALL #1 PLAN**

SCALE: 1/4" = 1'-0"



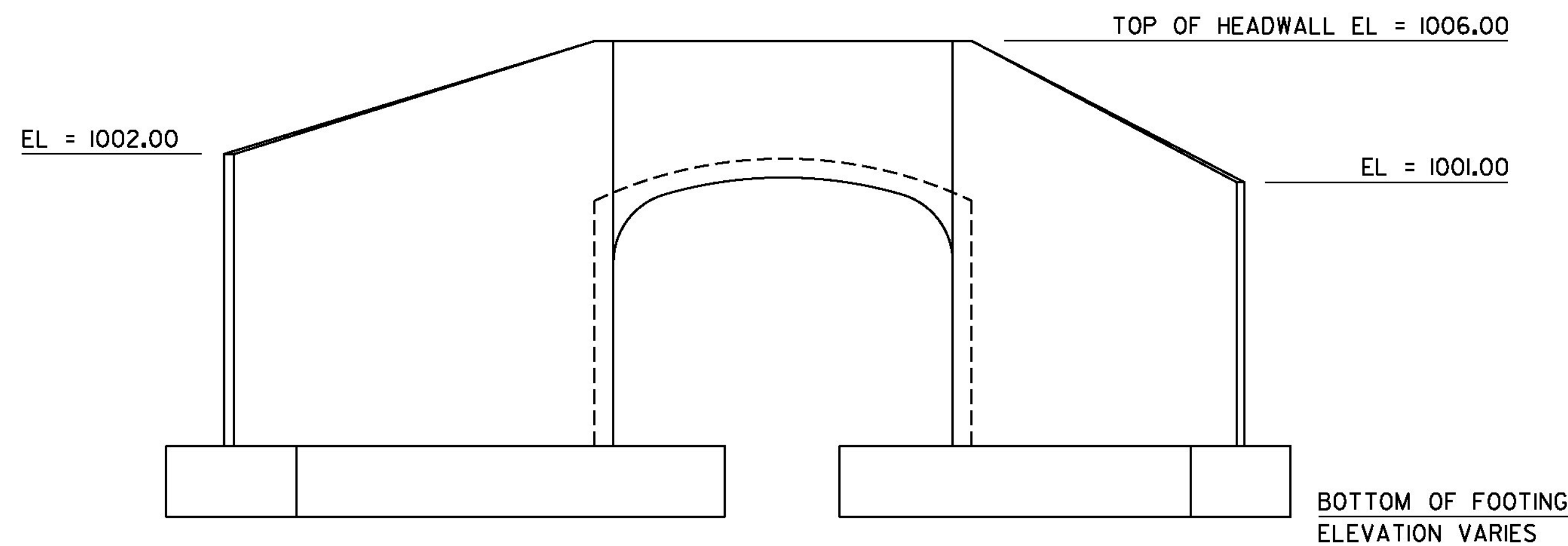
**WINGWALL TYPICAL**

SCALE: 1/4" = 1'-0"



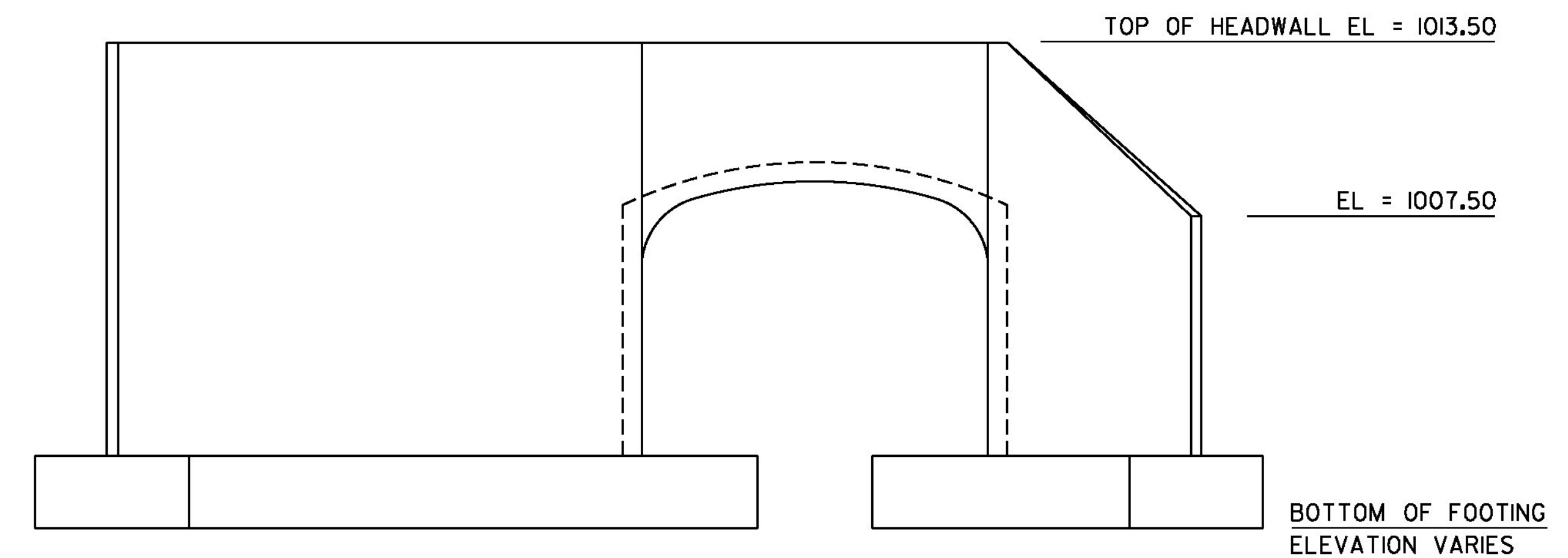
**HEADWALL #2 PLAN**

SCALE: 1/4" = 1'-0"



**HEADWALL #1 ELEVATION**

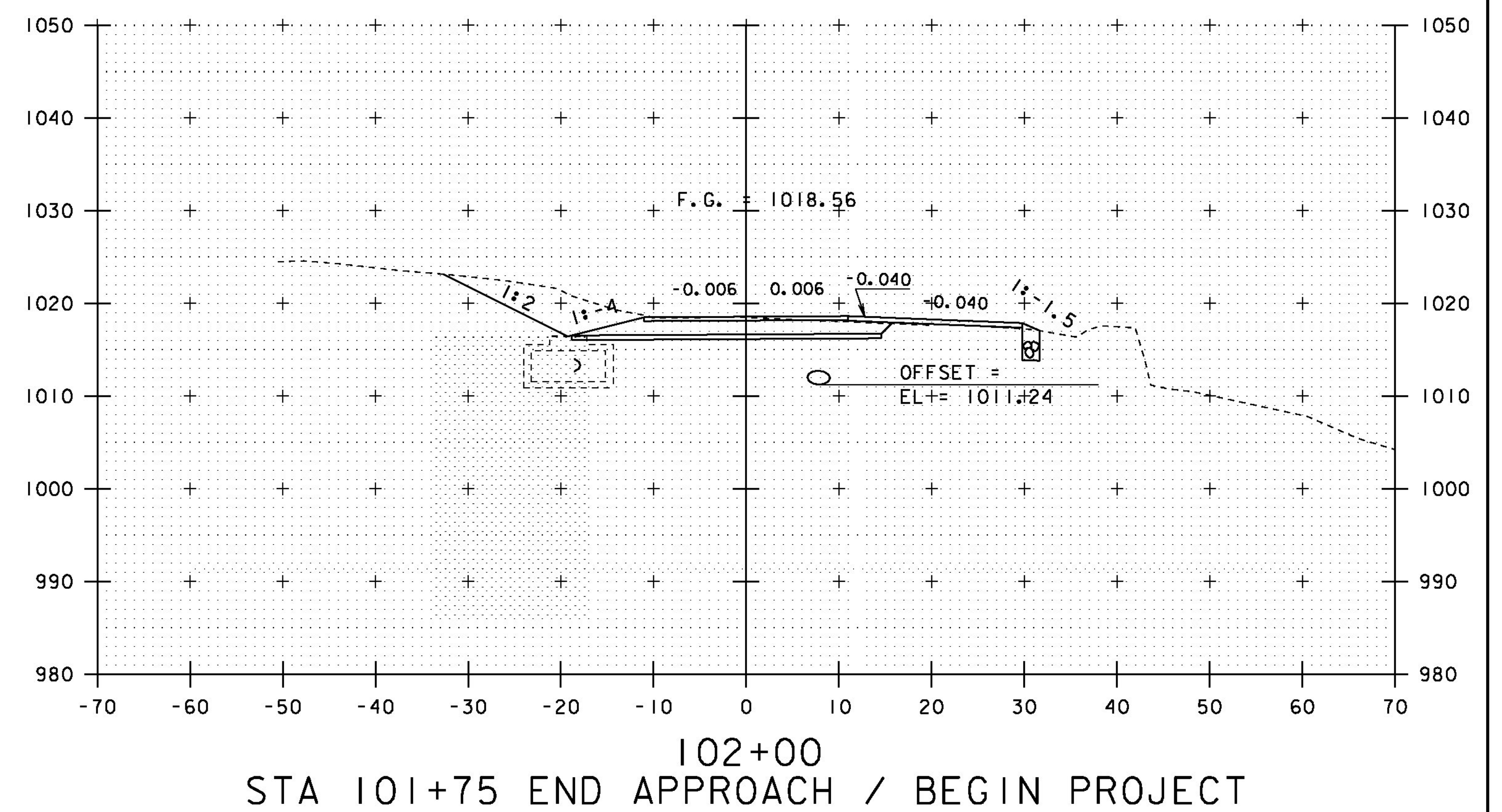
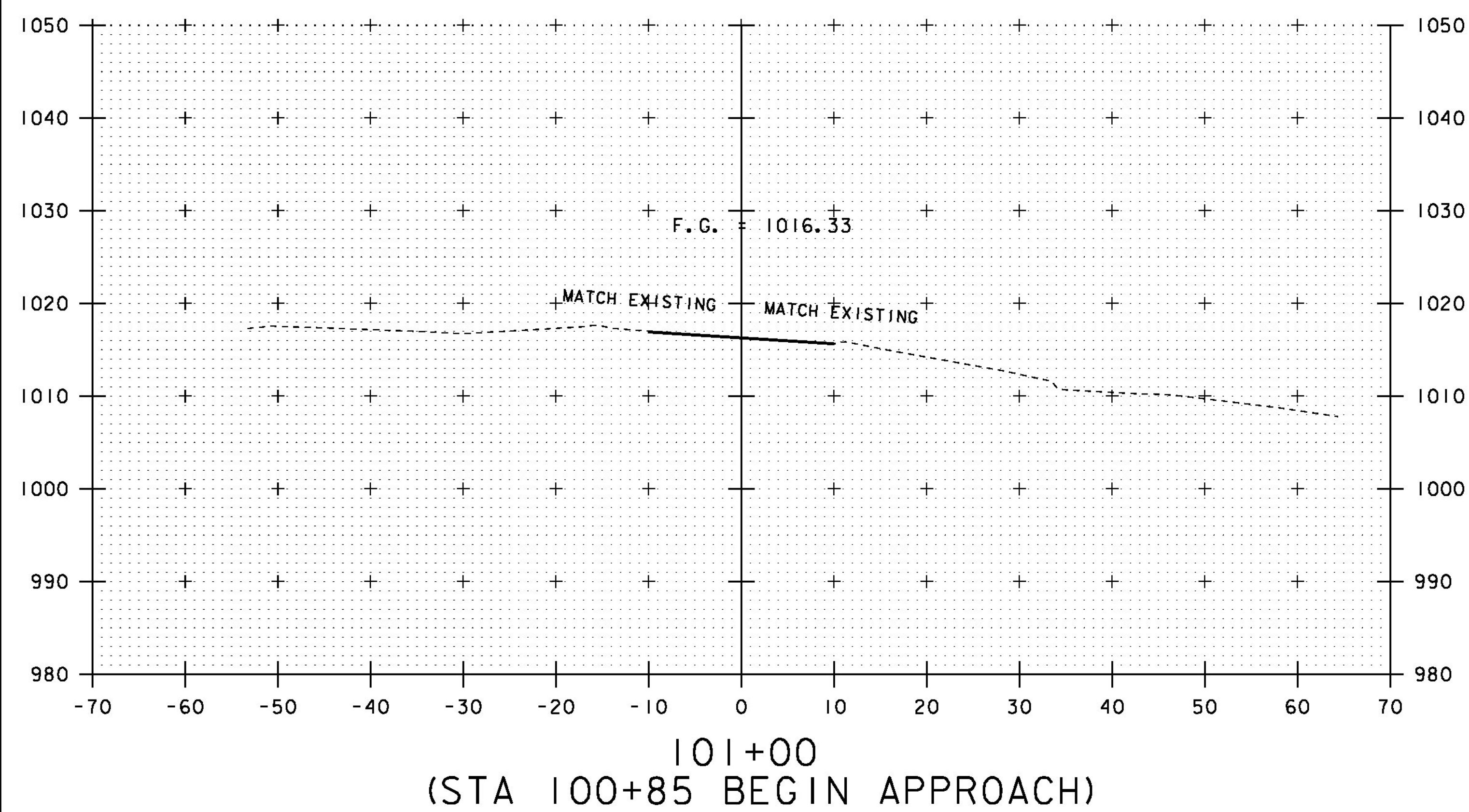
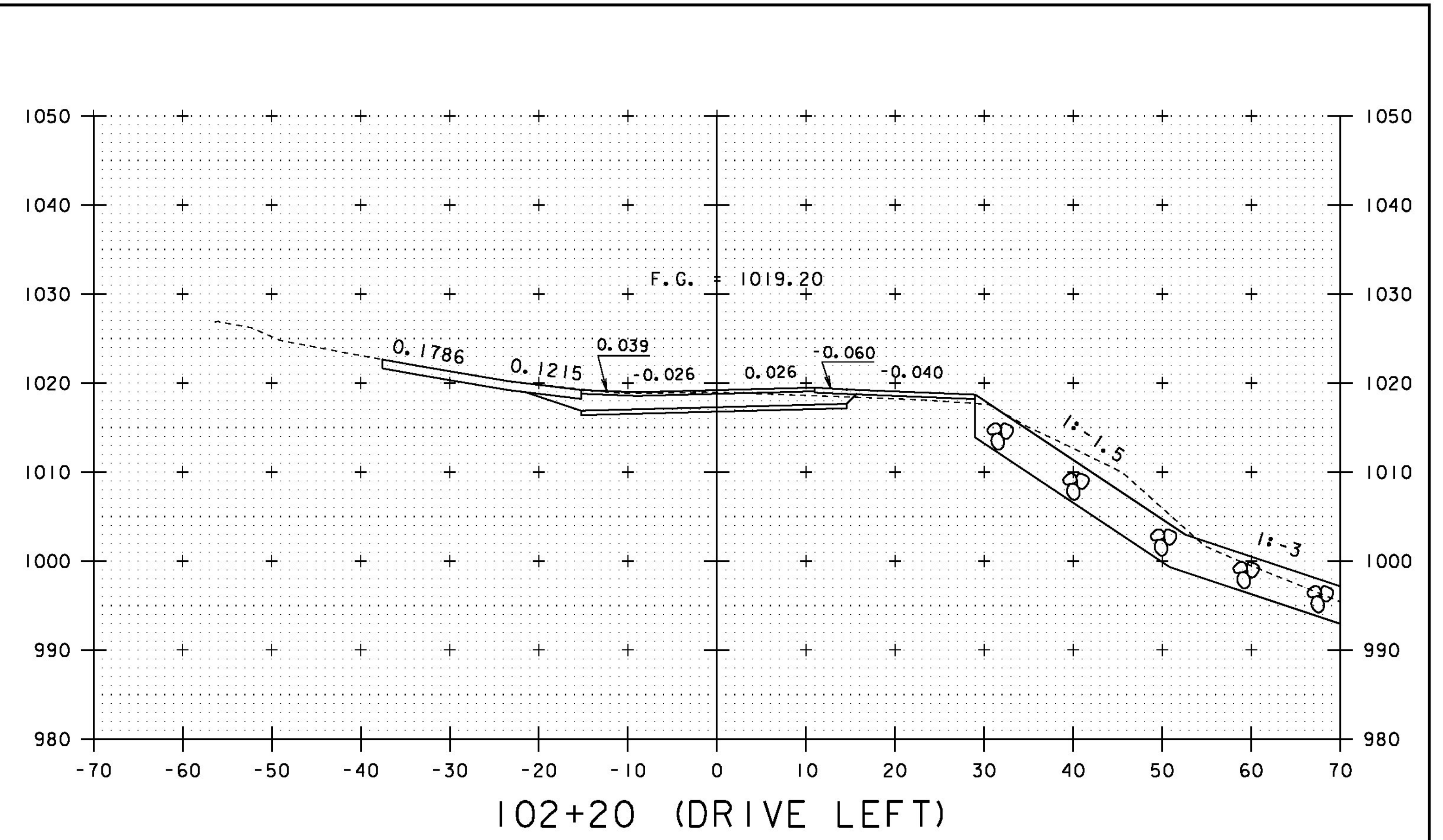
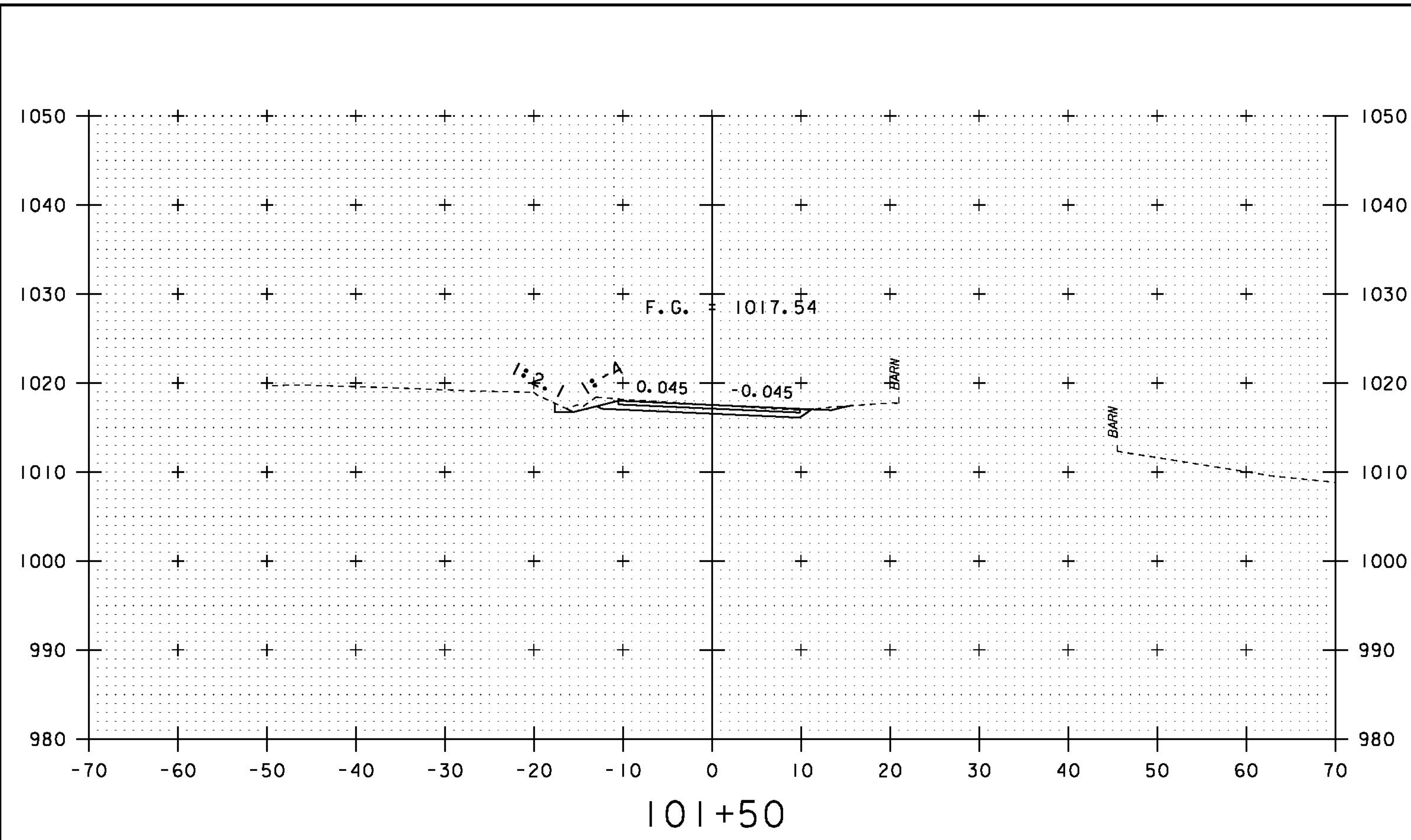
SCALE: 1/4" = 1'-0"



**HEADWALL #2 ELEVATION**

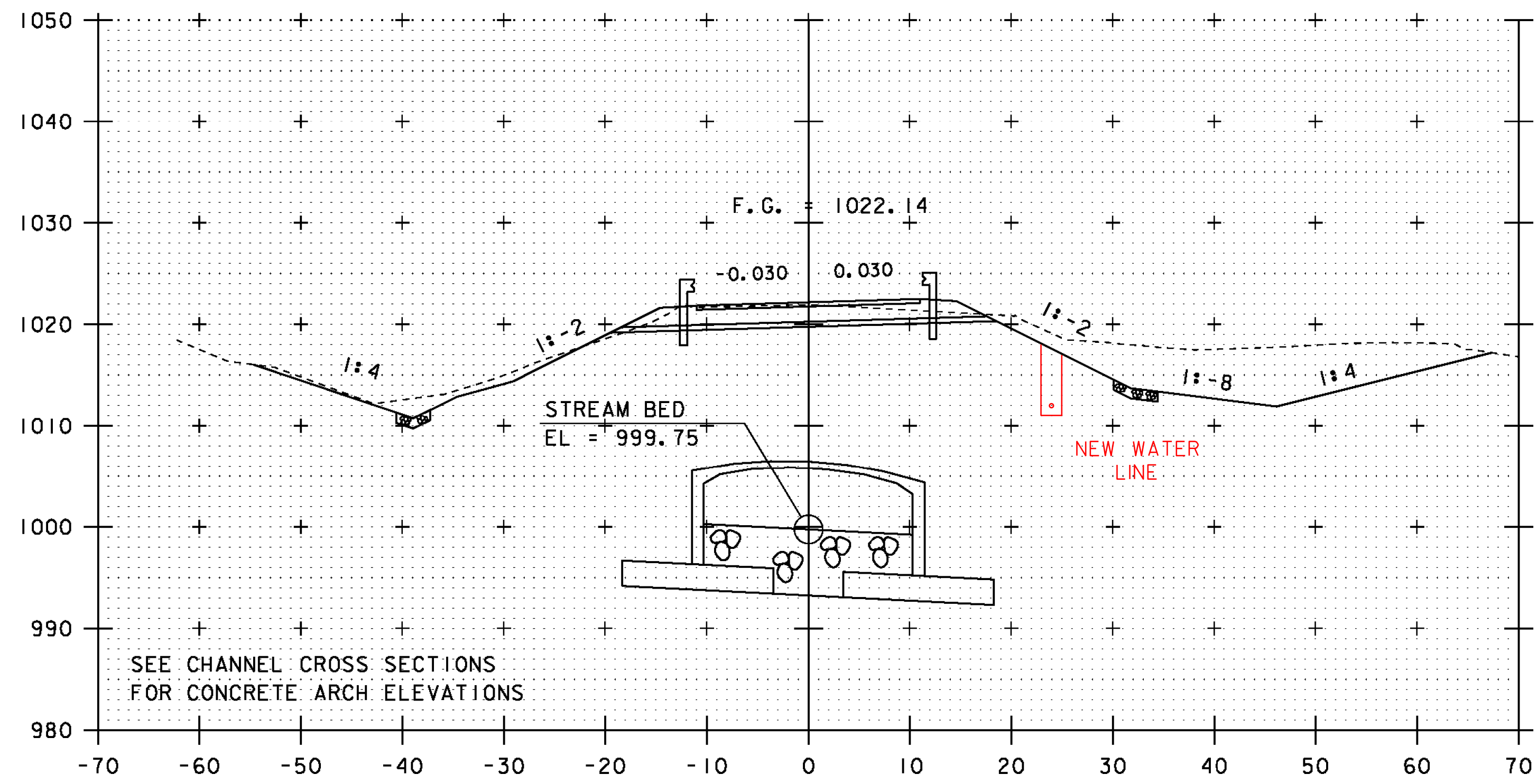
SCALE: 1/4" = 1'-0"

PROJECT NAME: SHREWSBURY	
PROJECT NUMBER: STP 1443 (44)	
FILE NAME: s94j154sub.dgn	PLOT DATE: 12-MAY-2014
PROJECT LEADER: C. CARLSON	DRAWN BY: M. LONGSTREET
DESIGNED BY: N. VANDENBERG	CHECKED BY: J. LACROIX
HEADWALL PLANS & ELEVATIONS	SHEET 20 OF 36

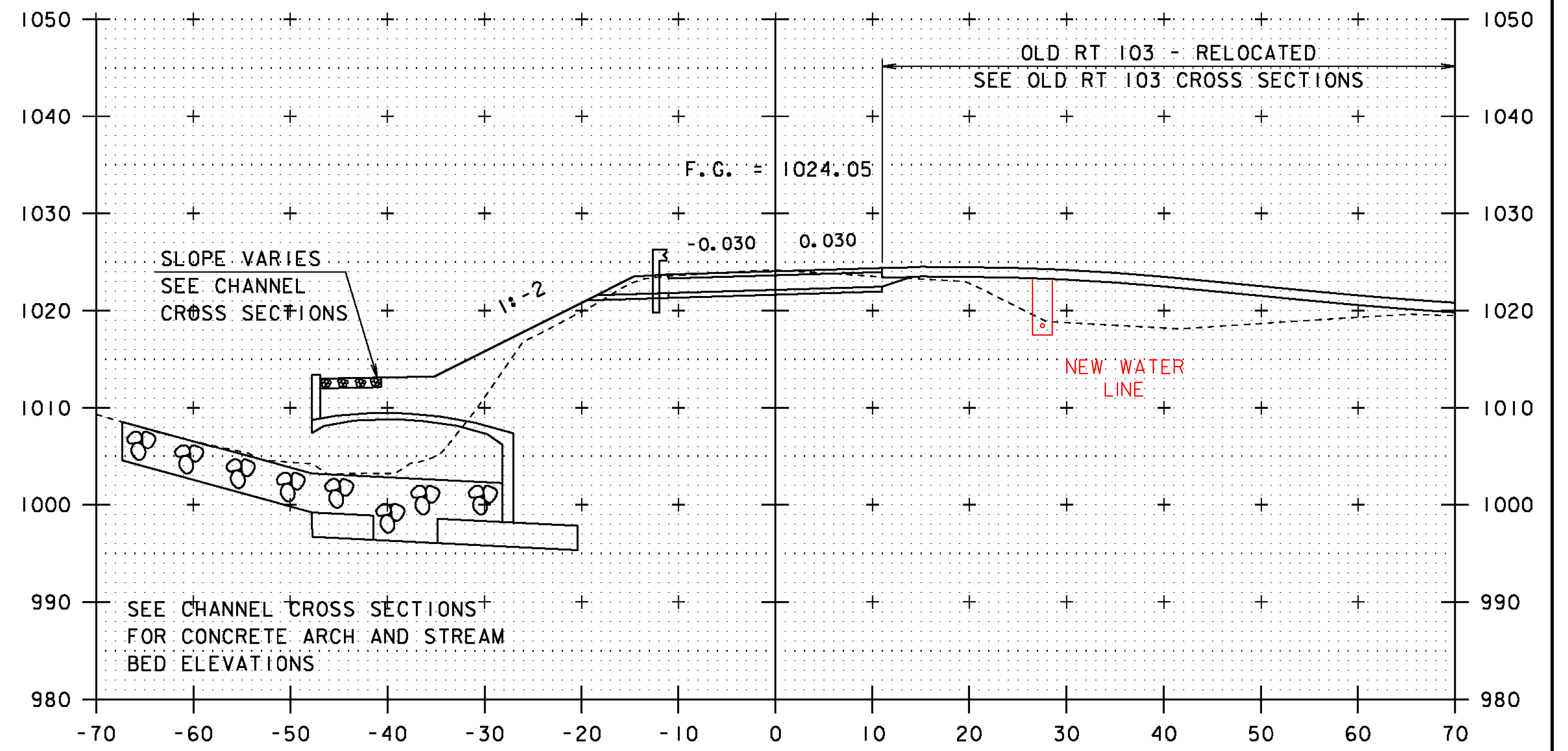


STA. 101+00 TO STA. 102+20

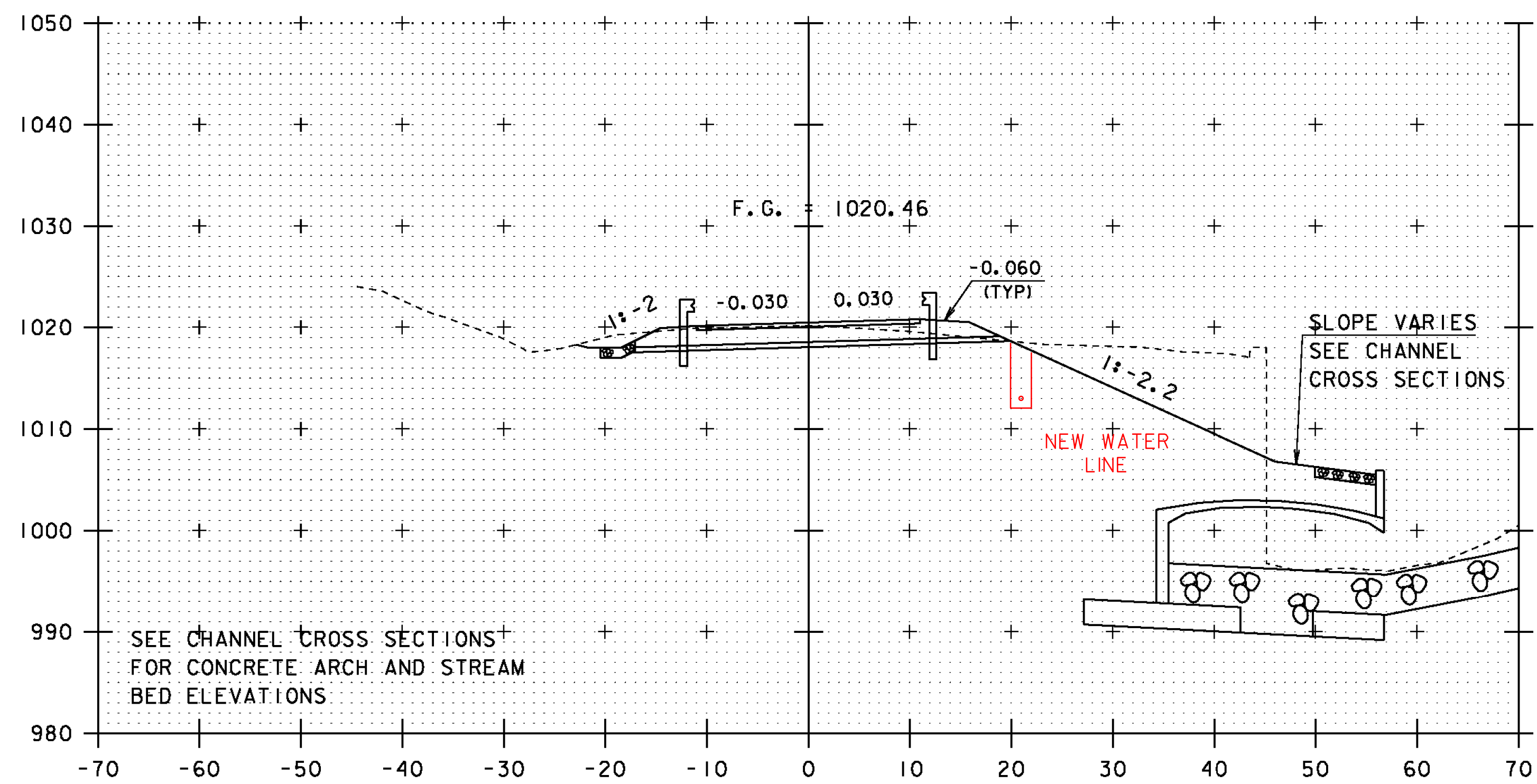
PROJECT NAME:	SHREWSBURY	PLOT DATE:	12-MAY-2014
PROJECT NUMBER:	STP 1443 (44)	DRAWN BY:	M. LONGSTREET
FILE NAME:	s94j154xs.dgn	DESIGNED BY:	N. VANDENBERG
PROJECT LEADER:	C. CARLSON	CHECKED BY:	J. LACROIX
TH 4 CROSS SECTION SHEET 1		SHEET 21 OF 36	



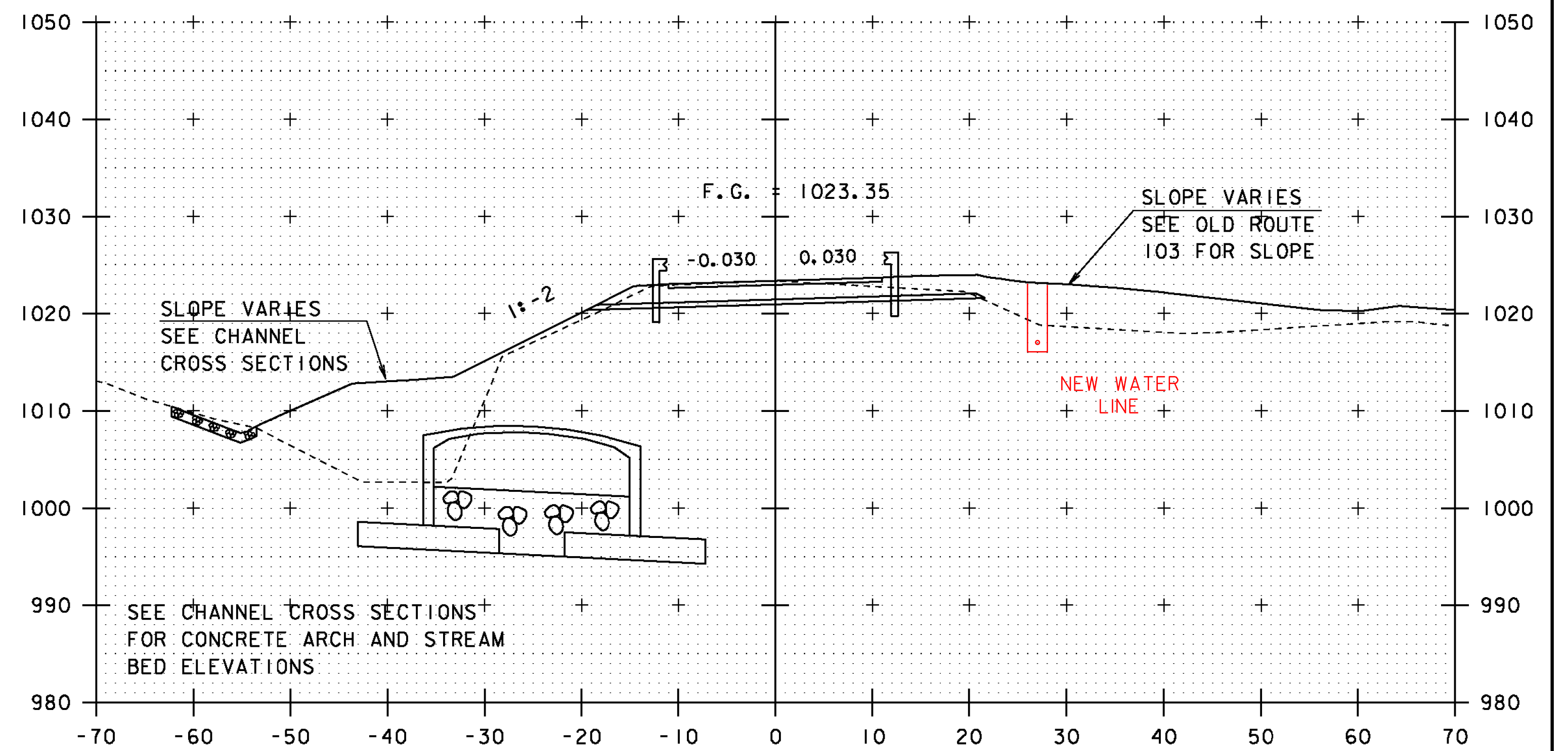
102+81.50 = CHANNEL STA 201+25.00  
(CONCRETE ARCH CROSSING)



103+10 (OLD RT 103 - RT)



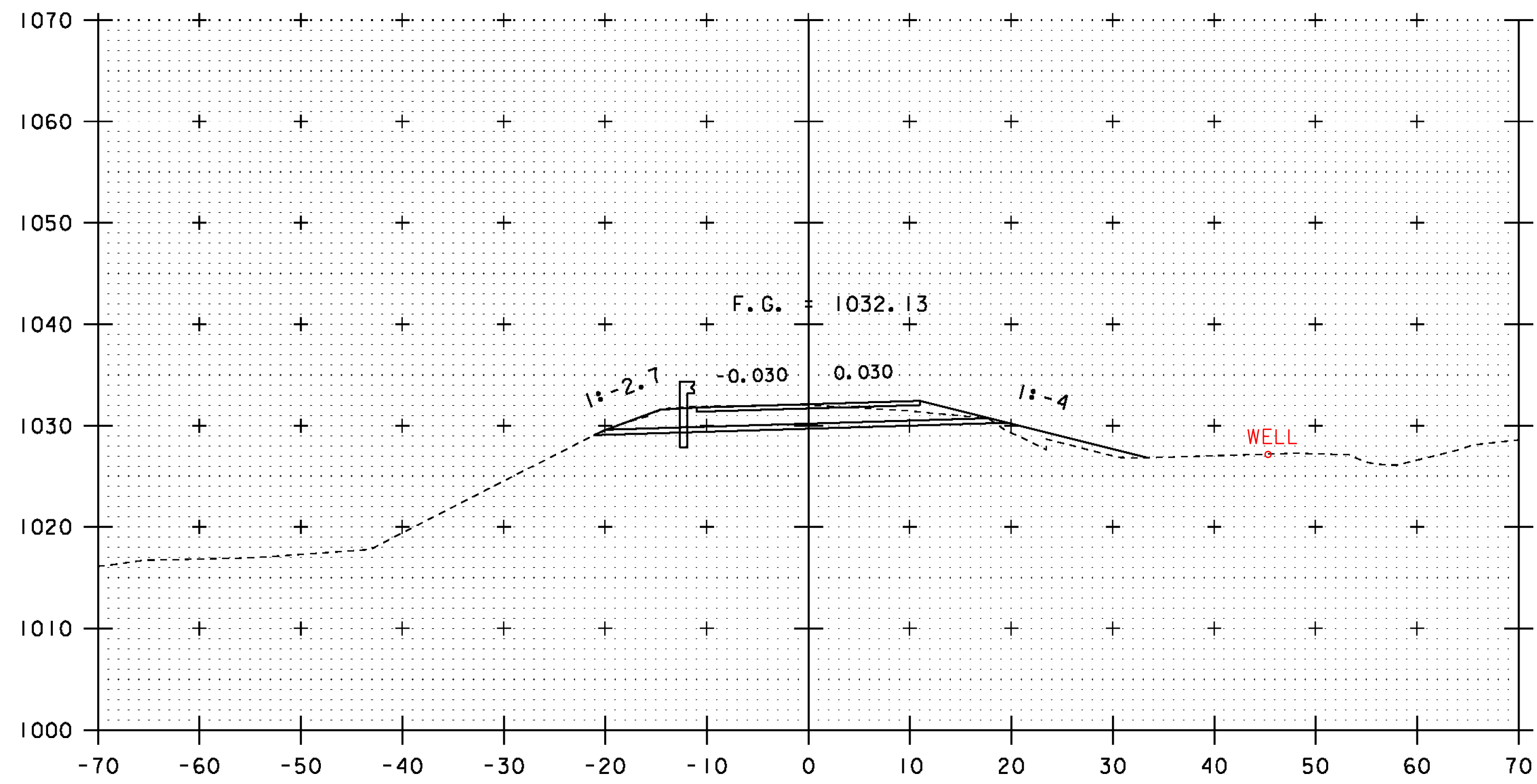
102+50



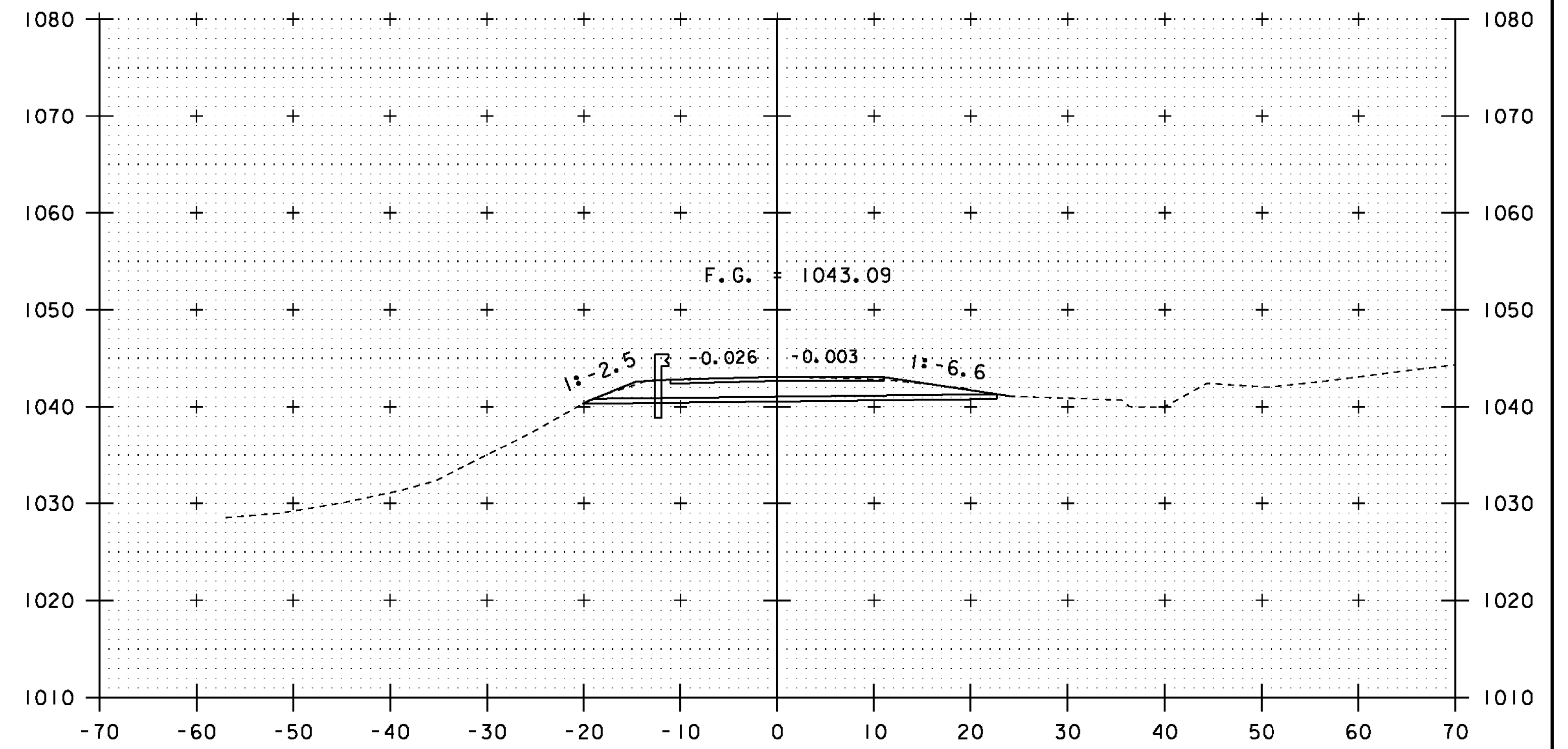
103+00

STA. 102+50 TO STA. 103+10

PROJECT NAME:	SHREWSBURY	PLOT DATE:	12-MAY-2014
PROJECT NUMBER:	STP 1443 (44)	DRAWN BY:	M. LONGSTREET
FILE NAME:	s94j54xs.dgn	DESIGNED BY:	N. VANDENBERG
PROJECT LEADER:	C. CARLSON	CHECKED BY:	J. LACROIX
TH 4 CROSS SECTION SHEET 2		SHEET	22 OF 36

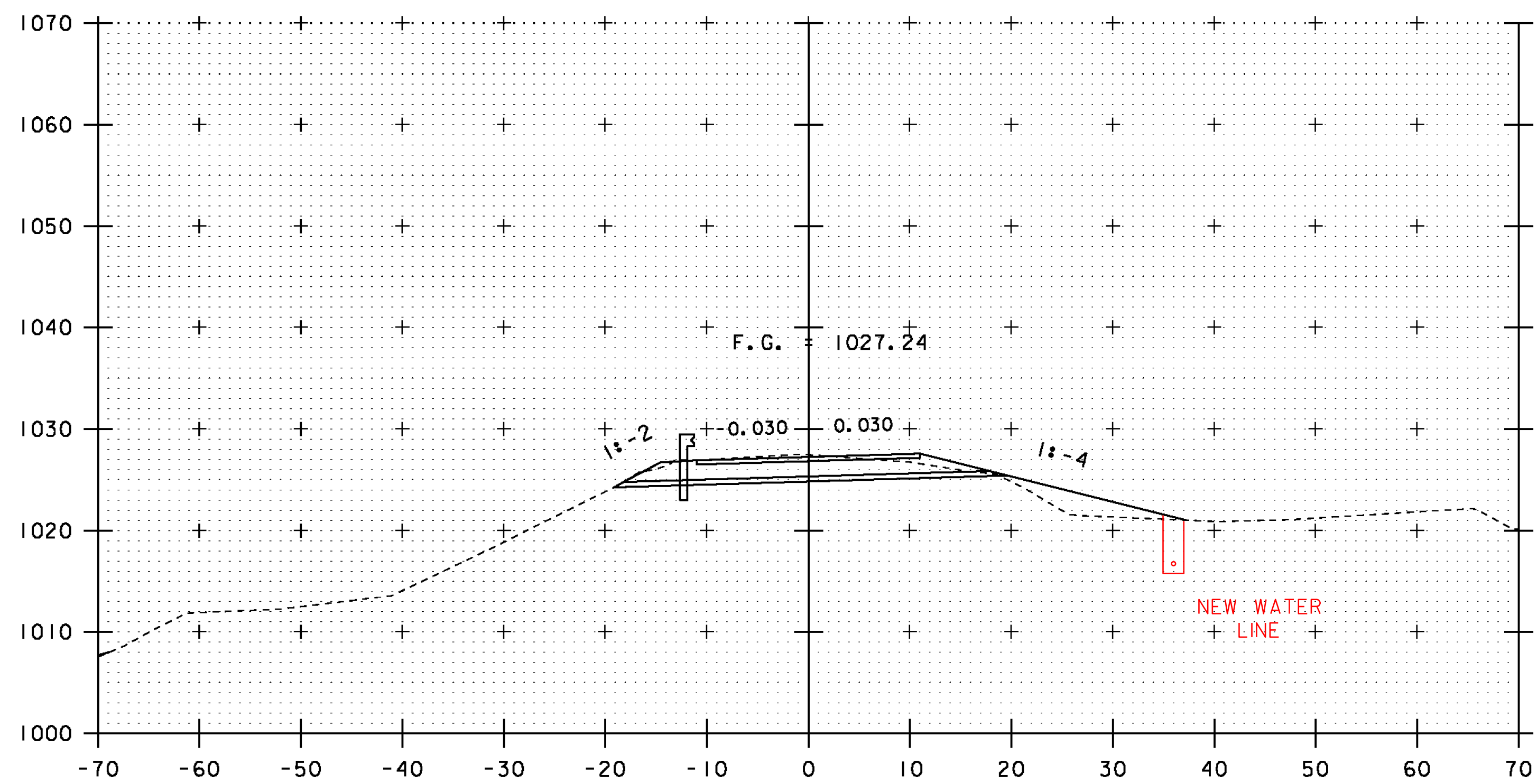


104+00

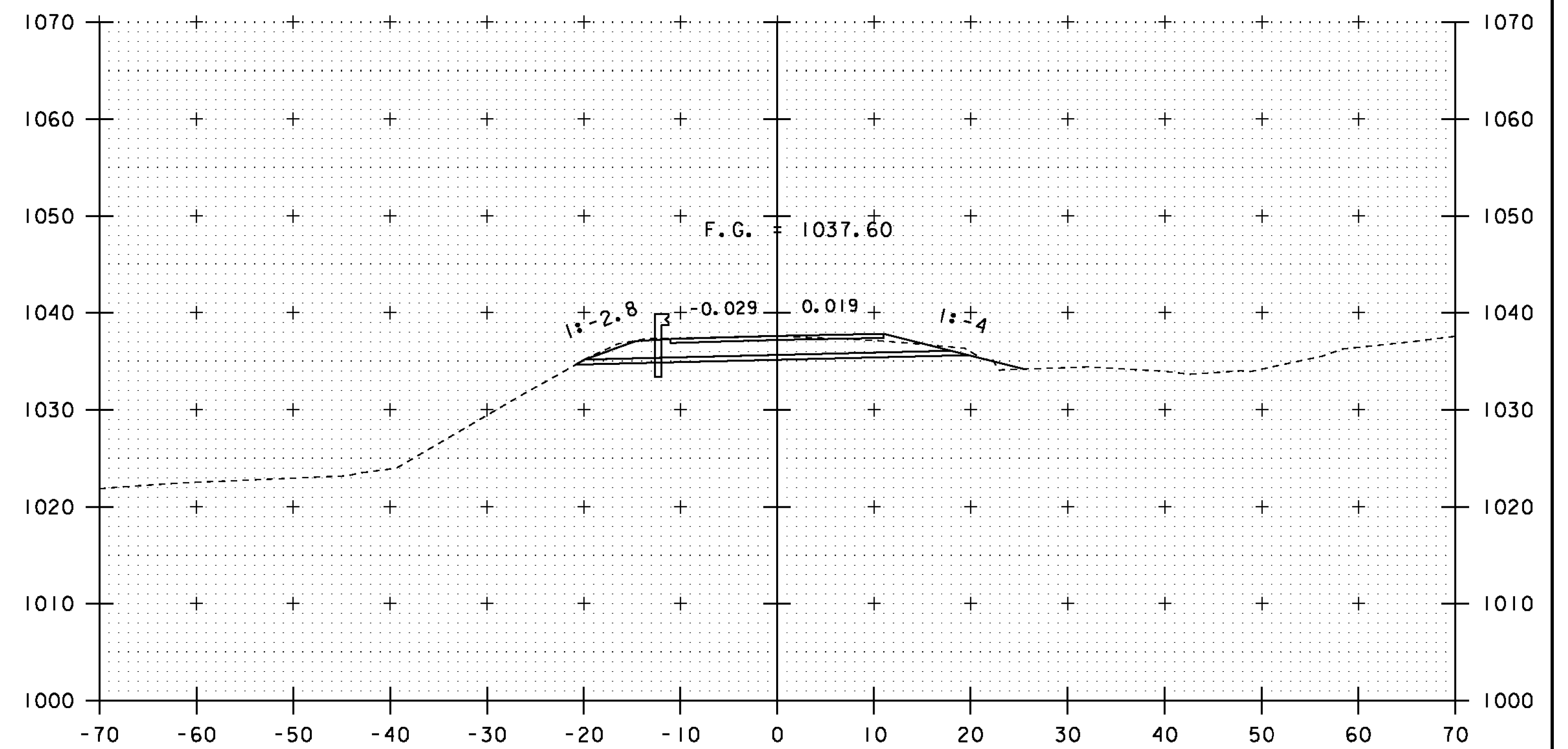


105+00

STA 105+25 BEGIN APPROACH / END PROJECT



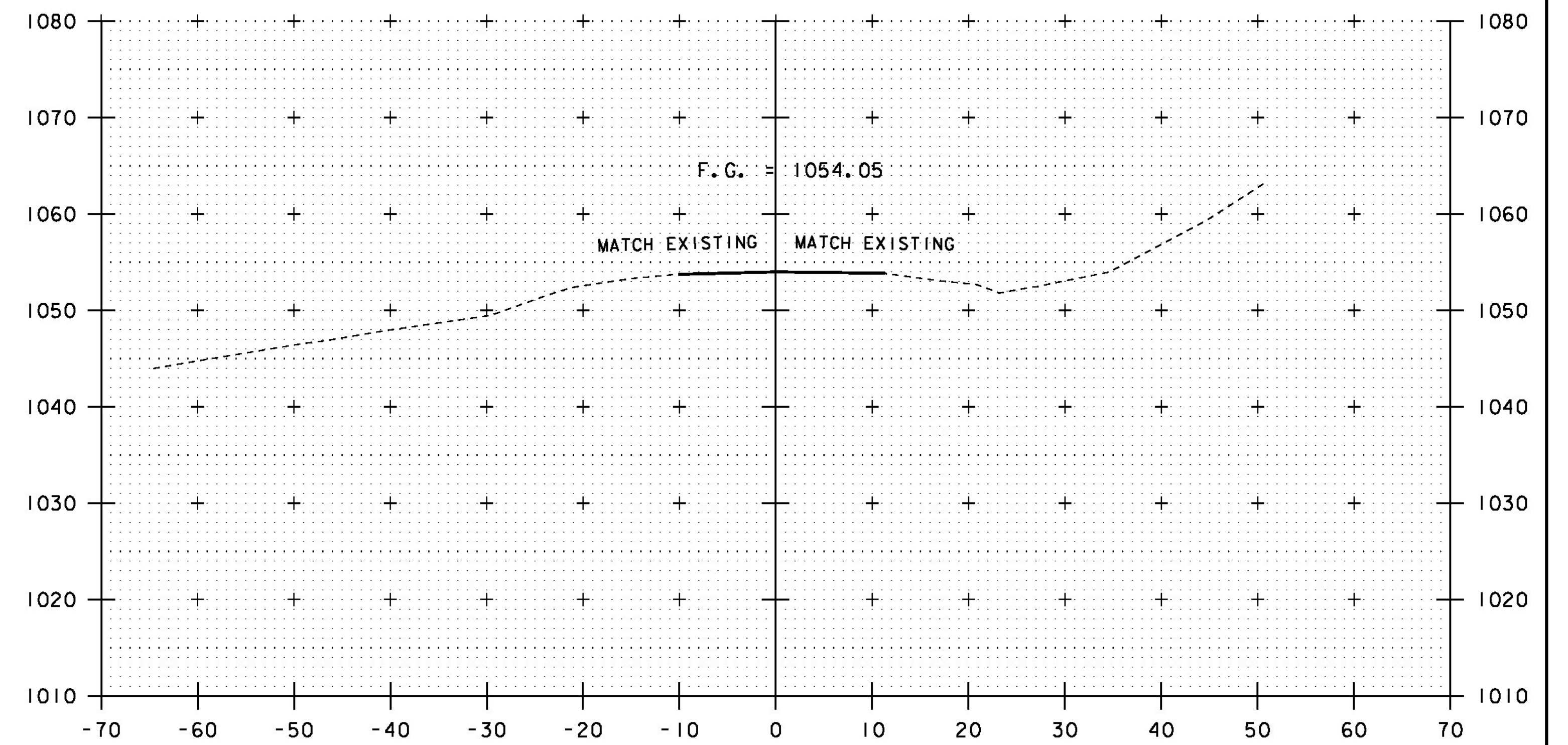
103+50



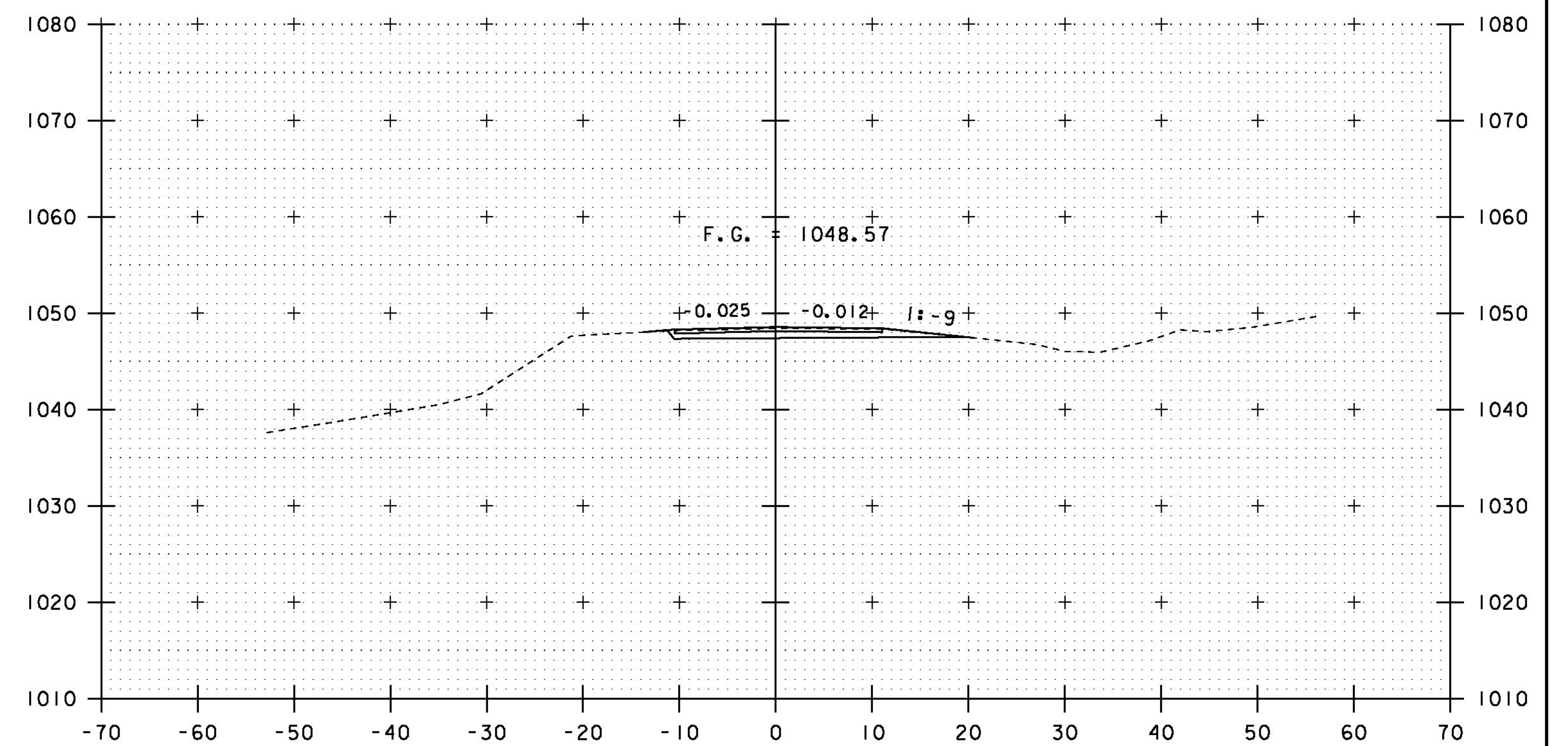
104+50

STA. 103+50 TO STA. 105+00

PROJECT NAME:	SHREWSBURY	PLOT DATE:	12-MAY-2014
PROJECT NUMBER:	STP 1443 (44)	DRAWN BY:	M. LONGSTREET
FILE NAME:	s94j154xs.dgn	DESIGNED BY:	N. VANDENBERG
PROJECT LEADER:	C. CARLSON	CHECKED BY:	J. LACROIX
TH 4 CROSS SECTION SHEET 3		SHEET	23 OF 36



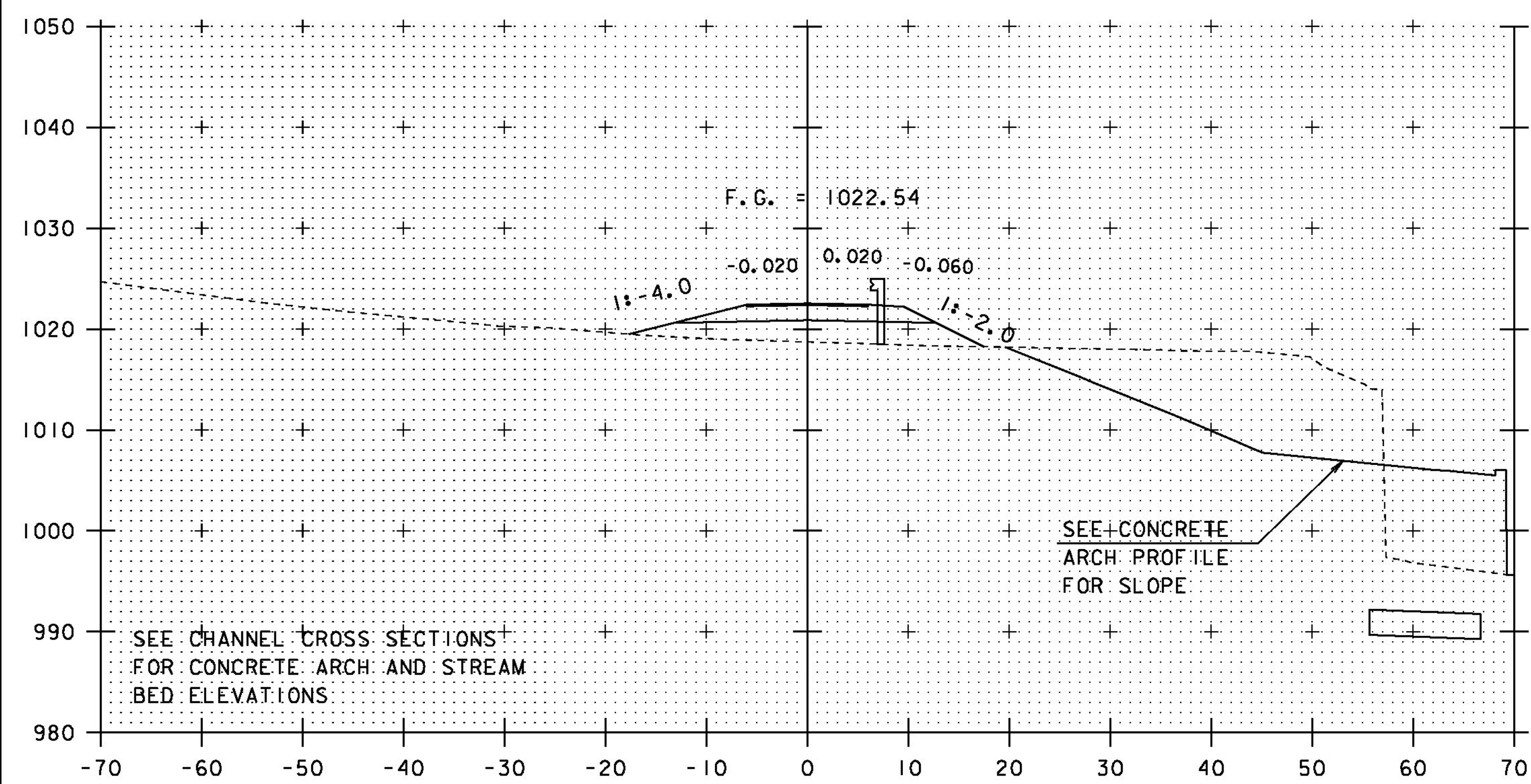
106+00  
STA 106+15 END APPROACH



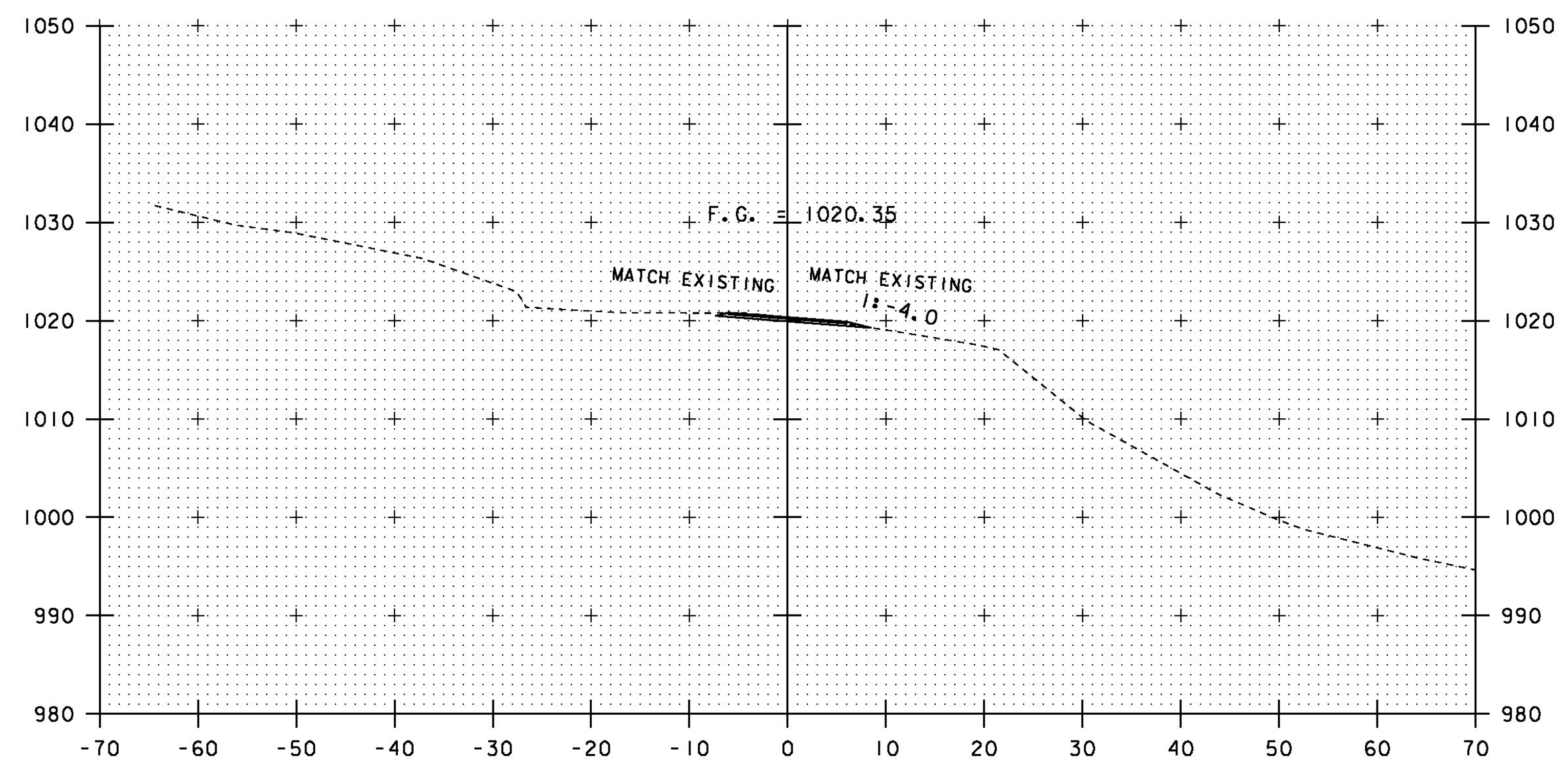
105+50

PROJECT NAME:	SHREWSBURY	FILE NAME:	s94j154xs.dgn	PLOT DATE:	12-MAY-2014
PROJECT NUMBER:	STP 1443 (44)	PROJECT LEADER:	C. CARLSON	DRAWN BY:	M. LONGSTREET
		DESIGNED BY:	N. VANDENBERG	CHECKED BY:	J. LACROIX
			TH 4 CROSS SECTION SHEET 4		SHEET 24 OF 36

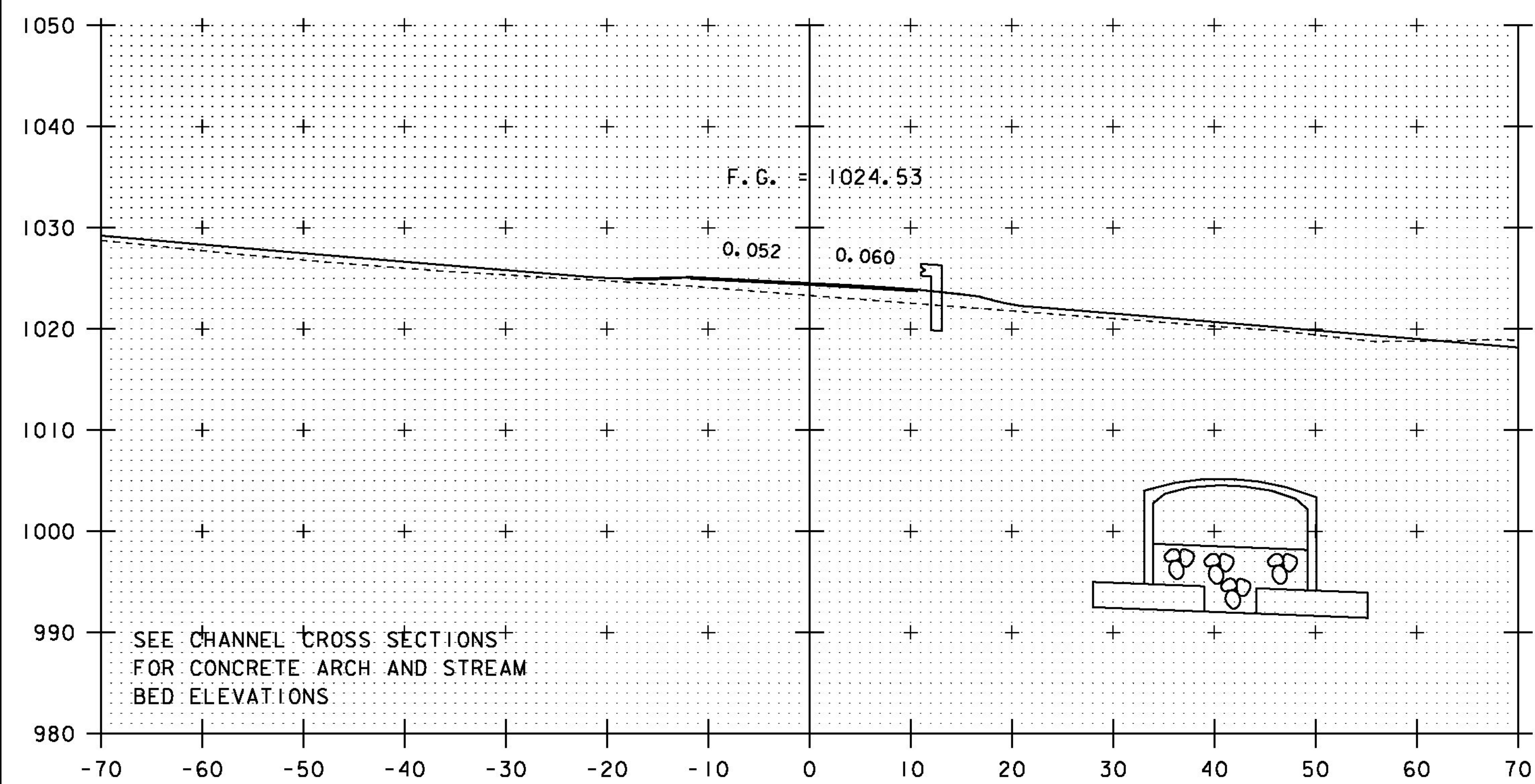
STA. 105+50 TO STA. 106+00



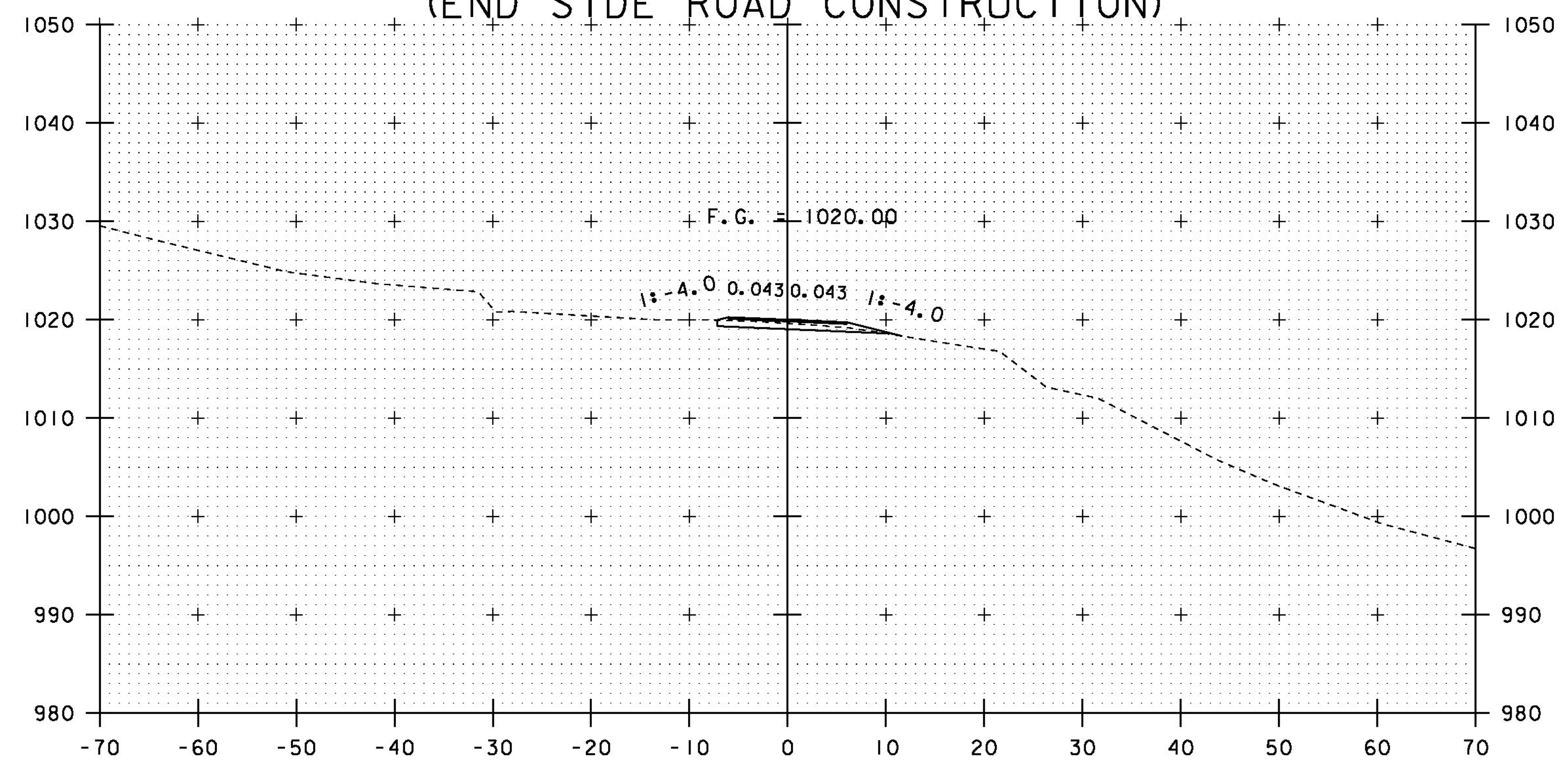
300+50



301+15  
(END SIDE ROAD CONSTRUCTION)



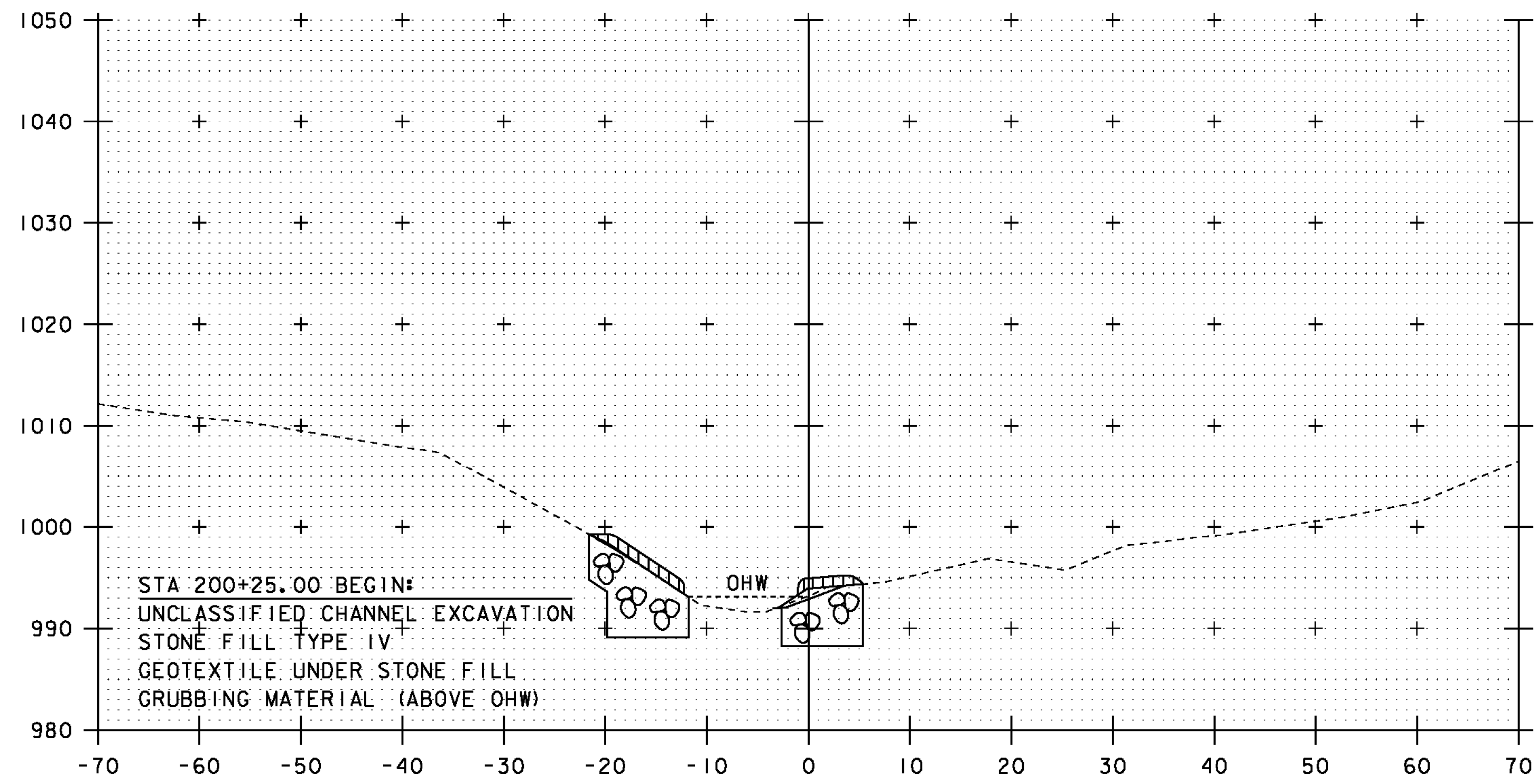
300+15



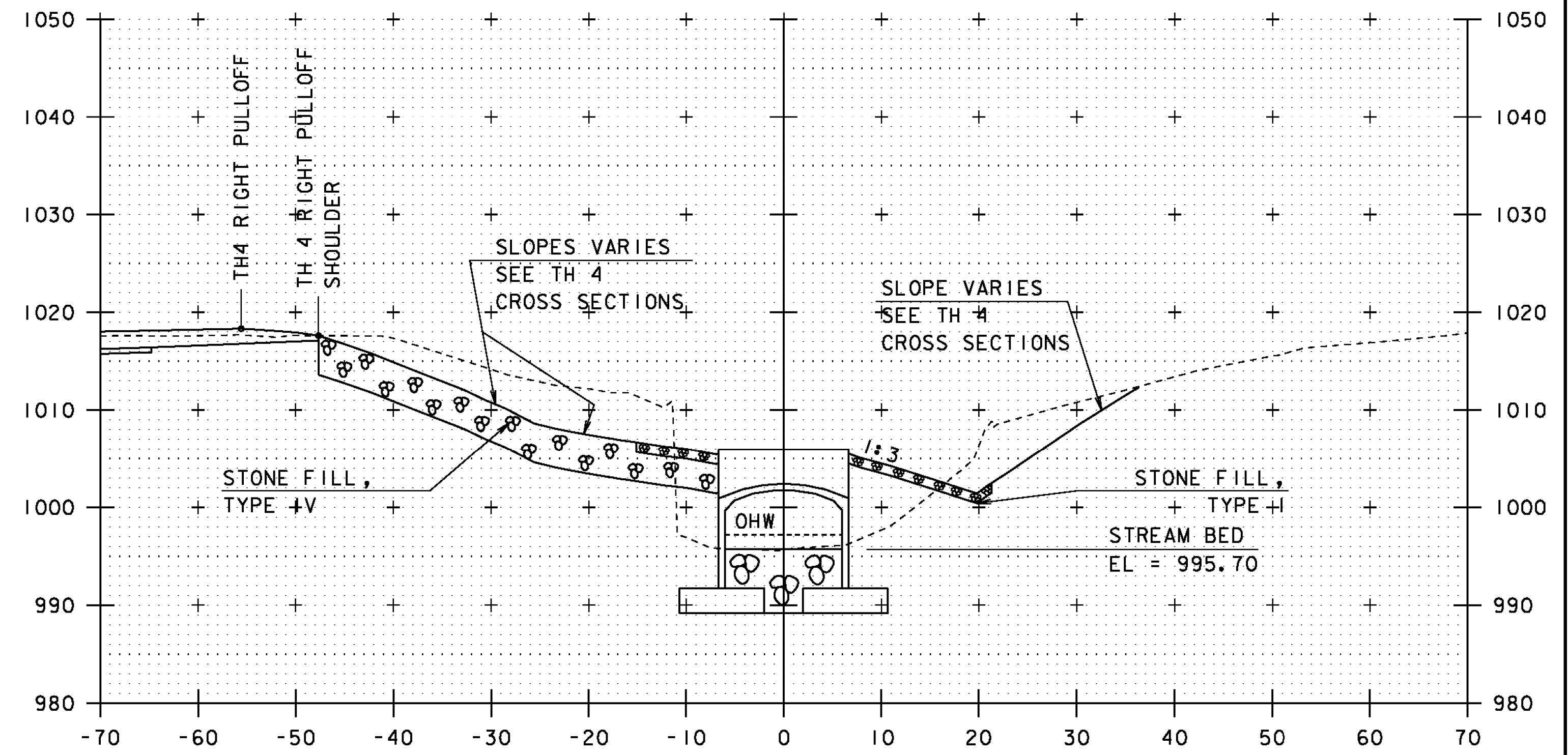
301+00

PROJECT NAME: SHREWSBURY	PLOT DATE: 12-MAY-2014
PROJECT NUMBER: STP 1443 (44)	DRAWN BY: M. LONGSTREET
FILE NAME: s94j154xs.dgn	CHECKED BY: J. LACROIX
PROJECT LEADER: C. CARLSON	SHEET 25 OF 36
DESIGNED BY: N. VANDENBERG	

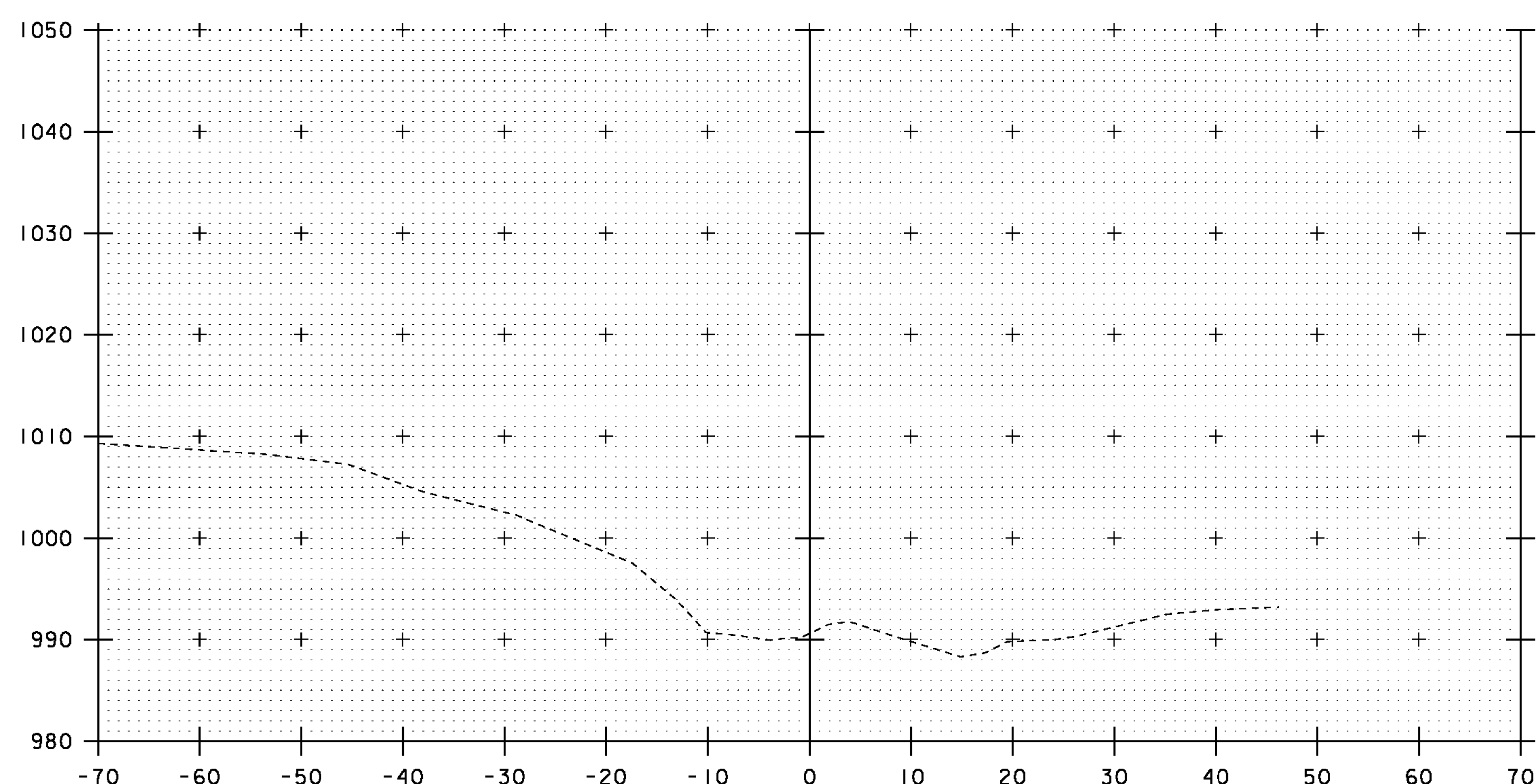
STA. 300+15 TO STA. 301+15



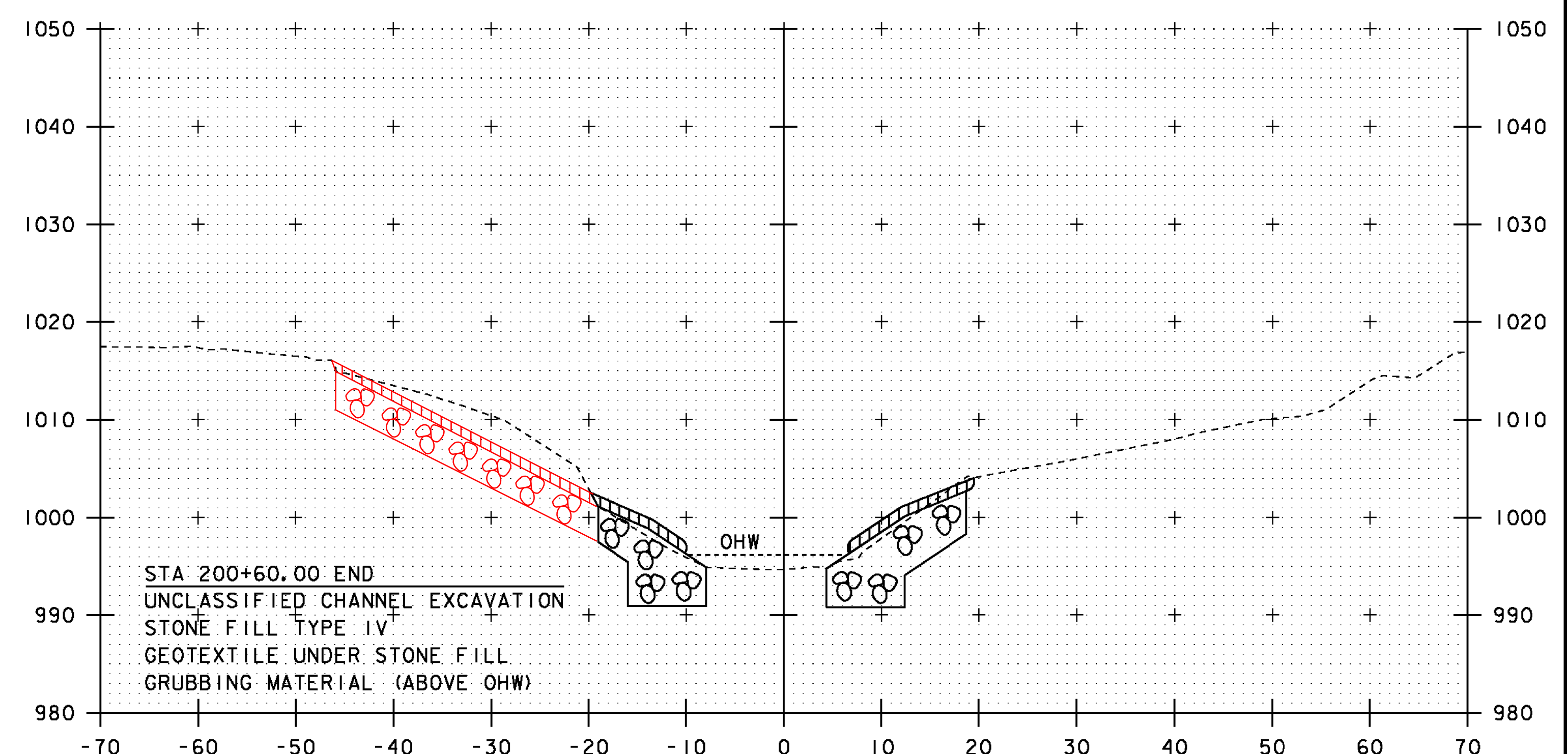
200+25  
BEGIN CHANNEL WORK



200+60.5



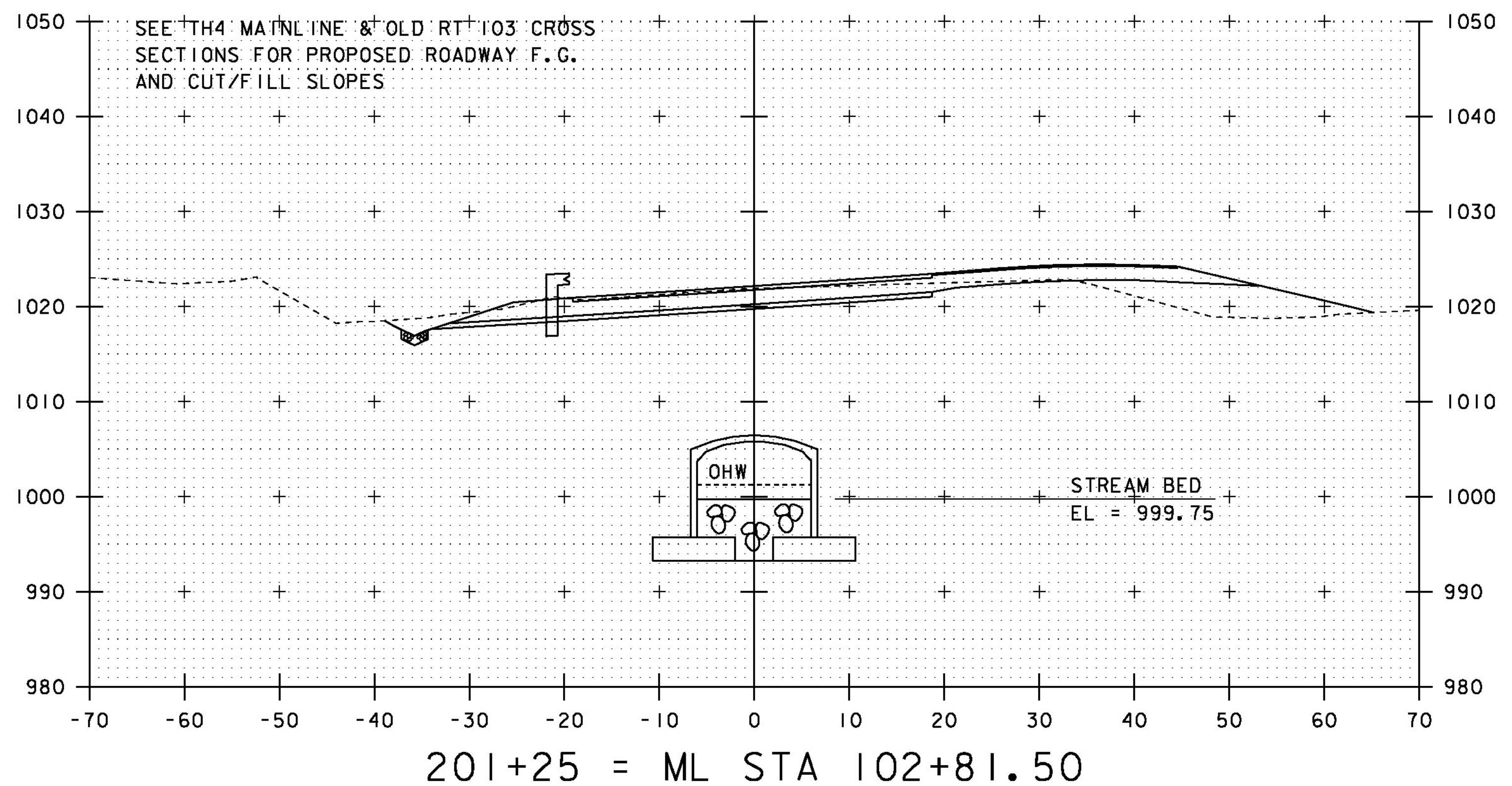
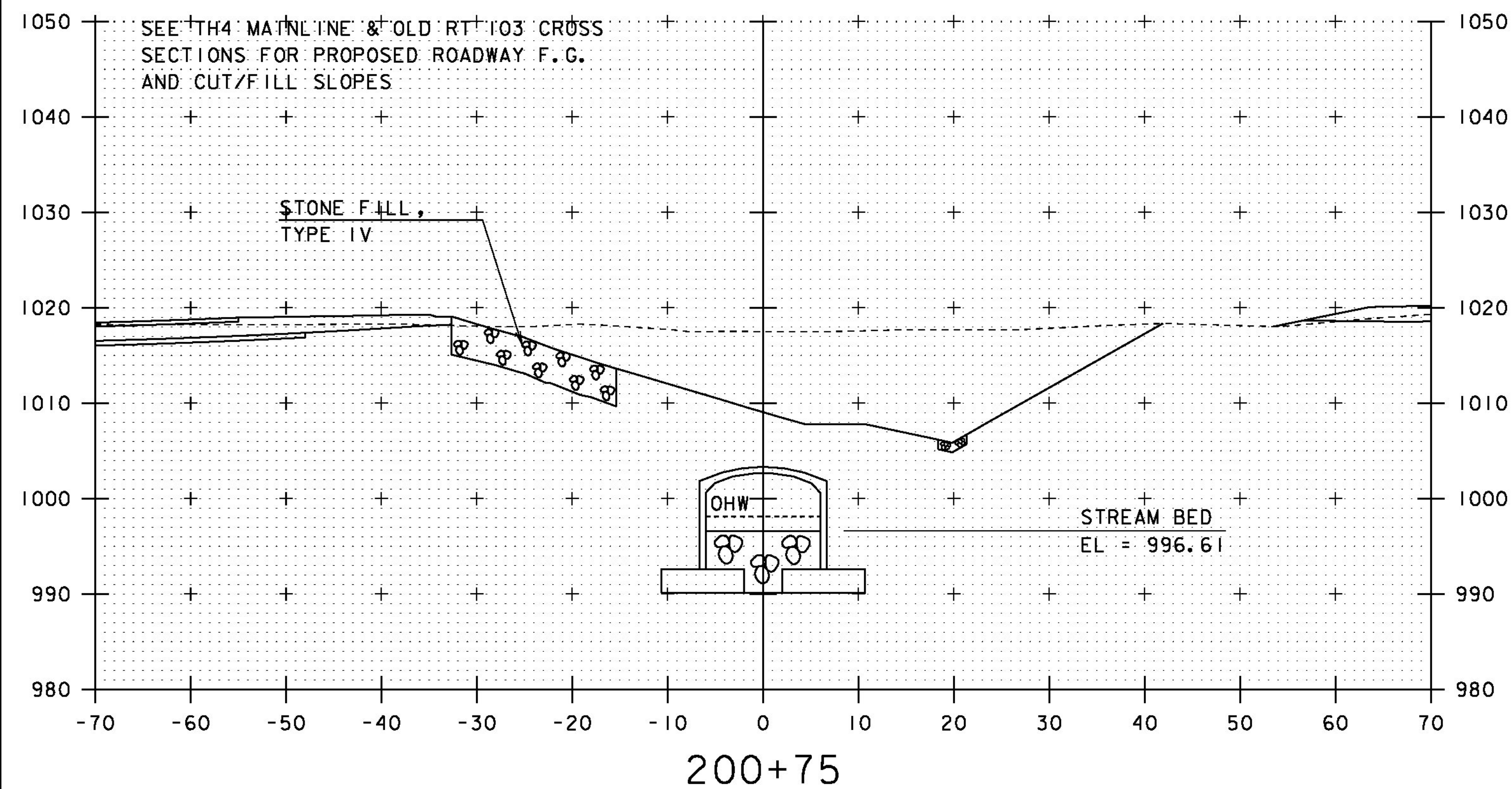
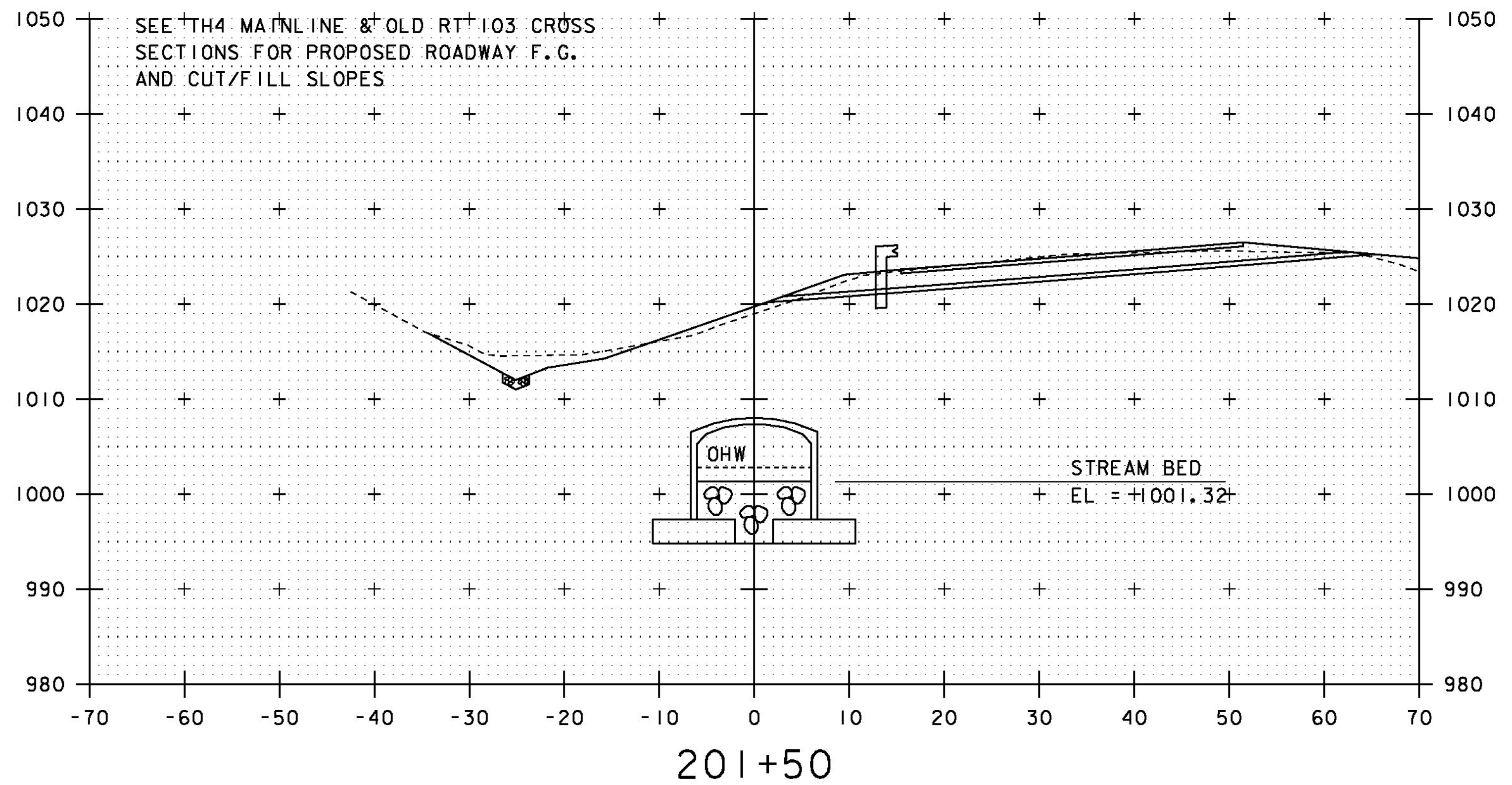
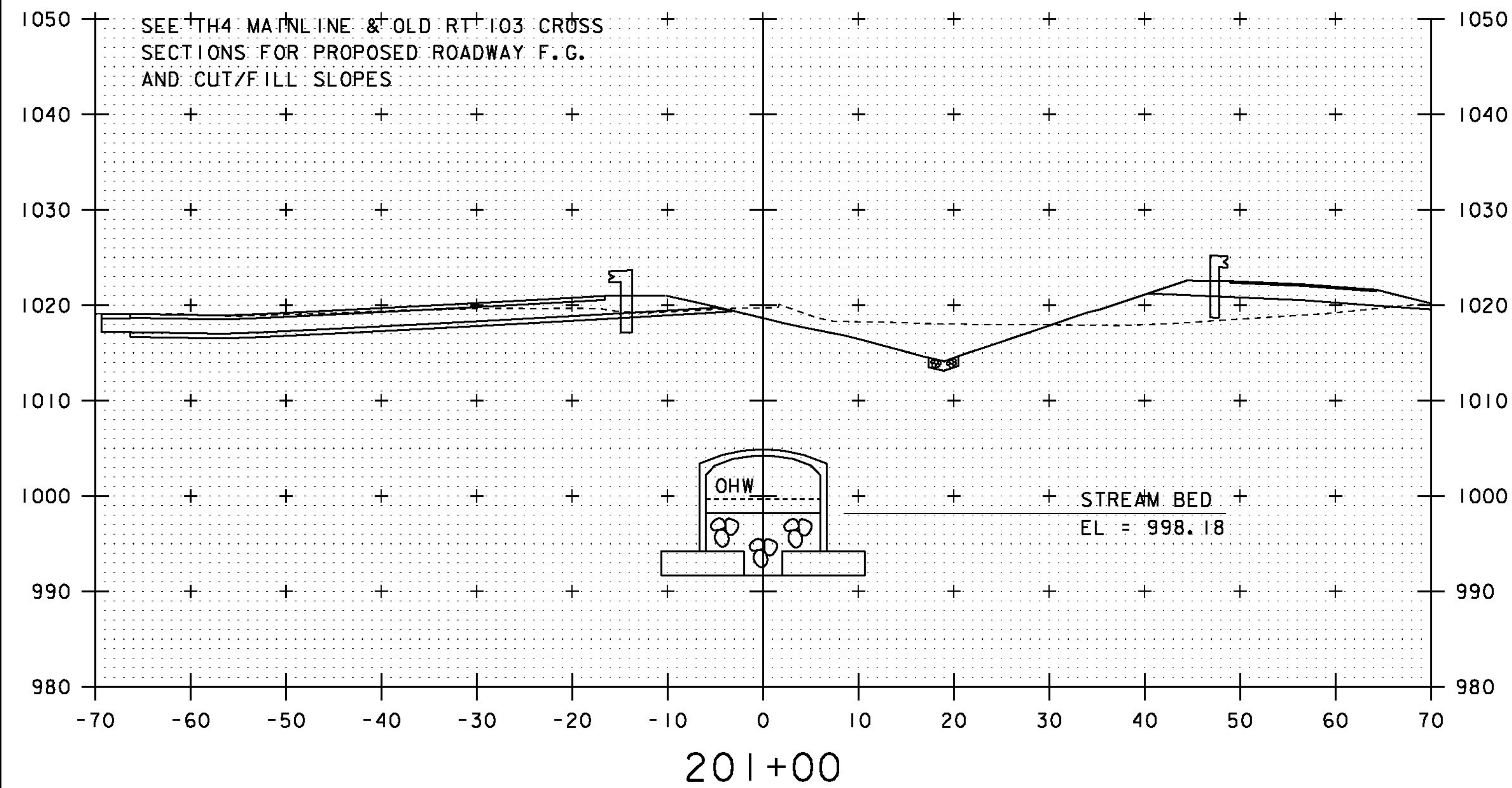
200+00



200+50  
STA 200+60 BEGIN SPECIAL PROVISION  
(STONE FILL, ARCH FLOW LINE)

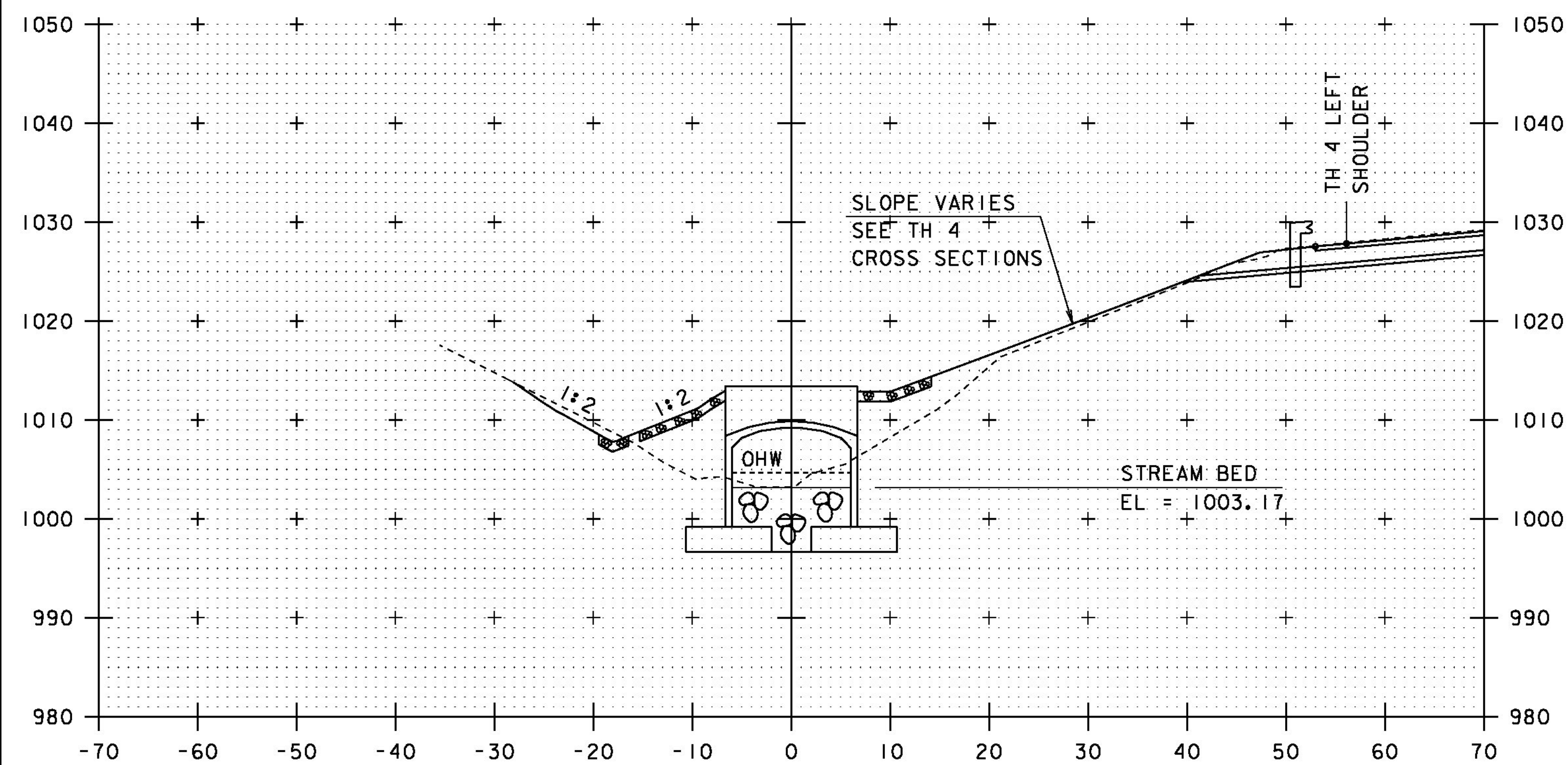
STA. 200+00 TO STA. 200+60.5

PROJECT NAME: SHREWSBURY	
PROJECT NUMBER: STP 1443 (44)	
FILE NAME: s94j154xs.dgn	PLOT DATE: 12-MAY-2014
PROJECT LEADER: C. CARLSON	DRAWN BY: M. LONGSTREET
DESIGNED BY: N. VANDENBERG	CHECKED BY: J. LACROIX
CHANNEL CROSS SECTION SHEET 1	SHEET 26 OF 36

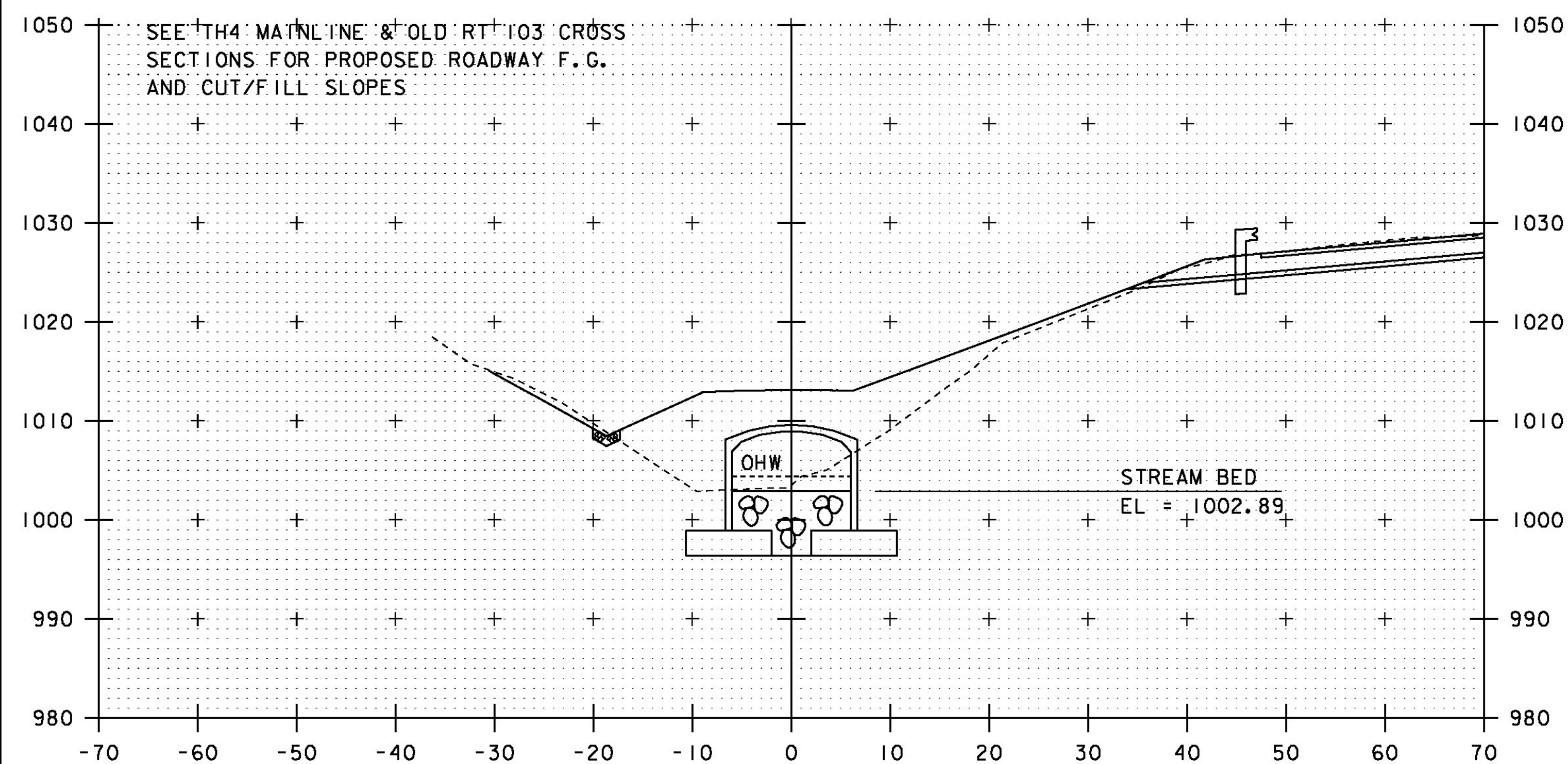


STA. 200+75 TO STA. 201+50

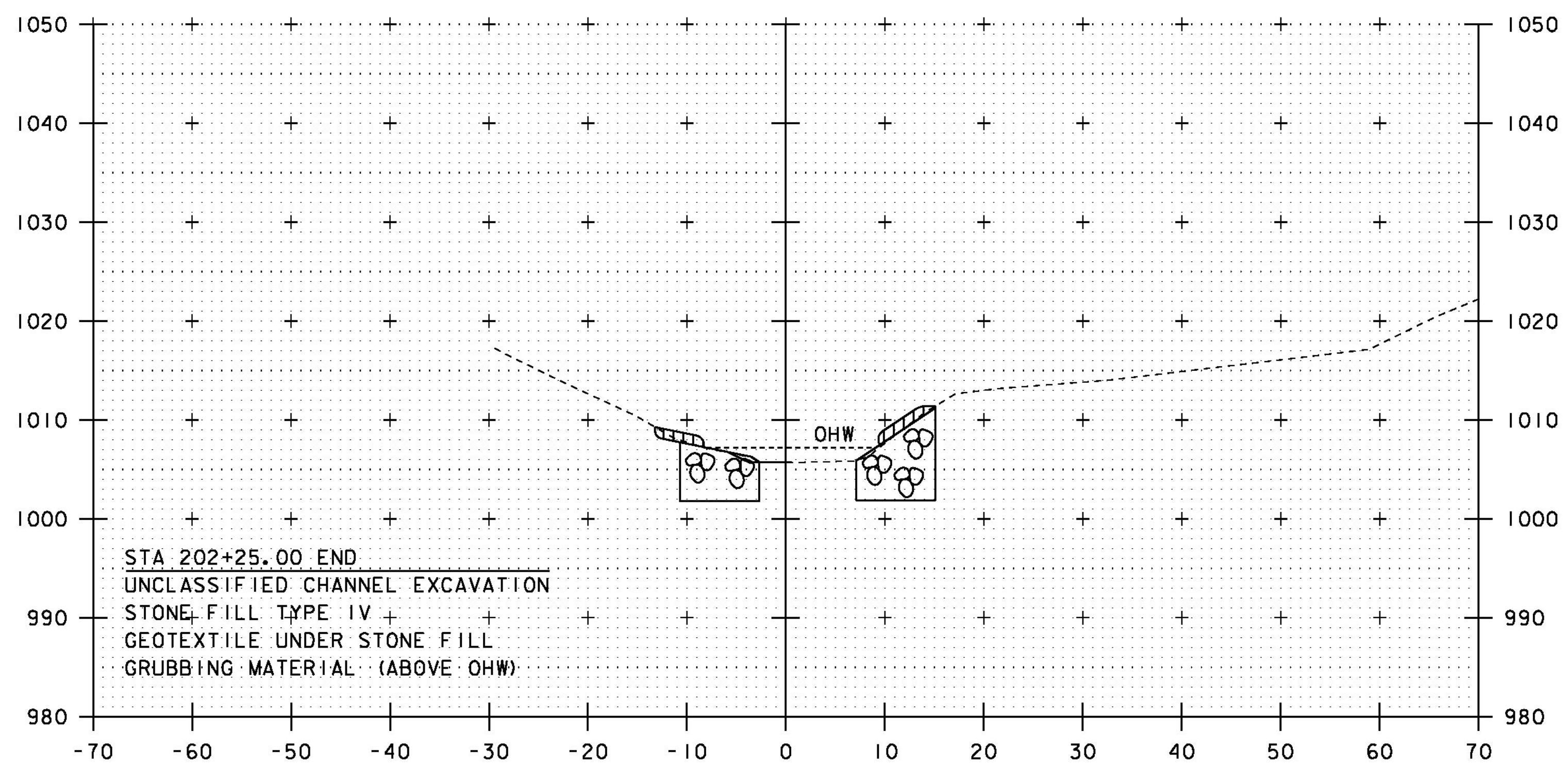
PROJECT NAME: SHREWSBURY	PLOT DATE: 12-MAY-2014
PROJECT NUMBER: STP 1443 (44)	DRAWN BY: M. LONGSTREET
FILE NAME: s94j154xs.dgn	CHECKED BY: J. LACROIX
PROJECT LEADER: C. CARLSON	SHEET 27 OF 36
DESIGNED BY: N. VANDENBERG	
CHANNEL CROSS SECTION SHEET 2	



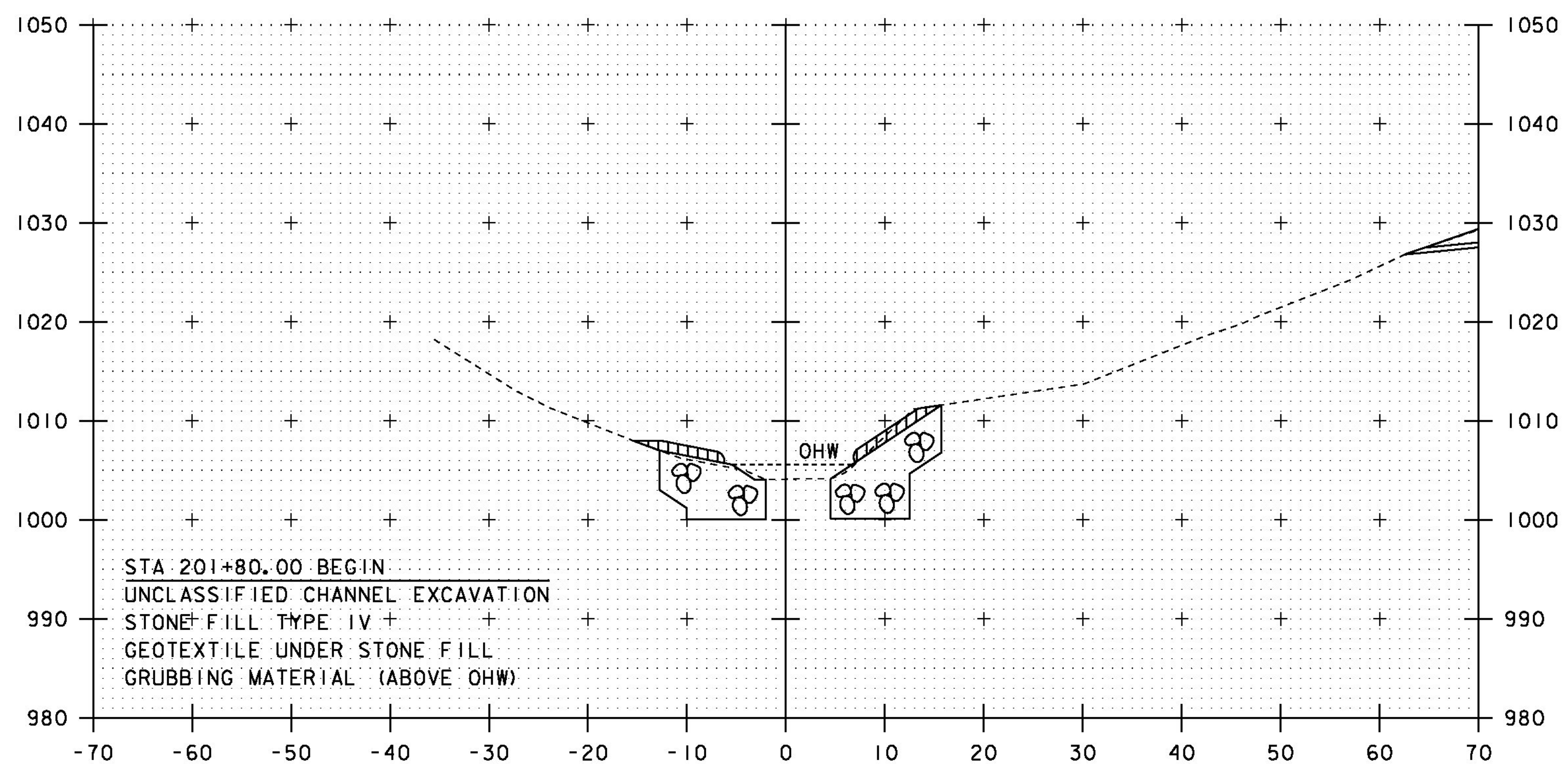
201+79.5



201+75



202+25  
END CHANNEL WORK



STA 201+80 END SPECIAL PROVISION  
(STONE FILL, ARCH FLOW LINE)

202+00

STA. 201+75 TO STA. 202+25

PROJECT NAME: SHREWSBURY  
PROJECT NUMBER: STP 1443 (44)

FILE NAME: s94j154xs.dgn  
PROJECT LEADER: C. CARLSON  
DESIGNED BY: N. VANDENBERG  
CHANNEL CROSS SECTION SHEET 3

PLOT DATE: 12-MAY-2014  
DRAWN BY: M. LONGSTREET  
CHECKED BY: J. LACROIX  
SHEET 28 OF 36

## EPSC PLAN NARRATIVE

### 1.1 PROJECT DESCRIPTION

THIS PROJECT INVOLVES THE REMOVAL OF CULVERT AND CONCRETE ARCH BR37 AND ITS HEADWALLS. THE CULVERT AND CONCRETE ARCH WILL BE REPLACED WITH A PRECAST ARCH WITH A 6 FOOT RISE, SPANNING 12 FEET OVER A BRANCH OF THE MILL RIVER, ON NEW FOOTINGS ALONG THE SAME ALIGNMENT. BR37 IS LOCATED IN THE TOWN OF SHREWSBURY, ON TH 4, APPROXIMATELY 0.25 MILES EASTERLY OF THE INTERSECTION OF TH 4 AND VT ROUTE 103. THE LENGTH OF THE CULVERT WILL BE INCREASED TO 120 FEET.

NOTE: AREA OF DISTURBANCE INCLUDES LIMITS OF EARTH DISTURBANCE WITHIN THE PROJECT LIMITS AS SHOWN ON THE ATTACHED EPSC PLAN, EXCLUDING ANY WASTE, BORROW OR STAGING AREAS.

TOTAL AREA OF DISTURBANCE AS SHOWN ON THE ATTACHED EPSC PLAN IS APPROXIMATELY 1.328 ACRES.

IT IS ANTICIPATED THAT THIS PROJECT WILL LAST ONE CONSTRUCTION SEASON.

### 1.2 SITE INVENTORY

#### 1.2.1 TOPOGRAPHY

THE TOPOGRAPHY OF THE AREA CAN BE DESCRIBED AS HILLY TO MOUNTAINOUS, MOSTLY FORESTED WITH SOME OPEN AREAS. LINCOLN HILL RD (TH 4), THE OLD VT ROUTE 103, AND A GRAVEL DRIVEWAY ARE WITHIN THE PROJECT SITE. THERE IS A RESIDENCE ON THE WEST SIDE OF THE PROJECT WITH A HOUSE ON THE NORTH SIDE OF THE ROAD AND A BARN ON THE SOUTHERN SIDE OF THE ROAD.

#### 1.2.2 DRAINAGE, WATERWAYS, BODIES OF WATER, AND PROXIMITY TO NATURAL OR MAN-MADE WATER FEATURES

A BRANCH OF THE MILL RIVER IS THE ONLY WATER SOURCE ON THE PROJECT SITE. THE BROOK IS CLASSIFIED AS PERENNIAL, STEEP, SINUOUS, NARROW, WITH A CONFINED AND ARMORED CHANNEL AT THE SITE. THE STREAM BED CONSISTS OF GRAVEL, COBBLES AND BOULDERS. THE TRIBUTARY AREA AT THE CULVERT CROSSING IS 1.2 SQ. MI. DUE TO THE NATURE OF THE SURROUNDING TERRAIN THE PROJECT SITE COULD RECEIVE RUNOFF WATER FROM A FEW NEARBY SLOPES.

#### 1.2.3 VEGETATION

THE VEGETATION IN THE PROJECT AREA CONSISTS OF HARDWOOD TREES AND UNDERGROWTH. THE IMPACT TO VEGETATION WILL BE LIMITED TO THAT WHICH IS DIRECTLY AFFECTED BY REPLACEMENT OF THE EXISTING CULVERT AND ARCH. UPON PROJECT COMPLETION, THE CHANNEL WILL BE ARMORED WITH STONE FILL TYPE IV AS SPECIFIED ON THE PLANS. DISTURBED VEGETATION WILL BE REESTABLISHED WITH STANDARD SEED AND MULCH PRACTICES.

#### 1.2.4 SOILS

ALL SOIL DATA CAME FROM THE U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE FOR THE COUNTY OF RUTLAND, VERMONT. SOILS ON THE PROJECT SITE ARE BERKSHIRE GRAVELLY FINE SANDY LOAM, 8% TO 15% SLOPES, K-FACTOR = 0.24; PAXTON FINE SANDY LOAM, 15% TO 25% SLOPES, K-FACTOR = 0.24; AND SUNAPEE FINE SANDY LOAM, VERY STONY, 15%-35% SLOPES, K-FACTOR = 0.28.

NOTE: K-VALUES GENERALLY INDICATE THE FOLLOWING:

0.0-0.23 = LOW EROSION POTENTIAL

0.24-0.36 = MODERATE EROSION POTENTIAL

0.37 AND HIGHER = HIGH EROSION POTENTIAL

#### 1.2.5 SENSITIVE RESOURCE AREAS

CRITICAL HABITATS: NO

HISTORICAL OR ARCHEOLOGICAL AREAS: HISTORICAL HOUSE, BARN AND SHED, ARCHEOLOGICALLY

SENSITIVE AREAS ON THE NORTHWEST SECTION ON THE PROJECT.

PRIME AGRICULTURAL LAND: NO

THREATENED AND ENDANGERED SPECIES: NO

WATER RESOURCE: BRANCH OF THE MILL RIVER.

WETLANDS: NO

### 1.3 RISK EVALUATION

THIS PROJECT FALLS UNDER THE JURISDICTION OF GENERAL PERMIT 3-9020 FOR STORMWATER RUNOFF FROM CONSTRUCTION SITES FOR LOW RISK PROJECTS. ANY MODIFICATIONS TO THE PROJECT THAT INCREASE THE RISK TO ENVIRONMENTAL RESOURCES SHALL BE EVALUATED IN ACCORDANCE WITH THE PERMIT REQUIREMENTS. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY ADDITIONAL PERMITTING.

### 1.4 EROSION PREVENTION AND SEDIMENT CONTROL

THE EROSION CONTROL PLANS ARE MEANT AS A GUIDELINE FOR PREVENTING EROSION AND CONTROLLING SEDIMENT TRANSPORT. THE PRINCIPLES OUTLINED IN THIS NARRATIVE CONSIST OF APPLYING MEASURES THROUGHOUT CONSTRUCTION OF THE PROJECT IN ORDER TO MINIMIZE SEDIMENT TRANSPORT TO THE RECEIVING WATERS. THE MEASURES INCLUDE STABILIZATION AND STRUCTURAL PRACTICES, STORM WATER CONTROLS AND OTHER POLLUTION PREVENTION PRACTICES. THEY HAVE BEEN PROPOSED BY THE DESIGNER AS A BASIS FOR PROTECTING RESOURCES AND WILL NEED TO BE BUILT UPON BASED ON THE SPECIFIC MEANS AND METHODS OF THE CONTRACTOR. REFER TO THE LOW RISK SITE HANDBOOK AND APPROPRIATE DETAIL SHEETS FOR SPECIFIC GUIDANCE AND CONSTRUCTION DETAILING.

ALL MEASURES SHALL BE REGULARLY MAINTAINED AND SHALL BE CHECKED FOR SEDIMENT BUILD-UP. SEDIMENT SHALL BE DISPOSED OF AT AN APPROVED SITE WHERE IT WILL NOT BE SUBJECT TO EROSION.

#### 1.4.1 MARK SITE BOUNDARIES

SITE BOUNDARIES AND AREAS CONSTRUCTION EQUIPMENT CAN ACCESS SHALL BE DELINEATED.

PROJECT DEMARCATION FENCING (PDF) SHALL BE USED TO PHYSICALLY MARK SITE BOUNDARIES. BECAUSE THIS PROJECT FALLS UNDER THE CGP 3-9020, BARRIER FENCE SHALL BE USED INSTEAD OF PROJECT DEMARCATION FENCE WITHIN 100 FEET OF A WATER RESOURCE (STREAM, BROOK, LAKE, POND, WETLAND, ETC).

#### 1.4.2 LIMIT DISTURBANCE AREA

PREVENTING INITIAL SOIL EROSION BY MINIMIZING THE EXPOSED AREA IS MUCH MORE EFFECTIVE THAN TREATING ERODED SEDIMENT. EARTH DISTURBANCE CAN BE MINIMIZED THROUGH CONSTRUCTION PHASING BY ONLY OPENING UP EARTH AS NECESSARY. THIS CAN LIMIT THE AREA THAT WILL BE DISTURBED AND EXPOSED TO EROSION. EMPLOY TEMPORARY CONSTRUCTION STABILIZATION PRACTICES IN INCREMENTAL STAGES AS PHASES CHANGE. FOR PROJECTS WHICH FALL UNDER THE CONSTRUCTION GENERAL PERMIT, ONLY THE ACREAGE LISTED ON THE PERMIT AUTHORIZATION MAY BE EXPOSED AT ANY GIVEN TIME.

MAINTAINING VEGETATED BUFFERS ALONG STREAM BANKS, WETLANDS OR OTHER SENSITIVE AREAS IS A CRUCIAL EROSION AND SEDIMENT CONTROL MEASURE THAT SHOULD BE ESTABLISHED WHEREVER POSSIBLE.

#### 1.4.3 SITE ENTRANCE/EXIT STABILIZATION

TRACKING OF SEDIMENT ONTO PUBLIC HIGHWAYS SHALL BE MINIMIZED TO REDUCE THE POTENTIAL FOR RUNOFF ENTERING RECEIVING WATERS. INSTALLATION SHALL COINCIDE WITH THE CONTRACTOR'S PROGRESS SCHEDULE.

STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AS NEEDED ANYWHERE EQUIPMENT WILL BE GOING FROM AREAS OF EXPOSED SOILS TO PAVED SURFACES.

#### 1.4.4 INSTALL SEDIMENT BARRIERS

SEDIMENT BARRIERS SHALL BE UTILIZED TO INTERCEPT RUNOFF AND ALLOW SUSPENDED SEDIMENT TO SETTLE OUT. THEY SHALL BE INSTALLED PRIOR TO ANY UP SLOPE WORK.

SILT FENCE WILL BE INSTALLED AS PROPOSED ON THE EPSC PLAN. BECAUSE THIS PROJECT FALLS UNDER THE CGP 3-9020, WOVEN WIRE REINFORCED SILT FENCE SHALL BE USED INSTEAD OF SILT FENCE WITHIN 100 FEET UPSLOPE OF RECEIVING WATERS.

#### 1.4.5 DIVERT UPLAND RUNOFF

DIVERSIONARY MEASURES SHALL BE USED TO INTERCEPT RUNOFF FROM ABOVE THE CONSTRUCTION AND DIRECT IT AROUND THE DISTURBED AREA SO THAT CLEAN WATER DOES NOT BECOME MUDDIED WHILE TRAVELING OVER EXPOSED SOILS ON THE CONSTRUCTION SITE.

THE STEEP SLOPES OF THE PROJECT MAY REQUIRE DIVERSIONARY MEASURES TO BE INSTALLED ON THE EASTERN END OF THE PROJECT.

#### 1.4.6 SLOW DOWN CHANNELIZED RUNOFF

CHECK STRUCTURES SHALL BE UTILIZED TO REDUCE THE VELOCITY, AND THUS THE EROSION POTENTIAL, OF CONCENTRATED FLOW IN CHANNELS.

STONE CHECK DAMS WILL BE INSTALLED AS PROPOSED ON THE EPSC PLAN, AT A MINIMUM.

#### 1.4.7 CONSTRUCT PERMANENT CONTROLS

PERMANENT STORMWATER TREATMENT DEVICES SHALL BE INSTALLED AS SHOWN ON THE PLANS AND IN ACCORDANCE WITH PERMIT CONDITIONS.

#### 1.4.8 STABILIZE EXPOSED SOILS DURING CONSTRUCTION

ALL AREAS OF DISTURBANCE MUST HAVE TEMPORARY STABILIZATION IN PLACE WITHIN 48 HOURS OF DISTURBANCE OR IN ACCORDANCE WITH THE CONSTRUCTION GENERAL PERMIT 3-9020 AUTHORIZATION.

SURFACE ROUGHENING OF ALL EXPOSED SLOPES, COMBINED WITH TEMPORARY MULCHING, SHALL BE UTILIZED ON A REGULAR BASIS. BIODEGRADABLE EROSION CONTROL MATTING OR AN EQUIVALENT SHALL BE USED TO STABILIZE ALL SLOPES STEEPER THAN 1:3.

THE FORECAST OF RAINFALL EVENTS SHALL TRIGGER IMMEDIATE PROTECTION OF EXPOSED SOILS.

#### 1.4.9 WINTER STABILIZATION

VARIOUS MEASURES SPECIFIC TO WINTER MAY BE NECESSARY SHOULD THE PROJECT EXTEND INTO WINTER (OCTOBER 15 THROUGH APRIL 15). REFER TO THE LOW RISK SITE HANDBOOK FOR GUIDANCE.

#### 1.4.10 STABILIZE SOIL AT FINAL GRADE

EXPOSED SOIL MUST BE STABILIZED WITHIN 48 HOURS OF REACHING FINAL GRADE.

SEED, MULCH, FERTILIZER AND LIME SHALL BE USED TO ESTABLISH PERMANENT VEGETATION. FOR SLOPES STEEPER THAN 1:3, BIODEGRADABLE EROSION CONTROL MATTING OR AN EQUIVALENT SHALL BE USED INSTEAD OF MULCH.

#### 1.4.11 DE-WATERING ACTIVITIES

DISCHARGE FROM DEWATERING ACTIVITIES THAT FLOWS OFF OF THE CONSTRUCTION SITE MUST NOT CAUSE OR CONTRIBUTE TO A VIOLATION OF THE VERMONT WATER QUALITY STANDARDS.

TREATMENT OF DEWATERING AREA IS ANTICIPATED. A LOCATION FOR TREATMENT HAS BEEN PROPOSED AND IS SHOWN ON THE PLANS. HOWEVER THE SPECIFIC MEANS FOR TREATMENT OF DISCHARGE SHALL BE PROVIDED BY THE CONTRACTOR.

#### 1.4.12 INSPECT YOUR SITE

INSPECT THE PROJECT SITE BASED ON SPECIAL PROVISION REQUIREMENTS OR CONSTRUCTION GENERAL PERMIT AUTHORIZATION STIPULATIONS.

### 1.5 SEQUENCE AND STAGING

THIS SECTION WILL BE DEVELOPED BY THE CONTRACTOR USING THE GUIDANCE OUTLINED IN THE VTRANS EPSC PLAN CONTRACTOR CHECKLIST.

#### 1.5.1 CONSTRUCTION SEQUENCE

#### 1.5.2 OFF-SITE ACTIVITIES

IN ADDITION TO THE CONTRACTOR CHECKLIST ANY ACTIVITIES OUTSIDE THE CONSTRUCTION LIMITS SHALL FOLLOW SUBSECTION 105.25- 105.29 OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION.

PROJECT NAME: SHREWSBURY  
PROJECT NUMBER: STP 1443 (44)

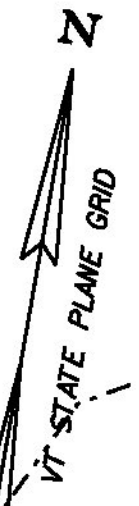
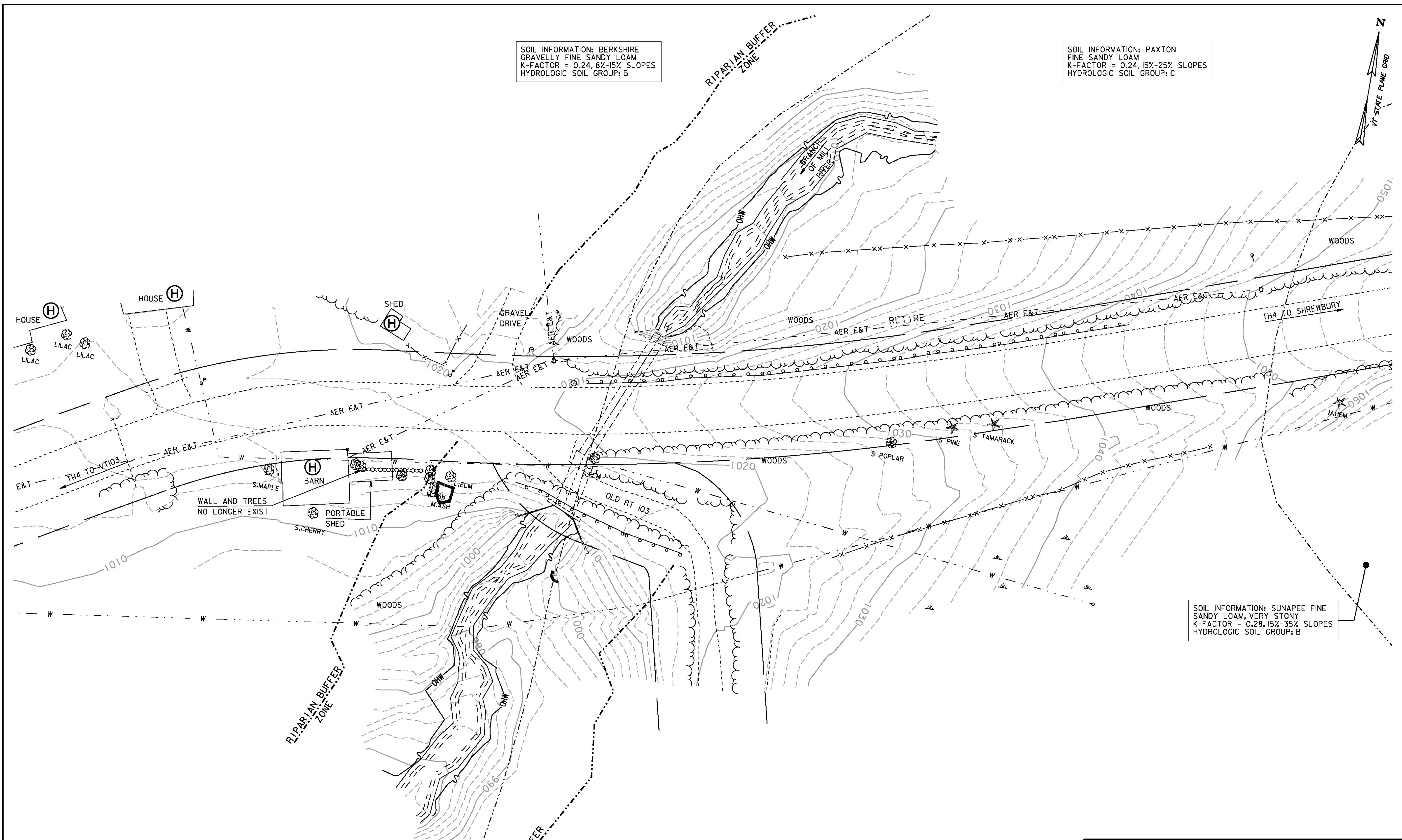
FILE NAME: s94j154erodt1s.dgn  
PROJECT LEADER: C. CARLSON  
DESIGNED BY: N. VANDENBERG  
EPSC NARRATIVE SHEET

PLOT DATE: 19-AUG-2014  
DRAWN BY: M. LONGSTREET  
CHECKED BY: J. LACROIX  
SHEET 29 OF 36

SOIL INFORMATION: BERKSHIRE  
GRAVELLY FINE SANDY LOAM  
K-FACTOR = 0.24, 8%-15% SLOPES  
HYDROLOGIC SOIL GROUP: B

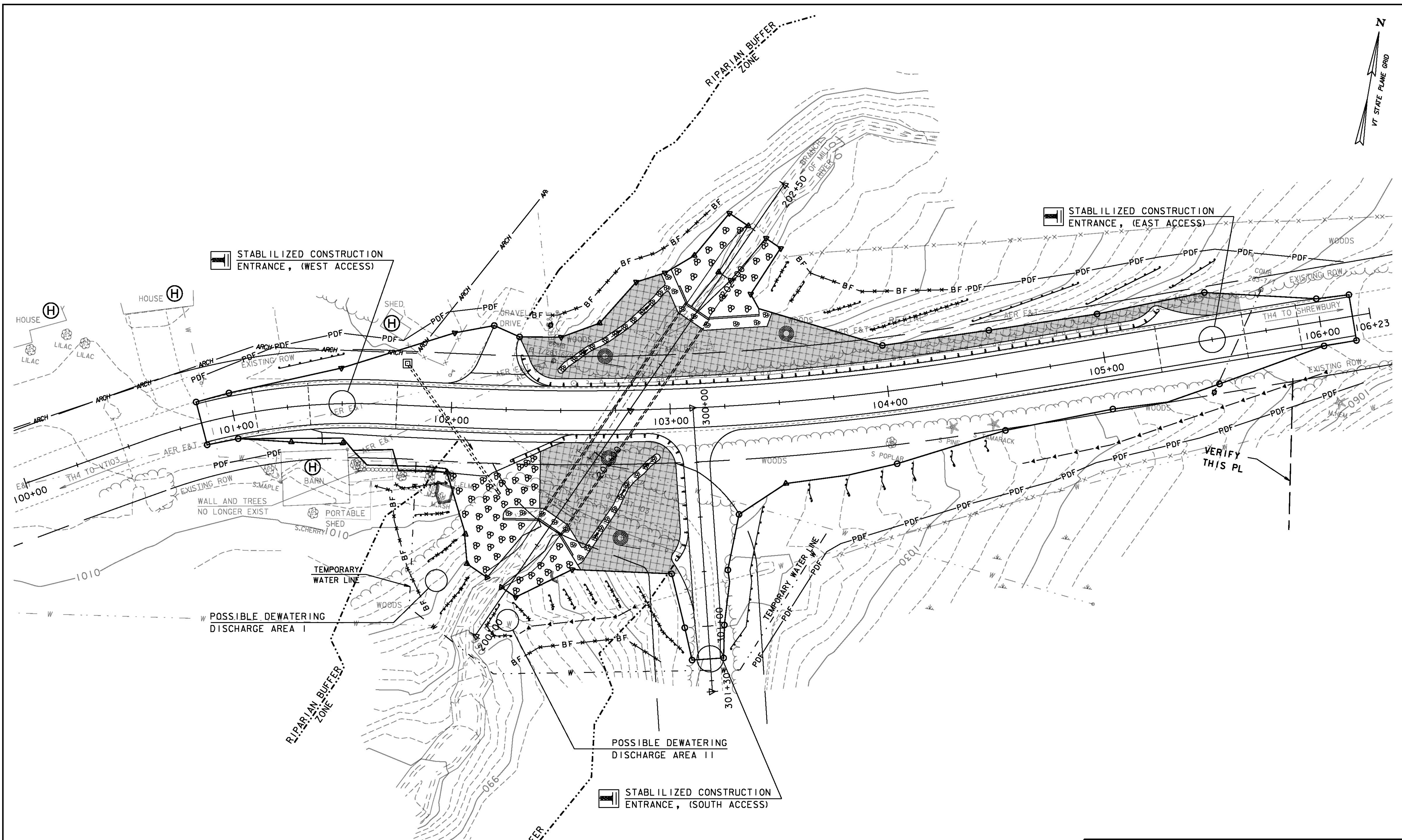
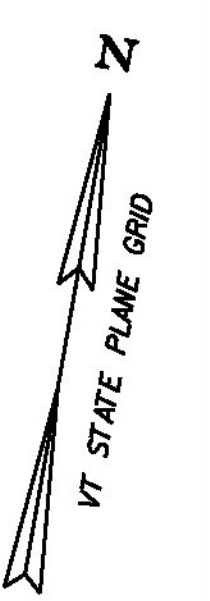
SOIL INFORMATION: PAXTON  
FINE SANDY LOAM  
K-FACTOR = 0.24, 15%-25% SLOPES  
HYDROLOGIC SOIL GROUP: C

SOIL INFORMATION: SUNAPEE FINE  
SANDY LOAM, VERY STONY  
K-FACTOR = 0.28, 15%-35% SLOPES  
HYDROLOGIC SOIL GROUP: B



SCALE: 1" = 20'-0"  
20 0 20

PROJECT NAME: SHREWSBURY	PLOT DATE: 12-MAY-2014
PROJECT NUMBER: STP 1443 (44)	DRAWN BY: M. LONGSTREET
FILE NAME: s94j154bdrero.dgn	CHECKED BY: J. LACROIX
PROJECT LEADER: C. CARLSON	SHEET 30 OF 36
DESIGNED BY: N. VANDENBERG	
EPSC EXISTING CONDITIONS	



STABILIZED CONSTRUCTION ENTRANCE, (WEST ACCESS)

STABILIZED CONSTRUCTION ENTRANCE, (EAST ACCESS)

STABILIZED CONSTRUCTION ENTRANCE, (SOUTH ACCESS)

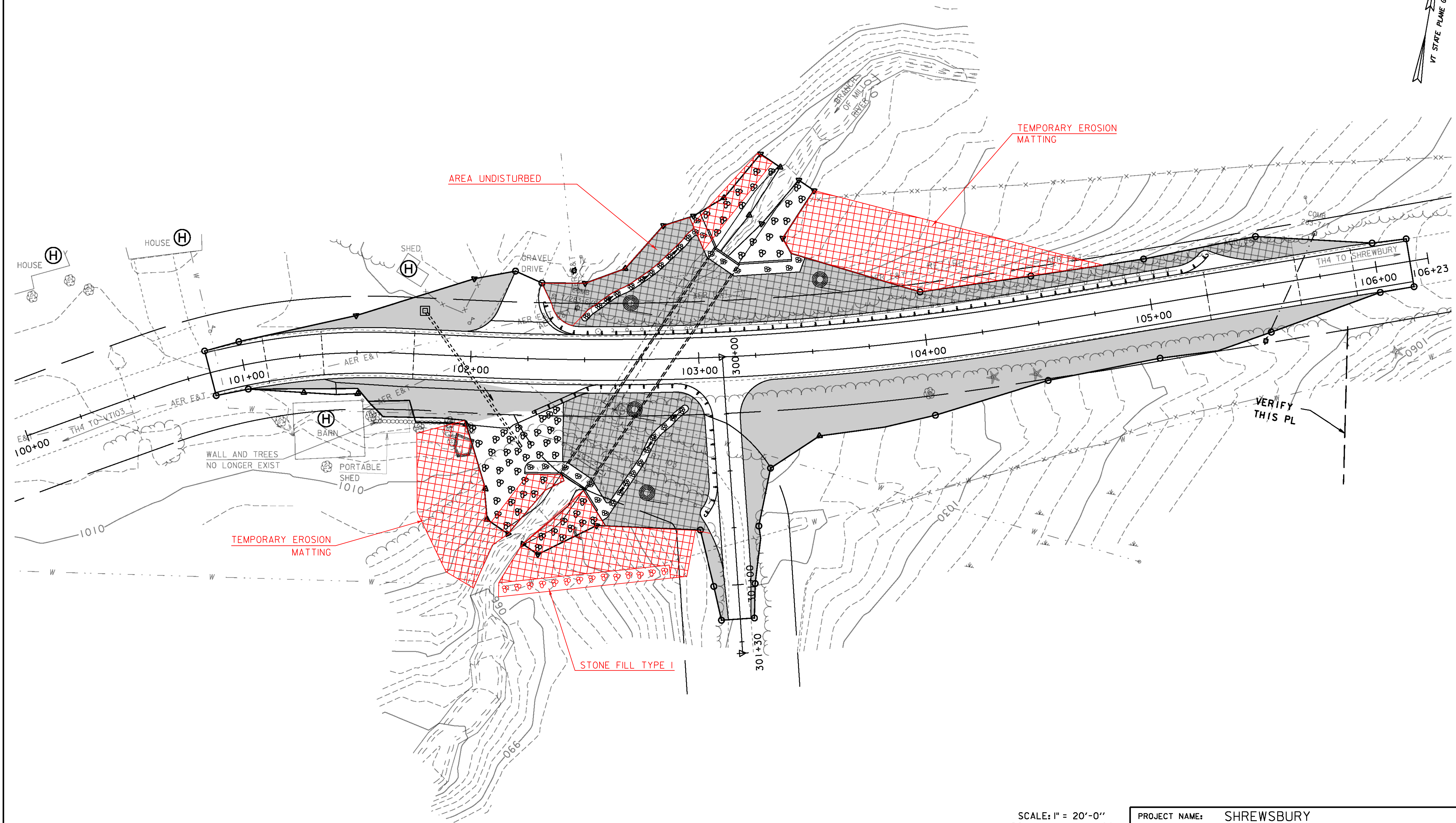
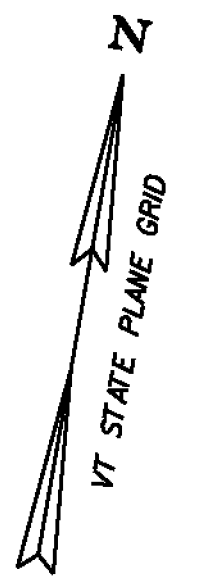
POSSIBLE DEWATERING DISCHARGE AREA I

POSSIBLE DEWATERING DISCHARGE AREA II

VERIFY THIS PL

PROJECT NAME:	SHREWSBURY	FILE NAME:	s94j154bdrero.dgn	PLOT DATE:	12-MAY-2014
PROJECT NUMBER:	STP 1443 (44)	PROJECT LEADER:	C. CARLSON	DRAWN BY:	M. LONGSTREET
		DESIGNED BY:	N. VANDENBERG	CHECKED BY:	J. LACROIX
		EPSC CONSTRUCTION CONDITIONS		SHEET	31 OF 36

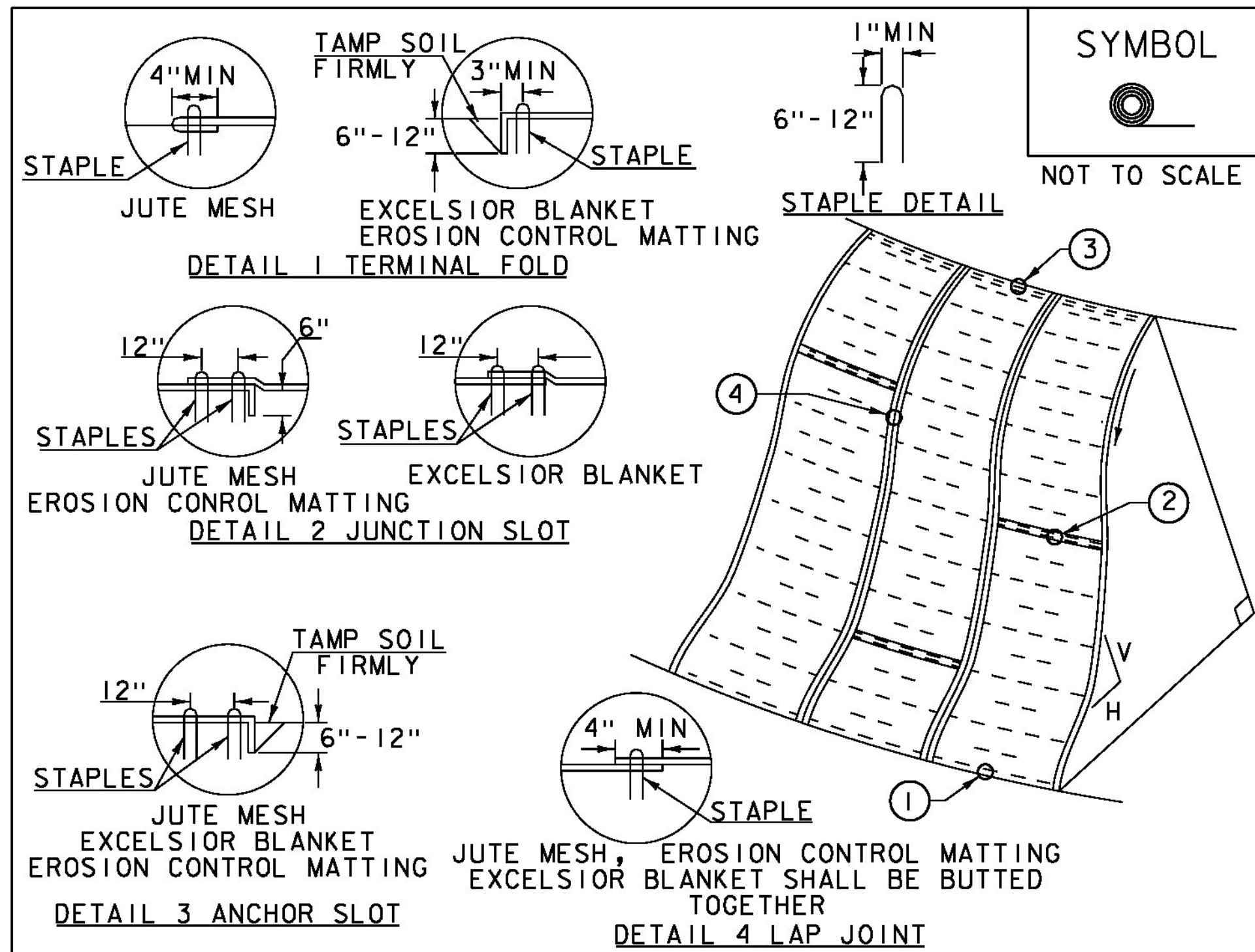
SCALE: 1" = 20'-0"  
20 0 20



SCALE: 1" = 20'-0"  
20 0 20

SEE TH4 MAINLINE CROSS SECTION FOR FINAL GRADING

PROJECT NAME:	SHREWSBURY	PLOT DATE:	12-MAY-2014
PROJECT NUMBER:	STP 1443 (44)	DRAWN BY:	M. LONGSTREET
FILE NAME:	s94j54brero.dgn	CHECKED BY:	J. LACROIX
PROJECT LEADER:	C. CARLSON	SHEET	32 OF 36
DESIGNED BY:	N. VANDENBERG		
EPSC FINAL CONDITIONS			



**CONSTRUCTION SPECIFICATIONS**

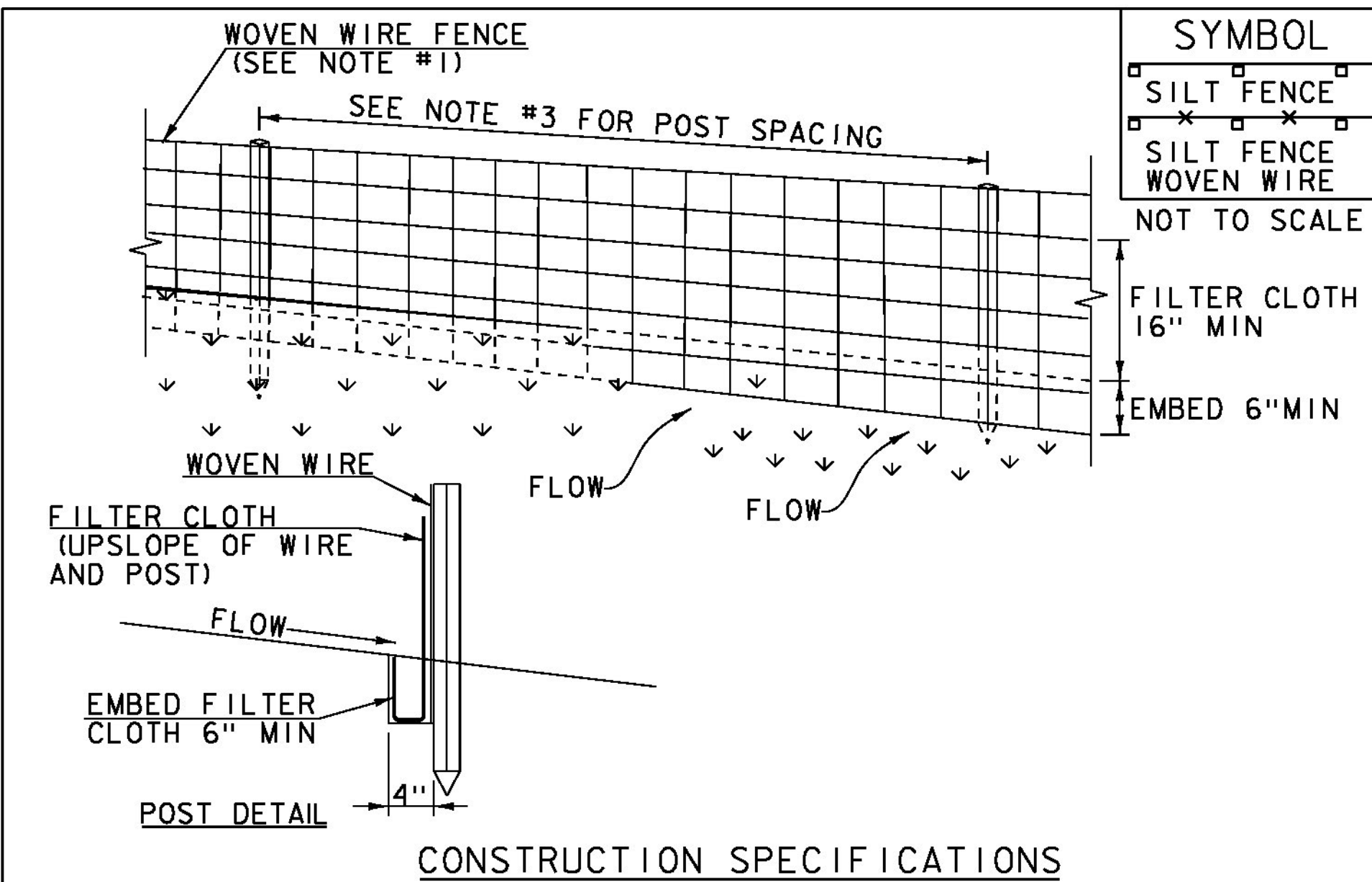
1. APPLY TO SLOPES GREATER THAN 3H:1V OR WHERE NECESSARY TO AID IN ESTABLISHING VEGETATION.
2. APPLY FERTILIZER, LIME SEED PRIOR TO PLACING MATTING.
3. STAPLES ARE TO BE PLACED ALTERNATELY, IN COLUMNS APPROXIMATELY 2' APART AND IN ROWS APPROXIMATELY 3' APART. APPROXIMATELY 175 STAPLES ARE REQUIRED PER 4' X 225' ROLL OF MATERIAL AND 125 STAPLES ARE REQUIRED PER 4' X 150' 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: NEW YORK STATE DEC  
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 WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 AND AS SHOWN IN THE PLANS FOR TEMPORARY EROSION MATTING (PAY ITEM 653.20) OR PERMANENT EROSION MATTING (PAY ITEM 653.21).

REVISIONS	
APRIL 16, 2007	JMF
JANUARY 13, 2009	WHF



**CONSTRUCTION SPECIFICATIONS**

1. WOVEN WIRE REINFORCED FENCE IS REQUIRED WITHIN 100' UPSLOPE OF RECEIVING WATERS WHEN THE PROJECT FALLS UNDER A CONSTRUCTION STORMWATER PERMIT. WOVEN WIRE SHALL BE A MIN. 14 GAUGE WITH A 6" MAX. MESH OPENING.
2. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAF1100X, 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' AND 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 6" AND FOLDED.
6. 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**

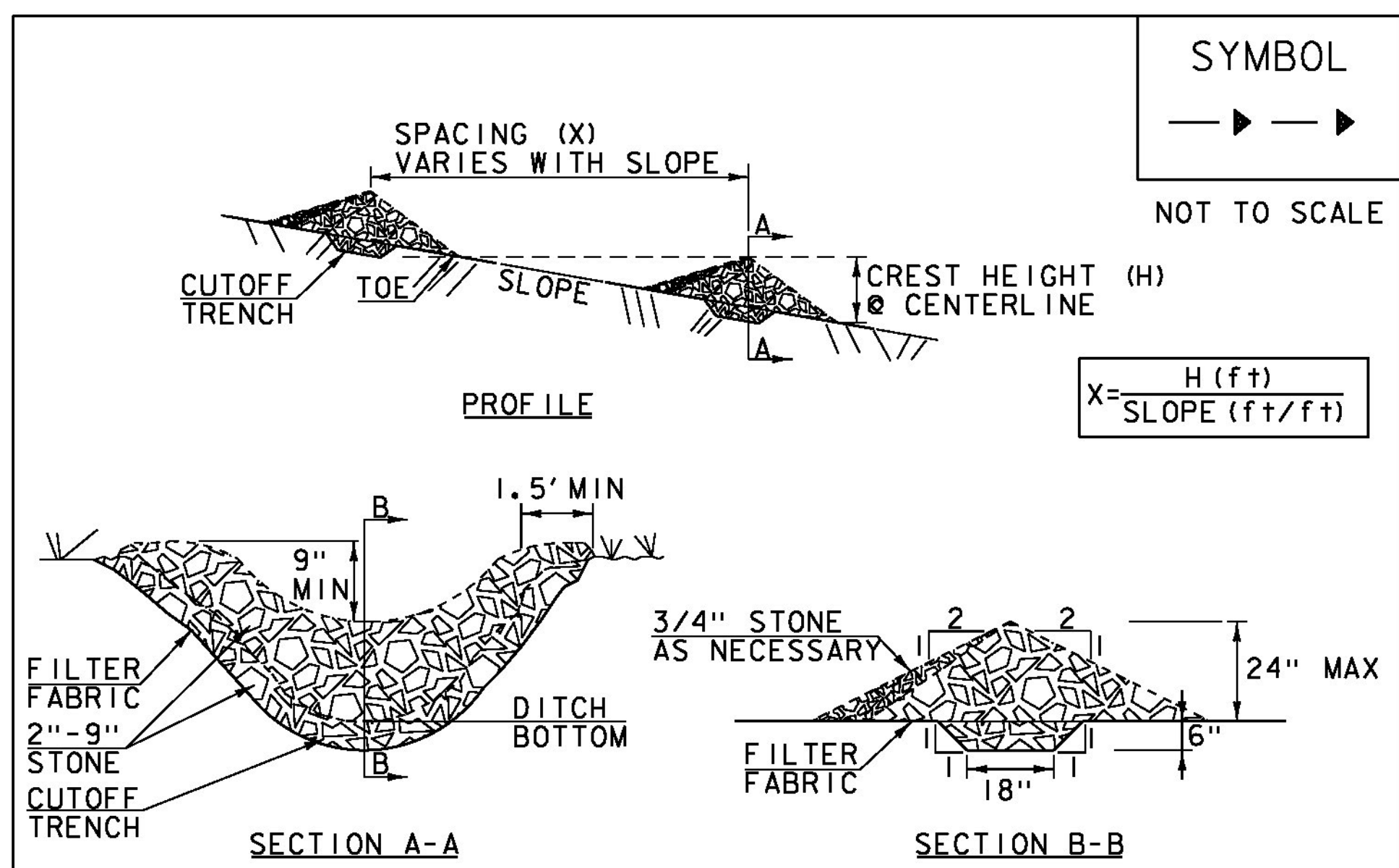
NOTES:  
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006-" FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 649 AND AS SHOWN IN THE PLANS FOR GEOTEXTILE FOR SILT FENCE (PAY ITEM 649.51) OR GEOTEXTILE FOR SILT FENCE, WOVEN WIRE REINFORCED (PAY ITEM 649.515).

REVISIONS	
MARCH 21, 2008	WHF
DECEMBER 11, 2008	WHF
JANUARY 13, 2009	WHF

PROJECT NAME: SHREWSBURY  
PROJECT NUMBER: STP 1443 (44)

FILE NAME: s94j154erodt1s.dgn PLOT DATE: 12-MAY-2014  
PROJECT LEADER: C. CARLSON DRAWN BY: M. LONGSTREET  
DESIGNED BY: N. VANDENBERG CHECKED BY: J. LACROIX  
EPSC DETAILS SHEET 1 SHEET 33 OF 36



**CONSTRUCTION SPECIFICATIONS**

1. STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION.
2. CHECK DAMS SHALL BE SPACED SO THAT THE ELEVATION OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION AS THE TOE OF THE UPSTREAM DAM.
3. 3/4" FILTERING STONE MAY BE ADDED TO THE FACE OF THE CHECK DAM AS NECESSARY.
4. EXTEND THE STONE A MINIMUM OF 1.5' BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
5. PROTECT CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.
6. ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONE.
7. MAXIMUM DRAINAGE AREA 2 ACRES.

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

**CHECK DAM**

NOTES:  
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- "FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.  
  
THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 FOR TEMPORARY STONE CHECK DAM, TYPE I(PAY ITEM 653.25)

REVISIONS	
MARCH 21, 2008	WHF
JANUARY 8, 2009	WHF

VAOT RURAL AREA MIX					
% WEIGHT	LBS/AC		NAME	GERM %	PURITY %
	BROADCAST	HYDROSEED			
37.5%	22.5	45	CREeping RED FESCUE	85%	98%
37.5%	22.5	45	TALL FESCUE	90%	95%
5.0%	3	6	RED TOP	90%	95%
15.0%	9	18	BIRDSFOOT TREFOIL	85%	98%
5.0%	3	6	ANNUAL RYE GRASS	85%	95%
100%	60	120			

VAOT URBAN AREA MIX					
% WEIGHT	LBS/AC		NAME	GERM %	PURITY %
	BROADCAST	HYDROSEED			
42.5%	34	68	CREeping RED FESCUE	85%	98%
10.0%	8	16	PERENNIAL RYE GRASS	90%	95%
42.5%	34	68	KENTUCKY BLUE GRASS	85%	85%
5.0%	4	8	ANNUAL RYE GRASS	85%	95%
100%	80	160			

SOIL AMENDMENT GUIDANCE			
FERTILIZER		LIME	
BROADCAST	HYDROSEED	BROADCAST	HYDROSEED
10-20-10	FOLLOW	PELLETIZED	FOLLOW
500 LBS/AC	MANUFACTURER	2 TONS/AC	MANUFACTURER

**CONSTRUCTION GUIDANCE**

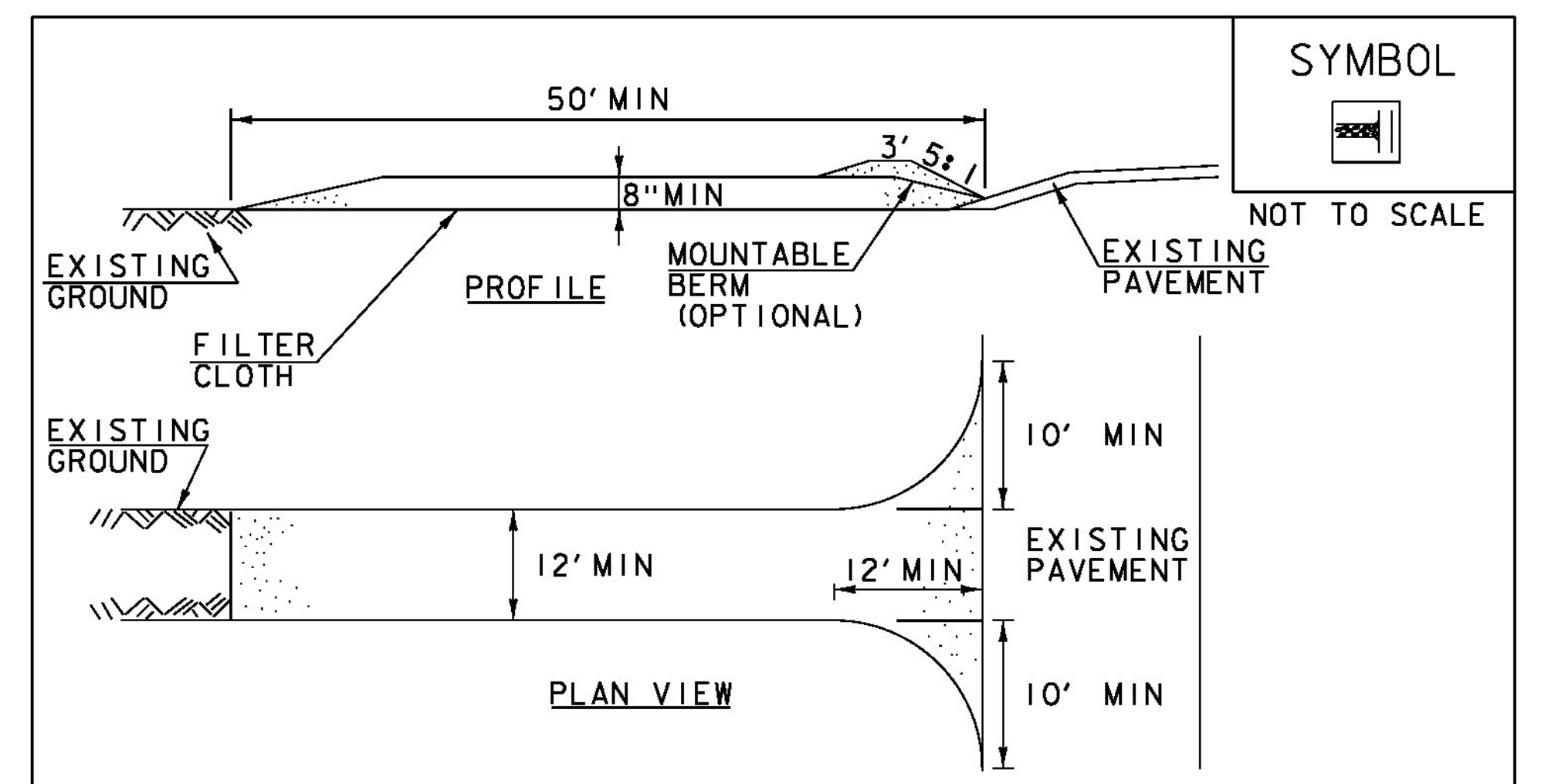
1. RURAL SEED MIX: USE AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED UPLAND (NON WETLAND) AREAS DISTURBED BY THE CONTRACTOR.
2. URBAN SEED MIX: USE AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED LAWN AREAS DISTURBED BY THE CONTRACTOR.
3. ALL SEED MIXTURES: SHALL NOT HAVE A WEED CONTENT EXCEEDING 0.40% BY WEIGHT AND SHALL BE FREE OF ALL NOXIOUS SEED.
4. FERTILIZER AND LIMESTONE: SHALL FOLLOW RATES SHOWN ON PLAN OR AS DIRECTED BY THE ENGINEER
5. HAY MULCH: TO BE PLACED ON EARTH SLOPES AT THE RATE OF 2 TONS/ACRE, ACHIEVE 90% GROUND COVER OR AS DIRECTED BY THE ENGINEER.
6. TOPSOIL: TO BE USED WITH SEED AS INDICATED ON THE PLANS, OR AS DIRECTED BY THE ENGINEER.
7. HYDROSEEDING: ALTHOUGH GUIDANCE IS GIVEN ABOVE THE SITE CONDITIONS AND THE TYPE OF HYDROSEED WILL ULTIMATELY DICTATE THE AMOUNTS AND TYPES OF SOIL AMENDMENTS TO BE APPLIED
8. TURF ESTABLISHMENT: PLACING SEED, FERTILIZER, LIME AND MULCH PRIOR TO SEPTEMBER 15 AND AFTER APRIL 15 CAN BETTER ENSURE A VIGOROUS GROWTH OF GRASS.

ADAPTED FROM VTRANS TECHNICAL LANDSCAPE MANUAL FOR ROADWAYS AND TRANSPORTATION FACILITIES

**TURF ESTABLISHMENT**

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 651 FOR SEED (PAY ITEM 651.15)

REVISIONS	
JUNE 23, 2009	WHF
JANUARY 15, 2010	WHF
FEBRUARY 16, 2011	WHF



**CONSTRUCTION SPECIFICATIONS**

1. STONE SIZE- USE 1-4" STONE, RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH- NOT LESS THAN 50' (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30' MINIMUM LENGTH APPLIES).
3. THICKNESS- NOT LESS THAN 8".
4. WIDTH- 12' MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. 24' 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 WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 FOR VEHICLE TRACKING PAD (PAY ITEM 653.35) OR AS SPECIFIED IN THE CONTRACT.

REVISIONS	
MARCH 24, 2008	WHF
JANUARY 13, 2009	WHF

# RIGHT - OF - WAY DETAIL SHEET

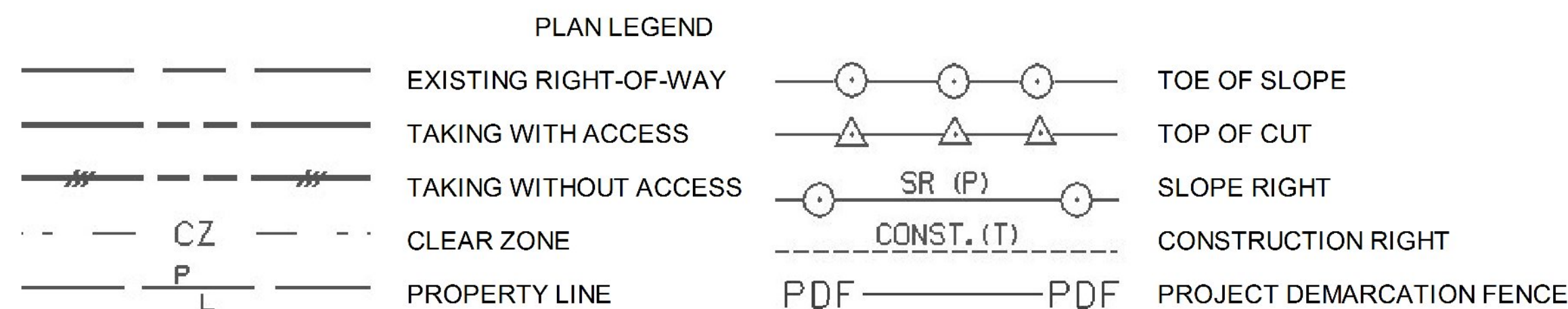
TABLE OF PROPERTY ACQUISITION

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	FILLMORE, TODD M. & DEIRDRE	1	TH 4 100+95 RT	TH 4 102+11 RT			INSTALL	(T)		WDOE		SHREWSBURY		TEMPORARY WATER LINE			
			TH 4 101+34 RT	TH 4 102+22 RT			R & R	(T)							WATER LINE		
			TH 4 101+52 RT	TH 4 102+05 RT			CONST.	(T)	2,133 SF							INCL. BF & EC	
			TH 4 101+58 RT	TH 4 102+22 RT			SR	(T)	226 SF								
			TH 4 101+99 RT	TH 4 102+ 22 RT			CH	(P)	703							INCL. STONE FILL	
			TH 4 102+12 RT	TH 4 102+21 RT			CUL	(P)									
1B		1	TH 4 102+11 RT	TH 4 103+64 RT			INSTALL	(T)				SHREWSBURY		TEMPORARY WATER LINE			
			TH 4 102+18 RT	TH 4 102+61 RT			CH	(P)	1,417 SF						INCL. STONE FILL		
			TH 4 102+21 RT	TH 4 102+25 RT			CUL & DR	(P)									
			TH 4 102+22 RT	TH 4 106+15 RT			CONST	(T)	0.35 A							INCL. BF, PDF & EC; 8,118 S.F.±	
			TH 4 102+22 RT	TH 4 104+77 RT			R & R	(T)								WATER LINE	
			TH 4 102+25 RT	TH 4 102+77 RT			I & M	(P)	980 SF							FOOTINGS, CULVERTS & WINGWALLS	
																	INCL. EC
			TH 4 102+22 RT	TH 4 102+28 RT			SR	(T)	14 SF								PAVEMENT & GUARD RAIL
			TH 4 102+42 RT	TH 4 103+17 RT			REMOVE	(T)									INCL. EC
			TH 4 102+57 RT	TH 4 103+08 RT			SR	(P)	2,396 SF								GUARD RAIL
TH 4 102+98 RT	TH 4 103+05 RT			INSTALL	(T)									OLD RTE. 103			
TH 4 103+11 RT				DRIVE	(T)												
TH 4 103+17 RT	TH 4 104+65 RT			SR	(T)	1,842 SF								GUY WIRE & ANCHOR			
TH 4 105+40 RT	TH 4 105+46 RT			I & M	(P)												
1C		1	TH 4 101+10 LT	TH 4 102+01 LT			CONST	(T)	546 SF			SHREWSBURY		INCLUDES PDF			
			TH 4 101+74 LT	TH 4 102+00 LT			SR	(P)	114 SF								
			TH 4 101+79 LT	TH 4 101+99 LT			REMOVE	(T)							FENCE		
2	FORREST, JOSEPH E. & MARY L.	1	TH 4 102+29 LT	TH 4 102+80 LT			UE	(P)	0.04A	WDOE		SHREWSBURY		1,715 SF±			
			TH 4 102+40 LT				I & M	(P)							GUY WIRE & ANCHOR		
3	KELLEY, CHARLES H. & KATHLEEN C., TRUSTEES FOR THE CHARLES H. KELLEY REVOCABLE LIVING TRUST	1	TH 4 101+99 LT	TH 4 102+18 LT			SR	(P)	173 SF			SHREWSBURY		FENCE			
			TH 4 101+99 LT	TH 4 102+06 LT			REMOVE	(T)		WDOE					INCL. BF & EC		
			TH 4 102+00 LT	TH 4 103+48 LT			CONST	(T)	1,472 SF						12' GRAVEL WITH 5' PAVED APRON		
			TH 4 102+13 LT				DRIVE	(T)							5,317 SF±		
			TH 4 102+29 LT	TH 4 103+32 LT			UE	(P)	0.12A							INCL. EC	
			TH 4 102+30 LT	TH 4 103+04 LT			SR	(P)	1,392 SF							GUY WIRE & ANCHOR	
			TH 4 102+45 LT	TH 4 102+67 LT			I & M	(P)								FOOTINGS, CULVERT & WING WALLS	
			TH 4 102+86 LT	TH 4 103+15 LT			I & M	(P)	326 SF							INCL. STONE FILL	
TH 4 102+98 LT	TH 4 103+42 LT			CH	(P)	707 SF											
4	CHESSER, JARED B. & TIFANY L.	1	TH 4 102+ 99 LT	TH 4 103+44 LT			I & M	(P)	369 SF	WDOE	09/18/13	SHREWSBURY	64	398	FOOTINGS, CULVERT & WING WALLS		
			TH 4 103+10 LT	TH 4 103+57 LT			CH	(P)	742 SF						INCL. STONE FILL		
			TH 4 103+50 LT	TH 4 103+92 LT			SR	(P)	637 SF						INCL. EC		
			TH 4 103+41 LT	TH 4 106+16.70 LT			CONST	(T)	0.10A						INCL. BF, PDF & EC; 4,484 SF±		
5	TOWN OF SHREWSBURY		TH 4 100+94.75 RT	TH 4 106+16.70 LT										TOWN EASEMENT			
6	GREEN MOUNTAIN POWER CORPORATION		TH 4 100+94.75 RT	TH 4 106+16.70 LT										UTILITY EASEMENT			
7	VERMONT TRANSCO, LLC		TH 4 100+94.75 RT	TH 4 106+16.70 LT										UTILITY EASEMENT			
8	TELEPHONE OPERATING COMPANY OF VERMONT, LLC		TH 4 100+94.75 RT	TH 4 106+16.70 LT										UTILITY EASEMENT			
9	COMCAST OF CONNECTICUT/GEORGIA/ MASSACHUSETTS/NEW HAMPSHIRE/ NEW YORK/NORTH CAROLINA/VERMONT, LLC		TH 4 100+94.75 RT	TH 4 106+16.70 LT										UTILITY EASEMENT			

TABLE OF REVISIONS

REVISION NO.	SHEET NO.	DESCRIPTION	DATE
1	3	PARCEL NO. 2 FORREST. CHANGE ENDING STATION OF UTILITY EASEMENT FROM TH 4 103+30 LT TO TH 4 102+80 LT. CHANGE THE AREA OF THIS RIGHT TO 0.04A±, 1,715 SF± PER C.O. 9815 APPROVED BY: HP MADE BY: MR	06/26/13
2	3,4	PARCEL NO. 1A FILLMORE. CHANGE ENDING STA. OF SR(T) FROM 102+14 RT TO 102+22 RT. 226 SF±. ADD CUL (P) FROM 102+12 RT ~ 102+24 RT. PARCEL 1B ADD SR (T) TH 4 102+22 RT ~ TH 4 102+28 RT 14 SF±. ADD CUL & DR (P) 102+21 RT ~ 102+25 RT PER C.O. 9844 APPROVED BY: RC MADE BY: MR	11/04/13

PLOT DATE 11/06/13



- 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

R & R - REMOVE & RESET  
I & M - INSTALL & MAINTAIN

APPROVED: HARRY PETROVS DATE: 5-2-13  
CHIEF, PLANS & TITLES

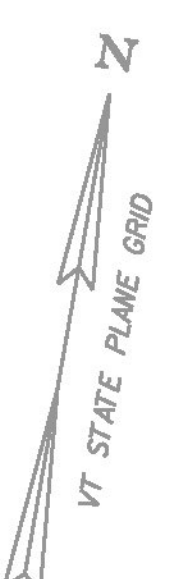
PROJECT NAME:	SHREWSBURY	
PROJECT NUMBER:	STP 1443 (44)	
FILE NAME:	r94j164detail.xls	PLOT DATE:
PROJECT LEADER:	J. LACROIX	DRAWN BY:
DESIGNED BY:	U. STANLEY	CHECKED BY:
R.O.W. DETAIL SHEET #1	ROW SHEET 35	OF 36

EXISTING STRUCTURE:  
 6' DIAMETER x 65' LONG CMP WITH  
 10' x 10' x 26' CONCRETE ARCH AT OUTFALL  
 OVERALL LENGTH: 91'  
 ROADWAY WIDTH: 21.4' OVER CMP

**FORREST, JOSEPH E.  
 & MARY L.**

HEAVY DUTY STEEL BEAM GUARDRAIL, GALVANIZED  
 ML STA 102+31.23 LT - ML STA 105+27.00 LT  
 ML STA 102+04.00 RT - SL STA 300+68.00 LT

ANCHORS FOR STEEL BEAM RAIL  
 ML STA 102+45.00 LT  
 ML STA 105+14.00 LT  
 ML STA 102+04.00 RT  
 SL STA 300+54.96 RT



BEGIN APPROACH STA 100+85.00  
 BEGIN PROJECT STA 101+75.00  
**FILLMORE, TODD M. & DEIRDRE**

CURVE (1)  
 DELTA = 22° 25' 00"  
 D = 20° 30' 00"  
 R = 279.49'  
 T = 55.38'  
 L = 109.35'  
 E = 5.43'

CENTERLINE STRUCTURE  
 ML STA 102+81.50 =  
 CHANNEL STA 201+25.00

MAIN LINE POST STA 102+79.82  
 = CHANNEL LINE STA 201+21.92  
 = DELTA ANGLE = 121.73°

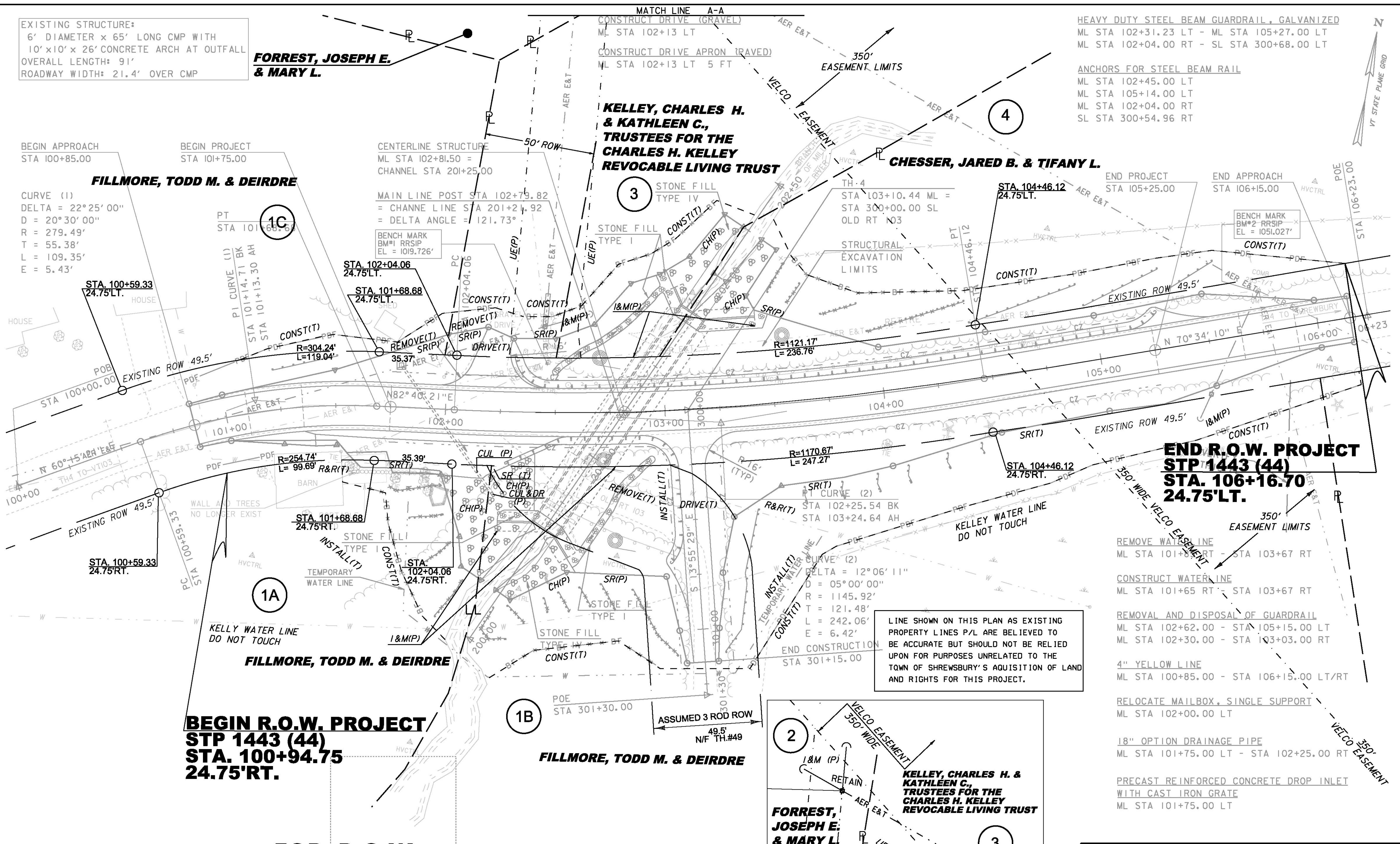
BENCH MARK  
 BM#1 RRSIP  
 EL = 1019.726'

**KELLEY, CHARLES H.  
 & KATHLEEN C.,  
 TRUSTEES FOR THE  
 CHARLES H. KELLEY  
 REVOCABLE LIVING TRUST**

**CHESSER, JARED B. & TIFANY L.**

END PROJECT STA 105+25.00  
 END APPROACH STA 106+15.00

BENCH MARK  
 BM#2 RRSIP  
 EL = 1051.027'



LINE 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  
 TOWN OF SHREWSBURY'S ACQUISITION OF LAND  
 AND RIGHTS FOR THIS PROJECT.

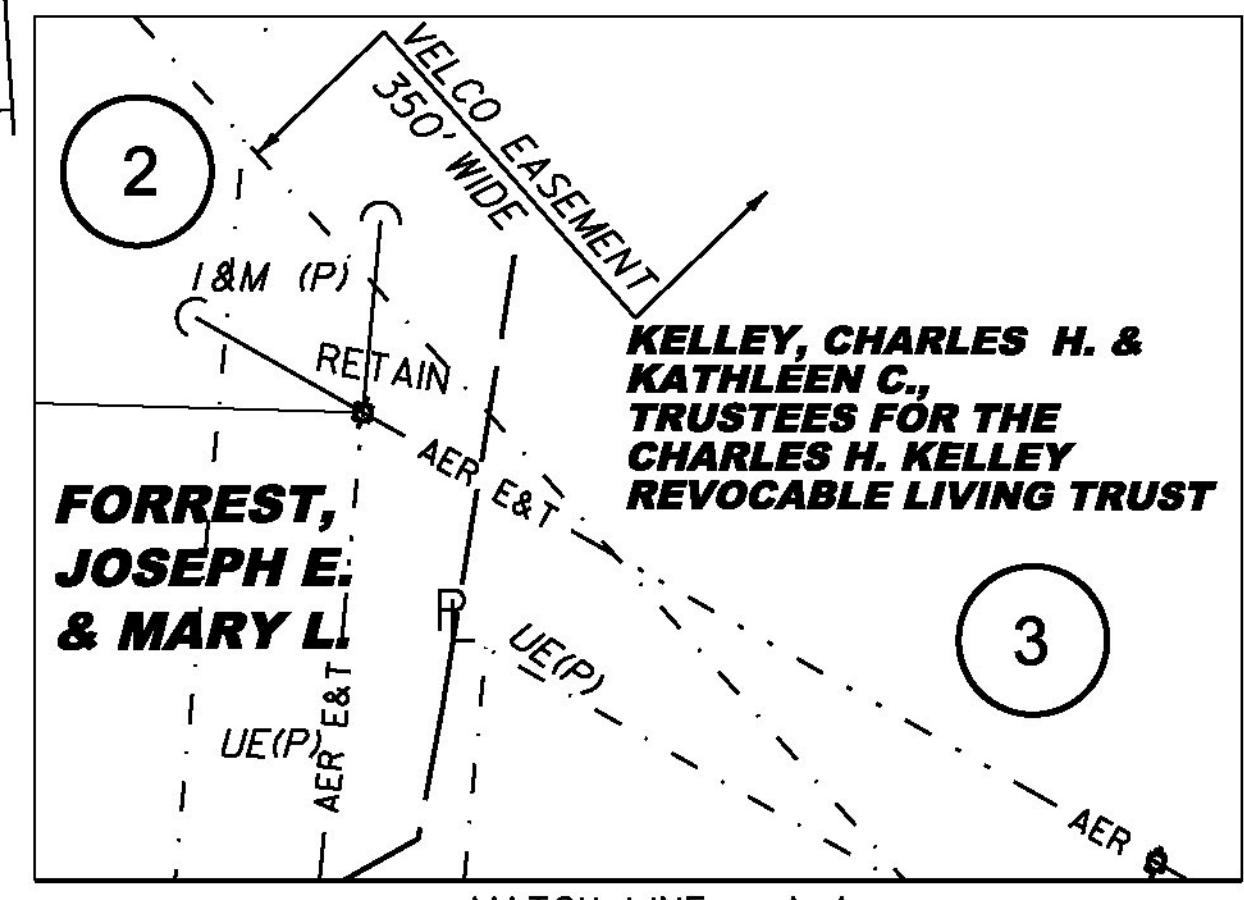
**END R.O.W. PROJECT  
 STP 1443 (44)  
 STA. 106+16.70  
 24.75'LT.**

**BEGIN R.O.W. PROJECT  
 STP 1443 (44)  
 STA. 100+94.75  
 24.75'RT.**

**FOR R.O.W.  
 USE ONLY**

LAYOUT PLAN

SCALE: 1" = 20'-0"  
 20 0 20



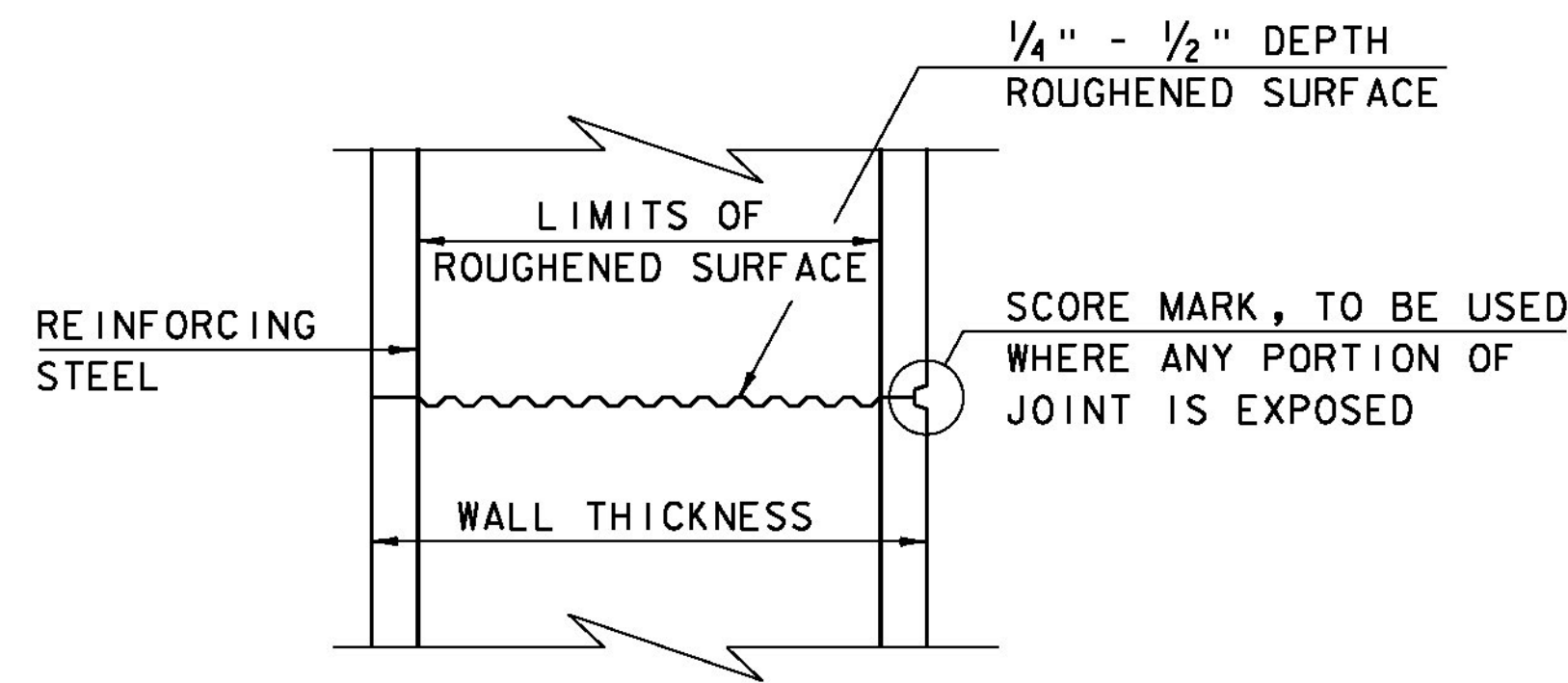
PROJECT NAME: SHREWSBURY  
 PROJECT NUMBER: STP 1443 (44)

FILE NAME: s94j154bdr.dgn  
 PROJECT LEADER: C. CARLSON  
 DESIGNED BY: N. VANDENBERG  
 ROW LAYOUT SHEET 1

PLOT DATE: 19-AUG-2014  
 DRAWN BY: M. LONGSTREET  
 CHECKED BY: J. LACROIX  
 ROW SHEET 36 OF 36

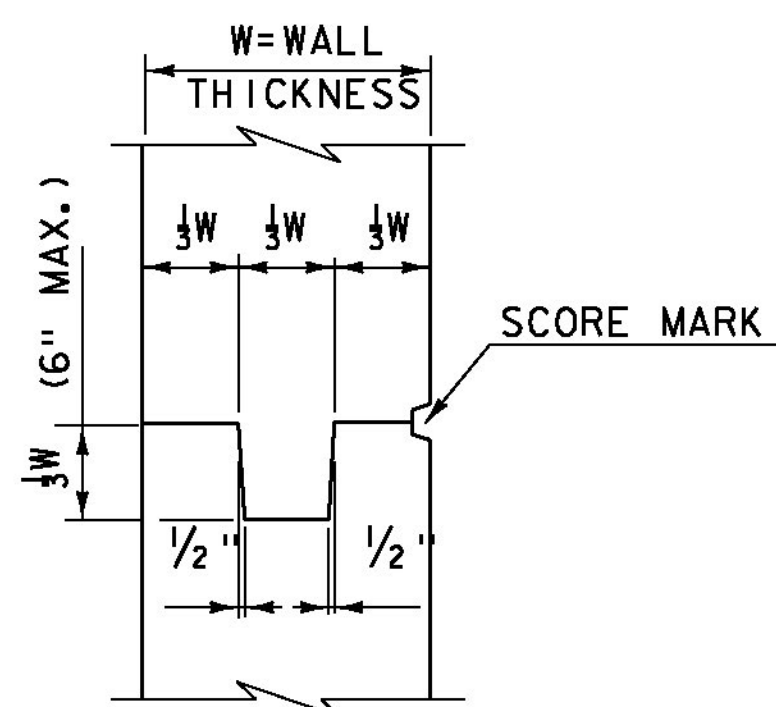
**CONCRETE GENERAL NOTES**

1. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1" x 1"
2. REINFORCING STEEL SIZE AND SPACING SHOWN IN THE PLANS IS BASED ON 60 KSI STEEL, UNLESS NOTED OTHERWISE. WITH THE ENGINEER'S PERMISSION, BAR SIZE AND SPACING MAY BE MODIFIED ACCORDING TO THE LATEST AASHTO LRFD BRIDGE DESIGN SPECIFICATION AND STRUCTURES DESIGN MANUAL WHEN USING HIGHER STRENGTH STEEL.

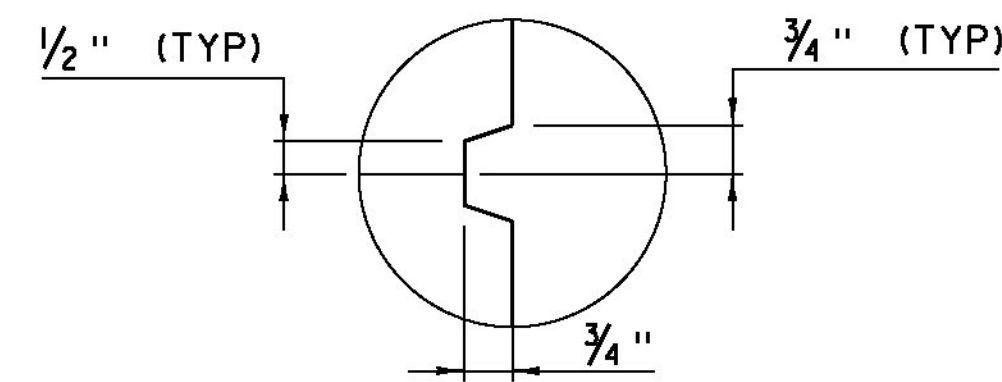


**TYPICAL HORIZONTAL CONSTRUCTION JOINT**  
(NOT TO SCALE)

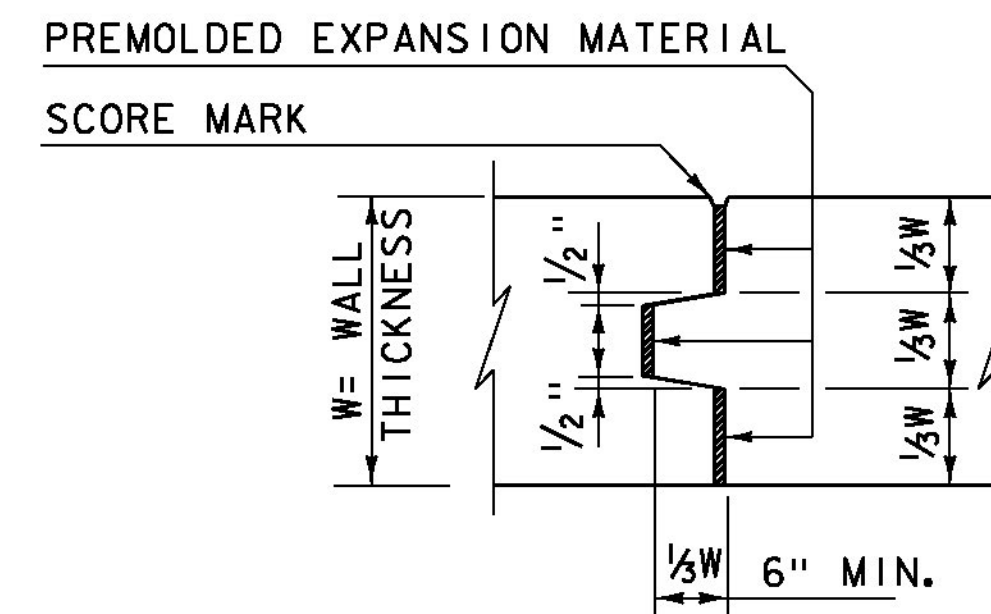
1. THE SURFACE OF THE CONCRETE CONSTRUCTION JOINTS SHALL BE CLEANED AND FREE OF LAITANCE.
2. IMMEDIATELY BEFORE NEW CONCRETE IS PLACED, ALL CONSTRUCTION JOINTS SHALL BE WETTED AND STANDING WATER REMOVED.



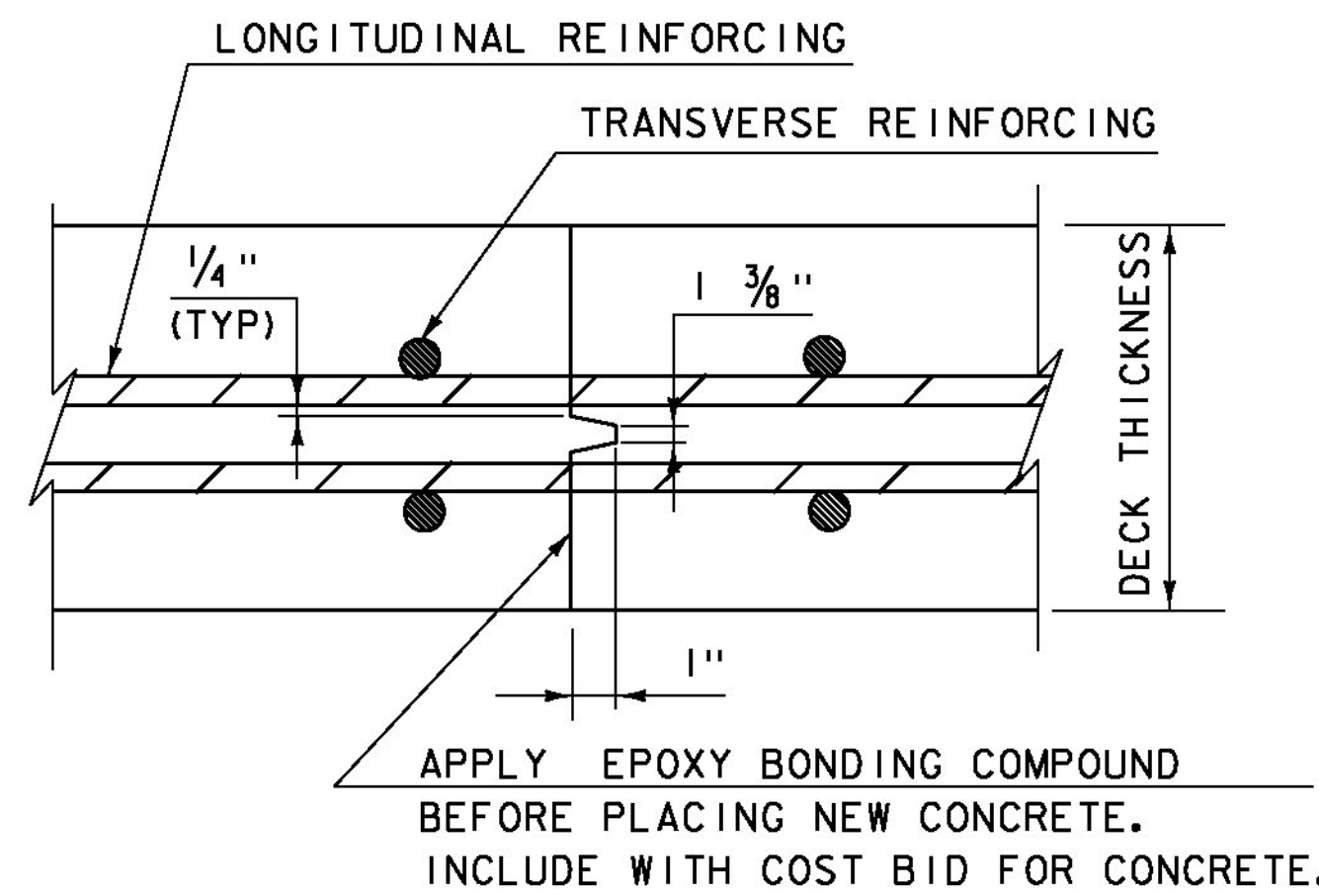
**TYPICAL CONCRETE CONSTRUCTION JOINT**  
(NOT TO SCALE)



**SCORE MARK DETAIL**  
(NOT TO SCALE)



**TYPICAL CONCRETE EXPANSION JOINT**  
(NOT TO SCALE)



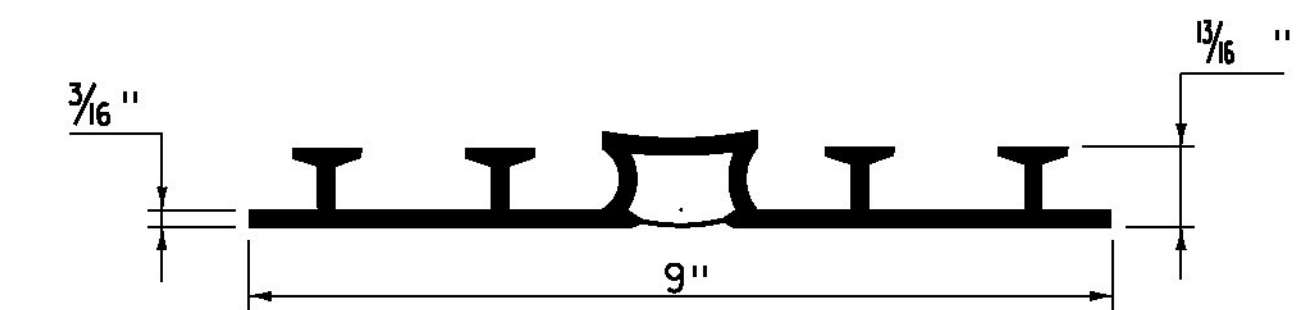
**TRANSVERSE BRIDGE SLAB CONSTRUCTION JOINT DETAILS**  
(NOT TO SCALE)



**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.

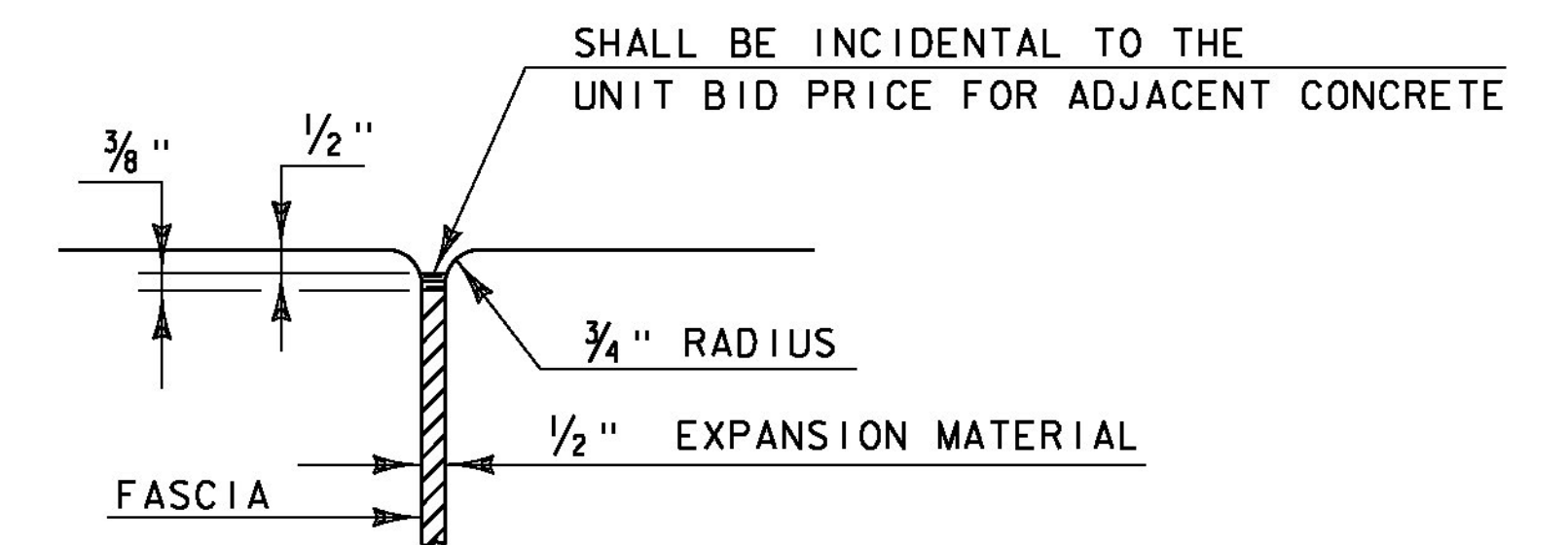
OTHER CONFIGURATIONS OF WATERSTOP MAY BE USED UPON APPROVAL OF THE ENGINEER.



**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.

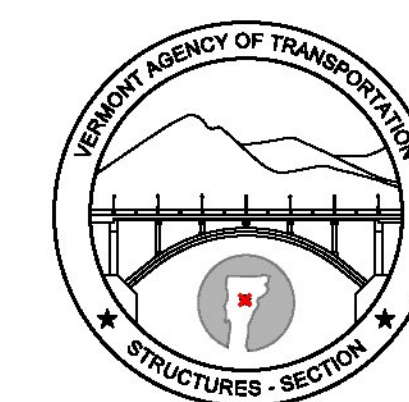
OTHER CONFIGURATIONS OF WATERSTOP MAY BE USED UPON APPROVAL OF THE ENGINEER.



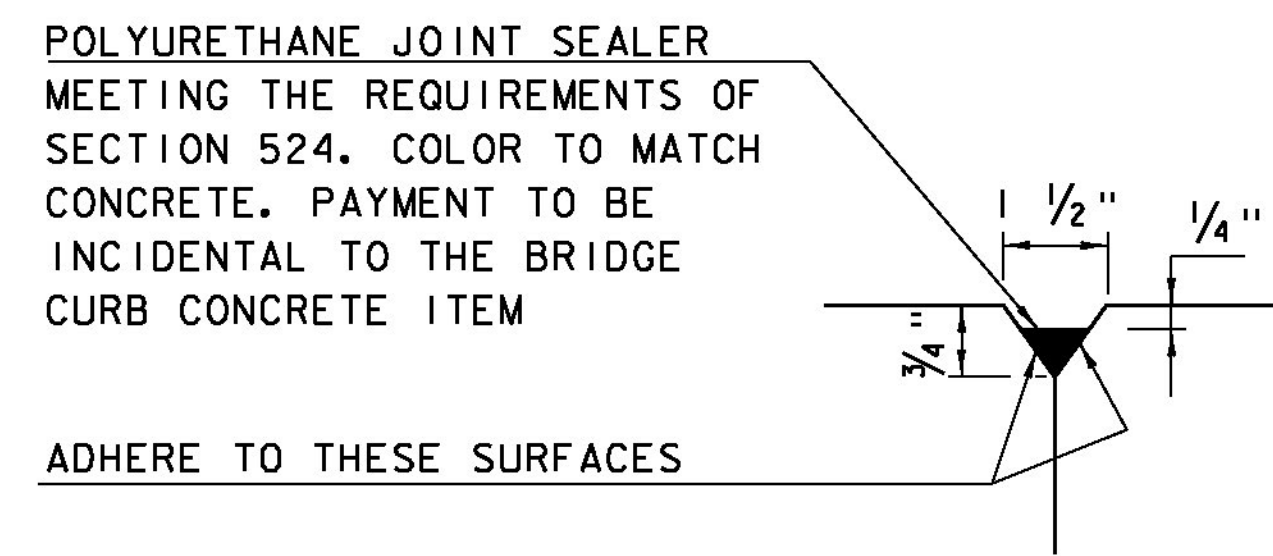
**JOINT BETWEEN FASCIA AND WINGWALL**  
(NOT TO SCALE)

REVISIONS	
MAY 7, 2010	APPROVED FOR USE BY VAOT STRUCTURES SECTION
FEBRUARY 9, 2012	REBAR SUBSTITUTION ALLOWANCE ADDED TO CONCRETE GENERAL NOTES.

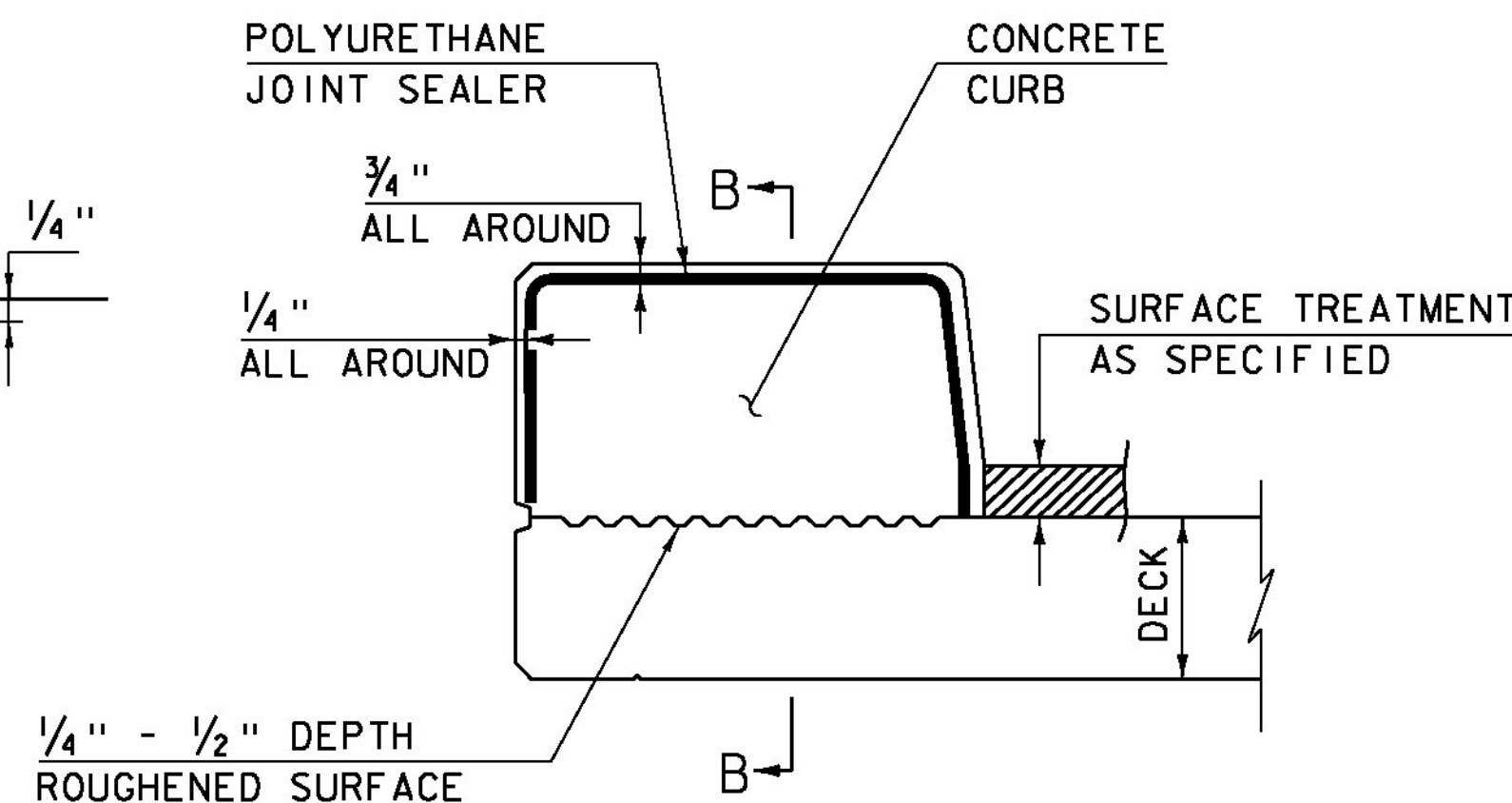
**CONCRETE  
DETAILS AND NOTES**



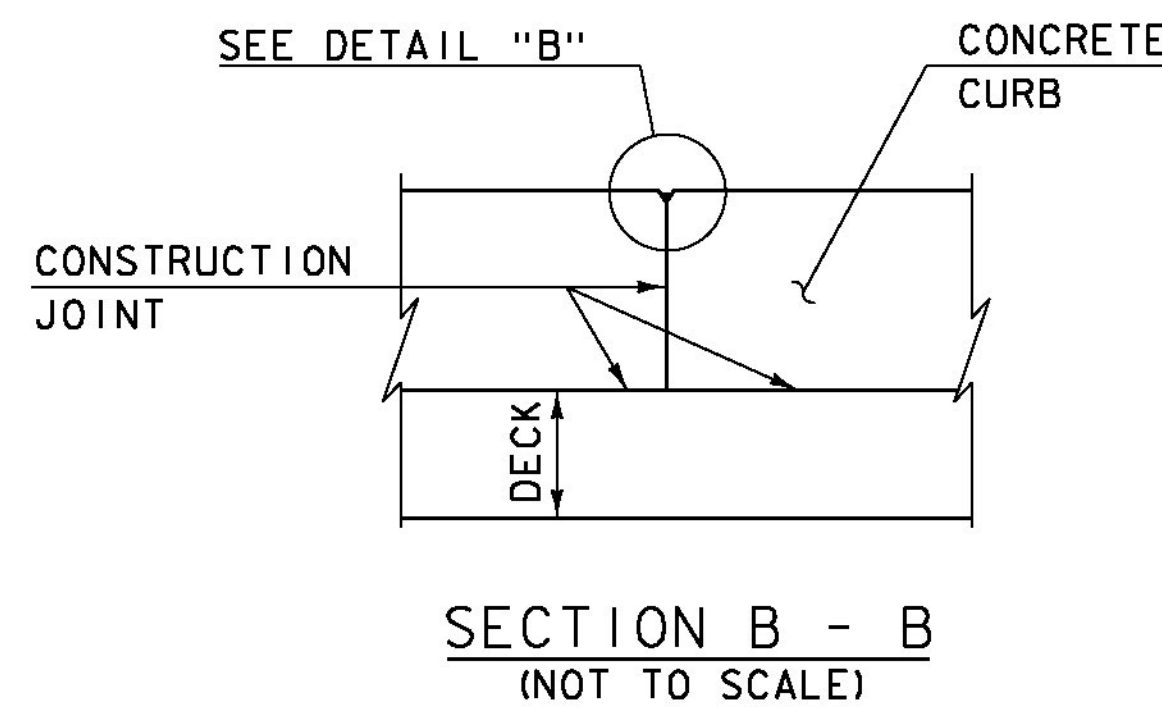
**STRUCTURES  
DETAIL  
SD-501.00**



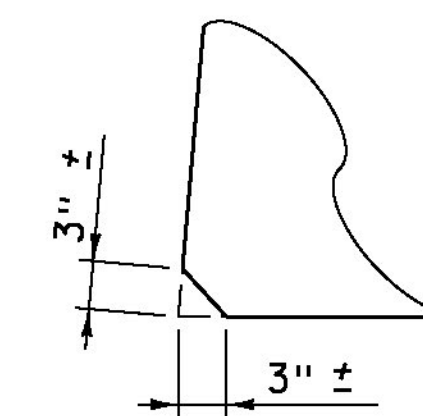
DETAIL "B"  
(NOT TO SCALE)



CONCRETE CURB JOINT SECTION  
(NOT TO SCALE)



SECTION B - B  
(NOT TO SCALE)

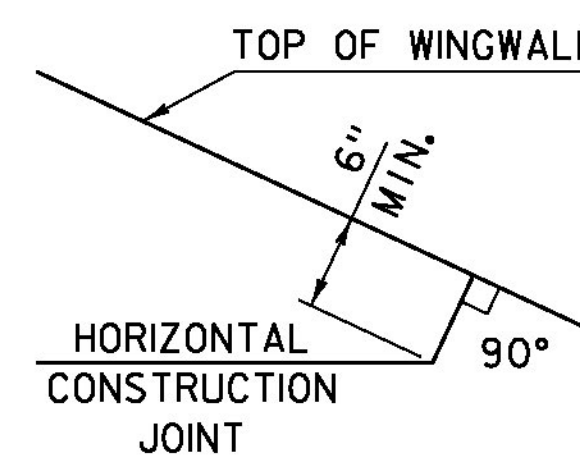


ACUTE ANGLE  
CLIP DETAIL  
(NOT TO SCALE)

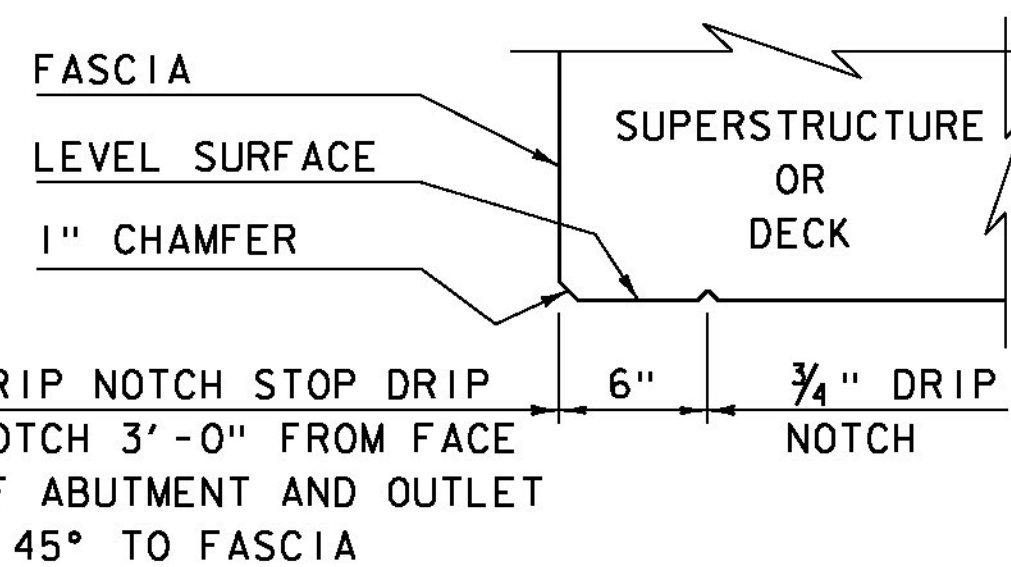
1. SEE TYPICAL HORIZONTAL CONSTRUCTION JOINT DETAIL FOR ADDITIONAL INFORMATION

CONCRETE CURB JOINT NOTES

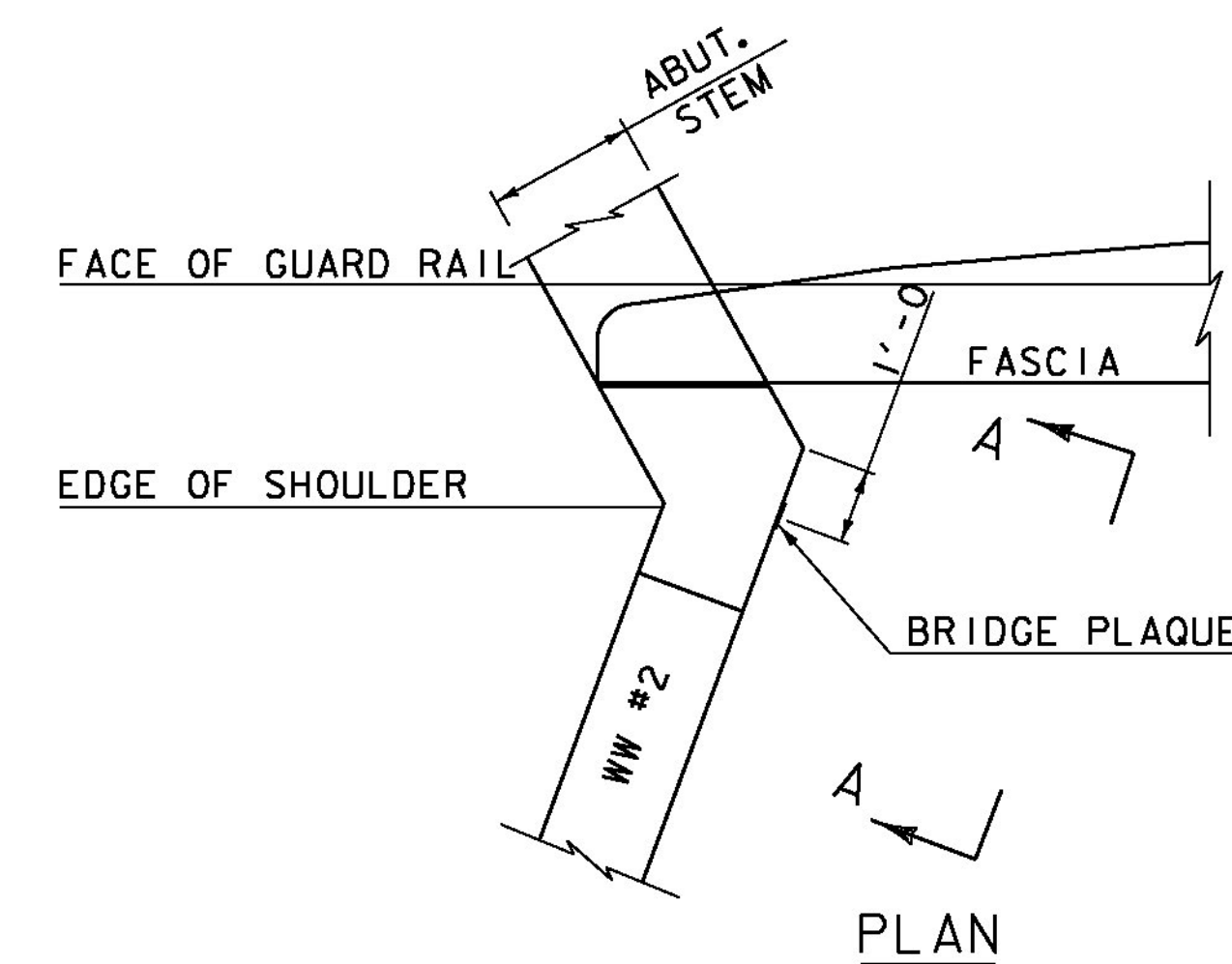
1. CONCRETE CURBS MAY BE PLACED IN ONE CONTINUOUS OPERATION IF AN APPROVED SHRINKAGE REDUCING ADMIXTURE LISTED IN THE SPECIAL PROVISIONS IS USED WITH THE CONCRETE MIX DESIGN. PAYMENT FOR THE SHRINKAGE REDUCING ADMIXTURE WILL BE INCIDENTAL TO THE BRIDGE CURB CONCRETE ITEM.
2. IF THE CONTRACTOR CHOOSES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



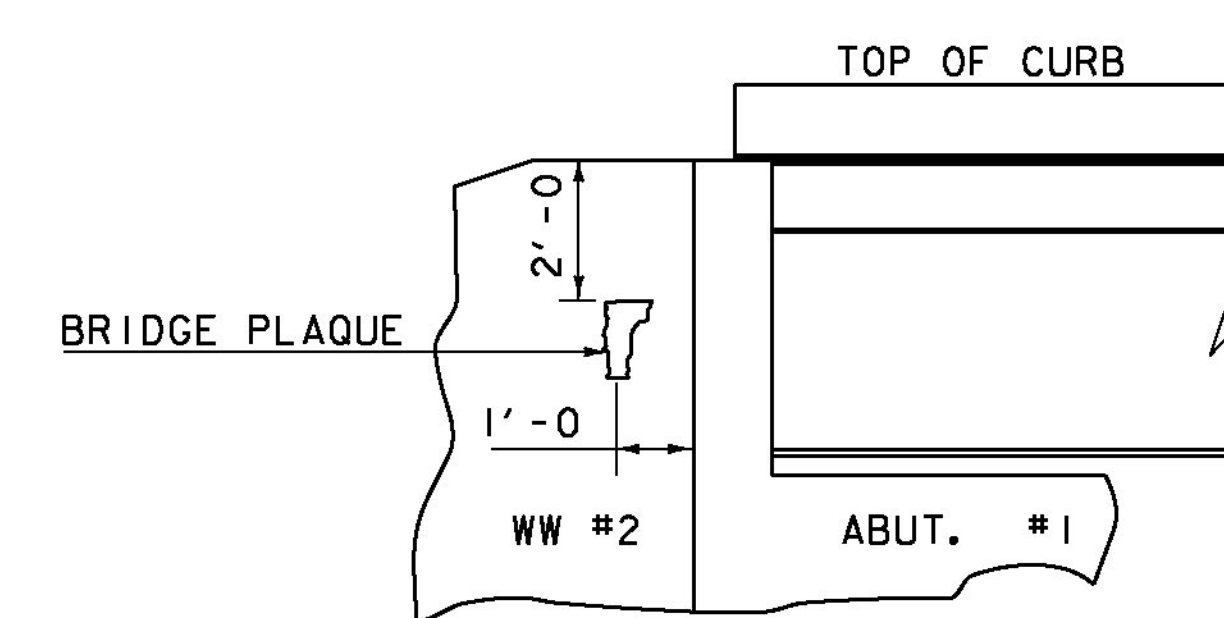
HORIZONTAL WINGWALL  
CONSTRUCTION JOINT  
(NOT TO SCALE)



DRIP NOTCH DETAIL  
(NOT TO SCALE)



PLAN



VIEW "A - A"

BRIDGE PLAQUE  
(NOT TO SCALE)

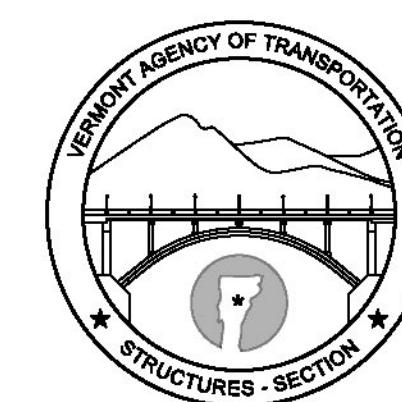
THE BRIDGE PLAQUE WILL BE SUPPLIED BY THE AGENCY OF TRANSPORTATION AND SHALL BE INSTALLED BY THE CONTRACTOR AT ABUTMENT #1 ON THE RIGHT SIDE AS SHOWN OR AS DIRECTED BY THE ENGINEER.

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

REVISIONS

MAY 7, 2010	APPROVED FOR USE BY VAOT STRUCTURES SECTION
JUNE 4, 2010	MODIFIED AND ADDED TWO DETAILS
OCTOBER 10, 2012	MODIFIED HORZ. JOINT WINGWALL ADD 6" MIN. DIMENSION

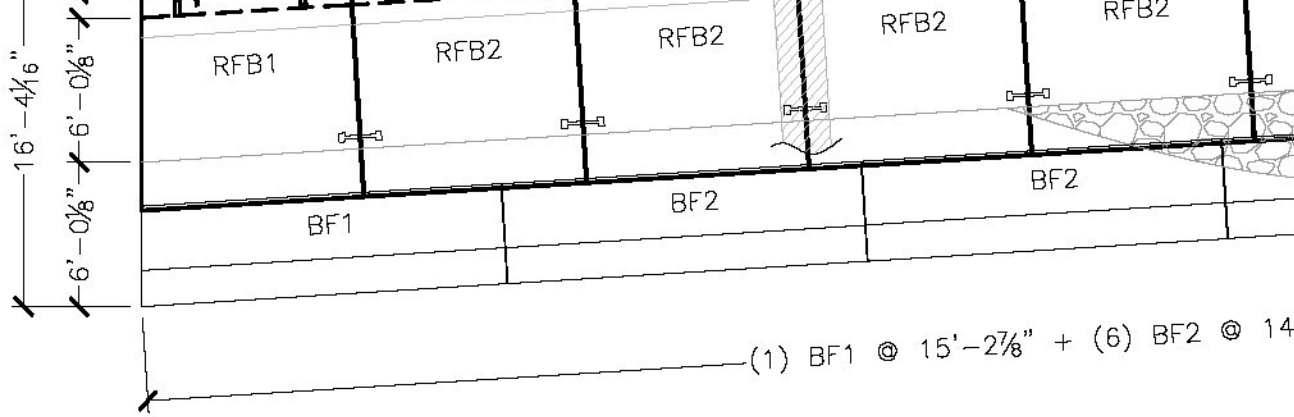
CONCRETE  
DETAILS AND NOTES



STRUCTURES  
DETAIL  
SD-502.00

S:\PROJECTS\CASELLA CONSTRUCTION\SHREWSBURY, VT - VTAOT STP 1443 (44)\DWGS\RFB 12x8 CASELLA 5676.DWG 3/18/2015 9:09 AM

- ELEV: 1002.69
- STREAM INVERT OUT  
ELEV: 995.67
- TOP OF FOOTING  
ELEV: 993.84
- BTM OF FOOTING  
ELEV: 989.66



### BILL OF MATERIALS

QTY	DESCRIPTION	IN STOCK
<b>ITEMS CAST-IN</b>		
114	5-TON UTILITY ANCHORS	
4	RL-4 8TON TECH ANCHORS	
28	1-8NC 6X6 DOUBLE WINGWALL ANCHORS	
6	4" PVC X 10"L SLEEVES	
6	6" X 6" X 4" POCKET	
6	3" PVC X 8" LONG	
6	MB CX-51 COIL THREAD INSERT	
<b>ITEMS FOR PRE-SHIPMENT PREPARATION</b>		
600LF	1" NEOPRENE (25LF/ROLL)	
2 GAL	RED ADHESIVE (250 SF/GAL)	
<b>ITEMS TO SHIP TO THE JOB</b>		
380LF	ROYSTON AHT104 24" WIDE JOINT WRAP (50LF/ROLL)	
4 GAL	ROYBOND 740 ADHESIVE PRIMER (2 ROLLS/GAL)	
4	180DEG 1/2" X 10" X 14" GALV BRACKET	
6	120DEG 1/2" X 10" X 14" GALV BRACKET	
3	128DEG 1" X 10" X 14" GALV BRACKET	
64	1" X 5" GALV ROD WITH PLATE WASHER AND NUT	
6	1" X 13.5" GALV COIL ROD WITH HD NUT AND PLATE WASHER	
18	#6 X 18"L DOWEL	
78	7/8" X 18" GALV ROD W/ 2 NUTS & 4 WASHERS	
204	1/4" SHIMS	

**2**  
S1.

**Vermont**

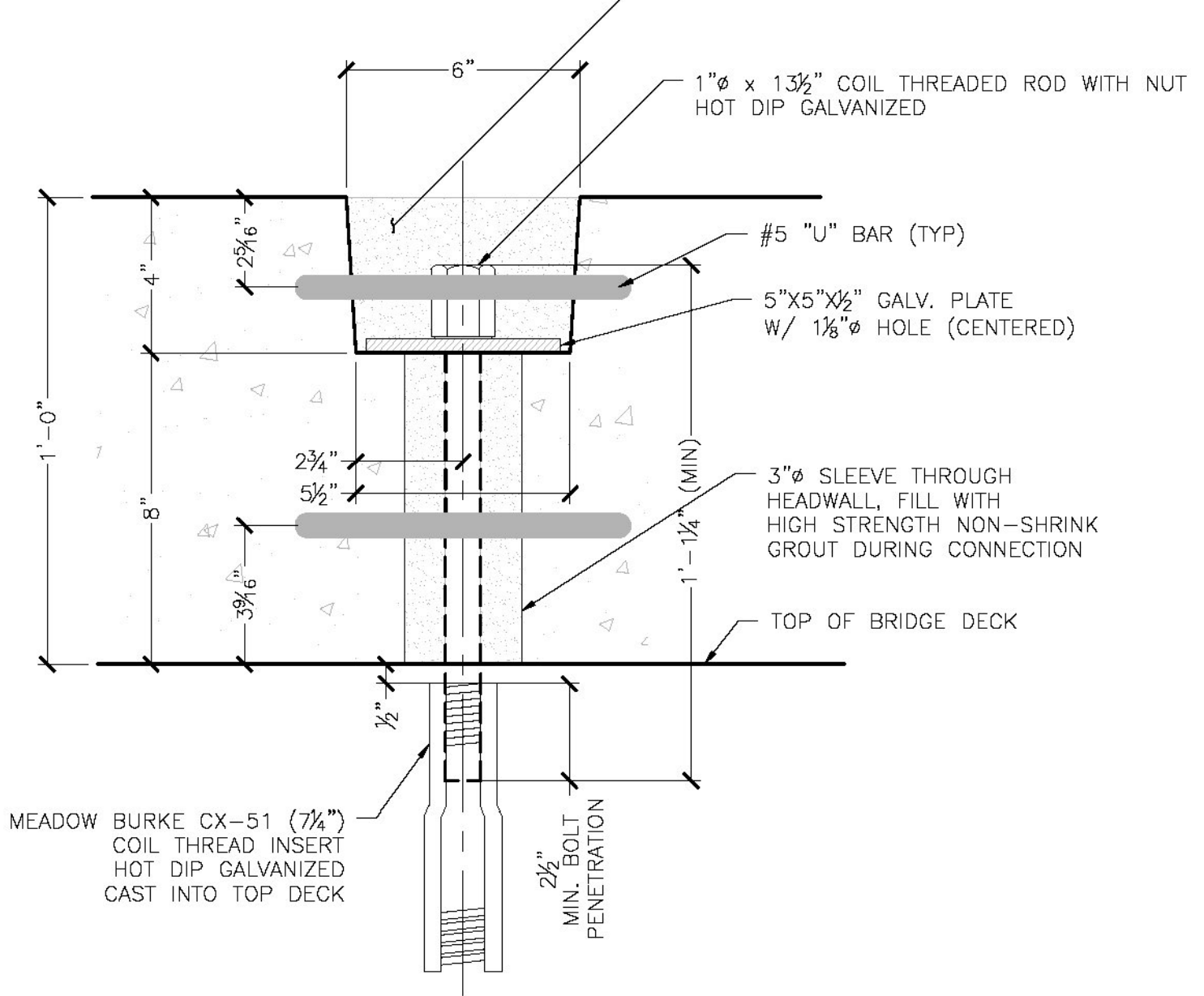
**R**  
Precast Rigid Frame

**CK'D BY C**

**RESUBMIT**

**BY C. CARL**

S:\PROJECTS\CASELLA CONSTRUCTION\SHREWSBURY, VT - VTAOT STP 1443 (44)\DWGS\RFB 12x8 CASELLA 5676.DWG 3/18/2015 9:09 AM

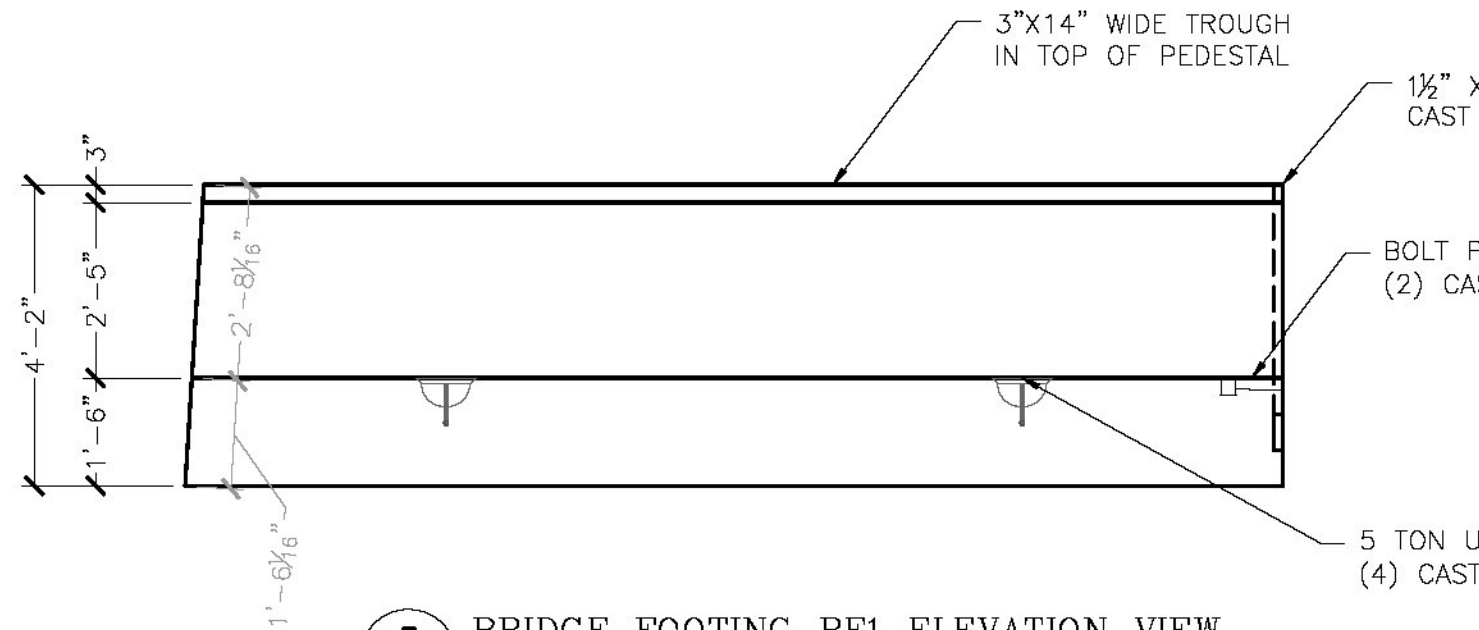


**4** HEADWALL ANCHORAGE DETAIL  
**S2.0** 3" = 1'-0"

5 TON UTILITY ANCHOR  
(4) CAST IN TOP OF

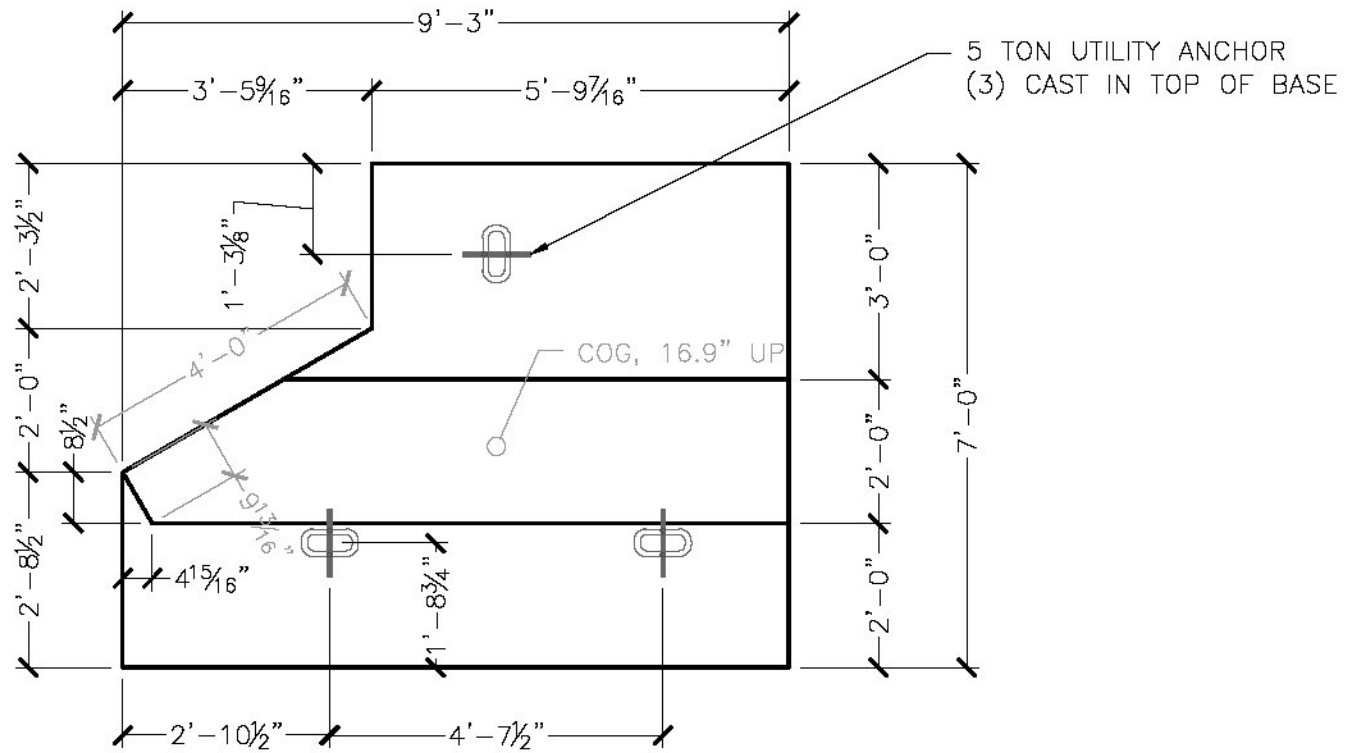
**2** BRIDGE FOOTING BF1 PLAN VIEW  
**S3.0**  $\frac{3}{8}'' = 1'-0''$

**BF1 - 2 REQ'D**  
ITEM #282400  
BASE: 5.06CY  
PEDESTAL: 2.82CY  
TOTAL WT: 33,100#



**3** BRIDGE FOOTING BF1 ELEVATION VIEW  
**S3.0**  $\frac{3}{8}'' = 1'-0''$

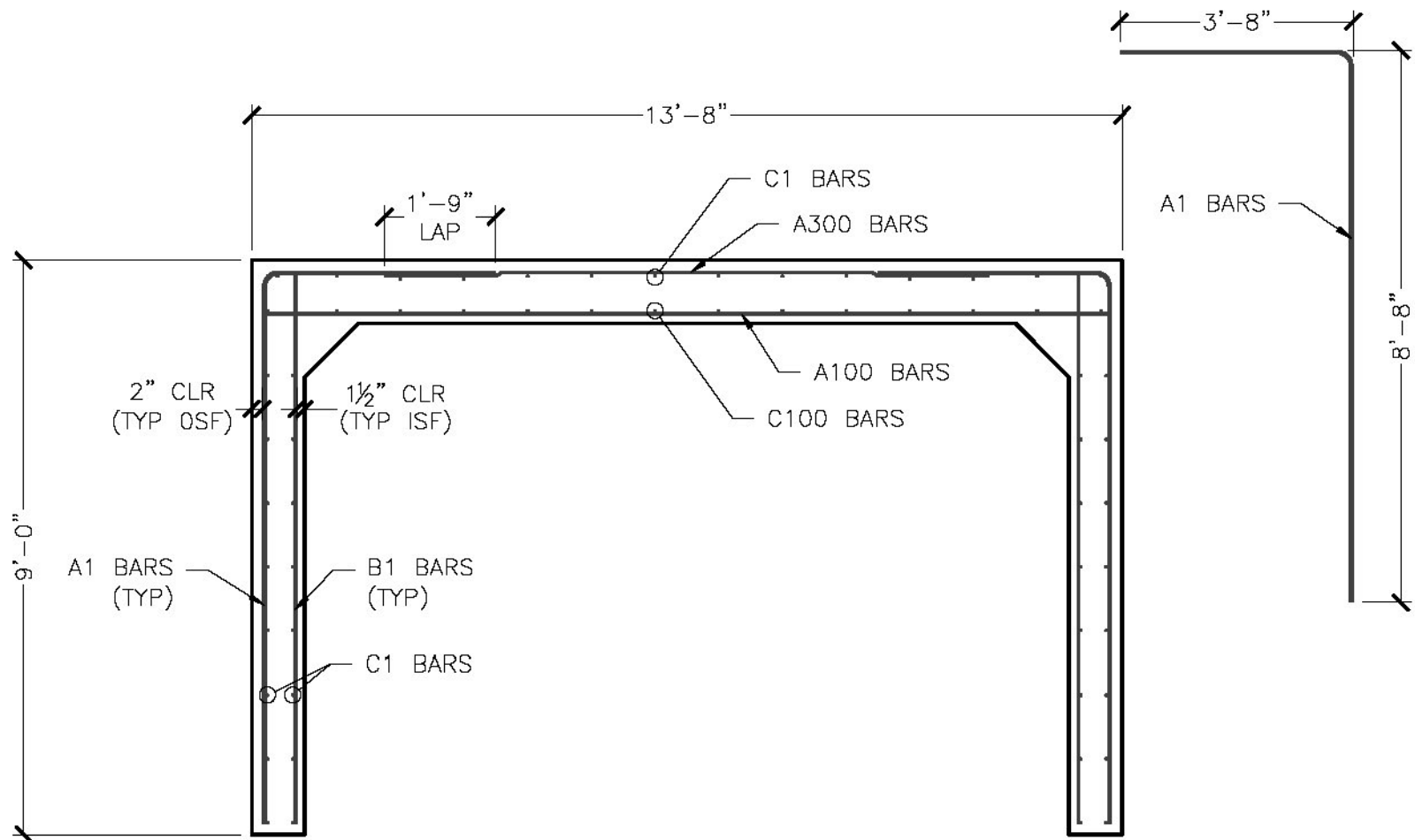
S:\PROJECTS\CASELLA CONSTRUCTION\SHREWSBURY, VT - VTAOT STP 1443 (44)\DWGS\RFB 12X8 CASELLA 5676.DWG 3/18/2015 9:09 AM



**3** WINGWALL FOOTING WWF3 PLAN VIEW  
**S4.0**  $\frac{3}{8}" = 1'-0"$

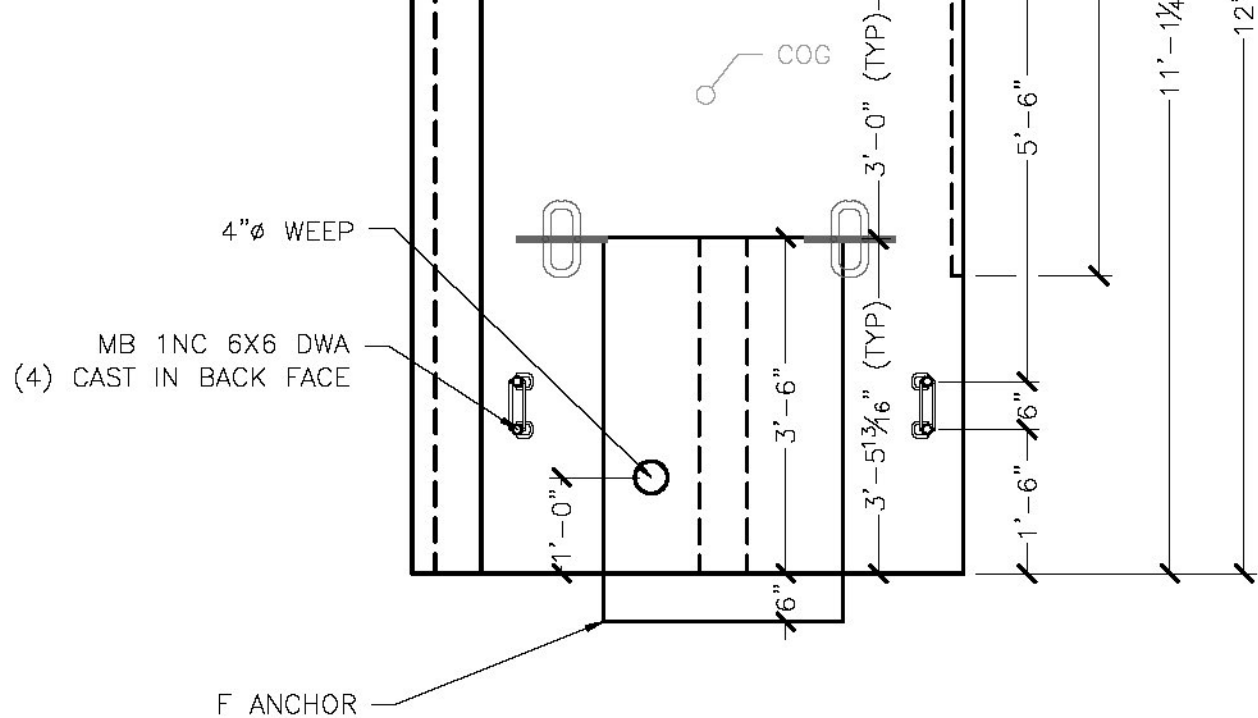
**WWF3 - 1 RE**  
**ITEM #282401**  
**BASE: 2.96CY**  
**PEDESTAL: 1.51CY**  
**TOTAL WT: 18,790#**

**2** RIGID FRAME RFB1 ELEVATION  
**S5.0**  $\frac{3}{8}'' = 1'-0''$



**7** RFB REINFORCING SECTION  
**S5.0**  $\frac{3}{8}'' = 1'-0''$

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# Vermont Agency of Transportation

# RECEIVED

ELEVATION VIEW

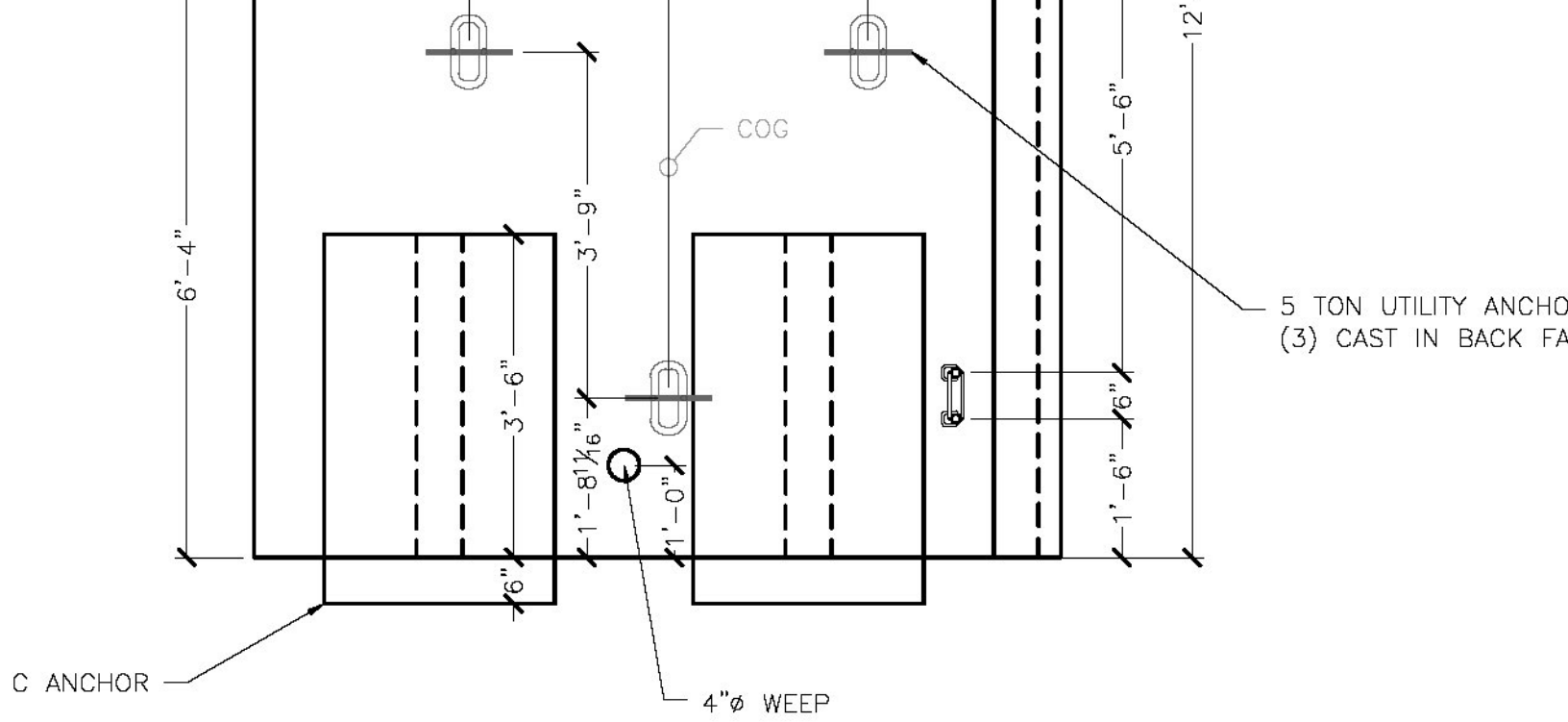
Precast Rigid Frame_ Approved 3.18.15.pdf

**CK'D BY** CLB      **OK'D BY** FDB

**March 18, 2015**

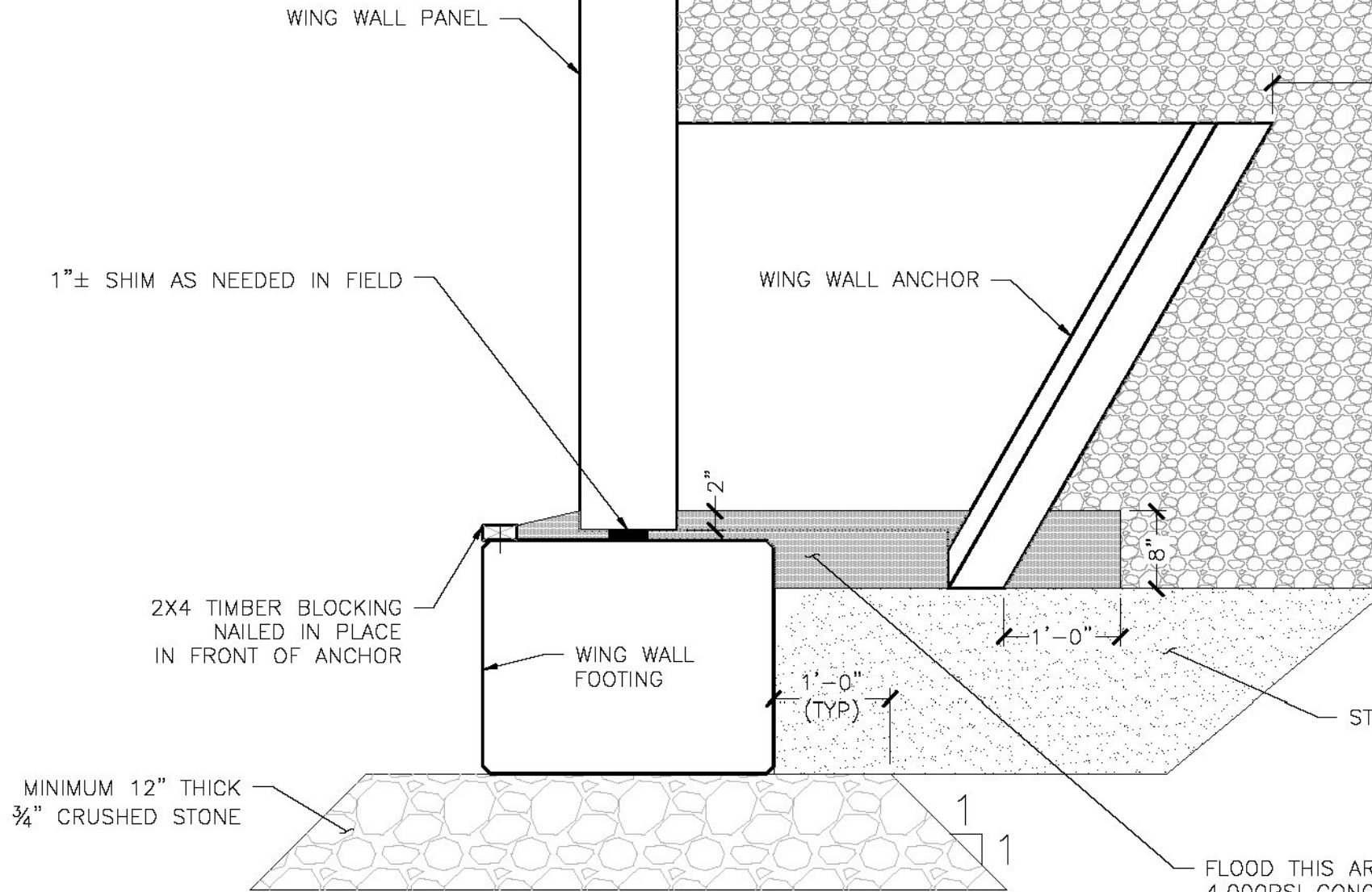
**RESUBMIT** NO      **Approved**

**BY** C. CARLSON      **DATE** 03/18/15



**2** WINGWALL WW3 ELEVATION VIEW  
**S7.0** 1/2" = 1'-0"

S:\PROJECTS\CASELLA CONSTRUCTION\SHREWSBURY, VT - VTAOT STP 1443 (44)\DWGS\RFB 12X8 CASELLA 5576.DWG 3/18/2015 9:09 AM



2  
S8.0

FOOTING TO WW  
ATTACHMENT DETAIL

NTS

**VAOT Project STP 1443 (44)  
Bridge No. 37  
12' x 8' 3-Sided Culvert with Wingwalls  
Lifting Capacity Check  
Shrewsbury, VT**

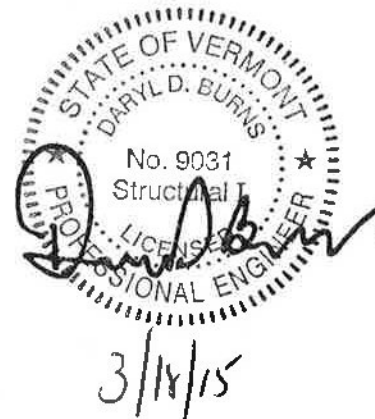
PREPARED BY:

**Michie Corporation  
PO Box 870  
Henniker, New Hampshire 03242**

REVIEWED BY:



860 Hooper Road, Endwell, New York 13760  
TEL: 607-231-6600 FAX: 607-231-6650  
EMAIL: [precast@deltaengineers.com](mailto:precast@deltaengineers.com)  
[www.deltaengineers.com](http://www.deltaengineers.com)



CASE 1 BRIDGE/WINGWALL FOOTINGS

- (4) 5 TON UTILITY ANCHORS. "OXFORD A750-7" CAST IN.
- SAFE WORKING LOAD SWL =  $10^R$  @  $60^\circ$  SLING ANGLE (4:1 SF)
- HEAVIEST PICK, WWF1

$$\frac{40,215 \text{ PICK WT}}{4 \text{ LIFTERS}} = 10,054 \text{ LBS/LIFTER}$$

$$\frac{10,000}{10,054} = 0.995 \text{ WITHIN } 1\%, \text{ SAY } \underline{\underline{OK}}$$

CASE 2 WINGWALL w/ 2 PICK POINTS / DETACHED HEADWALLS

- (3) 5 TON UTILITY ANCHORS. "OXFORD A750-7" CAST IN.
- (2) ANCHORS @ TOP USED FOR SETTING IN PLACE.
- (3) ANCHORS USED WHEN LIFTING OFF TRAILER → (2) ANCHOR CONNECTION CONTROLS.
- SWL  $10^R$  @  $60^\circ$  SLING (4:1 SF)
- HEAVIEST PICK WW1B

$$\frac{18,940 \# \text{ PICK WT}}{2 \text{ LIFTERS}} = 9470 \#/\text{LIFTER}$$

$$\frac{10,000}{9470} = 1.06 > 1 \quad \underline{\underline{OK}}$$

Vermont Agency of Transportation

**RECEIVED**

CK'D BY CLB OK'D BY FDB

March 18, 2015

RESUBMIT NO Approved

BY C. CARLSON DATE 03/18/15

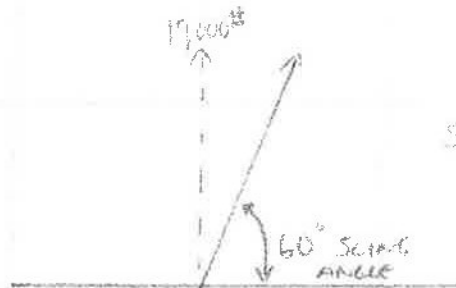
- STON UTILITY ANCHOR " OXFORD A1750-7" (1ST IN).
- CONTROLLING CONDITION, (4) ANCHORS @ TOP USED FOR SETTING IN PLACE.
- SWL 10^k @ 60° SLING (LH SE).
- HEAVIEST PICK, W04A.

$$\frac{24,700^{\#} \text{ PICK WT}}{4 \text{ LIFTERS}} = 6175^{\#} / \text{LIFTER}$$

$$\frac{10,000}{6175} = 1.62 > 1 \quad \underline{\underline{\text{OK}}}$$

#### CASE 4 RIGID FRAME (SETTING IN FIELD)

- (4) 2 1/2"  $\phi$  HOLES - CAST IN DECK.
- MUNCY TEACUP FITTING TC-32 WITH TC-32A 1" SLING AND NB-32 BUTTON.
- CONTROLLING CAPACITY IS 1" SLING - 19,000[#] W/ VERTICAL PICK



$$\begin{aligned} \text{SLING CAPACITY @ } 60^{\circ} &= 19^k \sin(60) \\ &= 16,450^{\#} \end{aligned}$$

- HEAVIEST PICK, RFBZ.

$$\frac{39,850^{\#}}{4 \text{ POINTS}} = 9960^{\#}$$

$$\frac{16,450^{\#}}{9960^{\#}} = 1.65 > 1 \quad \underline{\underline{\text{OK}}}$$

- (2) 2½" Ø HOLES IN DECK + (2) MB RL-4 TECH ANCHORS IN LEGS
- ASSUME 60° SLING ANGLE
- HANDLED WITH FORKLIFT(S)
- HEAVIEST PICK, RFB2.

$$\frac{39,850^{\#}}{4 \text{ POINTS}} = 9960^{\#} \text{ PER PICK POINT.}$$

- 1" Ø SLING CHECKED ON CASE 4

= CHECK MB RL-4 TECH ANCHOR @ 60° SLING ANGLE = 16^K SIN(60) = 13.86^K

$$\frac{13,860^{\#}}{9960^{\#}} = 1.39 > 1 \quad \underline{\underline{OK}}$$

Vermont Agency of Transportation

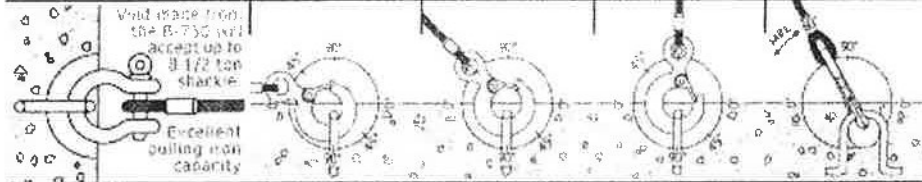
**RECEIVED**

Revised Sign Frame, Approved 2/12/14

CK'D BY CLB OK'D BY FDB

March 18, 2015

RESUBMIT NO Approved  
BY C. CARLSON DATE 03/18/15



Anchor Product Code	Slab Min. Inches	Safe Working Load @ 90 degree Shear-0 degree Pull	Safe Working Load @ 90 degree Shear-45 degree Pull	Safe Working Load @ 90 degree Tension-90 degree Pull	Safe Working Load @ 90 degree Shear-60 degree Pull
A 500-3	4.00"	4,500	4,000	3,500	4,000
A 500-4	5.00"	8,000	5,500	4,000	5,000
A 500-5	6.00"	10,500	6,500	5,000	5,500
A 750-5	6.00"	12,500	8,000	7,000	7,000
A 750-7	8.00"	15,000	12,500	10,000	10,000

Note: Safe Working Load provides a factor of safety of approximately 4:1

Test Results are based on a minimum concrete compressive strength of 4,000 psi.

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Home	B-500 & B-750	S-150	S-300	Lift Anchor & Order Form	Concrete Products
Pull Iron Capacity	Anchors & Accessories	Toggle-Lok	Insert/Lift Anchor	Grid-Lok/Rebar Chair	Helpful Calculations

Vermont Agency of Transportation

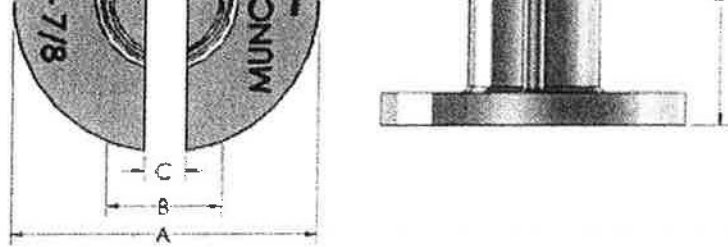
**RECEIVED**

Revised Dept Form, Approved 9/2/10 pd

CK'D BY CLB      OK'D BY FDB

March 18, 2015

RESUBMIT NO      **Approved**  
 BY C. CARLSON      **DATE** 03/18/15



- An efficient way to handle concrete pipes
- Light weight design
- Available with 7" and 12" diameter flanges.
- To be used with our special Muncy™ Machine NB Buttons

		A	B	C	D	Weight	
TC-24	3/4" - 7/8"	7.00	2.50	0.938	5.75	9.5 lbs	<u>NB-24, NB-28</u>
TC-32	1" - 1-1/8"	7.00	2.50	1.250	5.75	9.5 lbs	<u>NB-32, NB-36</u>
TC-40	1-1/4"	7.00	3.00	1.375	5.75	10 lbs	<u>NB-40</u>

		A	B	C	D	Weight	
TC-24A	3/4" - 7/8"	12.00	2.50	0.938	5.75	26 lbs	<u>NB-24, NB-28</u>
TC-32A	1" - 1-1/8"	12.00	2.50	1.250	5.75	26 lbs	<u>NB-32, NB-36</u>
TC-40A	1-1/4"	12.00	3.00	1.375	5.75	27 lbs	<u>NB-40</u>

## RATED CAPACITY

~~TC-24 / TC-24A~~

~~3/4" - 10,864-LBS WLL~~

~~7/8" - 14,744-LBS WLL~~

TC-32 / TC-32A

1" - 19,012-LBS WLL

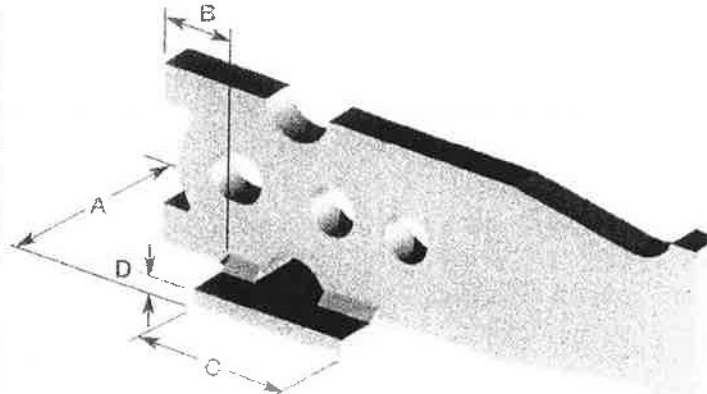
1-1/8" - 23,280-LBS WLL

~~TC-40 / TC-40A~~

~~1-1/4" - 29,100-LBS WLL~~

**(6015) RL-4 RAPID LIFT TECH ERECTION ANCHOR WITH SHEAR PLATE**  
**STD: 2-Ton, 4-Ton and 8-Ton High Capacity: 2.5-Ton, 5-Ton and 10-Ton**

The RL-4 Tech Erection Anchor with Plate is similar in design and use to the RL-3 Tech Erection Anchor, but has the added shear plate to eliminate the need for a shear bar. This design feature gives the anchor a smaller height envelope allowing it to be used in thinner concrete panels. This anchor is available in the sizes shown in the table and in plain or hot dip galva- nize finish.



See Ring Clutches on page 46, 47, and 48, the Recessing Members on 49, 50 and 51, and the Tension Bars on page 38.

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RL-4 TECH ERECTION ANCHOR WITH PLATE									
Ring Clutch System	Clutch I.D.	Item Number Standard	Item Number High Capacity	A	B	C	D	Weight (lbs)	Minimum Panel Thickness
2T/2.5T	2.5T	79527SP	79527SPHC	2 1/2"	3/4"	3"	1/4"	2.12	3 1/2"
4T/5T	5T	79548SP	79548SPHC	2 1/2"	1 1/4"	3"	3/8"	4.93	4"
8T/10T	10T	79589SP	79589SPHC	3"	1 5/8"	3 1/2"	3/8"	10.33	7"

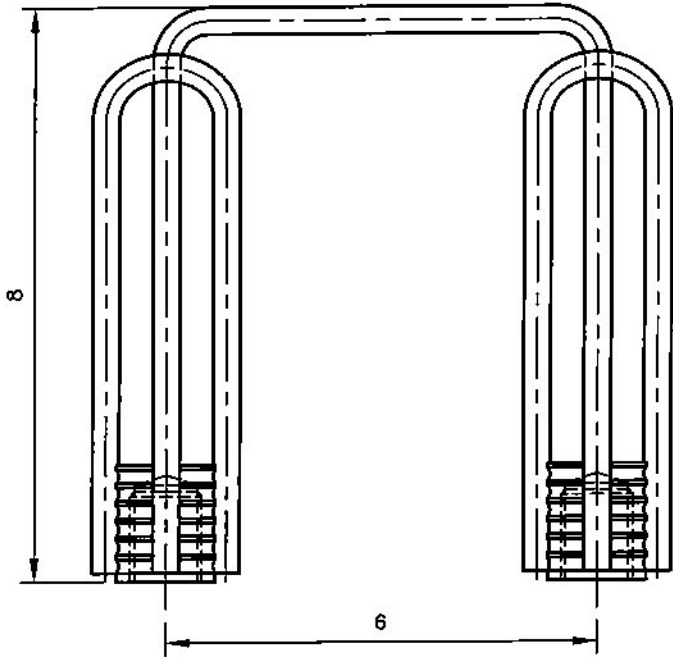
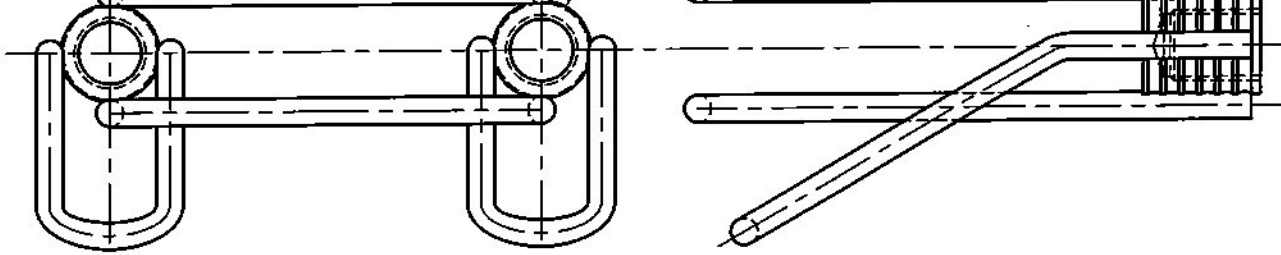
See Standard RL-3 Tech Erection Anchor for all other dimensions.

RL-4 2-TON, 4-TON, 8-TON								Standard	High Capacity
Ring Clutch System	Clutch I.D.	Item Number Standard	Item Number High Capacity	Panel Thickness in Inches	SHEAR 2.66:1 Safety Factor (lbs)	SHEAR 4:1 Safety Factor (lbs)	TENSION w/o Tension Bar 4:1 Safety Factor (lbs)	TENSION w/ Tension Bar 4:1 Safety Factor (lbs)	TENSION w/ Tension Bar 4:1 Safety Factor (lbs)
2T/2.5T	2.5T	79527SP	79527SPHC	3 1/2" min.	2150	1130	2640	4000	5000
2T/2.5T	2.5T	79527SP	79527SPHC	4"	2930	1950	3190	4000	5000
2T/2.5T	2.5T	79527SP	79527SPHC	4 1/2"	3040	2020	3550	4000	5000
2T/2.5T	2.5T	79527SP	79527SPHC	5"	3160	2100	3900	4000	5000
4T/5T	5T	79548SP	79548SPHC	4" min.	2710	1800	3400	8000	10,000
4T/5T	5T	79548SP	79548SPHC	4 1/2"	3710	2470	3360	8000	10,000
4T/5T	5T	79548SP	79548SPHC	5"	4000	2660	4730	8000	10,000
4T/5T	5T	79548SP	79548SPHC	5 1/2"	4160	2770	4970	8000	10,000
4T/5T	5T	79548SP	79548SPHC	6"	4290	2860	5170	8000	10,000
8T/10T	10T	79589SP	79589SPHC	7" min.	6030	4010	7100	16,000	20,000
8T/10T	10T	79589SP	79589SPHC	7 1/2"	6630	4010	7220	16,000	20,000
8T/10T	10T	79589SP	79589SPHC	8"	6030	4010	7690	16,000	20,000

Table is based on dead load only, 150 PCF and a standard concrete compressive strength of 3,500 psi.

- 1) The 2.66:1 safety factor is commonly used for back stopping operations. Increased safety factor may be required for unusual live loads or cable magnification.
- 2) Given full embedment, reinforcement and minimum compressive strength concrete, Tech Erection Anchors should achieve a pull out strength equal to their ultimate mechanical strength.

To order, specify: quantity, name, item number and finish.



NOTES:

1. S.W.L. IN TENSION IS 15,800 LBS W/ A MIN. EDGE DISTANCE = 16"
2. S.W.L. IN SHEAR IS 15,800 LBS W/ A MIN. EDGE DISTANCE = 36"
3. SAFETY FACTOR 3:1
4. 1/2" SETBACK
5. 3000 PSI CONCRETE

**MB** MeadowBurke[®]  
reinforcing concrete solutions

APPROVED BY	TITLE <b>DOUBLE WALL ANCHOR 1-8NC 6 X 8</b>	PRODUCT SERIES FERRULE INSERTS
LAST REV. DATE	DATE <b>8-28-09</b>	DRAWING NO. <b>A-1298-C</b>
	DRAWN BY <b>T.STORTZ</b>	