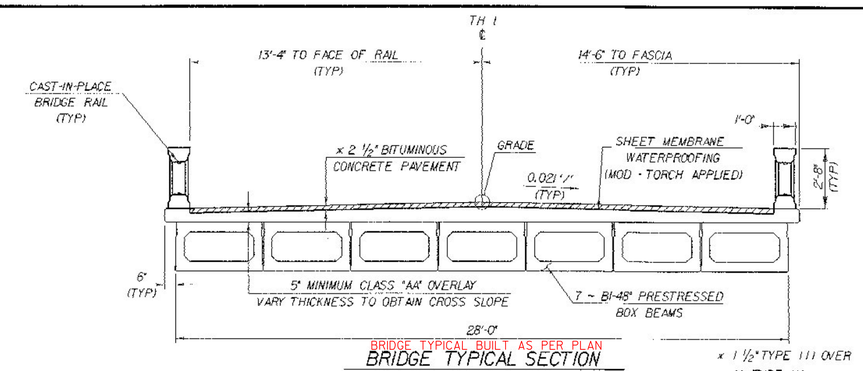
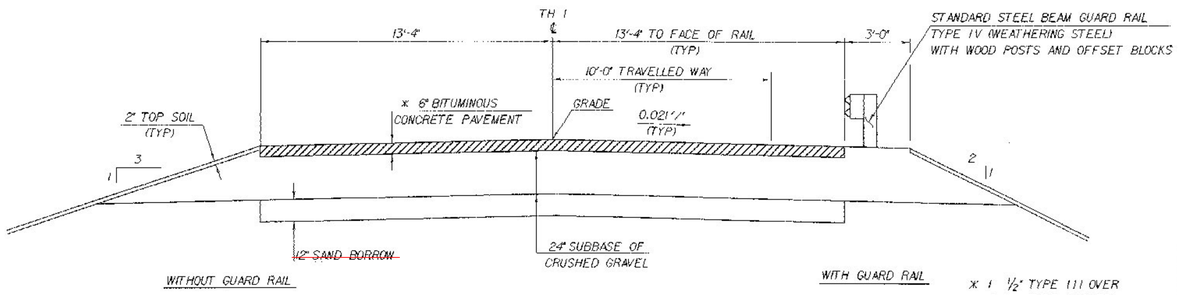


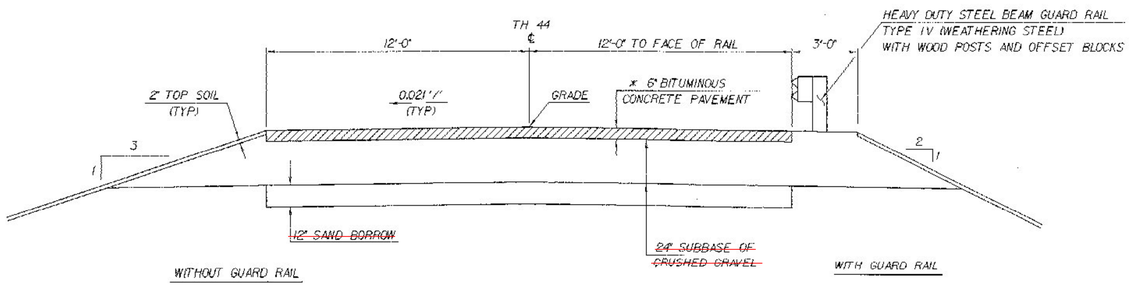
BRIDGE TYPICAL SECTION

SCALE 3/8" = 1'-0



TH 1 ROADWAY TYPICAL SECTION

SCALE 3/8" = 1'-0



TH 44 ROADWAY TYPICAL SECTION

SCALE 3/8" = 1'-0

~~x 1 1/2" TYPE III OVER~~
~~2 " TYPE II OVER~~
~~2 1/2" TYPE I~~

TRAFFIC DATA

YEAR	ADT	DHV	% D	% T	ADTT
1992	2410	340	74	02	na
2012	3260	455	74	02	na

18 Kip ESAL for flexible pavement from 1992 to 2012: 789,000
18 Kip ESAL for flexible pavement from to : N/A
Design speed: 30 mph

FINAL HYDRAULICS REPORT

HYDROLOGIC DATA

DRAINAGE AREA= 15.7 sq. mi. (40.7 sq. km)
CHARACTER OF TERRAIN: Hilly to mountainous
CHARACTER & TYPE OF STREAM: Straight, narrow flood plain, not incised, braided, or anabranched, moderate relief valley
NATURE OF STREAMBED: Gravel, cobbles, and boulders

Q2.33= 1000 cfs (28.3 cms) Q50= 2800 cfs (79.3 cms)
Q10= 1850 cfs (52.4 cms) Q100= 3350 cfs (94.9 cms)
Q25= 2400 cfs (68.0 cms) Q500= 5700 cfs (161.4 cms)

DATE OF FLOOD OF RECORD: Unknown
WATER SURFACE ELEV.: Unknown ESTIMATED DISCHARGE: Unknown
NATURAL STREAM VELOCITY @ Q25 = 5.9 fps (3.02 mps)
ICE CONDITIONS: Moderate DEBRIS: Moderate
DOES THE STREAM REACH MAXIMUM HIGHWATER ELEVATION RAPIDLY? Yes
IS ORDINARY RISE RAPID? Yes
IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? No
IF YES, DESCRIBE.
WATERSHED STORAGE (X) HEADWATERS ( ) UNIFORM THROUGHOUT WATERSHED (X) IMMEDIATELY ABOVE SITE

EXISTING STRUCTURE

STRUCTURE TYPE: Single span concrete side girder YEAR BUILT: 1922
CLEAR SPAN (NORMAL TO STREAM): 45 ft. (13.7 m)
VERTICAL CLEARANCE ABOVE STREAMBED: 9.5 ft. (2.9 m)
WATERWAY OF FULL OPENING: 435 sq. ft. (40.4 sq. m)
DISPOSITION OF STRUCTURE: Remove
TYPE OF MATERIAL UNDER SUBSTRUCTURE: Unknown
WATER SURFACE ELEV. @ Q2.33= 792.1 VELOCITY= 9.1 fps (2.77 mps)
Q10= 794.8 " = 11.0 fps (3.35 mps)
Q25= 795.5 " = 12.0 fps (3.66 mps)
Q50= 796.2 " = 12.6 fps (3.84 mps)
Q100= 797.1 " = 13.3 fps (4.05 mps)
LONG TERM STREAM BED CHANGES: 1 ft. (0.3 m) of channel degradation estimated since bridge built in 1922.
IS THE ROADWAY OVERTOPPED BELOW THE Q100? No FREQUENCY:
RELIEF ELEVATION: DISCHARGE OVER ROAD @ Q100:

UPSTREAM STRUCTURE: TOWN: Underhill DISTANCE: 0.4 mi. (0.6 km)
HIGHWAY NO.: T.H. 1 STRUCTURE NO.: 8
STRUCTURE TYPE: Single span steel beam bridge w/ conc. deck
CLEAR SPAN: 61 ft. (18.6 m) CLEAR HEIGHT: 7 ft. (2.1 m)
YEAR BUILT: 1957 FULL WATERWAY: 425 sq. ft. (39.5 sq. m)

DOWNSTREAM STRUCTURE: TOWN: Jericho DISTANCE: 3.1 mi. (5.0 km)
HIGHWAY NO.: Vt. 15 STRUCTURE NO.: 10
STRUCTURE TYPE: Single span steel beam bridge w/ conc. deck
CLEAR SPAN: 65 ft. (19.8 m) CLEAR HEIGHT: 12 ft. (3.7 m)
YEAR BUILT: 1982 FULL WATERWAY: 800 sq. ft. (74.3 sq. m)

PROPOSED STRUCTURE

STRUCTURE TYPE: Single span concrete box beam bridge
CLEAR SPAN (NORMAL TO STREAM): 50 ft. (15.2 m)
VERTICAL CLEARANCE ABOVE STREAMBED: 9.6 ft. (2.93 m)
WATERWAY OF FULL OPENING: 485 sq. ft. (45.1 sq. m)

WATER SURFACE ELEV. @ Q2.33= 791.9 VELOCITY= 7.0 fps (2.13 mps)
Q10= 794.4 " = 9.6 fps (2.93 mps)
Q25= 794.9 " = 10.0 fps (3.05 mps)
Q50= 795.8 " = 12.1 fps (3.69 mps)
Q100= 796.5 " = 12.8 fps (3.90 mps)

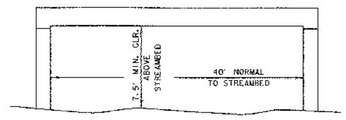
IS THE ROADWAY OVERTOPPED BELOW THE Q100? No FREQUENCY:
RELIEF ELEVATION: DISCHARGE OVER ROAD @ Q100:

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 797.6 (downstream side)
VERTICAL CLEARANCE @ Q100 = 1.1 ft. (0.34 m)

SCOUR: 3 ft. (0.9 m) total scour at Q100. (contraction & long term)
REQUIRED CHANNEL PROTECTION: Stone Fill, Type II

PERMIT INFORMATION

AVERAGE DAILY FLOW= 30 cfs (0.8 cms)
ORDINARY LOW WATER= 15 cfs (0.4 cms) DEPTH= 1 ft. (0.3 m)
ORDINARY HIGH WATER= 430 cfs (12.2 cms) DEPTH= 2 ft. (0.9 m)



TEMPORARY BRIDGE REQUIREMENTS

NTS

MATERIAL ITEM	TOLERANCE
PAVEMENT	±1/4" TOTAL THICKNESS
AGGREGATE SURFACE COURSE	±1/2"
BASE COURSE	±1/2"
SUBBASE	±1"
SAND BORROW	±1"
GRANULAR BORROW	±1"

DESIGN CRITERIA:

1. DESIGN LIVE LOAD AASHTO: MS-25
2. DESIGN SPAN: 58'-0"
3. ALLOWABLE LOAD FOR SPREAD FOOTINGS ON SOIL: 6 ksf ON LEDGE: N/A
4. ALLOWABLE LOAD FOR PILING: N/A TYPE: N/A ESTIMATED LENGTH: N/A
5. STRUCTURAL STEEL AASHTO GRADE: N/A
6. REINFORCING STEEL GRADE 60
7. CONCRETE CLASS A f'_c = 4000 PSI f_c=1600 psi
   CONCRETE CLASS B f'_c = 3500 PSI f_c=1400 psi
   SILICA-FUME CONCRETE f'_c = 5000 PSI f_c=2000 psi
8. CONCRETE CLASS AA f'_c = 4000 PSI f_c=1600 psi

TRAFFIC MAINTENANCE:

1. IS TRAFFIC TO BE MAINTAINED? YES IF YES, ON EXISTING STRUCTURE NO OR ON TEMPORARY BRIDGE YES
2. TEMPORARY BRIDGE REQUIREMENTS: ONE OR TWO WAY ? TWO-WAY TRAFFIC CONTROL SIGNALS REQUIRED NO
   MINIMUM CLEAR SPAN (NORMAL TO STREAM) 40' (12.2 m) MINIMUM CLEAR HEIGHT 7.5 ft. (2.3m)
   MINIMUM WATERWAY AREA 300 sq. ft. (27.8 sq.m)
   ARE SIDEWALKS REQUIRED? NO IF SO, ON WHAT SIDE?
   STRUCTURE TYPE SINGLE SPAN BRIDGE (TO BE REMOVED BEFORE WINTER)

ALLOWABLE STRESS LOAD RATING (TONS)

LOADING LEVELS (LOAD FACTOR)	TRUCK						
	H	HS	3S2	6 AXLE	3A. STR.	4A. STR.	5A. SEMI
INVENTORY *	57	70					
POSTED **	60	74	98		65	67	85
OPERATING ***		79	104	118	69	72	

* INVENTORY STRESSES
1) BOX BEAM TENSION = -465 psi
2) BOX BEAM COMPRESSION = 2400 psi
3) OVERLAY COMPRESSION = 1600 psi

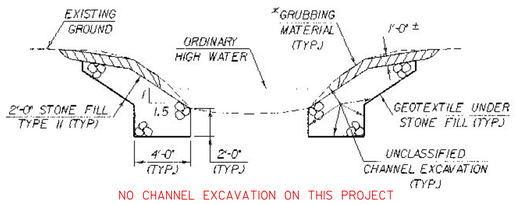
** POSTED STRESSES
1) BOX BEAM TENSION = -519 psi
2) BOX BEAM COMPRESSION = 2948 psi
3) OVERLAY COMPRESSION = 1985 psi

*** OPERATING STRESSES
1) BOX BEAM TENSION = -581 psi
2) BOX BEAM COMPRESSION = 3300 psi
3) OVERLAY COMPRESSION = 2200 psi

STATE OF VERMONT
AGENCY OF TRANSPORTATION

Town Of UNDERHILL — Bridge No. 9
Highway No. TH 1 — Log Sta. — Surv. Sta. 18+27
TH 1 OVER BROWNS RIVER
PRELIMINARY INFORMATION
Designed By K.M. HIGGINS — Drawn By K.M. HIGGINS
Checked By P.M. THURBER Date 5/96 — Bridge Design Supervisor C.P. WILLIAMS Date 2/95
PROJECT UNDERHILL — PROJECT NO. BRS 0233(2)
I.G.C. Info. MN88J099\Structures\s1099p1.dgn s1099p1.1
Bridge Sheet No. Sheet 2 of 43

PLOTTED 2-14-2000



NO CHANNEL EXCAVATION ON THIS PROJECT

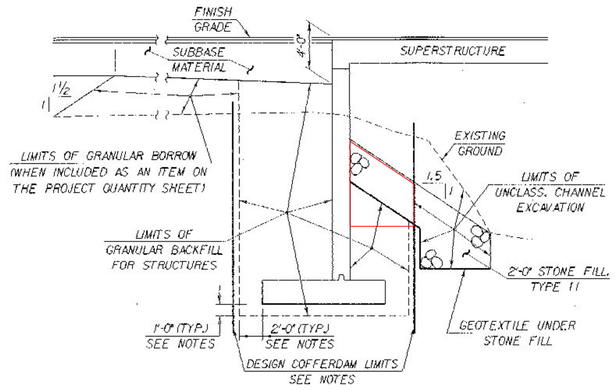
TYPICAL CHANNEL SECTION

(NOT TO SCALE)

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

NOTES

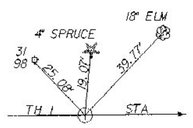
1. ACTUAL COFFERDAM LIMITS TO BE DETERMINED BY THE CONTRACTOR.
2. THE DESIGN LIMITS OF COFFERDAM SHALL BE 2'-0" OUTSIDE THE PERIMETER OF SUBSTRUCTURE FOOTING. THE QUANTITY TO BE MEASURED FOR PAYMENT FOR EXCAVATION INSIDE THE COFFERDAM WILL BE MEASURED FROM THE DESIGN LIMITS OF COFFERDAM AS SHOWN IN THE CONTRACT PLANS.
3. ONE FOOT UNDERCUT AS DETERMINED NECESSARY BY THE RESIDENT ENGINEER.
4. IF A COFFERDAM IS CONSTRUCTED WHICH IS LARGER THAN THE DESIGN LIMITS OF COFFERDAM, PAYMENT FOR ALL UNCLASSIFIED CHANNEL EXCAVATION INCLUDING THAT PORTION WHICH IS INSIDE THE COFFERDAM BUT OUTSIDE THE DESIGN COFFERDAM LIMITS SHOWN WILL BE MADE AT THE CONTRACT UNIT PRICE FOR UNCLASSIFIED CHANNEL EXCAVATION.



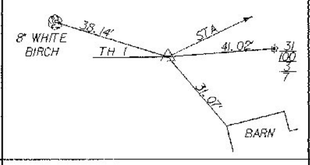
TYPICAL ABUTMENT SECTION

(NOT TO SCALE)

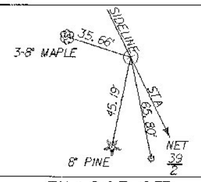
TH 1 P.O.T 20+00
SIDELINE P.O.T 5+00



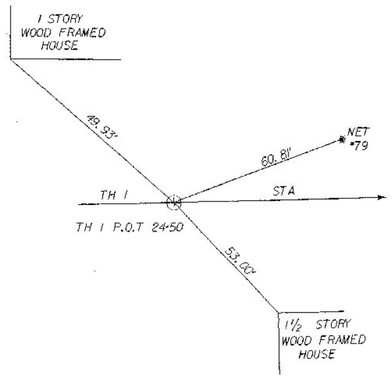
TH 1 P.I 21+90



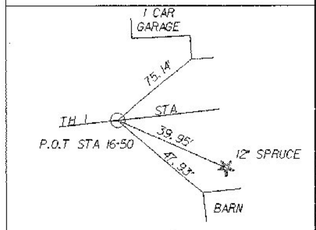
SIDELINE 7+00



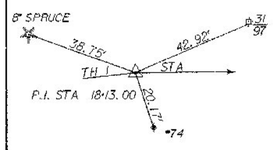
TH 1 P.O.T 24+50



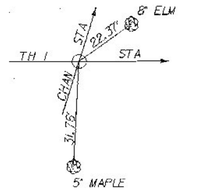
P.O.T STA 16+50



P.I. STA 18+30

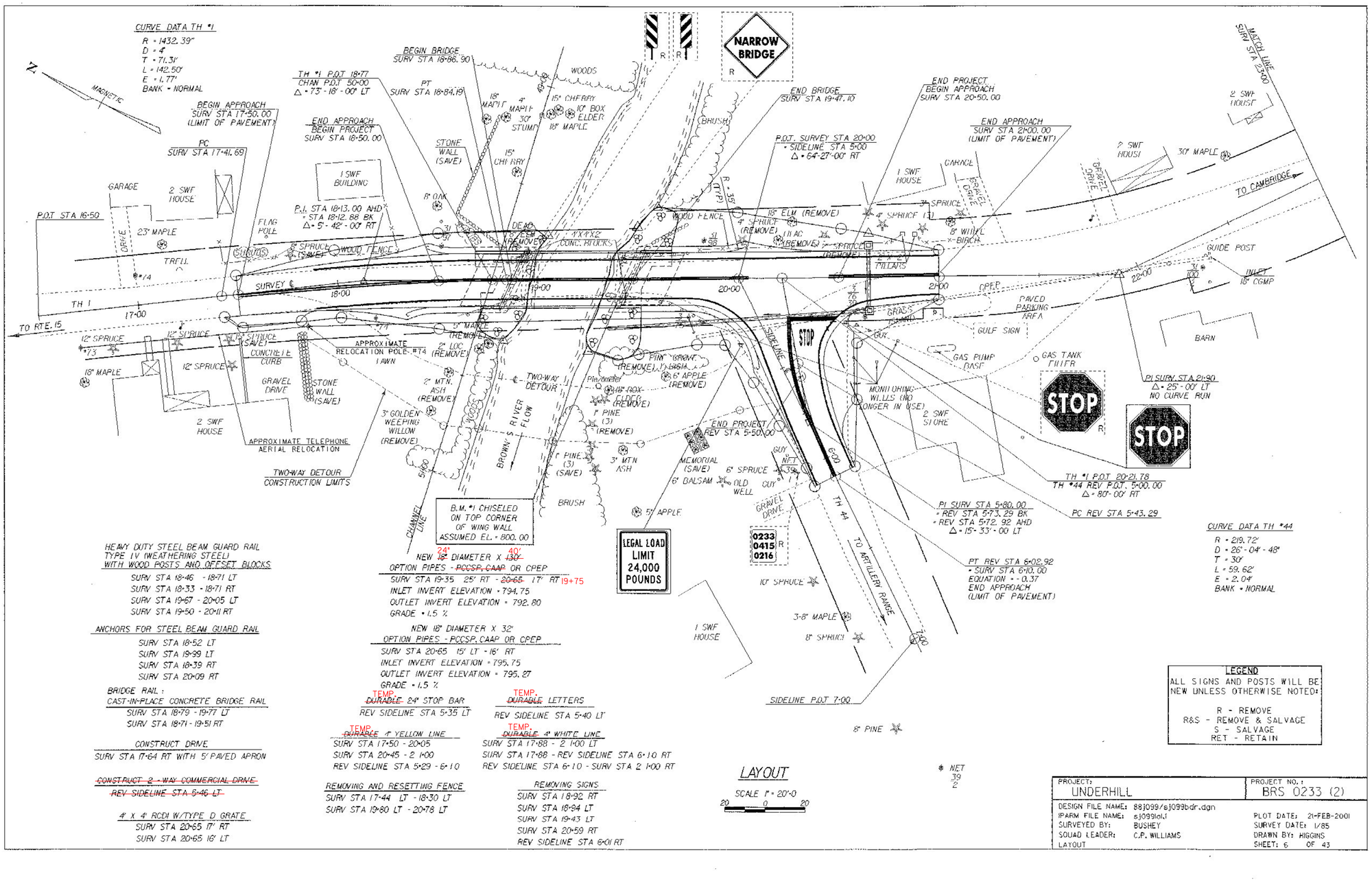


TH 1 P.O.T 18+77
CHAN P.O.T 50+00

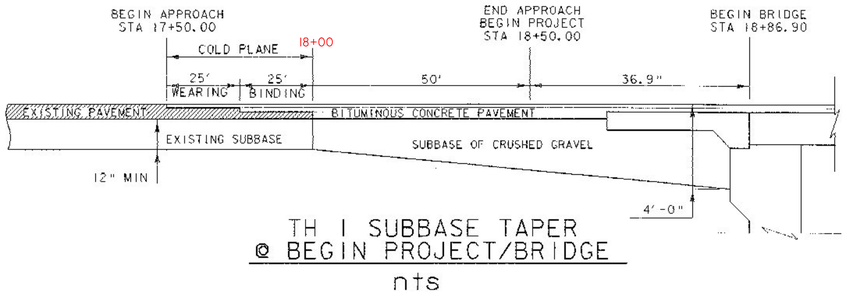


TIES ARE NOT TO SCALE

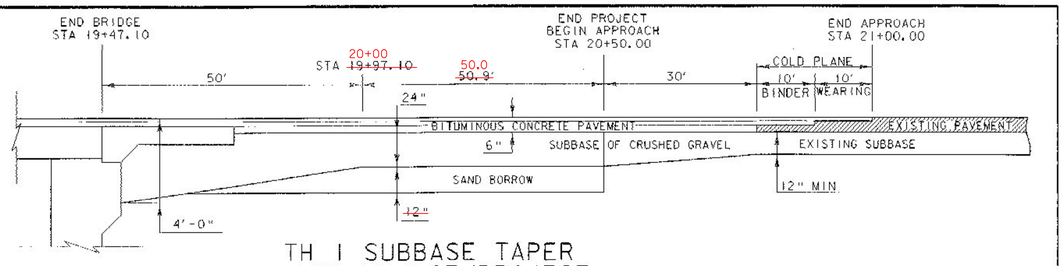
PROJECT: UNDERHILL	PROJECT NO.: BRS 0233 (2)
DESIGN FILE NAME: 88J099/sj099tle.dgn	
IPARM FILE NAME: sj099tle.i	PLOT DATE: 21-FEB-2001
SURVEYED BY: BUSHEY	SURVEY DATE: 1/85
SQUAD LEADER: C.P. WILLIAMS	DRAWN BY: W. SYMONDS
TIES AND EARTHWORK TYPICAL SECTIONS	SHEET: 5 OF 43



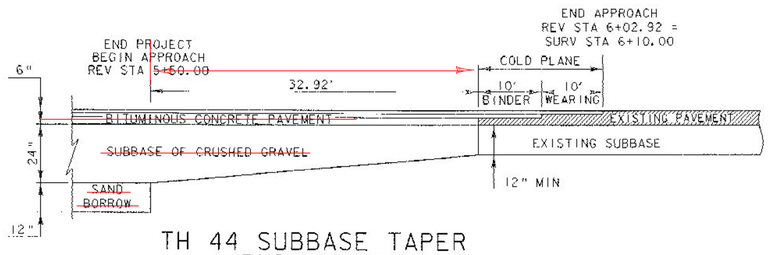
PROJECT: UNDERHILL	PROJECT NO.: BRS 0233 (2)
DESIGN FILE NAME: 88j099/sj099bdr.dgn	
PARM FILE NAME: sj099lol	PLOT DATE: 21-FEB-2001
SURVEYED BY: BUSHEY	SURVEY DATE: 1/85
SQUAD LEADER: C.P. WILLIAMS	DRAWN BY: HIGGINS
LAYOUT	SHEET: 6 OF 43



TH 1 SUBBASE TAPER
@ BEGIN PROJECT/BRIDGE
nts

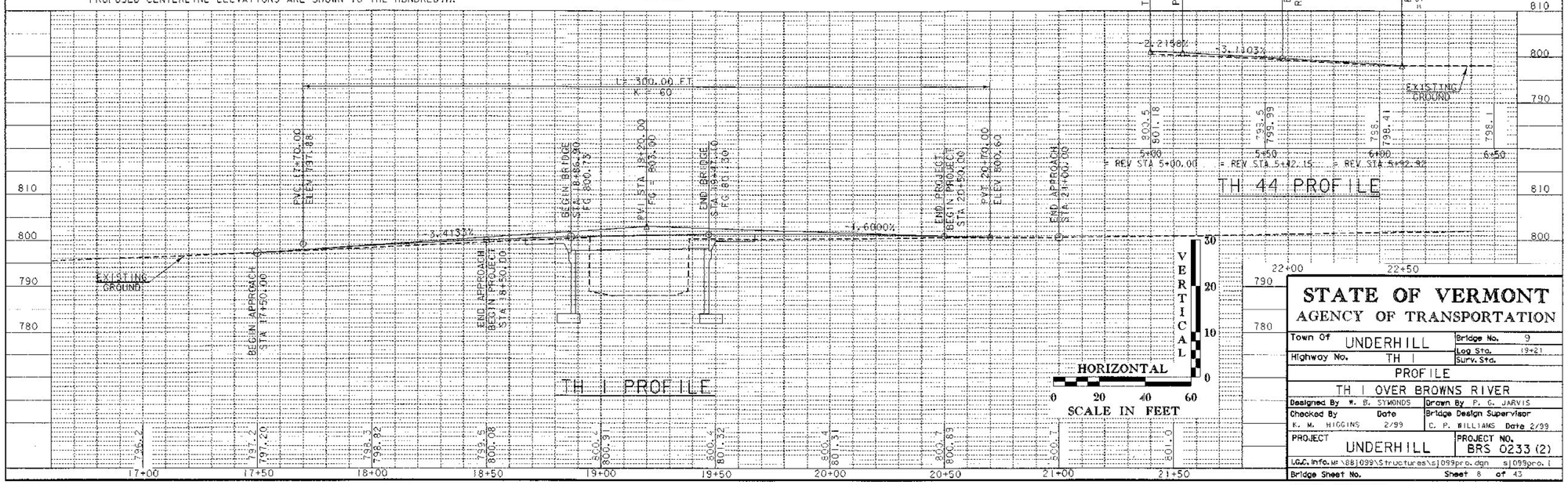


TH 1 SUBBASE TAPER
@ END BRIDGE/PROJECT
nts



TH 44 SUBBASE TAPER
@ END PROJECT
nts

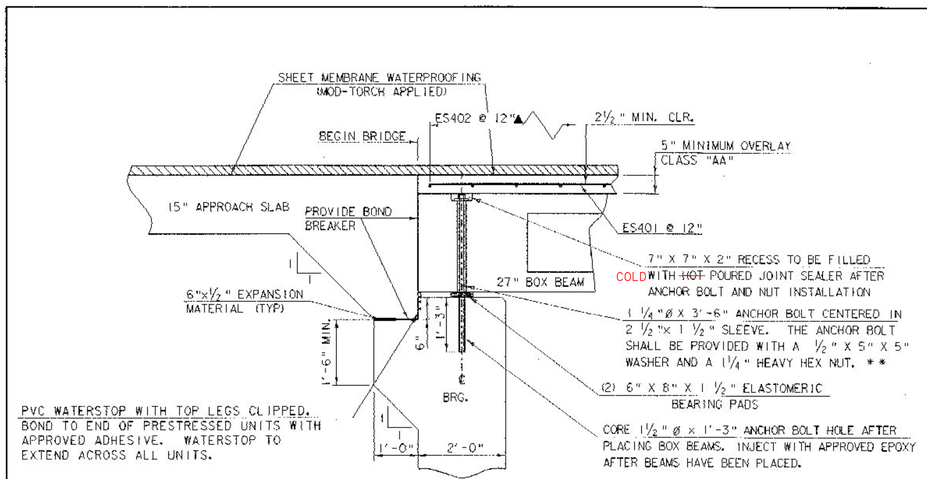
NOTE: EXISTING CENTERLINE ELEVATIONS ARE SHOWN TO THE TENTH.
PROPOSED CENTERLINE ELEVATIONS ARE SHOWN TO THE HUNDREDTH.



STATE OF VERMONT
AGENCY OF TRANSPORTATION

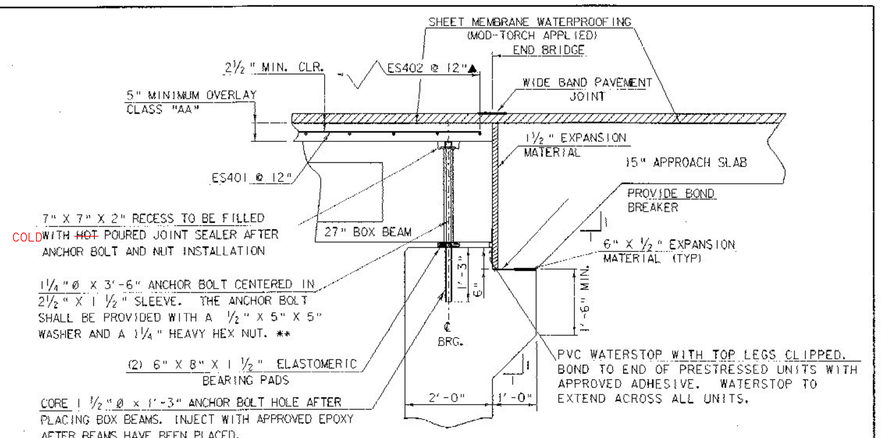
Town Of UNDERHILL	Bridge No. 9
Highway No. TH 1	Log Sta. (19+21) Surv. Sta.
PROFILE	
TH 1 OVER BROWNS RIVER	
Designed By W. B. SYMONDS	Drawn By P. G. JARVIS
Checked By K. M. HIGGINS Date 2/99	Bridge Design Supervisor C. P. WILLIAMS Date 2/99
PROJECT UNDERHILL	PROJECT NO. BRS 0233 (2)
L.G.C. Info. w:\88j099\Structures\sj099pro.dgn sj099pro.i	
Bridge Sheet No.	Sheet 8 of 43

PLOTTED 21-FEB-2001



ABUTMENT #1 END OF BRIDGE DETAIL

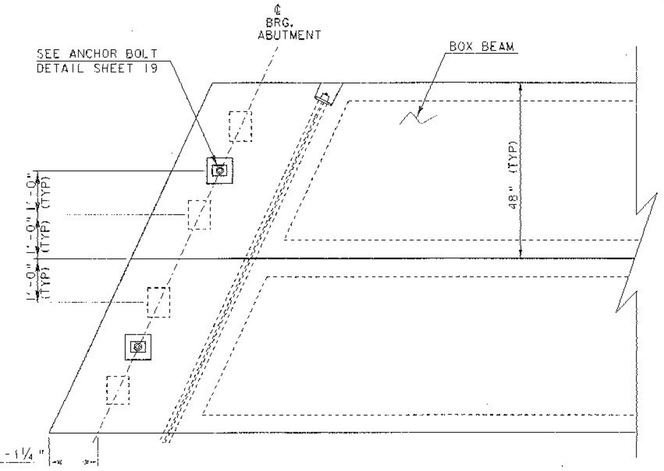
SCALE ¾" = 1'-0



ABUTMENT #2 END OF BRIDGE DETAIL

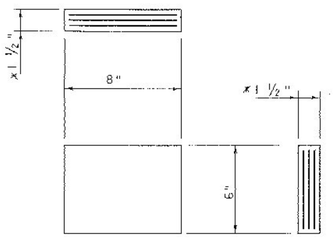
SCALE ¾" = 1'-0

** NOTE: FABRICATOR SHALL SUPPLY A SELF ADHESIVE COMPRESSIBLE SEALER BETWEEN THE BOTTOM OF THE UNITS AND THE BRIDGE SEAT. THIS COMPRESSIBLE SEALER SHALL SURROUND THE 2½" X 1½" SLEEVE IN THE UNIT. THE PURPOSE OF THE SEALER IS TO FACILITATE PLACEMENT OF THE EPOXY AROUND THE ANCHOR BOLTS.



ABUTMENT BEARING PLACEMENT DETAIL

SCALE ¾" = 1'-0



ELASTOMERIC BEARING DETAIL

* 4 - 0.30" LAYERS OF ELASTOMERIC ALTERNATING WITH 3 - 14 GAGE STEEL REINFORCING PLATES

SCALE 3" = 1'-0

BEARING NOTES

1) ALTERNATE CONFIGURATIONS FOR ELASTOMERIC BEARINGS MAY BE SUBMITTED FOR APPROVAL. ANY ALTERNATE BEARING SUBMITTED SHALL BE DESIGNED AND CERTIFIED TO MEET THE LOADS AND CRITERIA SHOWN ON THIS SHEET AND MAINTAIN THE ANCHORAGE SYSTEM SHOWN. THE BEARINGS SHALL BE DESIGNED ACCORDING TO AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" 1996 ED. AND ITS LATEST REVISIONS.

2) THE BEARING SHAPE FACTOR SHALL BE BETWEEN 5.0 AND 12.0.

3) ALL REINFORCEMENT BETWEEN LAYERS OF ELASTOMERIC SHALL BE STEEL GR. A36. NO FABRIC REINFORCEMENT WILL BE PERMITTED.

4) ELASTOMERIC BEARINGS REINFORCED WITH STEEL SHALL HAVE A ⅛" EDGE SEAL OF ELASTOMERIC INTEGRAL WITH THE BEARING OVER ALL PLATES.

5) ALL MATERIALS AND FABRICATION SHALL BE PER AASHTO DIVISION II SECTION 18.2 AND AASHTO MATERIAL SPECIFICATION M251.

6) DESIGN CRITERIA:

A) TEMPERATURE RANGE: 80° F

B) 60 DUROMETER ELASTOMERIC

C) MAXIMUM BEARING STRESS: 1000 PSI

D) DESIGN ROTATION: 0.014 RAD.

E) REACTION/BEAM:

RDL: 41.8 K
RLL: 24.2 K

PROJECT NAME:	UNDERHILL
PROJECT NUMBER:	BRS 0233(2)
FILE NAME:	88\099\s\099sup.dgn
IPARM NAME:	s\099bea.i
PROJECT LEADER:	C.P. WILLIAMS
DESIGNED BY:	K.M. HIGGINS
END OF BRIDGE DETAILS	
PLOT DATE:	21-FEB-2001
DRAWN BY:	D.G. BASSETT
CHECKED BY:	K.M. HIGGINS
SHEET 19 OF 43	

STATE OF VERMONT
AGENCY OF TRANSPORTATION
RIGHT OF WAY PLANS
DETAIL SHEET

TABLE OF PROJECT PROPERTY ACQUISITION

PARCEL NO.	GRANTOR	SHEET NO.	BEGINNING STATION	ENDING STATION	TAKING	REM.	RIGHTS	TITLE TAKEN	DATE	TOWN OR CITY RECORDED	BK.	PG.	REMARKS
1	MCAVOY, JOHN W. & RIMA	6	17+44 LT.	18+30 LT.			RESET (T)	OPTION	06-22-06	UNDERHILL	153	178-	WOOD FENCE
			17+92 LT.	19+10 LT.			CONST. (T) 620 S.F.±					180	
			18+47 LT.	18+94 LT.			SLOPE (P) 30 S.F.±						
			18+70 LT.	18+84 LT.			ALL R.T. & I.						STONE WALL
2	HILTNER, JONI	6	19+57 LT.	19+68 LT.			CHANNEL (P) 15 S.F.±	WDOE	05-14-01	UNDERHILL	104	305-	
			19+57 LT.	19+75 LT.			ALL R.T. & I.					306	STONE WALL
			19+58 LT.	20+29 LT.			CONST. (T) 335 S.F.±						
			19+63 LT.	19+82 LT.			SLOPE (P) 12 S.F.±						
			19+63 LT.	19+83 LT.			INSTALL (T)						SEDIMENTATION BASIN
			19+80 LT.	20+78 LT.			RESET (T)						WOOD FENCE
			20+82 LT.										EXCEPT & RESERVE PILLAR
			20+88 LT.										EXCEPT & RESERVE PILLAR
3	WELLS, CEDRIC P. & LAURA L.	6	20+43 RT.	20+51 RT.	30 S.F.±			WDOE	03-01-01	UNDERHILL	103	416-	
			TH 44 5+46 LT.				DRIVE (T)					417	
			20+59 RT.				REMOVE & RESET (T)						STOP SIGN
4	COLE, ELIZABETH A. & JAMES W.	6	19+20 RT.	19+97 RT.	1,250 S.F.±					UNDERHILL			
			19+07 RT.	20+07 RT.			DETOUR (T) 3080 S.F.±						TWO WAY
5	BLAIR, GORDON L. & RISA S.	6	18+50 RT.	18+87 RT.	120 S.F.±			WDOE	03-13-01	UNDERHILL	103	452-	
												453	
			17+77 RT.	17+82 RT.									EXCEPT & RESERVE STONE WALL
			17+82 RT.	18+81 RT.			DETOUR (T) 2,600 S.F.±						TWO WAY
			17+82 RT.	18+68 RT.			CONST. (T) 194 S.F.±						
6	CENTRAL VERMONT PUBLIC SERVICE CORP.	6											UTILITY
7	NEW ENGLAND TELEPHONE & TELEGRAPH COMPANY D/B/A/ BELL ATLANTIC - NEW ENGLAND	6											UTILITY
8	ADELPHIA CABLE COMMUNICATIONS	6											UTILITY

REVISION NO.	SHEET	DESCRIPTION OF REVISION	DATE	MADE BY	APPROVED BY
1	5,6	PARCEL NO. 3 WELLS. DELETE LANDSCAPE (T). DELETE REMOVE (T). PER C.O. 9125.	05-25-00	S.L.D.	R.P.D.
2	5,6	PARCEL NO. 3 WELLS. CHANGE NAME ON SIGN FROM "GETTY' TO "GULF." ADD A REMOVE & RESET (T) FOR SIGN AT 20+98 RT. PER C.O. 9140.	08-10-00	M.J.R.	R.P.D.
3	6	PARCEL NO. 2 HILTNER. REMOVE FLAG POLE TOPO AT STA. 20+48 LT. PER C.O. 9141.	08-10-00	M.J.R.	R.P.D.
4	5,6	PARCEL NO. 4 COLE. DELETE CONST. (T) EASEMENT FROM LAYOUT AND DETAIL SHEET. ADD NOTE "DO NOT DISTURB" NEAR MEMORIAL.	09-19-00	S.L.D.	R.P.D.
5	5,6	PARCEL NO. 3 WELLS. REMOVE THE REMOVE & RESET (T) AT STA. 20+98 RT. FOR GULF SIGN. PER C.O. 9192.	02-16-01	T.B.F.	R.P.D.

ACCT.eblodgett
M:\Archives\88J099\Right0fWay\rJ099d.dgn
DATE PLOTTED 18-JUN-2007

DR.(P)- DRAINAGE RIGHT
DIT.(P)- DITCHING RIGHT
CH.(P)- CHANNEL RT.
DRIVE (T)- DRIVE RIGHT
CUL.(P)- CULVERT RIGHT
[W]- WATER SOURCES

PRESENT R.O.W.
TAKING WITHOUT ACCESS
TAKING WITHOUT ACCESS ALONG PROPERTY LINE
TAKING WITH ACCESS
(P) PERMANENT EASEMENT
(T) TEMPORARY EASEMENT

LEGEND
C&T (P) CLEARING & TRIMMING
CZ (P) CLEAR ZONE
CONST.(T) CONSTRUCTION EASEMENT
SR SLOPE RIGHTS
P PROPERTY LINE
L
TOP OF CUT
TOE OF SLOPE
UE (P) PERMANENT UTILITY EASEMENT

APPROVED: ROGER P. DUMAS DATE: 04-11-00
CHIEF, PLANS & TITLES

R.O.W. PLANS
UNDERHILL
BRS 0233(2)
SHEET 28 OF 43