F-BRF-371(8) 9 33

S.H. 5578 WHITEHALL
S.H. 9113 SOUTH BAY
S.H. 5637A WHITEHALL
WASHINGTON COUNTY

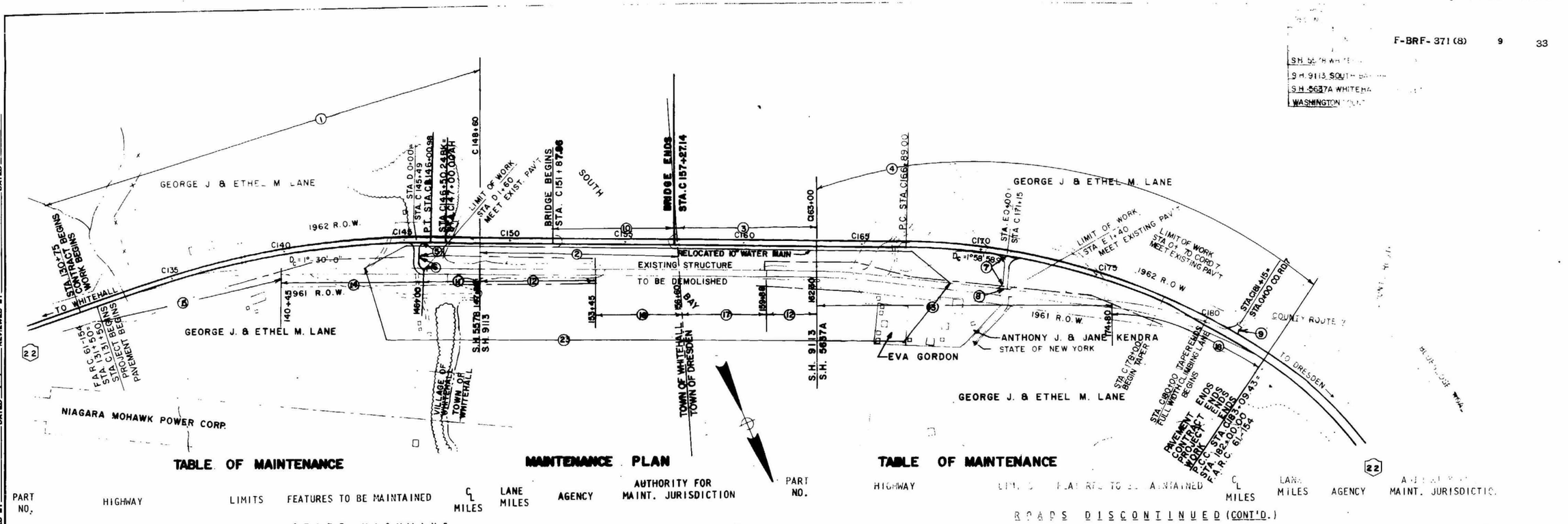


TABLE OF MAINTENANCE

MAINTENANCE PLAN

TABLE OF MAINTENANCE

PART NO.	HIGHWAY	LIMITS	FEATURES TO BE MAINTAINED	℄ MILES	LANE MILES	AGENCY	AUTHORITY FOR MAINT. JURISDICTION
			STATE HIGHWAYS				
1	S.H. 5578 (IN THE VILLAGE OF WHITEHALL)	C 131+50- C 148+60	PAVEMENT, SHLDRS, DRAINAGE, SYSTEM, LANDSCAPING	0.31	0.62	STATE	SECT. 12, HIGHWAY LAW
2	S.H. 9113 (IN THE TOWN OF WHITEHALL)	C 148+60- C 157+37	PAVEMENT, SHLDRS, DRAINAGE, SYSTEM, LANDSCAPING	0.06	0.12	STATE	SECT. 12, HIGHWAY LAW
3	S.H. 9113 (IN THE TOWN OF DRESDEN)	C 157+37- C 163+00	PAVEMENT, SHLDRS, DRAINAGE SYSTEM, LANDSCAPING	0.11	0.22	STATE	SECT. 12, HIGHWAY LAW
4	S.H. 5637A (IN THE TOWN OF DRESDEN)	C 163+00- C 189+09	PAVEMENT, SHLDRS, DRAINAGE SYSTEM, LANDSCAPING	0.38	0.84	STATE	SECT. 12, HIGHWAY LAW
			INTERSECTIONS AND CROSSROADS				
5	RELOCATED OLD S.H. 5578	D 0+12- D 0+85	PAVEMENT, SHLDRS, DRAINAGE SYSTEM, LANDSCAPING	0.01	0.02	STATE	SECT. 10, SUBDIV. 25, HIGHWAY LAW
6	RELOCATED OLD S.H. 5578	D 0+85- D 1+60	PAVEMENT, SHLDRS, DRAINAGE SYSTEM, LANDSCAPING	0.01	0.02	WASH. COUNTY	SECT. 10, SUBDIV. 25, HIGHWAY LAW
7	RELOCATED OLD S.H. 5637A	E 0+12- E 1+32	PAVEMENT, SHLDRS, DRAINAGE SYSTEM, LANDSCAPING	0.02	0.04	STATE	SECT. 10, SUBDIV. 25, HIGHWAY LAW
8	RELOCATED OLD S.H. 5637A	E 1+32- E 1+40	PAVEMENT, SHLDRS, DRAINAGE SYSTEM, LANDSCAPING			WASH. COUNTY	SECT. 10, SUBDIV. 25, HIGHWAY LAW
9	COUNTY ROAD 7	0+12- 0+70	PAVEMENT, SHLDRS, DRAINAGE SYSTEM, LANDSCAPING	0.01	0.02	STATE	SECT. 10, SUBDIV. 25, HIGHWAY LAW
			STRUCTURES				
10	S.H. 9113 BRIDGE OVER SOUTH BAY	C 151+87.86- C 157+27.14	ENTIRE STRUCTURE	0.10	0.20	STATE	SECT. 230, HIGHWAY LAW
			ROADS DISCONTINUED				
11	OLD S.H. 5578	146+00- 147+90	DISCONTINUE TO PUBLIC AGENCY FORMERLY HAVING JURISDICTION THEREOVER	0.04	0.08	WASH. COUNTY	SECT. 62, HIGHWAY LAW & RESOLUTION DATED 9/20/71
12	OLD S.H. 9113	147+90- 153+45 159+88- 162+30	DISCONTINUE TO PUBLIC AGENCY FORMERLY HAVING JURISDICTION THEREOVER	0.15	0.30	WASH. COUNTY	SECT. 62, HIGHWAY LAW & RESOLUTION DATED 9/20/71
13	OLD S.H. 5637A	162+30- 174+80	DISCONTINUE TO PUBLIC AGENCY FORMERLY HAVING JURISDICTION THEREOVER	0.24	0.48	WASH. COUNTY	SECT. 62, HIGHWAY LAW & RESOLUTION DATED 9/20/71
14	OLD S.H. 5578	140+45- 146+00	DISCONTINUE & REMOVE, RIGHT OF WAY TO REVER TO COUNTY	0.15	0.30	WASH. COUNTY	SECT. 62, HIGHWAY LAW & RESOLUTION DATED 9/20/71
			ROADS DESTROYED BY CONSTRUCTION				
15	OLD S.H. 5578	131+50- 153+45	DESTROYED BY CONSTRUCTION			STATE	SECT.62, HIGHWAY LAW
16	EXISTING STRUCTURE (IN THE TOWN OF WHITEHALL)	156+60	DESTROYED BY CONSTRUCTION	0.06	0.12	STATE	SECT.62, HIGHWAY LAW
17	EXISTING STRUCTURE (IN THE TOWN OF DRESDEN)	156+60 159+88	DESTROYED BY CONSTRUCTION	0.06	0.12	STATE	SECT. 62, HIGHWAY LAW
18	OLD S.H. 5637A	174+80- 182+00	DESTROYED BY CONSTRUCTION	0.13	0.26	STATE	SECT. 62, HIGHWAY LAW
			SNOW REMOVAL				
19	S.H. 5578	AS INDICATED ABOVE	SNOW REMOVAL ON PTS. 1 & 5	0.31	0.62	STATE	SECT. 12, HIGHWAY LAW
20	S.H. 9113	AS INDICATED ABOVE	SNOW REMOVAL ON PTS. 2, 3 & 10	0.27	0.54	STATE	SECT. 12, HIGHWAY LAW
21	S.H. 5637A	AS INDICATED ABOVE	SNOW REMOVAL ON PTS. 4, 7 & 9	0.39	0.86	STATE	SECT. 12, HIGHWAY LAW
22	RELOCATED OLD S.H.5578 S.H.5637A; OLD S.H.5578, S.H.9113 & OLD S.H.5637A	AS INDICATED ABOVE	SNOW REMOVAL ON PTS. 6,11,12, 13, & 8			WASH. COUNTY	SECT. 12, HIGHWAY LAW
			WATERMAINS				
23	RELOCATION OF EXISTING 10" WATERMAIN	C 143+00, 195'± RT. -C168+30, 150' RT.	ENTIRE WATERMAIN AND APPURTENANCES			VILL.OF WHITEHALL	SECT. 10, SUBDIV. 27 HIGHWAY LAW AND RESOLUTION DATED

SPECIAL NOTES: - THE MAINTENANCE TABLE INDICATES THE DIVISION OF RESPONSIBILITY FOR MAINTENANCE FOR THIS CONTRACT ON COMPLETION. IT IN NO WAY RELIEVES THE CONTRACTOR OF HIS RESPONSIBILITY AS COVERED BY ITEM 76, MAINTENANCE AND PROTECTION OF TRAFFIC.

ALL EXISTING SANITARY SEWERS AND OTHER SEWERS NOT DEEMED TO BE PART OF THE PROJECT BY THE COMMISSIONER; WATERMAINS; HYDRANTS; AND OTHER MUNICIPALLY OR PRIVATELY OWNED FACILITIES WITHIN THE LIMITS OF THE HIGHWAY RIGHT-OF-WAY WHICH REMAIN IN SERVICE UNCHANGED; AND ALL SUCH FACILITIES RELOCATED OR PROTECTED AS PART OF WORK PERFORMED UNDER THE PROJECT WHETHER CROSSING, LOCATED WITHIN OR ADJACENT TO THE RIGHT-OF-WAY SHALL BE MAINTAINED, AS THE CASE MAY BE, BY THE MUNICIPALITY OR BY THE AGENCY OR UNIT HAVING CONTROL AND JURISDICTION THEREOF AT NO COST OR EXPENSE TO THE STATE.

THE PORTION OF DRIVEWAYS OR PRIVATE ROADS, CONSTRUCTED OR ADJUSTED UNDER THIS PROJECT BETWEEN THE EDGE OF PAVEMENT OUTSIDE EDGE OF ROAD SHOULDERS SHALL BE MAINTAINED BY THE STATE, COUNTY, LOCAL UNIT OF GOVERNMENT OR AGENCY, RESPONSIBLE FOR THE ADJOINING RD. THE REMAINING PORTION OF THE ADJUSTED DRIVEWAY OR PRIVATE RD. SHALL BE MAINTAINED BY THE OWNER AS UNDER SECTION 54(A) OF THE HIGHWAY LAW.

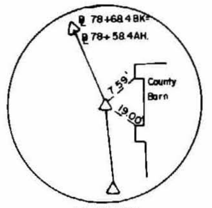
TABLE & PLAN OF MAINTENANCE UPON COMP. OF CONTRACT (9/70)

DESIGNED BY R. W. Palmer DATED 10/21/71 REVIEWED BY DATED
CHECKED BY Roy N. Cole DATED 10/21/71 IN CHARGE OF Roy N. Cole

F.A.R.C. 72-1

FED. ROAD REG. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
1	N.Y.	F-BRF-371 (8)	10	33

S.H.5578 WHITEHALL-DRESDEN CENTER PART 1
S.H.9113 SOUTH BAY BRIDGE
S.H.5637A WHITEHALL-DRESDEN CENTER PART 2
WASHINGTON COUNTY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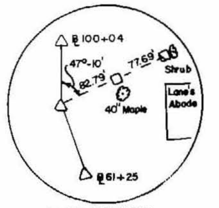
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℄ 78+58.4 AH.
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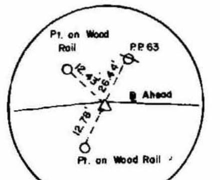
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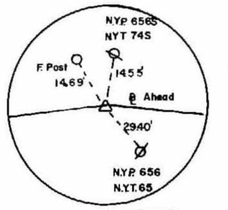
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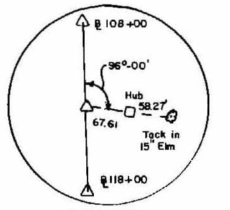
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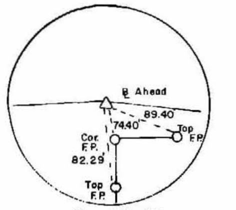
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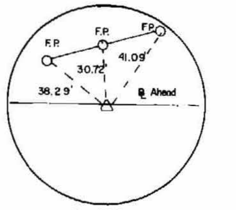
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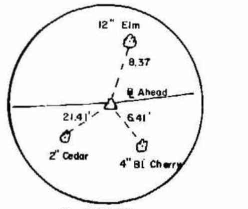
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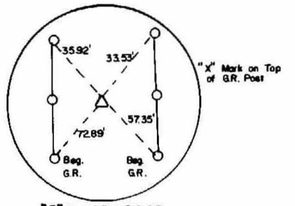
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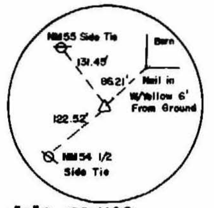
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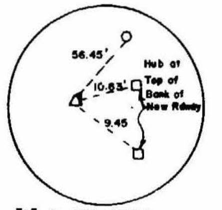
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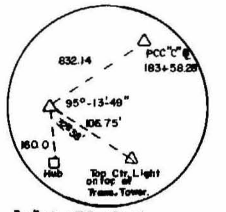
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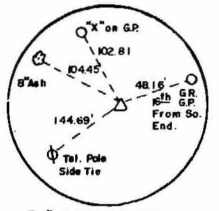
"C" ℄ 183+53.25
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E 736,829.851

BASE LINE DATA

STATION	AZIMUTH	DISTANCE FEET	COORDINATES NORTH	COORDINATES EAST
C128+11.42			1,302,301.950	741,666.110
	275-05-09	392.83		
C132+04.25			1,302,336.774	741,274.827
	275-05-09	779.59		
C139+83.84			1,302,405.884	740,498.306
	293-46-03	628.29		
C146+12.13 BK = AH C146+00.98			1,302,659.103	739,923.297
	293-46-03	49.26		
C146+50.24 BK = AH C147+00.00			1,302,678.954	739,878.220
	293-46-03	2821.11		
C175+21.11			1,303,815.933	737,296.371
	325-54-03	832.14		
C183+53.25			1,304,505.001	736,829.851
61+25			1,302,223.54	742,382.62
	278-06-21	1743.40		
78+68.4BK = 78+58.4AH			1,302,469.363	740,656.638
	293-43-47	2145.60		
100+04			1,303,332.801	738,692.440
	296-05-13	796.00		
108+00			1,303,682.830	737,977.530
	298-44-50	300.00		
111+00			1,303,827.114	737,714.505
	314-39-32	700.00		
118+00			1,304,319.133	737,216.592
	327-41-43	200.00		
120+00			1,304,488.176	737,109.708
	327-42-05	190.00		
121+90			1,304,648.779	737,008.185

TABLE OF EQUALITIES

℄ STATION	℄ STATION	COORDINATES NORTH	COORDINATES EAST
C131+50	C131+50		
P.C. C133+55.5	C133+55.5	1,302,350.186	741,124.127
C146+50.24 =	C146+50.24=		
C147+00.00	C147+00.00	1,302,678.954	739,878.220
P.T. C146+00.98	C146+12.13=		
	C146+00.98	1,302,659.103	739,923.297
P.C. C166+88.97	C166+88.97	1,303,480.559	738,057.937
P.C.C. C183+09.40	C183+53.25	1,304,505.001	736,829.851

BENCH MARK DATA

B.M. NO.	ELEV.	STATION	OFFSET	DESCRIPTION
5E	181.87	125+25	80' RT.	S.W. COR. GAS PUMP FOUNDATION
9B	102.81	C 145+50	100' LT.	BOLT IN 16" ELM
11X	105.85	C 168+00	75' LT.	BOLT IN 24" ELM
11B	156.62	C 180+45	75' LT.	BOLT IN POLE NM 67½

BASE LINE & BENCH MARK DATA

FED. ROAD REG. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
1	N.Y.	F-BRF-371(8)	11	33

SH 5578 WHITEHALL - DRESDEN CENTER PART 1
SH 9113 SOUTH BAY BRIDGE
SH 5637A WHITEHALL - DRESDEN CENTER PART 2
WASHINGTON COUNTY

BOX BEAM GUIDE RAIL

STATION TO STATION	SIDE	ITEM 33AF ACTUAL LF	ADJUSTMENT FACTOR	ITEM 33AF LF	ITEM 33AFY LF	ITEM 33AFDR EACH
C130+80 - C134+50	LT.	226	1.0	226	144	2
C149+56 - C151+88	LT.	105	1.0	105	72	1
C149+56 - C151+88	LT.	55*	1.2	66	-	-
C157+27 - C162+44	LT.	55*	1.2	66	-	-
C157+27 - C162+44	LT.	390	1.0	390	72	1
C132+16 - C134+50	RT.	96	1.0	96	144	2
C145+80 - C151+88	RT.	536*	1.2	643	72	1
C157+27 - C169+22	RT.	1123*	1.2	1347	72	1
*INCLUDES 5' CONNECTION TO BRIDGE		TOTALS		2939	576	8

CABLE GUIDE RAIL

STATION TO STATION	SIDE	ITEM 32 DH LF	ITEM 32 DDD EACH
C167+00-C171+00	LT.	400	2
	TOTAL	400	2

RESETTING GUIDE RAIL

STATION TO STATION	SIDE	ITEM 32R LF
C181+85-C183+09.43	RT.	125
	TOTAL	125

TABLE OF LENGTHS

DESCRIPTION	STATION TO STATION	DESCRIPTION	LF	MILES
CONTRACT BEGINS	130+75 - C131+50	PROJECT BEGINS	75	0.01
PROJECT BEGINS	C131+50 - C146+50.24=	EQUALITY	1500.24	0.28
EQUALITY	C147+00 - C148+60	VILLAGE LINE OF WHITEHALL S.H. 5578 ENDS	160	0.03
TOWN LINE OF WHITEHALL S.H. 9113 BEGINS	C148+60 - C151+87.86	BRIDGE BEGINS	327.86	0.06
BRIDGE BEGINS	C151+87.86-C157+27.14	BRIDGE ENDS	539.28	0.10
BRIDGE ENDS	C157+27.14-C157+35	TOWN LINE OF WHITEHALL	7.86	0.00
TOWN LINE OF DRESDEN	C157+35 - C163+00	S.H. 9113 ENDS	565	0.11
S.H. 5736A BEGINS	C163+00 - C183+09.46	PROJECT & CONTRACT END	2009.46	0.38
INTERSECTING ROAD D (M_L STA. C145+49)	D 0+12 - D 1+60	LIMIT OF WORK	148	0.03
INTERSECTING ROAD E (M_L STA. C171+15)	E 0+12 - E 1+40	LIMIT OF WORK	128	0.02
COUNTY ROAD 7 (M_L STA. C181+15)	0+12 - 0+70	LIMIT OF WORK	58	0.01

S.H. 5578 PROJECT LENGTH 1660.24 L.F. = 0.31 MILES (VILLAGE OF WHITEHALL)
S.H. 9113 PROJECT LENGTH 1440.00 L.F. = 0.27 MILES (TOWNS OF WHITEHALL & DRESDEN)
S.H. 5637A PROJECT LENGTH 2009.46 L.F. = 0.38 MILES (TOWN OF DRESDEN)
CONTRACT LENGTH 5184.70 L.F. = 0.98 MILES (WASHINGTON COUNTY)

UTILITY DISPOSITION TABLE

TABULATION OF UTILITIES

STA. TO STA.	SIDE	OWNER	DESCRIPTION	DISPOSITION	STATUS OF AGREEMENT
C130+75 C183+09.43	L & R	NIAGARA MOHAWK POWER CORP.	OVERHEAD POWER LINES	NOT AFFECTED	
C130+75 C144+85	L	NEW YORK TELEPHONE	OVERHEAD TELEPHONE LINES	NOT AFFECTED	
C144+85 C163+20	L & R	NEW YORK TELEPHONE	OVERHEAD TELEPHONE LINES	TO BE RELOCATED BY OWNER (4" CONDUITS IN SOUTH BAY BRIDGE)	OWNER AGREED TO RELOCATE
C163+20 C183+09.43	L & R	NEW YORK TELEPHONE	OVERHEAD TELEPHONE LINES	NOT AFFECTED	
C130+75 C142+15	R	VILLAGE OF WHITEHALL	UNDERGROUND WATER MAIN		
C142+15 C169+91	R	VILLAGE OF WHITEHALL	UNDERGROUND WATER MAIN	TO BE RELOCATED ON TO PROPOSED STRUCTURE IN CONTRACT	
C169+91 C183+09.40	R	VILLAGE OF WHITEHALL	UNDERGROUND WATER MAIN		

EARTHWORK SUMMARY

	ITEM 710 BRIDGE PIER REMOVAL L.S.	ITEM 2A EXCAV. & DISPOSAL OF EXCAV. MAT'L CU.YD.	ITEM 2BZ EMBANKMENT IN PLACE CU. YD.	ITEM 2ECBGI SELECTED BORROW CU. YD.	ITEM 2EFB SELECTED GRANULAR FILL CU. YD.		ITEM 2VJE SELECTED FILL (BRIDGE FOUNDATION) CU. YD.	ITE 5B STRUCTURAL EXCAV. CU.YD.	ITEM 5T TRENCH & CULVERT EXCAV. CU. YD.
EXCAVATION FROM EARTHWORK SUMMARY SHEET		14,391	41,222	12,647					101
EXCAVATION FROM DRAINAGE SHEET									1,063
EXCAVATION FROM WATER MAIN SHEET					564		553	508	
QUANTITIES FROM BRIDGE SUMMARY SHEET	N.E.C.								
TOTAL COMBINED NEAT									

MISC. TABLES

DESIGNED — IN CHARGE OF — DATED — CHECKED BY — DATED 10/21/71 — REVIEWED BY — DATED

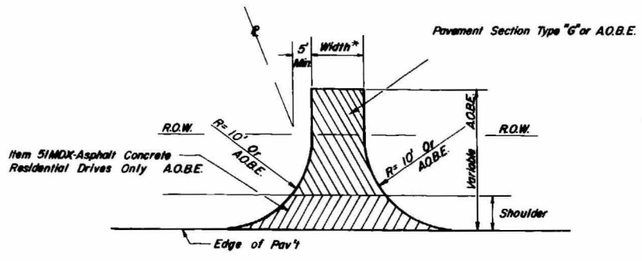
FED. ROAD REG. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
1	N.Y.	F-BRF-371(8)	12	33
S.H. 5578 WHITEHALL-DRESDEN CENTER PART 1				
S.H. 9113 SOUTH BAY BRIDGE				
S.H. 5637A WHITEHALL-DRESDEN CENTER PART 2				
WASHINGTON COUNTY				

DESIGNED BY L. R. Glass DATED 12/1/71 CHECKED BY Paul Kuehn DATED 12/21/71 REVIEWED BY _____ DATED _____

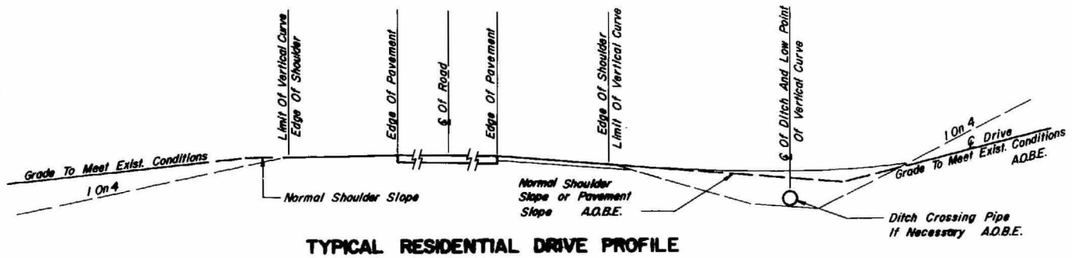
TABLE OF DRIVEWAYS & CULVERTS

℄ STATION	SIDE	TYPE	WIDTH L. F.	CULVERTS		CULVERT OFFSETS			
				SIZE (IN.)	LENGTH L.F.	STATION	OFFSET	STATION	OFFSET
C 134+65	RT.	G	12	---	---	---	---	---	---
C 135+34	LT.	G	12	---	---	---	---	---	---
C 137+00	RT.	G	12	12"	24'	C 136+85±	34'RT.	C 137+15±	35'RT.
C 137+38	LT.	G	12	12"	30'	C 137+23±	37'LT.	C 137+53±	37'LT.
C 137+58	RT.	G	12	12"	28'	C 137+44±	36'RT.	C 137+72±	35'RT.
C 143+50	LT.	G	12	12"	34'	C 143+36±	40'LT.	C 143+70±	40'LT.
INT. RD. D	RT.			12"	54'	C 145+24±	31'RT.	C 145+82±	40'RT.
C 166+70	LT.	G	12	24"	72'	C 166+34±	53'LT.	C167+06±	50'LT.
INT. RD. E	RT.			24"	142'	C 170+43±	64'RT.	C171+88±	80'RT.
C 174+90	LT.	G	12	12"	44'	C 174+67±	37'LT.	C175+11±	34'LT.
D 1+15	RT.	G	12'	--	--	---	---	---	---
E 1+40	RT	G	24	--	--	---	---	---	---

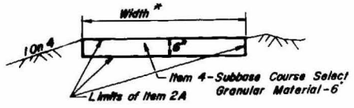
DRIVEWAY CULVERT NOTES: The Above List Of Driveways Is Intended For Estimate Purposes Only. The Exact Number, Location And Width Of Placement Will Be Determined By The Engineer. All Driveway Pipe To Be Item 14 MQ, Optional Culvert Pipe, With Item 14 ESM, Optional End Section, At Each End Unless Otherwise Noted On Plans Or Ordered By The Engineer.



TYPICAL DRIVEWAY PLAN
NO SCALE



TYPICAL RESIDENTIAL DRIVE PROFILE
NOT TO SCALE



TYPICAL SECTION
TYPE "G" DRIVEWAY
NO SCALE

NOTE: All Drives Shall Conform To "Policy And Standards For Entrances To State Highways" As Adopted July 1, 1960.
* As Shown On Table Or A.O.B.E.

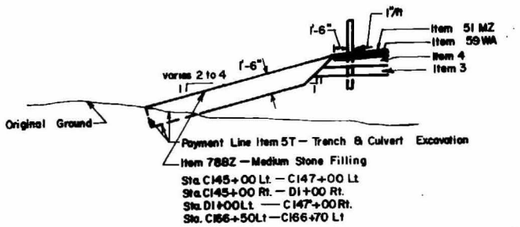
DRIVEWAY DETAILS

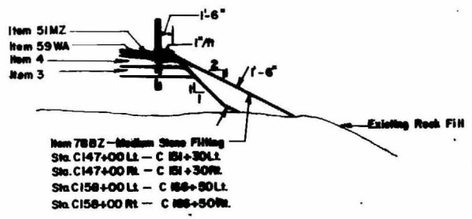
HC-47b (9/70)

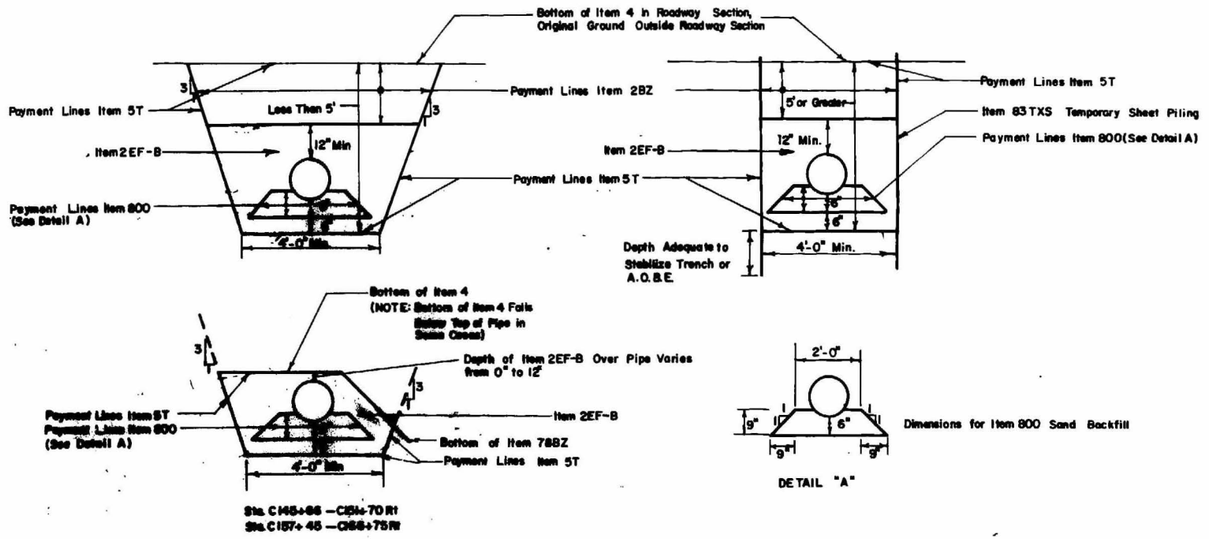
F.A.R.C. 72-1

FED. ROAD REG. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
1	N.Y.	F-BRF-371(8)	14	33

S.H.5578 WHITEHALL - DRESDEN CENTER PART 1
S.H.9113 SOUTH BAY BRIDGE
S.H.5637A WHITEHALL - DRESDEN CENTER PART2
WASHINGTON COUNTY

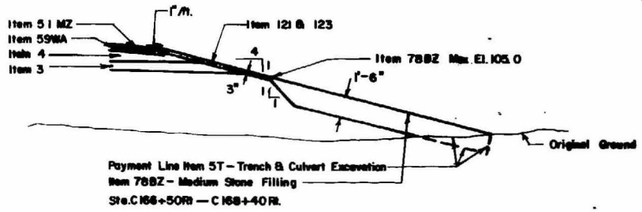






EXCAVATION & BACKFILL DETAILS FOR DUCTILE CAST IRON WATER MAIN WORK

NO SCALE



MEDIUM STONE FILLING DETAIL

NO SCALE

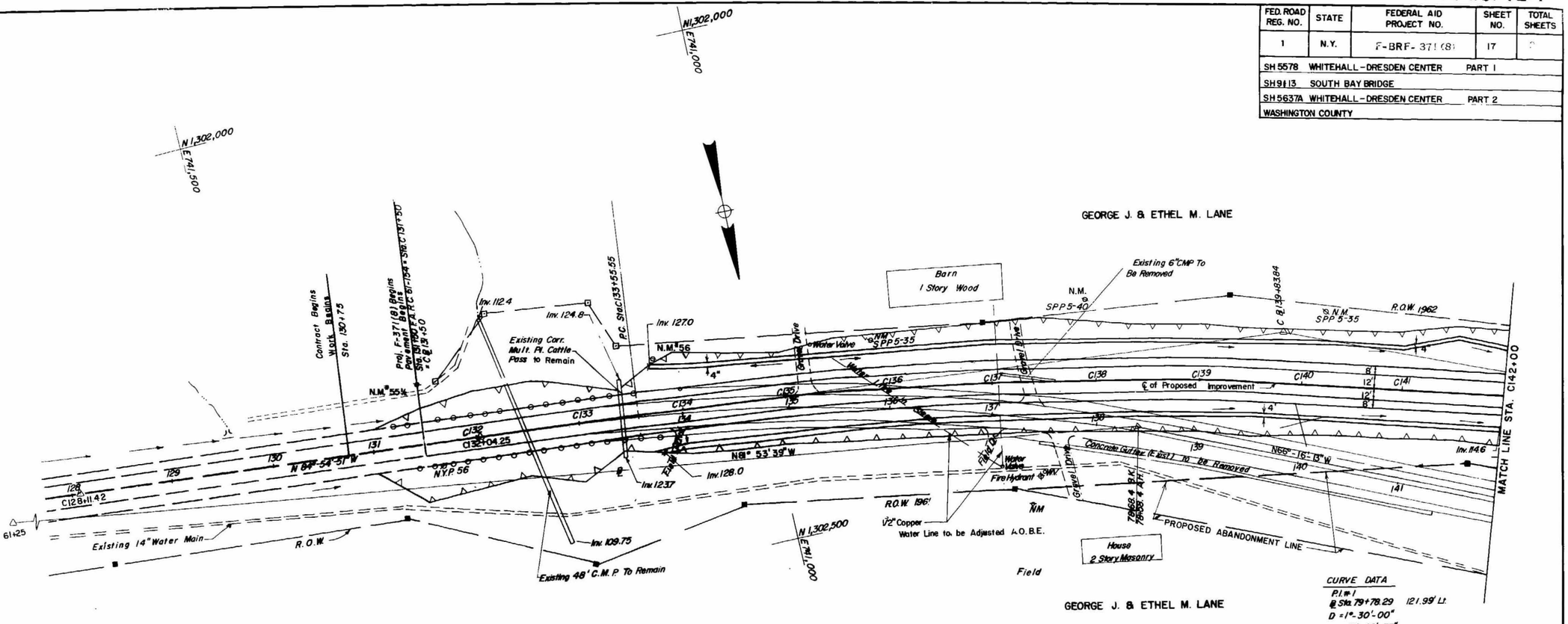
MISC. DETAILS

F.A.R.C. 72-1

FED. ROAD REG. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
1	N.Y.	F-BRF-371(8)	17	

SH 5578 WHITEHALL-DRESDEN CENTER PART 1
SH 9113 SOUTH BAY BRIDGE
SH 5637A WHITEHALL-DRESDEN CENTER PART 2
WASHINGTON COUNTY

DESIGNED BY _____ DATED _____ CHECKED BY _____ DATED _____ REVIEWED BY _____ DATED _____



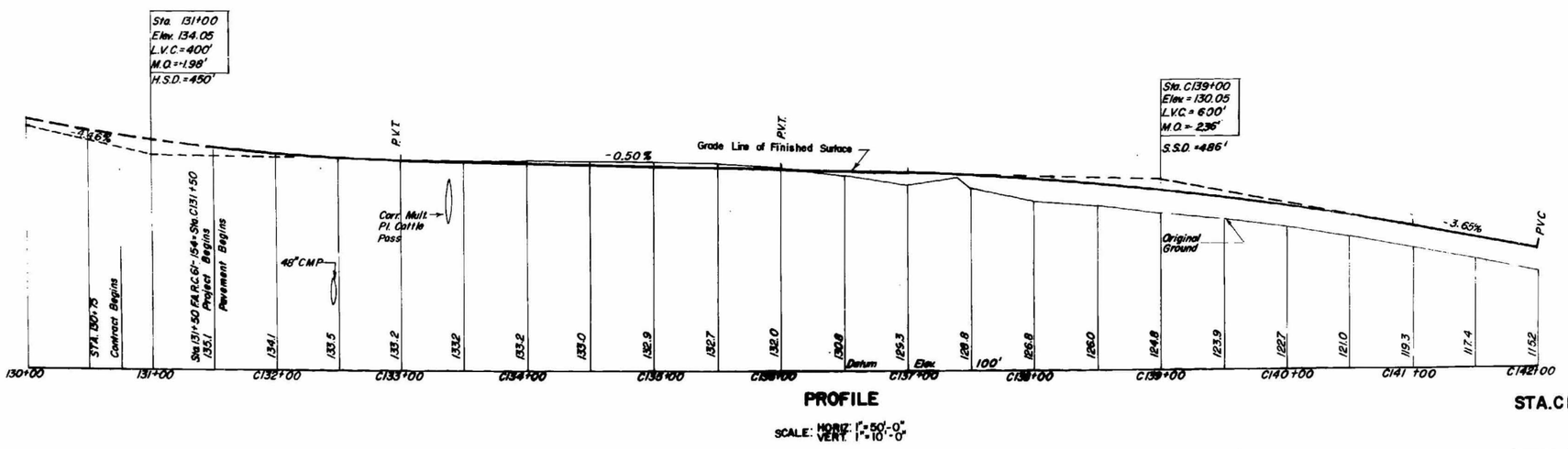
PLAN

SCALE: 1"= 50'-0"

GEORGE J. & ETHEL M. LANE

STA. 138+40 TO STA. 146+00
REMOVE EXISTING PAVEMENT
GRADE TO DRAIN AND SEED A.O.B.E.

CURVE DATA
P.I. # 1
@ Sta. 79+78.29 121.99' Lt.
D = 1°-30'-00"
Δ = 18°-40'-53"
R = 3819.72'
T = 628.29'
L = 1245.43'
E = 51.33'
e = 1/2 Alt.



PROFILE

SCALE: HORIZ. 1"=50'-0"
VERT. 1"=10'-0"

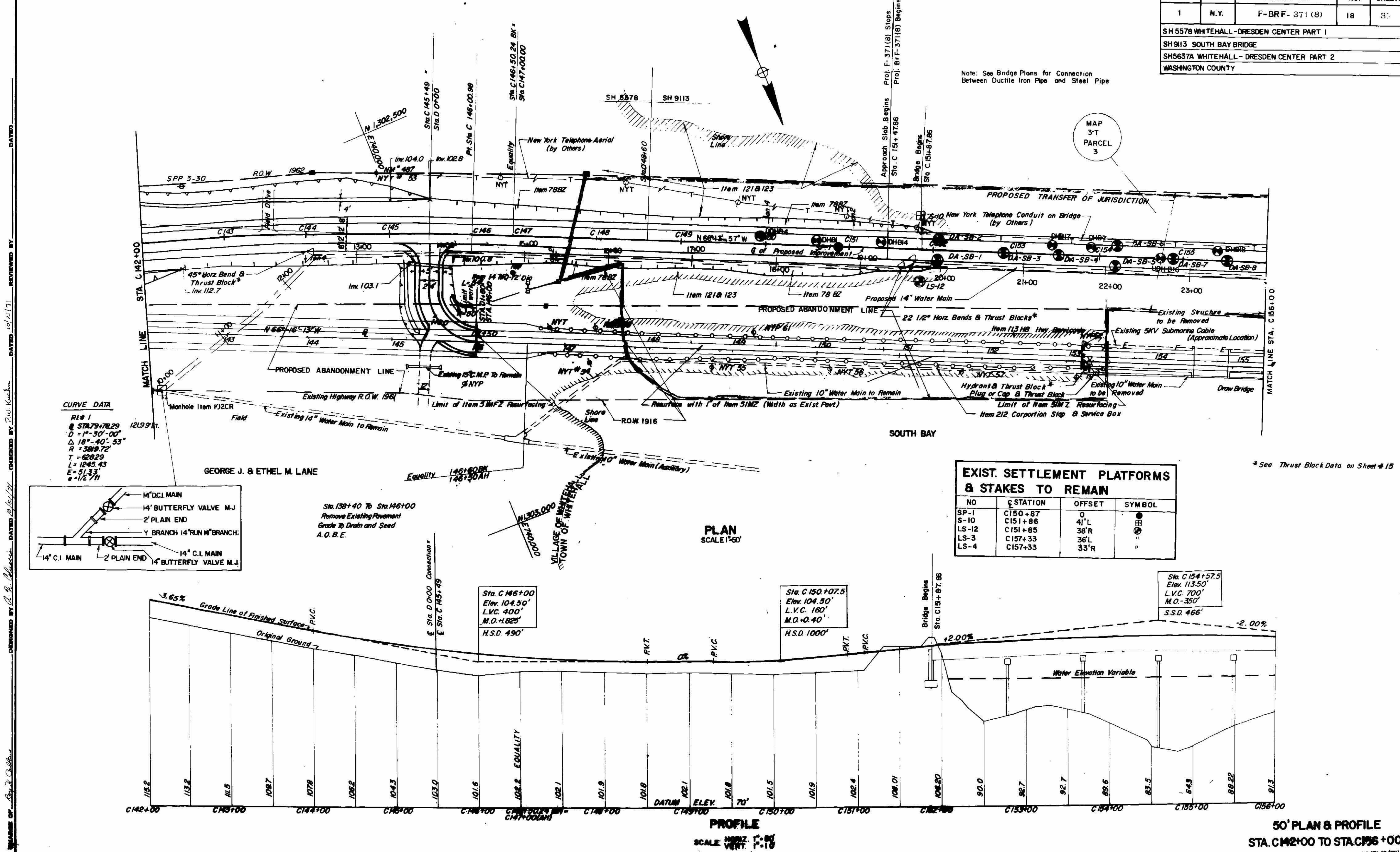
50' PLAN & PROFILE
STA. C131+50 TO STA. C142+00

HC 47b (9/70)

F.A.R.C. 72-

FED. ROAD REG. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
1	N.Y.	F-BRF-371(8)	18	3[illegible]

SH 5578 WHITEHALL-DRESDEN CENTER PART 1
SH 9113 SOUTH BAY BRIDGE
SH5637A WHITEHALL-DRESDEN CENTER PART 2
WASHINGTON COUNTY



Note: See Bridge Plans for Connection Between Ductile Iron Pipe and Steel Pipe
SH 5578
SH 9113
MAP 3-T PARCEL 3
PROPOSED TRANSFER OF JURISDICTION
PROPOSED ABANDONMENT LINE
Proposed 14" Water Main
22 1/2° Horz. Bends & Thrust Blocks*
Existing Structure to be Removed
Existing 5KV Submarine Cable (Approximate Location)
Draw Bridge
MATCH LINE STA. C142+00
MATCH LINE STA. C156+00
New York Telephone Aerial (by Others)
New York Telephone Conduit on Bridge (by Others)
Approach Slab Begins Sta. C 151+47.86
Bridge Begins Sta. C151+87.86
Proj. F-371(8) Stops
Proj. BrF-371(8) Begins
45° Horz. Bend & Thrust Block* Inv. 112.7
Existing 15" C.M.P. To Remain
Existing Highway R.O.W. 1961
Limit of Item 51MZ Resurfacing
Resurface with 1" of Item 51MZ (Width as Exist. Pavt.)
Existing 10" Water Main to Remain
Hydrant & Thrust Block* Plug or Cap & Thrust Block
Existing 10" Water Main to be Removed
Item 212 Corporation Stop & Service Box
Existing 14" Water Main to Remain
Existing 10" Water Main (Auxiliary)
Manhole Item 1/2CR
R.O.W. 1916
SOUTH BAY
GEORGE J. & ETHEL M. LANE
Equality 146+60BK 146+50AH
Sta. 138+40 To Sta. 146+00 Remove Existing Pavement Grade To Drain and Seed A.O.B.E.
VILLAGE OF WHITEHALL
TOWN OF WHITEHALL
CURVE DATA
P.I.# 1
STA. 79+78.29
D = 1°-30'-00"
Δ 18°-40'-53"
R = 3819.72'
T = 628.29
L = 1245.43
E = 51.33'
e = 1/2"/ft
14" D.C.I. MAIN
14" BUTTERFLY VALVE M.J.
2' PLAIN END
Y BRANCH 14" RUN 14" BRANCH
14" C.I. MAIN
2' PLAIN END
14" BUTTERFLY VALVE M.J.
* See Thrust Block Data on Sheet # 15
PLAN
SCALE 1"=50'
Sta. C146+00 Elev. 104.50' L.V.C. 400' M.O.+1.825' H.S.D. 490'
Sta. C150+07.5 Elev. 104.50' L.V.C. 160' M.O.+0.40' H.S.D. 1000'
Sta. C154+57.5 Elev. 113.50' L.V.C. 700' M.O.-3.50' S.S.D. 466'
-3.65%
Grade Line of Finished Surface
Original Ground
+2.00%
-2.00%
Water Elevation Variable
DATUM ELEV. 70'
C142+00
C143+00
C144+00
C145+00
C146+00
C147+00
C148+00
C149+00
C150+00
C151+00
C152+00
C153+00
C154+00
C155+00
C156+00
PROFILE
SCALE HORIZ. 1"=50' VERT. 1"=10'

EXIST. SETTLEMENT PLATFORMS & STAKES TO REMAIN			
NO	℄ STATION	OFFSET	SYMBOL
SP-1	C150+87	0	●
S-10	C151+86	41'L	⊞
LS-12	C151+85	38'R	[symbol]
LS-3	C157+33	36'L	"
LS-4	C157+33	33'R	"

50' PLAN & PROFILE
STA. C142+00 TO STA. C156+00

F.A.R.C. 72-1

FED. ROAD REG. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
1	N.Y.	F-BRF-371(8)	19	3?

SH 5578 WHITEHALL-DRESDEN CENTER PART 1
SH 9113 SOUTH BAY BRIDGE
SH 5637A WHITEHALL-DRESDEN CENTER PART 2
WASHINGTON COUNTY

DESIGNED BY C. L. Glaser DATED 12/21/71 CHECKED BY Paul Kuehn DATED 12/21/71 REVIEWED BY DATED

NOTE: SEE BRIDGE PLANS FOR CONNECTION BETWEEN DUCTILE IRON PIPE & STEEL PIPE

SH 9113 SH 5637A

MAP 3-T PARCEL 3

TRANSFER OF JURISDICTION

BRIDGE ENDS STA. C157+27.14

Proj. BRF-371(8) Ends
End Approach Slab
Sta. C 157+67.14
Proj. F-371(8) Resumes

NEW YORK TELEPHONE AERIAL (BY OTHERS)

PROPOSED TRANSFER OF JURISDICTION

STA. C 163+00

SHORE LINE

ITEM 121 & 123

ITEM 78BZ

LS-3

LS-4

DN B-9 DHB19 DN B-8 DH B-7 UH B-9 DH B-5 DN B-4 DH B-13

C156 C157 C158 C159 N66°-13'-57"W C160 C161 C162 C163 C164 C165 C166 C167 C168 C169 C170

℄ of Proposed Improvement

MATCH LINE STA. C156+00

MATCH LINE STA. C170+50

N1,303,000

E738,000

N1,303,500

E738,500

N1,304,000

E738,000

22 1/2° Horz. Bends & Thrust Blocks*

PROPOSED 8" WATER MAIN

EXISTING STRUCTURE TO BE REMOVED

EXISTING 5KV SUBMARINE CABLE (APPROX. LOCATION)

N66°-16'-13"W

N63°-54'-47"W

PLUG OR CAP & THRUST BLOCK

EXISTING 10" WATER MAIN TO BE REMOVED

Hydrant & Thrust Block*

EXISTING PAVEMENT TO REMAIN

Item 113 HB - Hwy Barricade

Limit of Item 5IMZ Resurfacing

PROPOSED ABANDONMENT LINE

EXISTING 10" WATER MAIN (AUXILIARY)

Item 212 Corporation Stop & Service Box

N.Y.T.#60 N.Y.T.#61 N.Y.T.#62 N.Y.T.#63 N.Y.T.#64 N.Y.T.#65 N.Y.T.#66 N.Y.T.#70

EXIST. 10" WATER MAIN TO REMAIN

CURVE DATA
P I #2
℄ STA. 113+89.98 302.21'LT.
D = 1°-58'-58.9"
Δ = 32°-08'-00"
R = 2889.33
T = 832.14
L = 1620.43
E = 117.44'
e = 5/8"/ft

TOWN OF WHITEHALL
TOWN OF DRESDEN

*See Thrust Block Data Sheet # 15

SOUTH BAY

PLAN
SCALE: 1"=50'

INV. 96.7 INV. 96.0 INV. 97.5 INV. 99.5 INV. 109.0 INV. 110.0 INV. 98.0 INV. 98.2 INV. 98.4

PC STA. C166+88.97

EXISTING HWY. R.O.W. 1962

R.O.W.

1 ON 2 1 ON 4 1 ON 2 1 ON 4 1 ON 2

WATERLINE SLEEVE

N.Y.T.#65A

45° Horz. Bend & Thrust Block

11 1/4° Vert. Bend & Thrust Block

Manhole Item 102CR

LOW WATER LINE

NM 64 1/2 NM 65 NM 65

N61°-15'-10"W

EXISTING HIGHWAY R.O.W. 1961

Resurface with 1" of Item 5IMZ (Width as Exist. Pavet)

22'

RESTAURANT

PROPOSED ABANDONMENT LINE

ANTHONY J. & JANE C. KENDRA

EVA GORDON

ANTHONY J. & JANE C. KENDRA

14" D.I. MAIN
14" BUTTERFLY VALVE M.J.
2' PLAIN END
Y BRANCH 14" RUN 14" BRANCH
14" C.I. MAIN
14" BUTTERFLY VALVE M.J. 2' PLAIN END 14" C.I. MAIN

STA. C 159+075
ELEV. 104.50'
L.V.C. 160'
M.O. +0.40'
H.S.D. 1000'+

STA. C 165+63
ELEV. 104.50'
L.V.C. 400'
M.O. +1.83'
H.S.D. 488'

Bridge Ends Sta. 157+27.14

-2.00%

+3.66%

0.00% GRADE LINE OF FINISHED SURFACE

P.V.T. P.V.C. P.V.T. P.V.C. P.V.T.

ORIGINAL GROUND

WATER ELEVATION VARIABLE

DATUM ELEV.=70'

85.1 94.8 108.0 108.00 101.5 101.0 101.3 101.7 101.7 101.5 101.3 100.8 100.9 101.1 101.5 102.3 102.2 102.4 101.5 101.8 102.0 102.1 102.1 99.7 99.1 97.3 97.9 98.5 99.9

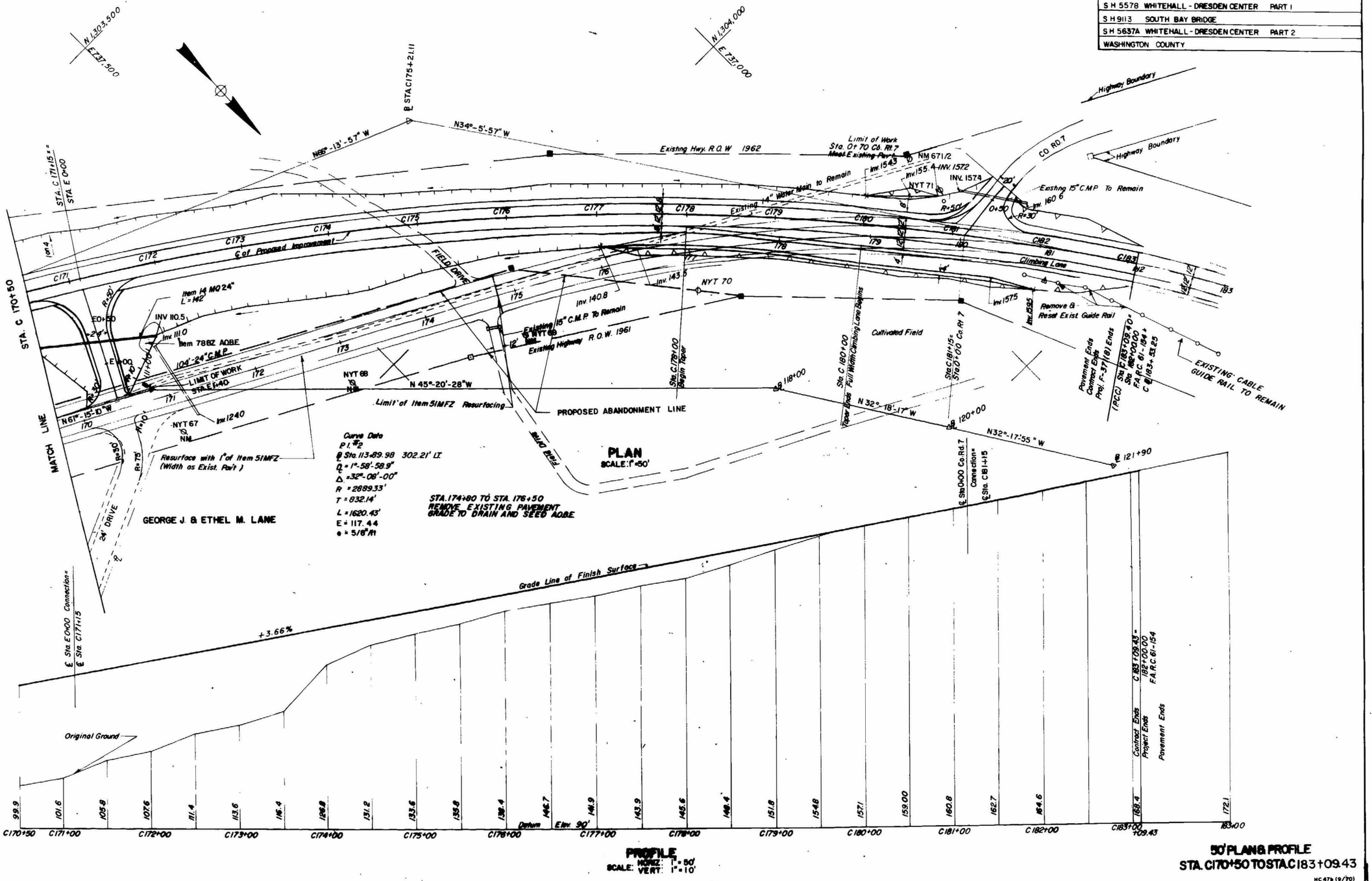
C 157 +00 C 158 +00 C 159 +00 C 160 +00 C 161 +00 C 162 +00 C 163 +00 C 164 +00 C 165 +00 C 166 +00 C 167 +00 C 168 +00 C 169 +00 C 170 +00

PROFILE
SCALE: HORIZ. 1"=50'
VERT. 1"=10'

50' PLAN & PROFILE
STA. C156+00 – STA. C170+50
HC 47b (9/70)

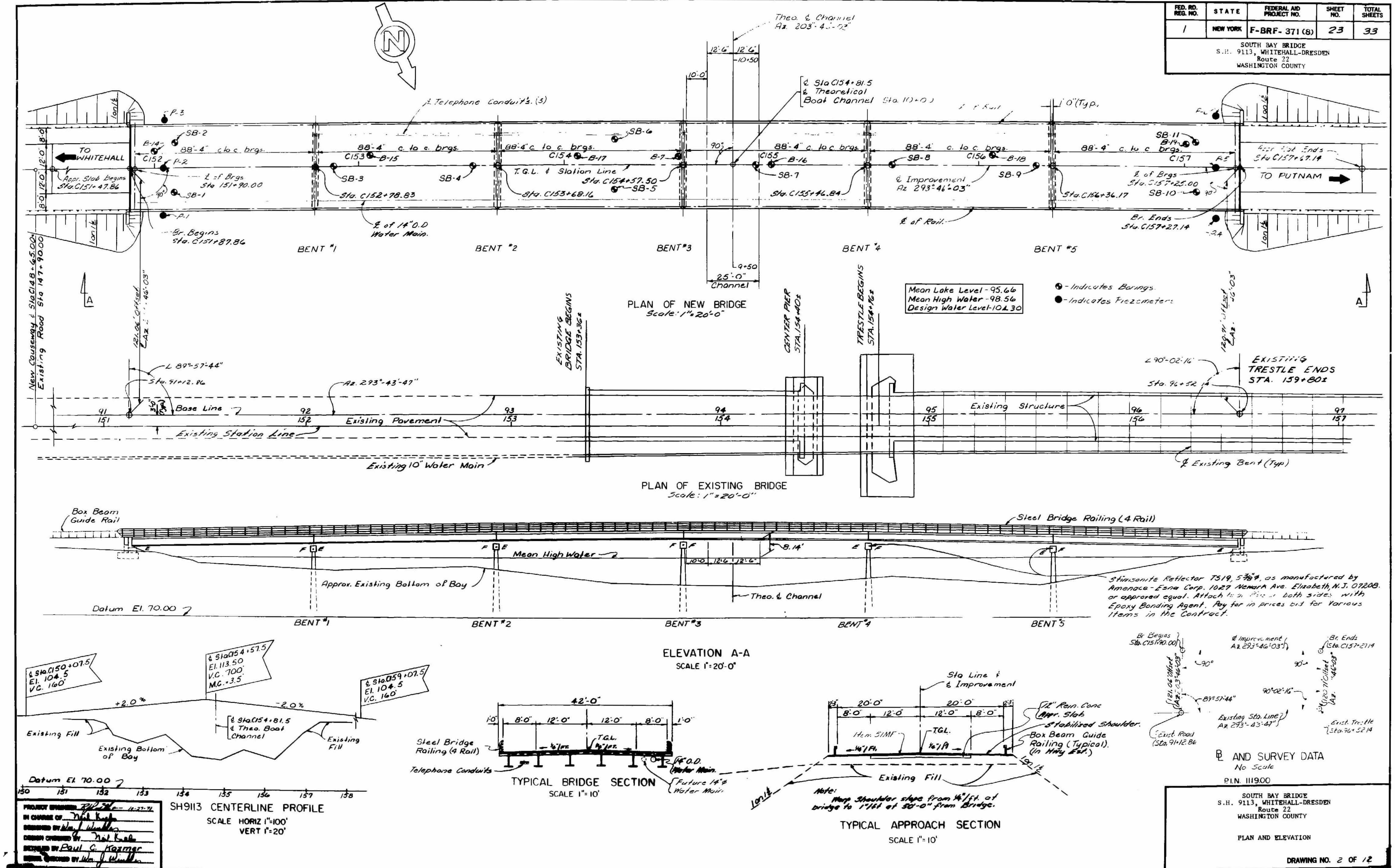
F.A.R.C. 72-1

FED. ROAD REG. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
1	N.Y.	F-BRF-371(8)	20	
S H 5578 WHITEHALL - DRESDEN CENTER PART 1				
S H 9113 SOUTH BAY BRIDGE				
S H 5637A WHITEHALL - DRESDEN CENTER PART 2				
WASHINGTON COUNTY				



50' PLAN & PROFILE
STA. C170+50 TO STA. C183+09.43

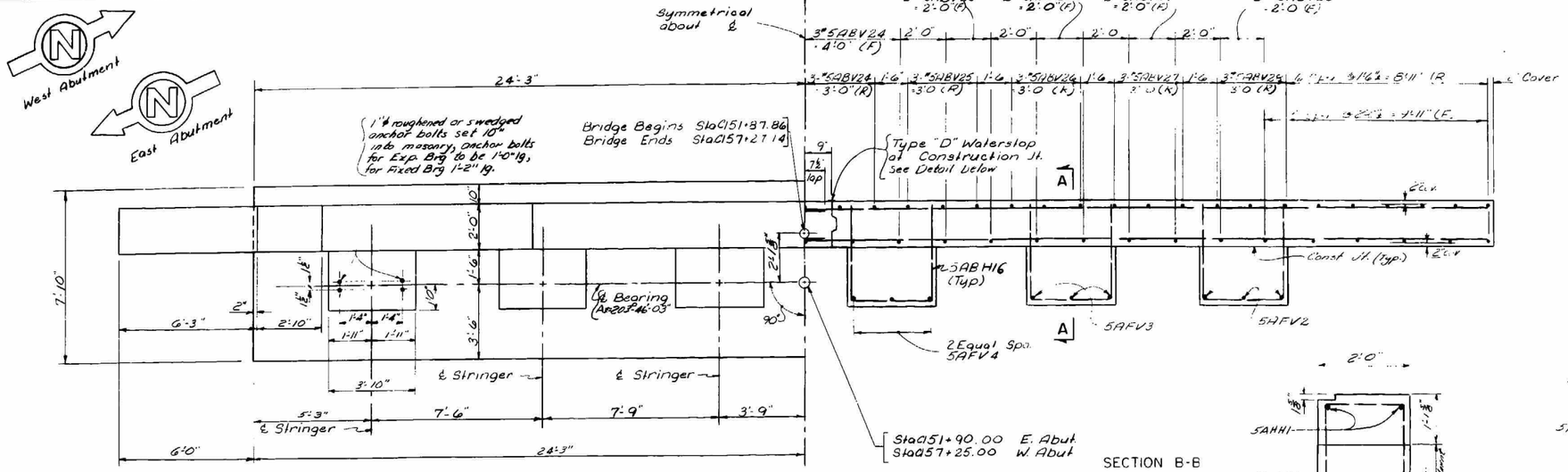
HC 47b (9/70)



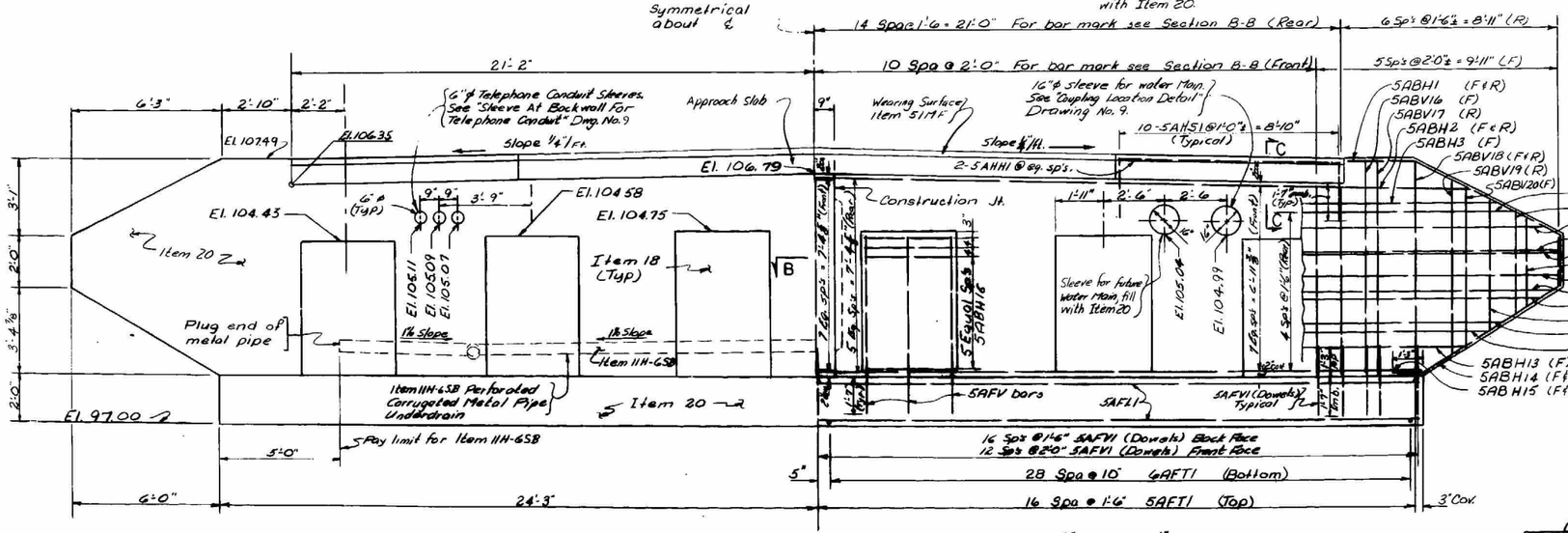
FED. RD. REG. NO. 1 | STATE NEW YORK | FEDERAL AID PROJECT NO. F-BRF-371(8) | SHEET NO. 23 | TOTAL SHEETS 33
SOUTH BAY BRIDGE
S.H. 9113, WHITEHALL-DRESDEN
Route 22
WASHINGTON COUNTY
Theo. ℄ Channel
Az. 203°-45'-03"
℄ Sta C154+81.5
℄ Theoretical
Boat Channel Sta. 10+00
℄ Telephone Conduits (3)
TO WHITEHALL
TO PUTNAM
Appr. Slab begins Sta. C151+47.86
℄ of Brgs Sta 151+90.00
Br. Begins Sta. C151+87.86
88'-4" c. to c. brgs.
T.G.L. & Station Line
Sta. C154+57.50
Sta. C152+78.83
Sta. C153+68.16
Sta. C155+46.84
Sta. C156+36.17
℄ of 14" O.D. Water Main
℄ Improvement Az. 293°-46'-03"
℄ of Rail
℄ of Brgs Sta. C157+25.00
Br. Ends Sta. C157+27.14
Appr. Slab Ends Sta C157+67.14
BENT #1
BENT #2
BENT #3
BENT #4
BENT #5
25'-0" Channel
PLAN OF NEW BRIDGE
Scale: 1"=20'-0"
Mean Lake Level - 95.66
Mean High Water - 98.56
Design Water Level - 102.30
- Indicates Borings
- Indicates Piezometers
New Causeway ℄ Sta C148+65.00
Existing Road Sta 147+90.00
EXISTING BRIDGE BEGINS STA. 153+36±
CENTER PIER STA. 154+40±
TRESTLE BEGINS STA. 154+76±
EXISTING TRESTLE ENDS STA. 159+80±
Base Line
Existing Pavement
Existing Station Line
Existing 10" Water Main
Existing Structure
℄ Existing Bent (Typ)
Az. 293°-43'-47"
Sta. 91+12.86
Sta. 96+52.14
PLAN OF EXISTING BRIDGE
Scale: 1"=20'-0"
Box Beam Guide Rail
Steel Bridge Railing (4 Rail)
Mean High Water
Approx. Existing Bottom of Bay
Theo. ℄ Channel
Datum El. 70.00
Stimsonite Reflector 7519, 5⅜"ϕ, as manufactured by Amerace-Esna Corp. 1027 Newark Ave. Elizabeth, N.J. 07208. or approved equal. Attach to all Posts both sides with Epoxy Bonding Agent. Pay for in prices bid for Various Items in the Contract.
ELEVATION A-A
SCALE 1"=20'-0"
℄ Sta C150+07.5 El. 104.5 V.C. 160'
℄ Sta C154+57.5 El. 113.50 V.C. 700' M.C. +3.5
℄ Sta C159+07.5 El. 104.5 V.C. 160'
+2.0%
-2.0%
℄ Sta C154+81.5 ℄ Theo. Boat Channel
Existing Fill
Existing Bottom of Bay
SH9113 CENTERLINE PROFILE
SCALE HORIZ 1"=100' VERT 1"=20'
Steel Bridge Railing (4 Rail)
Telephone Conduits
14" O.D. Water Main
Future 14"ϕ Water Main
TYPICAL BRIDGE SECTION
SCALE 1"=10'
Sta Line & Improvement
12" Rein. Conc. Appr. Slab
Stabilized Shoulder
Box Beam Guide Railing (Typical) (in Hwy Est.)
Existing Fill
Note: Warp Shoulder slope from ¼"/ft. at bridge to 1"/ft at 50'-0" from Bridge.
TYPICAL APPROACH SECTION
SCALE 1"=10'
℄ AND SURVEY DATA
No Scale
P.I.N. 1119.00
PROJECT ENGINEER
IN CHARGE OF
DESIGNED BY
DESIGN CHECKED BY
DETAILED BY Paul C. Kozmer
DETAIL CHECKED BY
SOUTH BAY BRIDGE
S.H. 9113, WHITEHALL-DRESDEN
Route 22
WASHINGTON COUNTY
PLAN AND ELEVATION
DRAWING NO. 2 OF 12

FED. ROAD REGL. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
1	NEW YORK	F-BRF-371(8)	25	33

SOUTH BAY BRIDGE
S.H. 9113, WHITEHALL-DRESDEN
ROUTE 22
WASHINGTON COUNTY



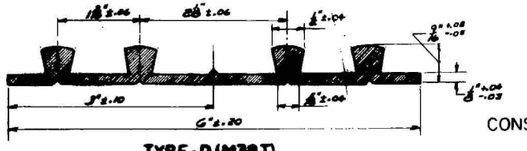
Note: Space between the sleeves and the water pipes are to be filled with Oakum or an approved equal. Fill and cap sleeve for future Water Main, before backfilling, with Item 20.

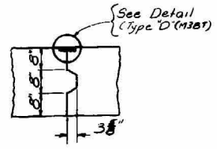


ELEVATION
SCALE 3/8"=1'-0"

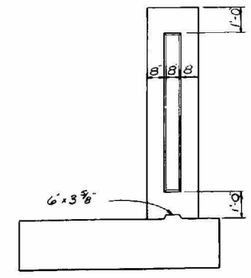
Note: Reinforcing bars in backwall are to be field bent around water pipe and telephone conduit sleeves.

Note: All reinforcement cover shall be 2" clear unless otherwise shown.





CONSTRUCTION JOINT DETAIL
SCALE 1/2"=1'-0"



KEYWAY DETAIL
SCALE 3/8"=1'-0"

P.I.N. 1119.00

SOUTH BAY BRIDGE
S.H. 9113, WHITEHALL-DRESDEN
ROUTE 22
WASHINGTON COUNTY

ABUTMENT (PLAN AND ELEVATION)

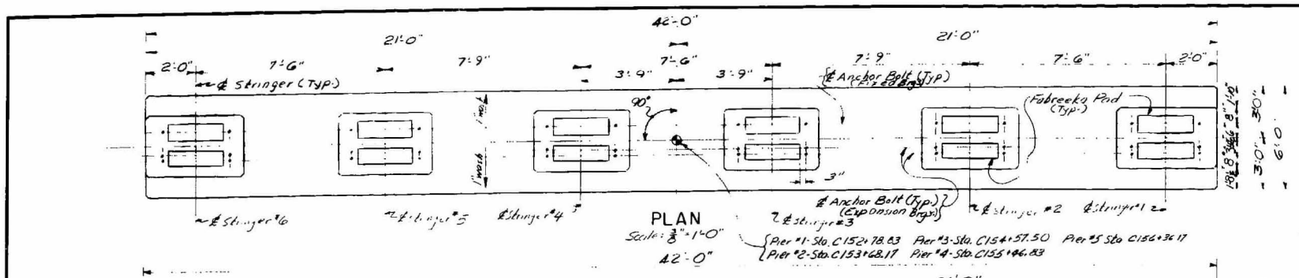
DRAWING NO. 4 OF 12

PROJECT ENGINEER
IN CHARGE OF
DESIGNED BY
DESIGN CHECKED BY
DETAILED BY
DETAILS CHECKED BY

F.A.R.C. 72-1

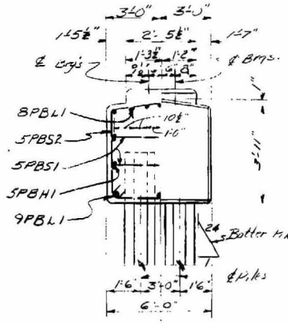
FED. RD. REG. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
1	NEW YORK	F-BRF-371(8)	26	33

SOUTH BAY BRIDGE
S.H. 9113, WHITEHALL-DRESDEN
ROUTE 22
WASHINGTON COUNTY

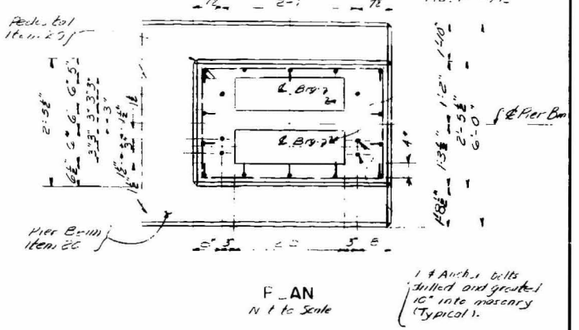


Note: Pier Pedestals shall be poured monolithically with the cap beam. The pedestal shall be poured to a minimum of 2" high, and shall be bush hammered (or by other means) over the pedestal surface of the pier elevation.

Note: Bearings on Piers 4 and 5 are as shown, Piers 1 and 2 are opposite hand about ℄ Pier Beam and Pier 3 is fixed at both bearings.

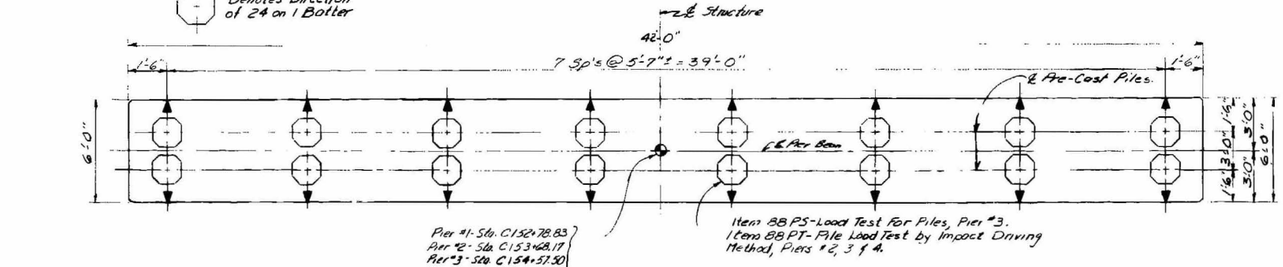


SECT. A-A
Not to Scale



PLAN
N.T. to Scale

1 ℄ Anchor bolts drilled and grouted 10" into masonry (Typical).

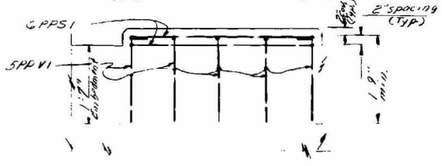


PILE PLAN

PIER
Not to Scale

Note: For pedestal bar reinforcement see chart below.

PEDESTAL REINFORCEMENT PER PIER							
Pedestals	Bar Mark	Position	Total	Bar Mark	Position	Total	Length
1 ℄ 6 Fos.	GPPS1	Horiz.	4	SPPV1	Vert	28	2'-0"
2 ℄ 5 Int.	"	"	6	SPPV2	"	"	2'-2"
3 ℄ 4 Int.	"	"	8	SPPV3	"	"	2'-4"

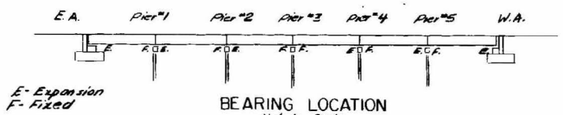


ELEVATION

PEDESTAL
Scale 3/4" = 1'-0"

PILE SIZE OCTAGONAL	FINAL PRESTRESS FORCE	CONTRACTORS OPTION STRANDS PER PILE DIAMETER 7/16"	DIAMETER 1/2"
14"	114 kips	7	5

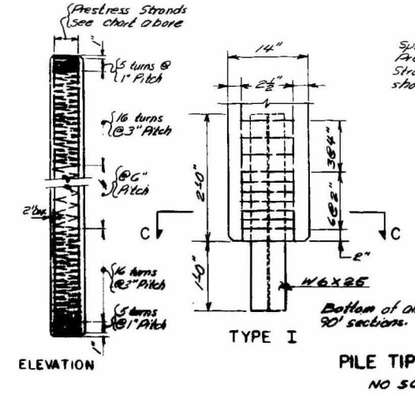
PILF PROPERTIES

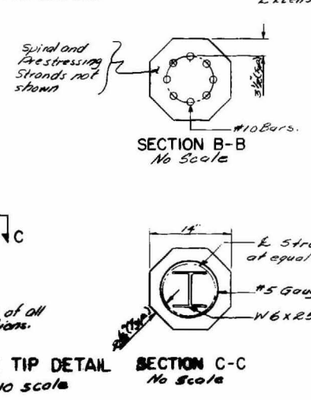


BEARING LOCATION
Not to Scale

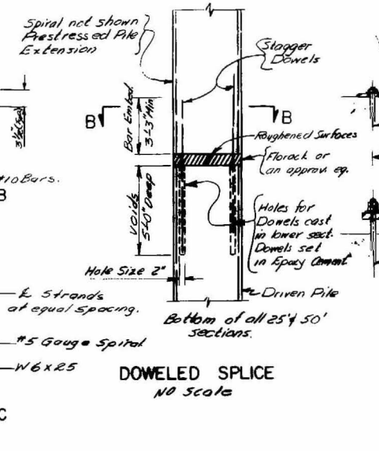
PEDESTAL EL. PIERS 1-5				
LOCATION		PED. ELEV. 1-6	2-5	3-4
E. ABUT	E	104.43	104.36	104.75
PIER 1	F	105.56	105.71	105.85
" 1	E	105.56	105.71	105.85
" 2	F	106.24	106.39	106.85
" 2	E	106.24	106.39	106.85
" 3	F	106.47	106.62	106.79
" 3	E	106.47	106.62	106.79
" 4	F	106.24	106.39	106.93
" 4	E	106.24	106.39	106.93
" 5	F	105.56	105.71	105.99
" 5	E	105.56	105.71	105.99
W. ABUT	E	104.43	104.58	104.75

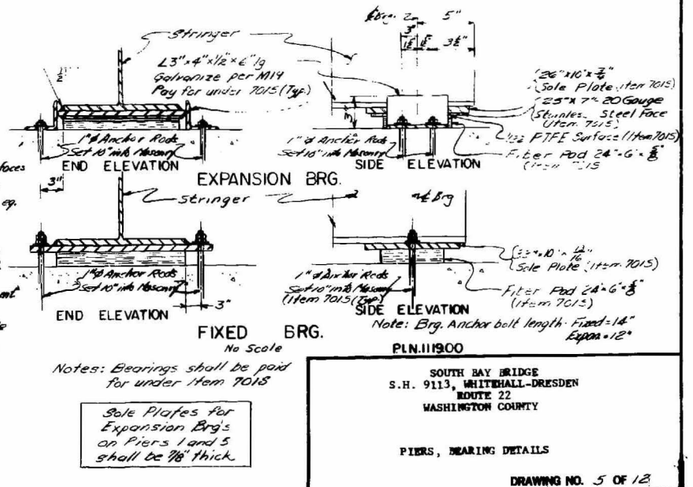
F-FIXED
E-EXPANSION





Note: Vary each length of dowel embedment.





Notes: Bearings shall be paid for under Item 7018

Sole Plates for Expansion Brg's on Piers 1 and 5 shall be ⅞" thick.

PLN.111900

SOUTH BAY BRIDGE
S.H. 9113, WHITEHALL-DRESDEN
ROUTE 22
WASHINGTON COUNTY

PIERS, BEARING DETAILS

DRAWING NO. 5 OF 12

PROJECT ENGINEER
IN CHARGE OF
DESIGNED BY
DESIGN CHECKED BY
DETAILED BY
DETAILS CHECKED BY

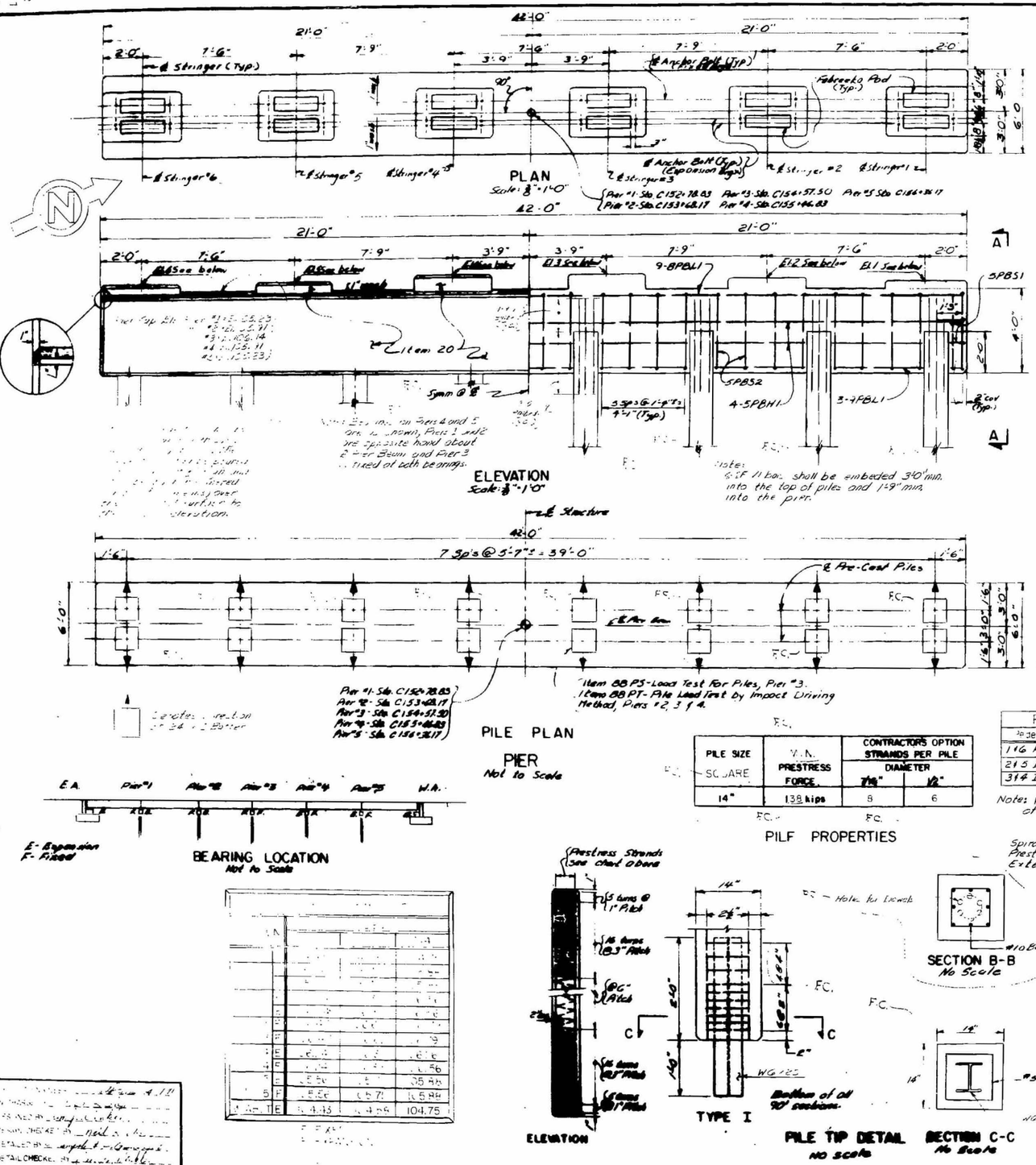
FED. RD REG. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
1	NEW YORK	F-BRF-371(6)	26-F1	33

SOUTH BAY BRIDGE
S.H. 9113, WHITEHALL-DRESDEN
ROUTE 22
WASHINGTON COUNTY

FIELD CHANGE SHEET

SHEET 26-F1 SUPERCEDES SHEET NO. 26 DUE TO THE FOLLOWING REASONS:

1. The addition of #5 bar reinforcement in the top of the pile was due to the omission on the original contract plans.
2. [illegible]



PLN.III.800

SOUTH BAY BRIDGE
S.H. 9113, WHITEHALL-DRESDEN
ROUTE 22
WASHINGTON COUNTY

PIERS, BEARING DETAILS

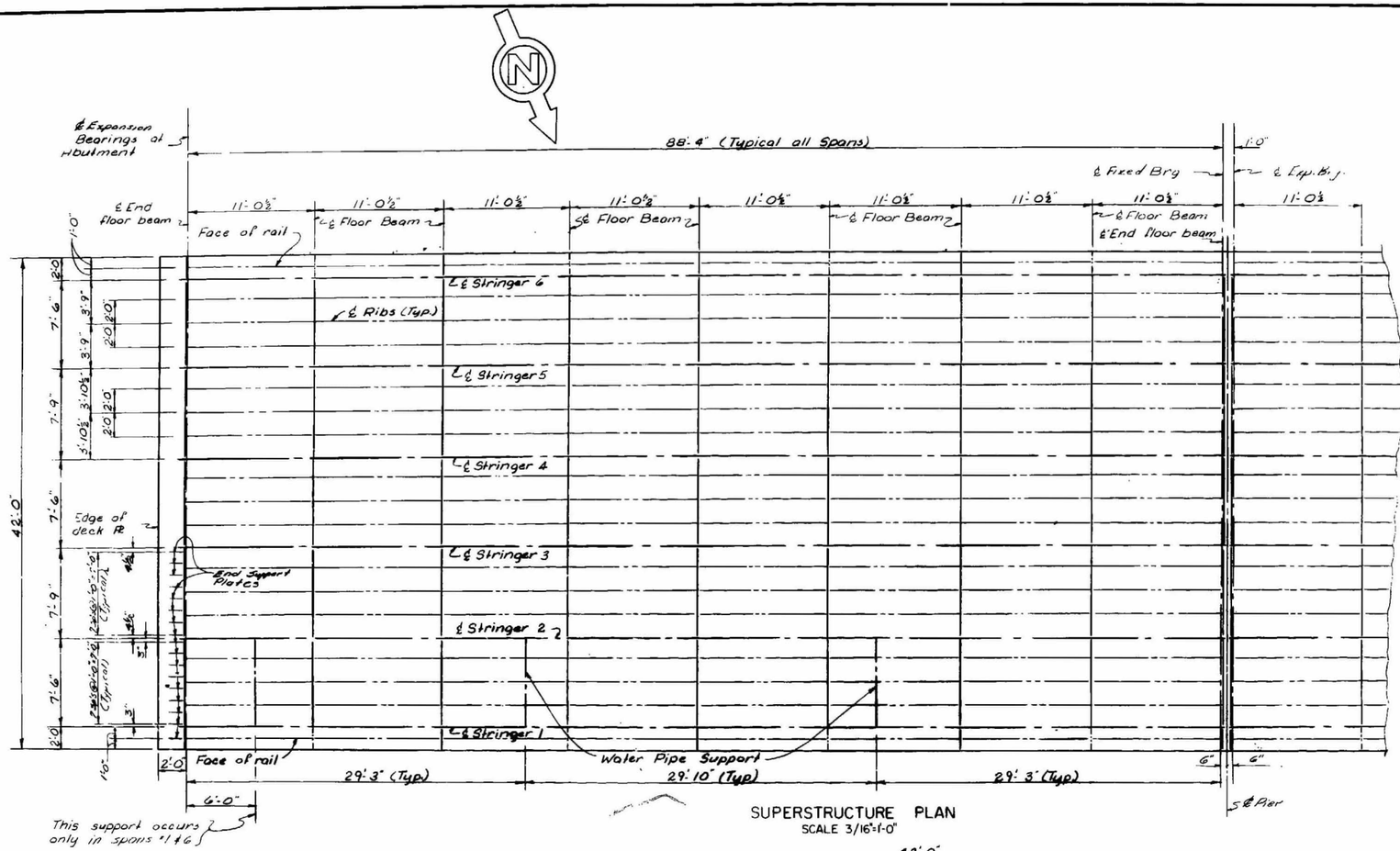
DRAWING NO. 5 OF 12

FARC 72-1

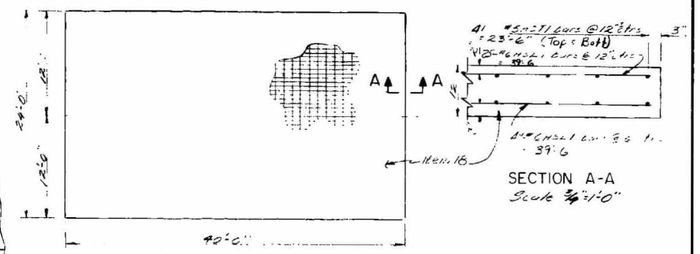
F.A.R.C. 72-1

FED. RD. REG. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
1	NEW YORK	F-BRF-371(8)	27	33

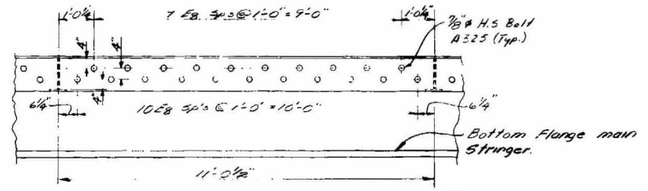
SOUTH BAY BRIDGE
S.H. 9113, WHITEHALL-DRESDEN
ROUTE 22
WASHINGTON COUNTY

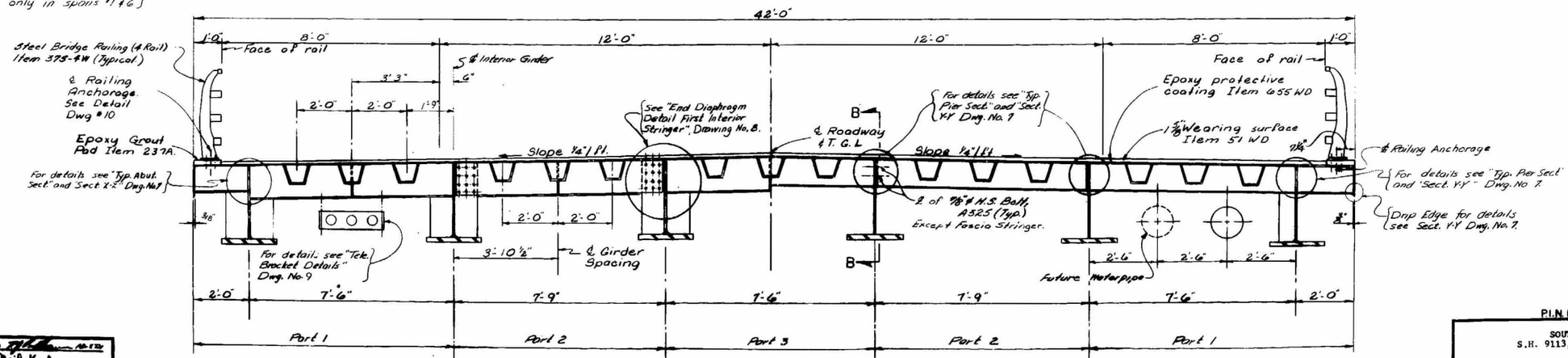


SUPERSTRUCTURE PLAN
SCALE 3/16"=1'-0"



APPROACH SLAB
Scale 1/8"=1'-0"





END DIAPHRAGM LOOKING EAST

INTERIOR FLOOR BEAM LOOKING EAST

TRANSVERSE SECTION
SCALE 1/2"=1'-0"

P.I.N. 1119.00

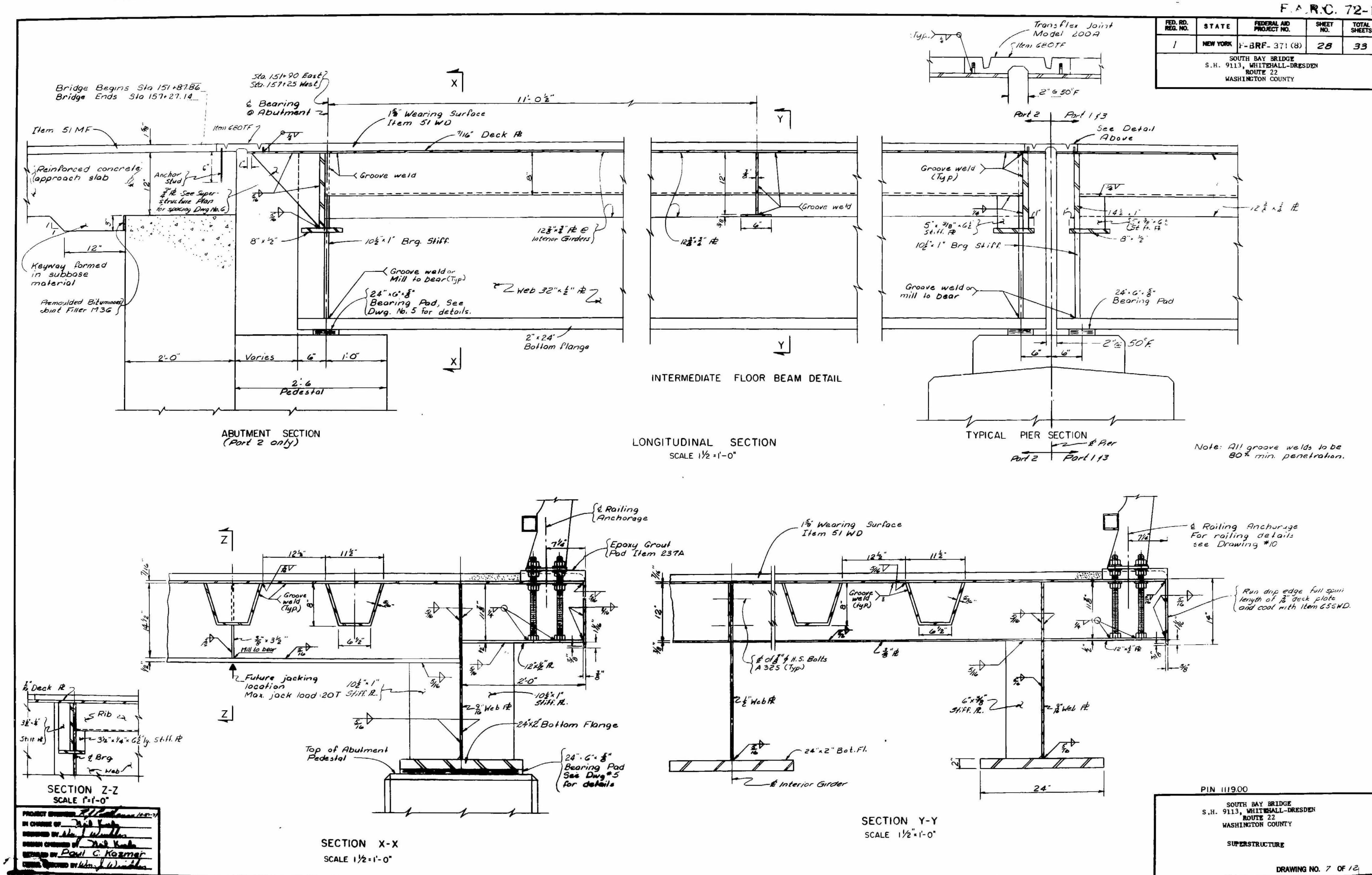
SOUTH BAY BRIDGE
S.H. 9113, WHITEHALL-DRESDEN
ROUTE 22
WASHINGTON COUNTY

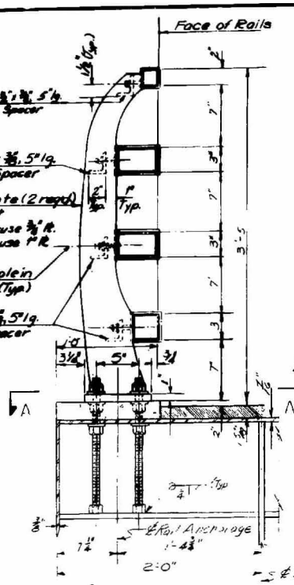
SUPERSTRUCTURE

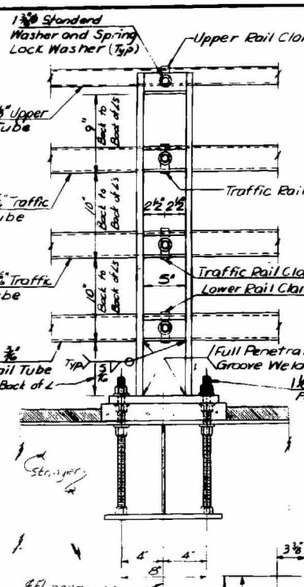
APPROACH SLAB AND TRANSVERSE SECTION

DRAWING NO. 6 OF 12

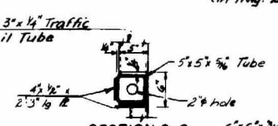
PROJECT ENGINEER Neil Kuhn
IN CHARGE OF Neil Kuhn
DESIGNED BY [illegible]
DESIGN CHECKED BY Neil Kuhn
DETAILED BY Paul C. Kazmer
DETAILS CHECKED BY [illegible]

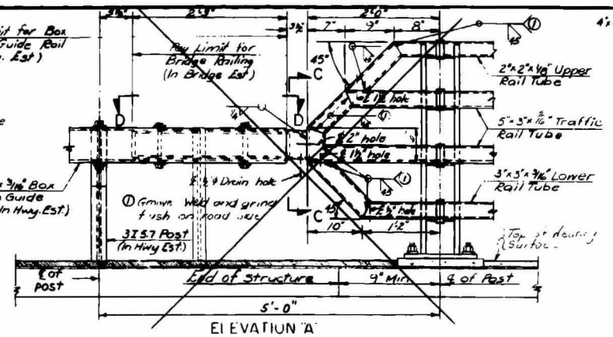

F.A.R.C. 72-1
FED. RD. REG. NO. | STATE | FEDERAL AID PROJECT NO. | SHEET NO. | TOTAL SHEETS
1 | NEW YORK | F-BRF-371(8) | 28 | 33
SOUTH BAY BRIDGE
S.H. 9113, WHITEHALL-DRESDEN
ROUTE 22
WASHINGTON COUNTY
Transflex Joint Model 200A
Item 680TF
2" @ 50°F
Bridge Begins Sta 151+87.86
Bridge Ends Sta 157+27.14
Sta. 151+90 East
Sta. 157+25 West
℄ Bearing @ Abutment
11'-0½"
1⅜" Wearing Surface Item 51 WD
7/16" Deck ℞
Item 51 MF
Reinforced concrete approach slab
Anchor Stud
⅝" ℞ See Superstructure Plan for spacing Dwg No. 6
Groove weld
8" x ½"
10½" x 1" Brg. Stiff.
12⅜" x ⅜" ℞ @ Interior Girders
12" x ⅜" ℞
Keyway formed in subbase material
Premoulded Bituminous Joint Filler M36
Groove weld or Mill to bear (Typ)
24" x 6" x ⅝" Bearing Pad, See Dwg. No. 5 for details.
Web 32" x ½" ℞
2" x 24" Bottom Flange
2'-0"
Varies
2'-6 Pedestal
ABUTMENT SECTION (Part 2 only)
INTERMEDIATE FLOOR BEAM DETAIL
LONGITUDINAL SECTION
SCALE 1½ = 1'-0"
Part 2
Part 1 & 3
See Detail Above
Groove weld (Typ)
5" x 9/16" x 6½" Stiff. ℞
10½" x 1" Brg. Stiff.
14½ x 1"
Groove weld or mill to bear
24" x 6" x ⅝" Bearing Pad
2" @ 50°F
TYPICAL PIER SECTION
℄ Pier
Note: All groove welds to be 80% min. penetration.
℄ Railing Anchorage
Epoxy Grout Pad Item 237A
Groove weld (typ)
⅜" x 3½"
Mill to bear
Future jacking location Max. jack load 20T
10½" x 1" Stiff. ℞.
12" x ½" ℞
2'-0"
10½" x 1" Stiff. ℞.
7/16" Web ℞
24" x 2" Bottom Flange
Top of Abutment Pedestal
24" x 6" x ⅝" Bearing Pad See Dwg #5 for details
SECTION X-X
SCALE 1½ = 1'-0"
7/16" Deck ℞
Rib
3½" x 7/16" x 6½" lg. Stiff. ℞
℄ Brg
Web
SECTION Z-Z
SCALE 1" = 1'-0"
1⅜" Wearing Surface Item 51 WD
℄ Railing Anchorage For railing details see Drawing #10
Run drip edge full span length of ⅜" deck plate and cool with Item 655WD.
⅞" of ⅞" ∅ H.S. Bolts A325 (Typ)
½" Web ℞
24" x 2" Bot. Fl.
℄ Interior Girder
6" x ⅜" Stiff. ℞.
12" x ½" ℞
SECTION Y-Y
SCALE 1½" = 1'-0"
24"
PIN 1119.00
SUPERSTRUCTURE
DRAWING NO. 7 OF 12
DETAILED BY Paul C. Kozmar

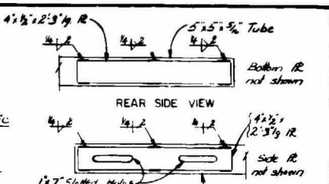




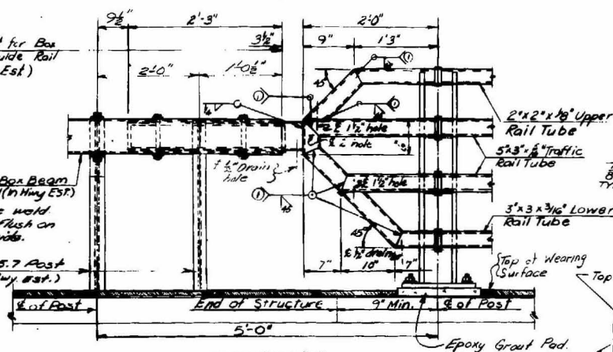
BRIDGE RAILING DETAILS
SCALE: 1 1/2" = 1'-0"

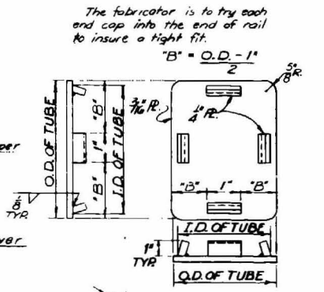




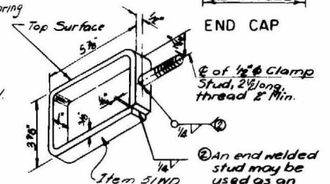


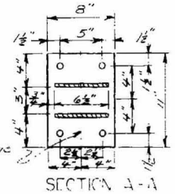
DETAIL OF WELDING 4"x1/2"x 2'-3" LG. PL TO 5"x5"x5/16" TUBE

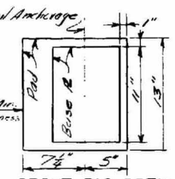


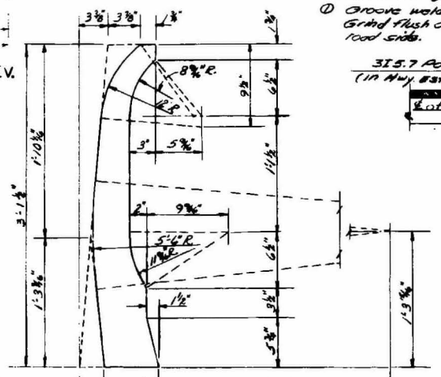


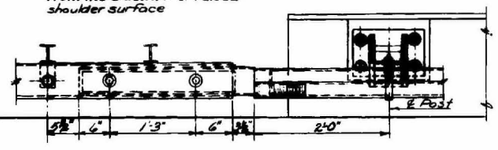
NOTE:
Elevation "A" is to be used when the height of the Approach Box Beam Guide Railing is measured from the roadway surface.
Elevation "B" is to be used when the height of the Approach Box Beam Guide Railing is measured from the sidewalk or raised shoulder surface

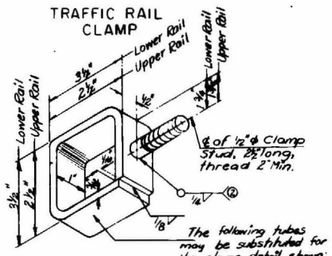


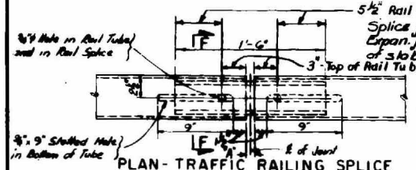


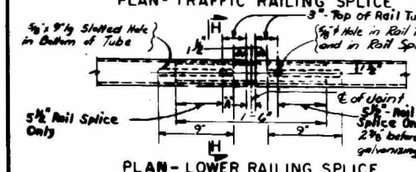


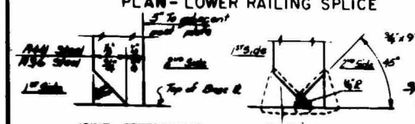


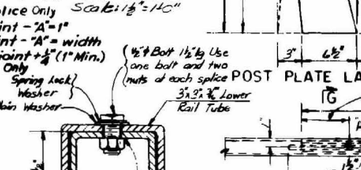


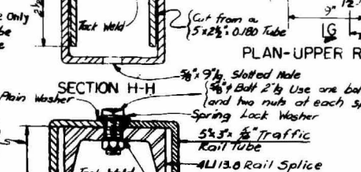


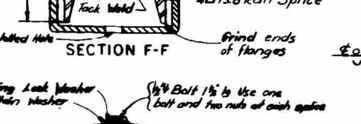


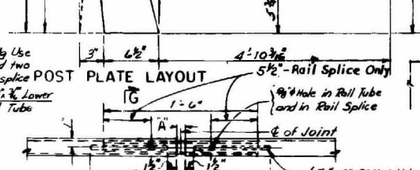


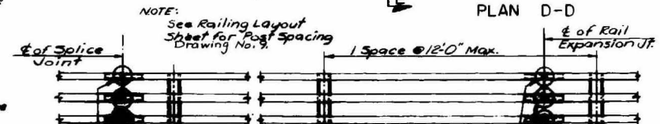


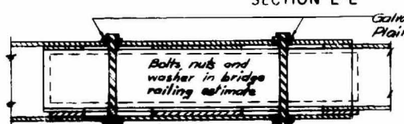












Notes:

All railing is to be fabricated and erected so that the rails are parallel to each other and to the top of wearing surface and so that the posts are truly vertical.

All Traffic Rail Tubes are to be 5/16" thick.

The Base Plates shall be perpendicular to the posts unless otherwise noted. When the railing is to be placed on a preformed surface the Base Plates may be parallel to the grade or may be perpendicular to the post and made level by the use of beveled shims.

Tubular steel rails, rail clamp assemblies including studs, nuts and washers, posts, post spacers, base plates, rail end caps, railing splices and any necessary shims and aluminum caulking compound shall be paid for under the railing item.

Anchor studs, nuts, washers and anchor plates shall be paid for under the railing item.

After the anchor stud nuts have been placed and tightened to the satisfaction of the Engineer, the studs shall be cut off 1/8 inch above the nut and peened.

Rails shall span a minimum of 2 posts.

Materials used in the manufacture of this railing shall conform to the requirements and/or specifications listed below.

Rail Tubes - ASTM Designation A500 Grade B or A501.
Rail Clamps - ASTM Designation A36
Clamp Studs, Nuts and Washers - ASTM Designation A307
Rail End Caps - ASTM Designation A36
Channel Rail Splices - ASTM Designation A36
Tubular Rail Splices - ASTM Designation A500 Grade B or A501
Splice Plates - ASTM Designation A36
3/4" Post Plates - ASTM Designation A441
1" Post Plates - ASTM Designation A36
Post Spacers - Same as post plate material
Base Plates - Same as post plate material
Splice Bolts, Nuts and Washers - ASTM Designation A307
Anchor Studs - ASTM Designation A449
Nuts&Washer for Anchor Studs-ASTM Design. A325
Anchor Plates - ASTM Designation A36
Beveled Shims - Material Specification M13

Galvanized Railing - All components of the railing including anchor studs, nuts, and washers shall be galvanized in accordance with Material Specification M19. Anchor studs shall have a Class 2A thread fit prior to galvanizing. The cut portion of the anchor studs shall be given one field coat of dull Orange Primer and two field coats of Ready-Mixed Aluminum Paint conforming to the requirements of Material Specifications M18CA and M18J in that order.

All bolts shall have a Class 2A thread fit prior to galvanizing.

Grind all edges of Post Plates and Base Plates so that all sharp edges are removed.

Railing post shall be erected to proper line and grade before epoxy pad is poured.

FED. RD. REG. NO.	STATE	FEDERAL AID PROJECT NO	SHEET NO.	TOTAL SHEETS
1	N.Y.	F-BRF-371(8)	31	33

SOUTH BAY BRIDGE
S.H. 9113, WHITEHALL-DRESDEN
ROUTE 22
WASHINGTON COUNTY

P.I.N. 1119.00

SOUTH BAY BRIDGE
S.H. 9113, WHITEHALL-DRESDEN
ROUTE 22
WASHINGTON COUNTY

STEEL BRIDGE RAILING - FOUR RAIL

DWG. NO. 10 OF 12

F.A.R.C. 72-1

FED. RD. REG. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
1	NEW YORK	F-BRF-371 (8)	32	33

SOUTH BAY BRIDGE
S.H. 9113, WHITEHALL-DRESDEN
ROUTE 22
WASHINGTON COUNTY

PIER NO. 1 THRU PIER NO. 5

MARK	SIZE	NO	LENGTH	TYPE	A	B	C	D	E	F	G	H	I	J	K	L	LOCATION
5PBH1	5	20	41'-8"	Str.													Horiz. in Pier Beam
5PBS1	5	20	8'-0"	IV	1'-3"	5'-6"	1'-3"										Stirrups in Pier Beam B/J
5PBS2	5	150	19'-2"	IX	3'-8"	5'-8"	5½"	2'-10"	5'-8"	5¾"							Stirrups in Pier Beam
8PBL1	8	65	41'-8"	Str.													Long. in Pier (Top)
9PBL1	9	15	41'-8"	Str.													" " " (Bot.)
5PPV1	5	140	2'-0"	X	1'-9"	4"											Vert. in Pier Beam under Pedestal
5PPV2	5	140	2'-2"	X	1'-11"	4"											" " " " " "
5PPV3	5	140	2'-3"	X	2'-1"	4"											" " " " " "
6PPS1	6	90	11'-9"	IX	3'-6"	2'-1½"	5¾"	5½"									Horiz. in Pedestal

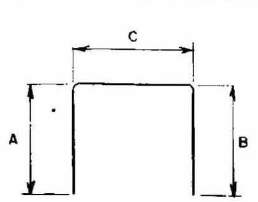
APPROACH SLAB

MARK	SIZE	NO	LENGTH	TYPE	A	B	C	D	E	F	G	H	I	J	K	L	LOCATION
5HST1	5	164	23'-6	Str													Trans in Approach Slab Top & Bot.
6HSL1	6	148	39'-6	Str													Long. in Approach Slab Top & Bot.

ABUTMENTS

MARK	SIZE	NO	LENGTH	TYPE	A	B	C	D	E	F	G	H	I	J	K	L	LOCATION
5AFL1	5	24	48'-0"	Str.													Abut. Ftg. Long. (T&B)
5AFT1	5	66	7'-4"	Str.													" " Trans Top
6AFT1	6	116	7'-4"	Str													" " " Bot.
5ABH1	5	8	10'-7"	XXIII	2'-8"	6'-1"	6'-8	1'-10	2'-9								Abut. Backwall Horiz (F&R)
5ABH2	5	8	26'-3"	Str.													(F&R)
3		4	27'-3"														(F&R)
4			28'-0"														(R)
5			29'-0"														(F)
6			29'-9"														(R)
7			29'-9"														(F)
8			29'-9"														(F)
9			29'-6"														(R)
10			29'-0"														(F)
11			27'-6"														(F)
12			27'-0"														(R)
13			26'-0"	Str.													(F)
5ABH14	5	8	9'-7"	XXIII	1'-3"	5'-7"	6'-7"	1'-10"	3'-0"								(F&R)
5ABH15	5	8	24'-2"	Str.													Abut Backwall Horiz. (F&R)
5ABH16	5	96	11'-7"	IV	4'-2"	3'-6"	4'-2"										Abut. Backwall Horiz. into Pedestal
5ABV16	5	4	8'-4"	Str													Abut Backwall Vert. (Front)
17		4	8'-4"														(R)
18		8	8'-4"														(F&R)
19		4	7'-0"														(R)
20		4	6'-3"														(F)
21		4	4'-0														(F)
22		8	3'-6'														(F&R)
23		4	5'-3'														(R)
24		20	7'-5"														(F&R)
25		20	7'-4"														"
26		20	7'-3'														"
27		20	7'-2"														"
5ABV28	5	20	7'-1"	Str													Abut. Backwall Vert. (F&R)
5AFV1	5	112	2'-10"	Str.													Abut. Ftg. Dowels
2	5	12	6'-10"	"													" " "
3	5	12	7'-0"	"													" " "
5AFV4	5	12	7'-2"	"													" " "

MARK	SIZE	NO	LENGTH	TYPE	A	B	C	D	E	F	G	H	I	J	K	L	LOCATION



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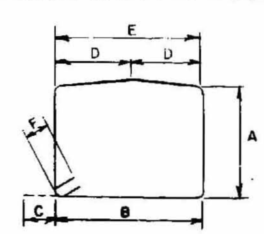

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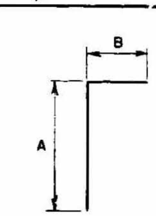

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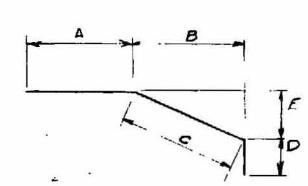


XXIII

PROJECT ENGINEER R. ...
IN CHARGE OF Neil Koch
DESIGNED BY
DESIGN CHECKED BY
DRAWN BY P.S. ...
CHECKED BY Wm. J. ...

R.I.N. 111900

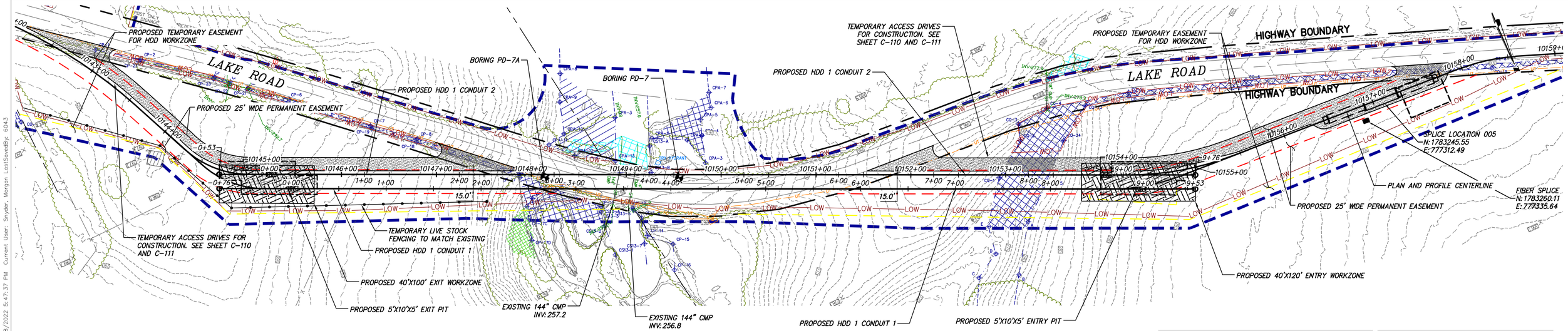
SOUTH BAY BRIDGE
S.H. 9113, WHITEHALL-DRESDEN
ROUTE 22
WASHINGTON COUNTY

BAR LIST

DRAWING NO. 11 OF 12

Appendix C

HDD Design Drawings



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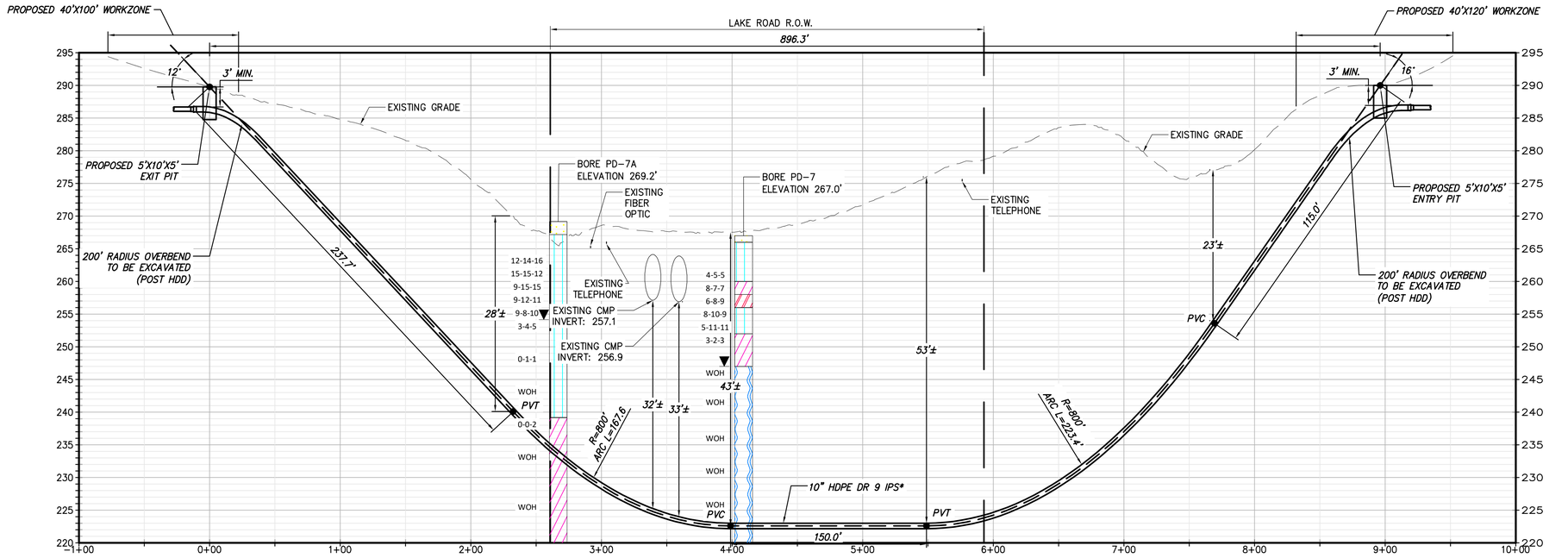
Scale in feet

PROPOSED HDD 1 PLAN VIEW
CONDUIT 1



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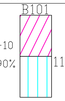
Scale in feet

PROPOSED HDD 1 PROFILE
CONDUIT 1

*HDD 1 CONSIST OF (2) HVDC ELECTRICAL TRANSMISSION CABLES HOUSED IN INDIVIDUAL 10" DIAMETER CASINGS.

*A THIRD 2" CASING WILL BE BUNDLED WITH ONE OF THE 10" CASINGS FOR A TELECOMMUNICATIONS LINE.

BORING LOG STRIP LEGEND



Blow Counts per 6" =10-10-10
Recovery %/RQD % =95%/90%

Legend	
ASPHALT	Asphalt
Bedrock	Bedrock
Boulder	Boulder
CH	Fat CLAY
CH-MH	SILTY Fat CLAY
CL	Lean CLAY
CL-ML	SILTY CLAY
CONCRETE	Concrete
Fill	Fill
GC	CLAYEY GRAVEL
GC-GM	SILTY CLAYEY GRAVEL
GM	SILTY GRAVEL
GP	Poorly Graded GRAVEL
GP-GC	Poorly Graded Gravel with CLAY
GP-GM	Poorly Graded GRAVEL with SILT
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GW-GC	Well Graded GRAVEL with CLAY
GW-GM	Well Graded GRAVEL with SILT
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MH	Elastic SILT
ML	SILT
OH	ORGANIC Fat CLAY
OL	ORGANIC Lean CLAY
OL/OH	ORGANIC SOIL
PT	PEAT
Rock	Rock
Sandstone	Sandstone
SC	CLAYEY SAND
SC-SM	SILT, CLAYEY SAND
SHALE	Shale
SILTSTONE	Siltstone
SM	SILTY SAND
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SP-SC	Poorly Graded SAND with CLAY
SP-SM	Poorly Graded SAND with SILT
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SW-SC	Well Graded SAND with CLAY
SW-SM	Well Graded SAND with SILT
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USGS 601	Gravel or Conglomerate 1
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USGS 702	Quartzite
USGS 705	Schist
USGS 705	Schist
USGS 708	Gneiss
USGS 708	Gneiss
USGS 718	Granite 1
Void	Void
Water	Water
Weathered Rock	Undefined
Water Table	Water Table during drilling
Delayed Water Table	Water Table after drilling

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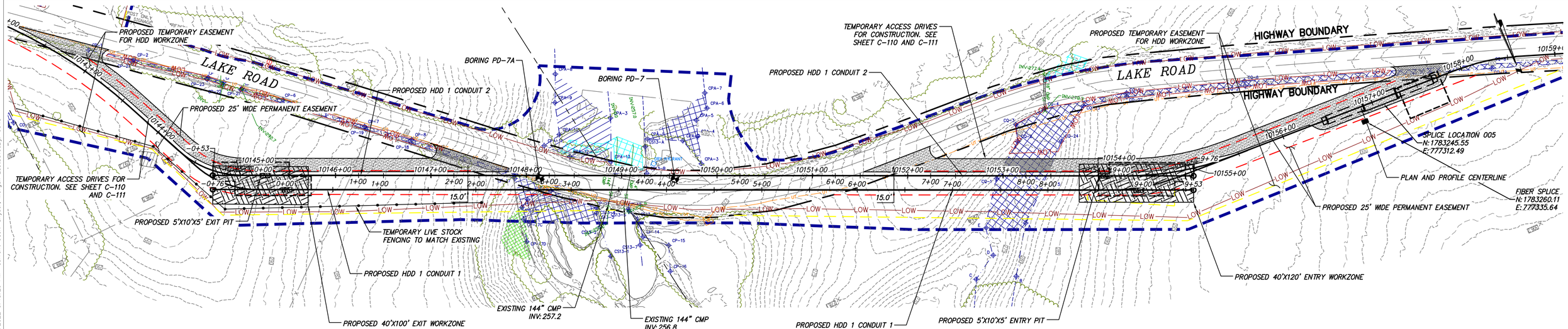
No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
0	09/21/2022	FINAL EM&CP SUBMISSION	MCS	JEO

CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 1 (PACKAGE 1A) PUTNAM TO DRESDEN
HDD 1 PLAN AND PROFILE - CONDUIT 1
MILL BROOK CULVERTS CROSSING, CONDUIT 1
WHITEHALL, WASHINGTON COUNTY, NY

KIEWIT PROJECT NO.	21162
CHA PROJECT NO.	066076
DRAWING NO.	C-301

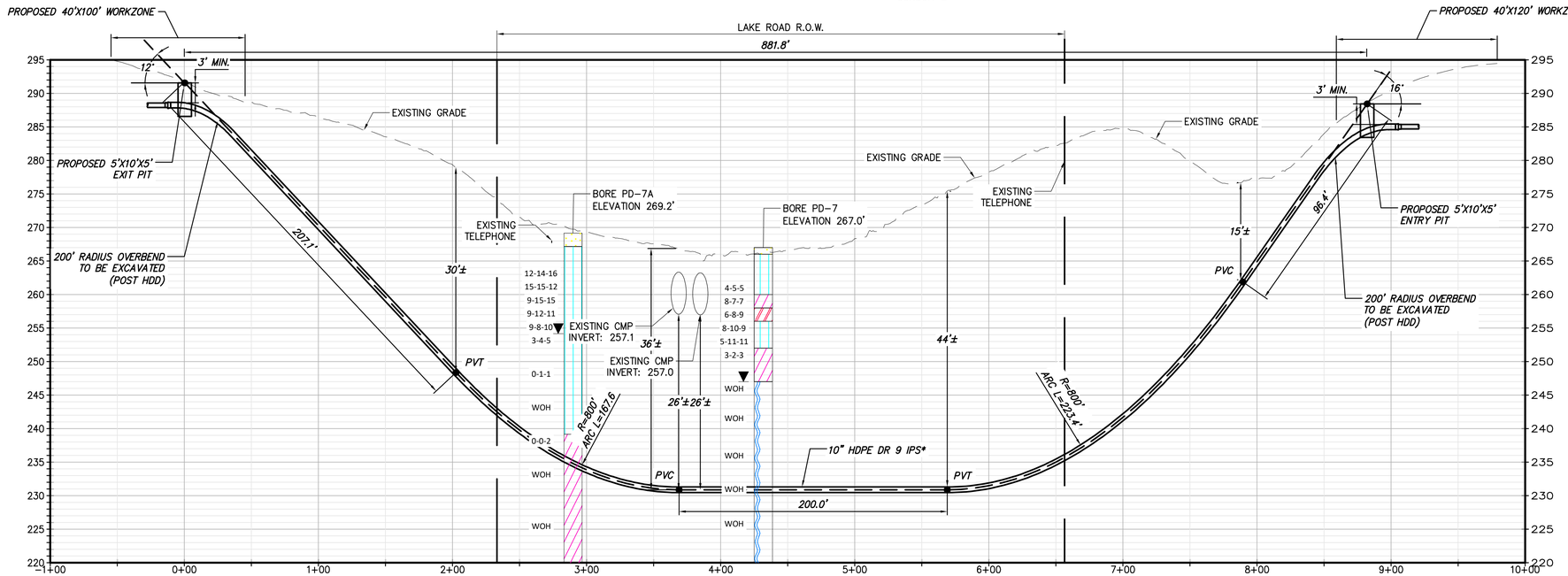
DRAWN BY: TAR | DESIGNED BY: TAR | APPROVED BY: JEO | SCALE AS NOTED | REV. NO. X | DATE 09/21/2022 | SH.NO. XXX OF XXX



A

0 50 100
Scale in feet

PROPOSED HDD 1 PLAN VIEW
CONDUIT 2



0 50 100
Scale in feet

PROPOSED HDD 1 PROFILE
CONDUIT 2

*HDD 1 CONSIST OF (2) HVDC ELECTRICAL TRANSMISSION CABLES HOUSED IN INDIVIDUAL 10" DIAMETER CASINGS.

A THIRD 2" CASING WILL BE BUNDLED WITH ONE OF THE 10" CASINGS FOR A TELECOMMUNICATIONS LINE.

BORING LOG STRIP LEGEND

B101

Blow Counts per 6" =10-10-10
Recovery %/RQD % =95%/90%
11000 =UCS

Legend	
ASPHALT	Asphalt
Bedrock	Bedrock
Boulder	Boulder
CH	Fat CLAY
CH-MH	SILTY Fat CLAY
CL	Lean CLAY
CL-ML	SILTY CLAY
CONCRETE	Concrete
Fill	Fill
GC	CLAYEY GRAVEL
GC-GM	SILTY CLAYEY GRAVEL
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ML	SILT
OH	ORGANIC Fat CLAY
OL	ORGANIC Lean CLAY
OL/OH	ORGANIC SOIL
PT	PEAT
Rock	Rock
Sandstone	Sandstone
SC	CLAYEY SAND
SC-SM	SILT, CLAYEY SAND
SHALE	Shale
SILTSTONE	Siltstone
SM	SILTY SAND
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USGS 670	Interbedded Sandstone and Shale
USGS 702	Quartzite
USGS 705	Schist
USGS 705	Schist
USGS 708	Gneiss
USGS 708	Gneiss
USGS 718	Granite 1
Void	Void
Water	Water
Weathered Rock	Undefined
Water Table	Water Table during drilling
Delayed Water Table	Water Table after drilling

B

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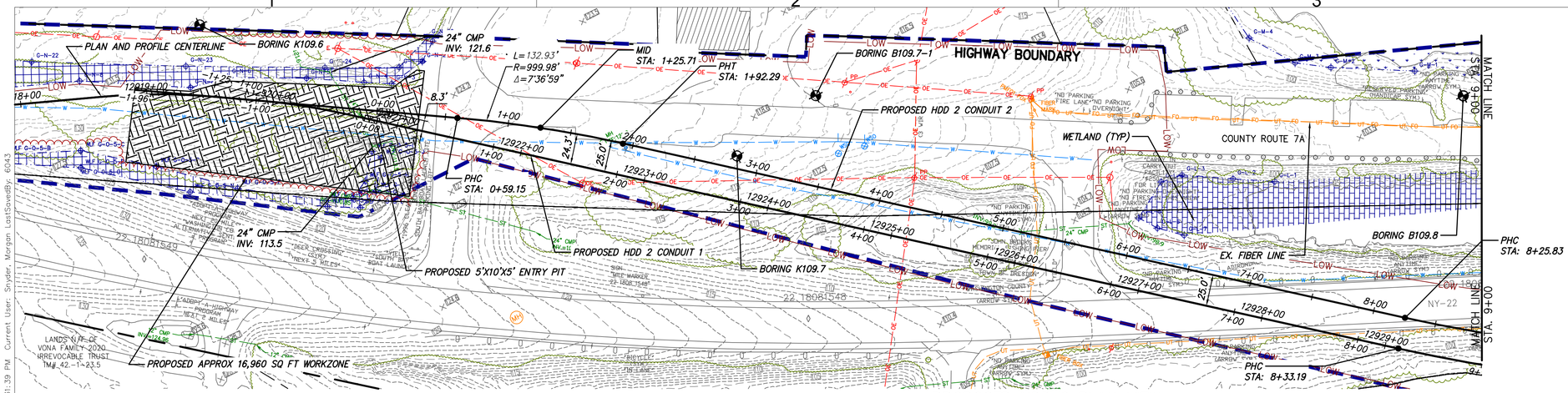
CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 1 (PACKAGE 1A) PUTNAM TO DRESDEN
HDD 1 PLAN AND PROFILE - CONDUIT 2
MILL BROOK CULVERTS CROSSING, CONDUIT 2
WHITEHALL, WASHINGTON COUNTY, NY

KIEWIT PROJECT NO.	21162
CHA PROJECT NO.	066076
DRAWING NO.	C-301A

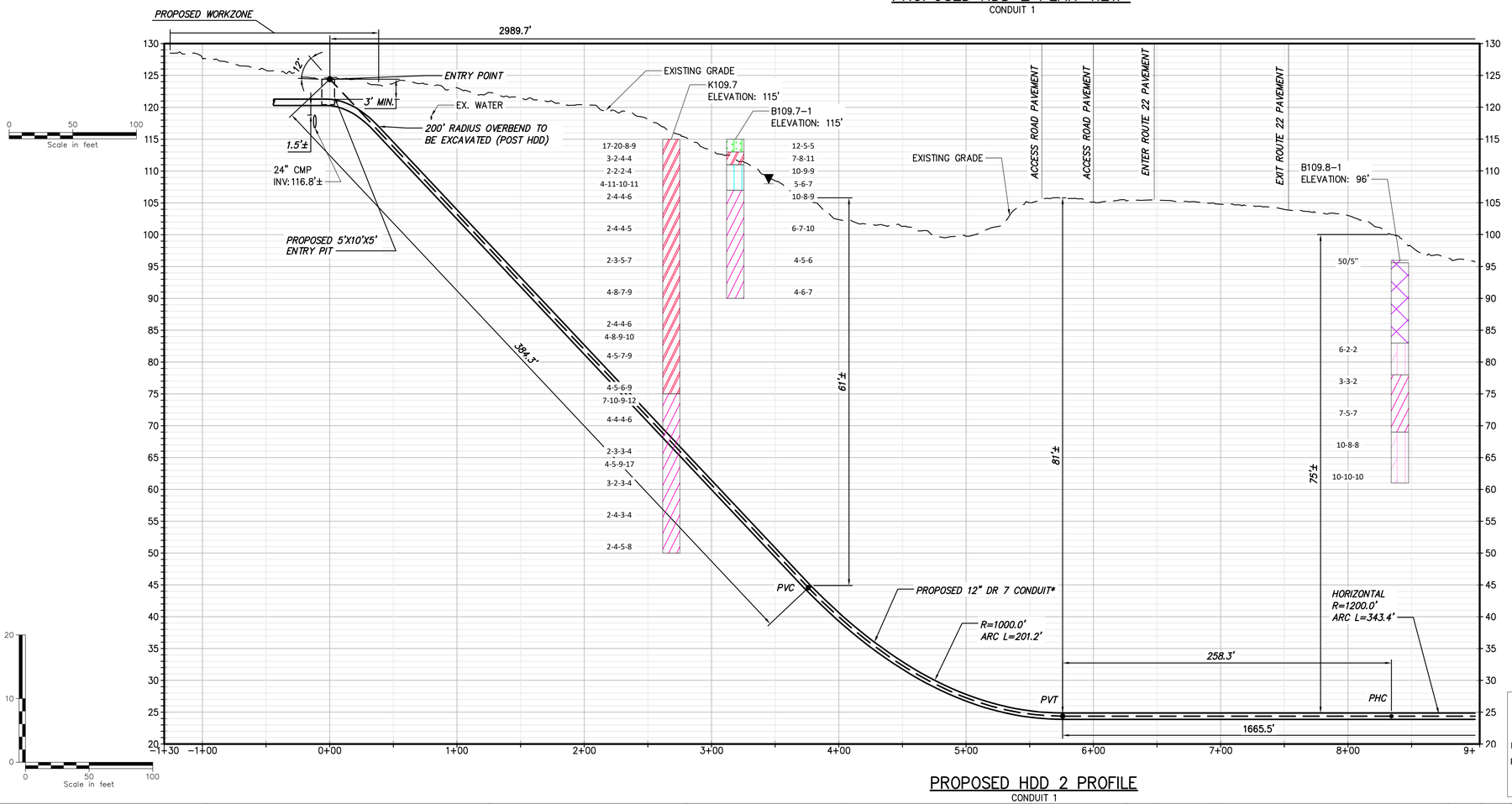
DRAWN BY: TAR | DESIGNED BY: TAR | APPROVED BY: JEO

SCALE	AS NOTED	DATE	09/21/2022
REV. NO.	X	SH.NO.	XXX OF XXX



PROPOSED HDD 2 PLAN VIEW

CONDUIT 1



PROPOSED HDD 2 PROFILE

CONDUIT 1

* HDD2 CONSISTS OF (2) HVDC ELECTRICAL TRANSMISSION CABLES HOUSED IN INDIVIDUAL 12" HDPE DR 7 IPS CASINGS

A THIRD 3" DR 7 CASING WILL BE BUNDLED WITH ONE OF THE 12" HDPE DR 7 IPS FOR A TELECOMMUNICATIONS LINE.

NOTE:

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2) RECOMMEND INTERSECTING BORE METHOD BE USED TO REDUCE DRILLING FLUID PRESSURES AT THE EAST END OF THE HDD ALIGNMENT.
3) IT IS EXPECTED THAT BALLASTING OR USE OF ROLLERS WILL BE REQUIRED.
4) BORES AND BORE HATCHING IN PROFILE IS NOT CLEARLY LEGIBLE DUE TO THE CLOSE PROXIMITY OF THE MULTIPLE BORES AT 50 SCALE. USERS MUST CONSULT THE ACTUAL BORE LOGS AND REPORTS FOR CLARIFICATION AND OR INTERPRETATION.

BORING LOG STRIP LEGEND

B101

Blow Counts per 6" =10-10-10

Recovery %/RQD % =95%/90%

11000 =UCS

Legend		
	ASPHALT	Asphalt
	Bedrock	Bedrock
	Boulder	Boulder
	CH	Fat CLAY
	CH-MH	SILTY Fat CLAY
	CL	Lean CLAY
	CL-ML	SILTY CLAY
	CONCRETE	Concrete
	Fill	Fill
	GC	CLAYEY GRAVEL
	GC-GM	SILTY CLAYEY GRAVEL
	GM	SILTY GRAVEL
	GP	Poorly Graded GRAVEL
	GP-GC	Poorly Graded Gravel with CLAY
	GP-GM	Poorly Graded GRAVEL with SILT
	GW	Well Graded GRAVEL
	GW-GC	Well Graded GRAVEL with CLAY
	GW-GM	Well Graded GRAVEL with SILT
	Limestone	Limestone
	MH	Elastic SILT
	ML	SILT
	OH	ORGANIC Fat CLAY
	OL	ORGANIC Lean CLAY
	OL/OH	ORGANIC SOIL
	PT	PEAT
	Rock	Rock
	Sandstone	Sandstone
	SC	CLAYEY SAND
	SC-SM	SILT, CLAYEY SAND
	SHALE	Shale
	SILTSTONE	Siltstone
	SM	SILTY SAND
	SP	Poorly Graded SAND
	SP-SC	Poorly Graded SAND with CLAY
	SP-SM	Poorly Graded SAND with SILT
	SW	Well graded SAND
	SW-SC	Well Graded SAND with CLAY
	SW-SM	Well Graded SAND with SILT
	Topsoil	Topsoil
	USGS 601	Gravel or Conglomerate 1
	USGS 654	Subgraywacke
	USGS 670	Interbedded Sandstone and Shale
	USGS 702	Quartzite
	USGS 705	Schist
	USGS 705	Schist
	USGS 708	Gneiss
	USGS 708	Gneiss
	USGS 718	Granite 1
	Void	Void
	Water	Water
	Weathered Rock	Undefined
▼	Water Table	Water Table during drilling
▽	Delayed Water Table	Water Table after drilling

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CHAMPLAIN HUDSON POWER EXPRESS

SEGMENT 2 - ROUTE 22: DRESDEN - WHITEHALL

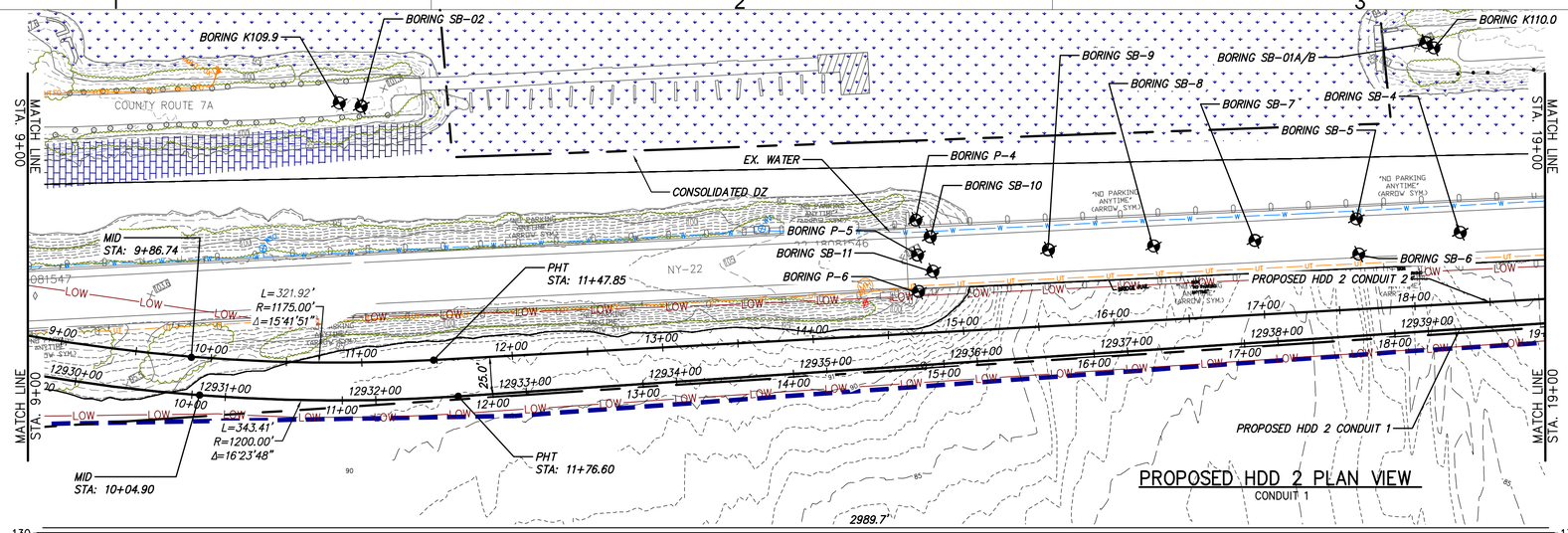
PROPOSED HDD PLAN AND PROFILE - HDD 2

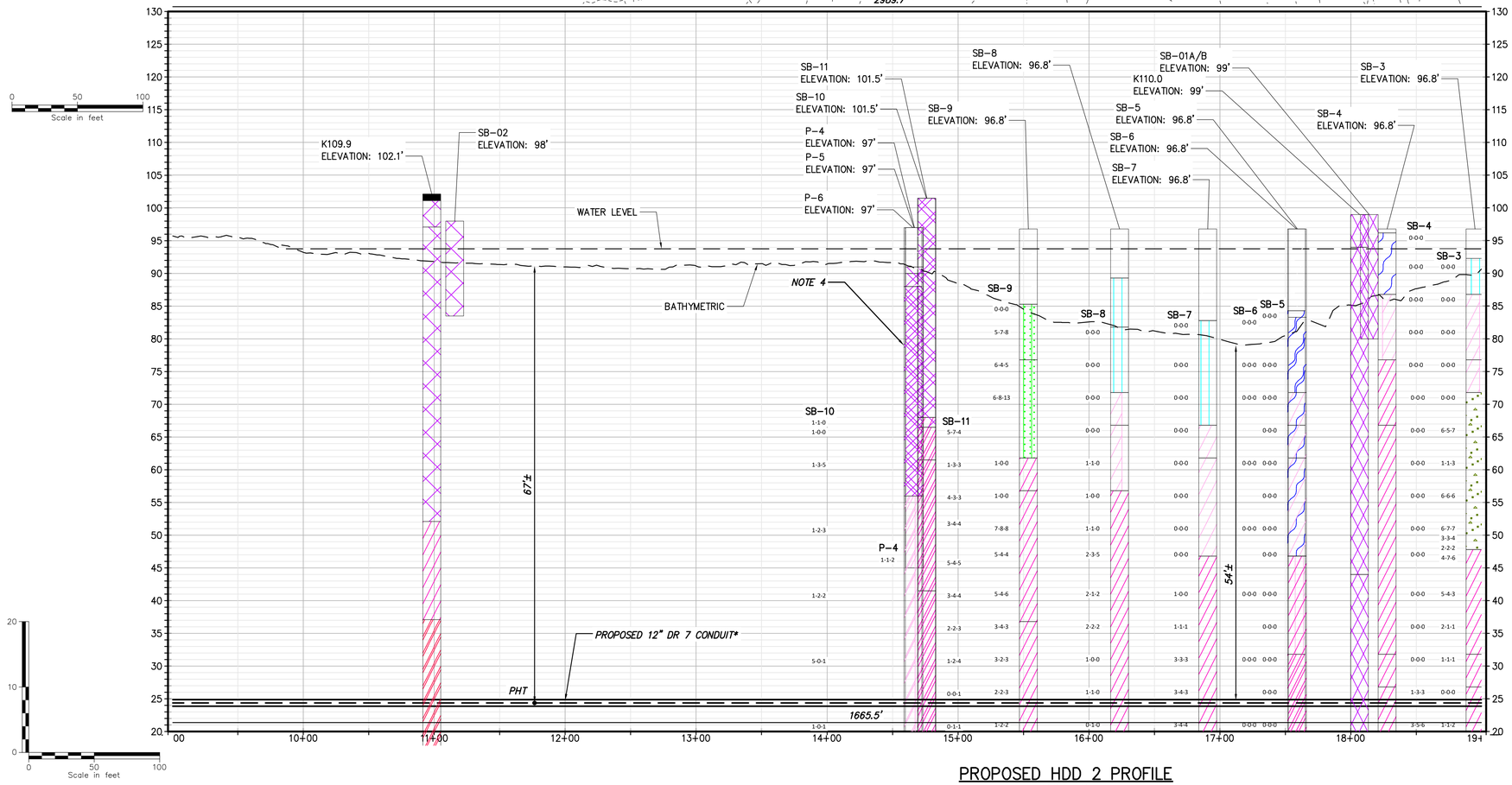
SOUTH BAY CROSSING, CONDUIT 1

WHITEHALL, WASHINGTON COUNTY, NY

KIEWIT PROJECT NO.	21162
CHA PROJECT NO.	066076
DRAWING NO.	C-301

DRAWN BY: MCS | DESIGNED BY: MB | APPROVED BY: JEO | SCALE AS NOTED | REV. NO. X | DATE 09/21/2022 | SH.NO. XXX OF XXX





PROPOSED HDD 2 PROFILE
CONDUIT 1

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Legend	
ASPHALT	Asphalt
Bedrock	Bedrock
Boulder	Boulder
CH	Fat CLAY
CH-MH	SILTY Fat CLAY
CL	Lean CLAY
CL-ML	SILTY CLAY
CONCRETE	Concrete
Fill	Fill
GC	CLAYEY GRAVEL
GC-GM	SILTY CLAYEY GRAVEL
GM	SILTY GRAVEL
GP	Poorly Graded GRAVEL
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GW-GM	Well Graded GRAVEL with SILT
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MH	Elastic SILT
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OH	ORGANIC Fat CLAY
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SC-SM	SILT, CLAYEY SAND
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USGS 705	Schist
USGS 705	Schist
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USGS 708	Gneiss
USGS 718	Granite 1
Void	Void
Water	Water
Weathered Rock	Undefined
Water Table	Water Table during drilling
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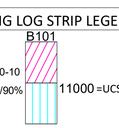
BORING LOG STRIP LEGEND



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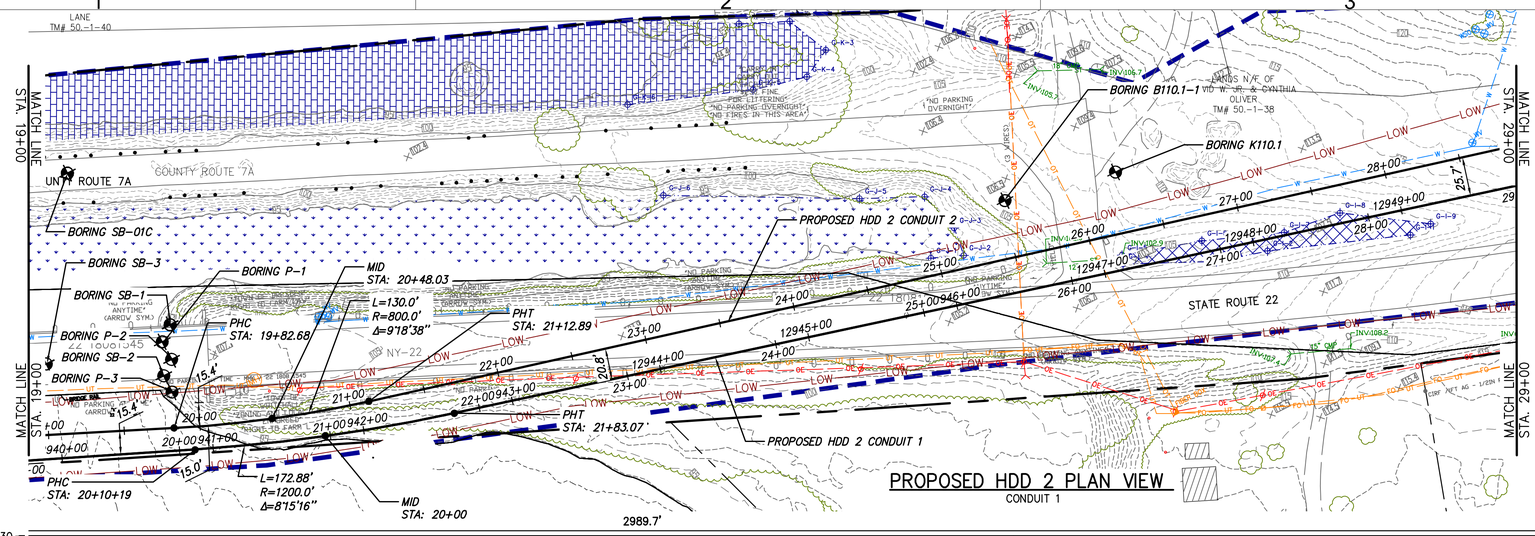
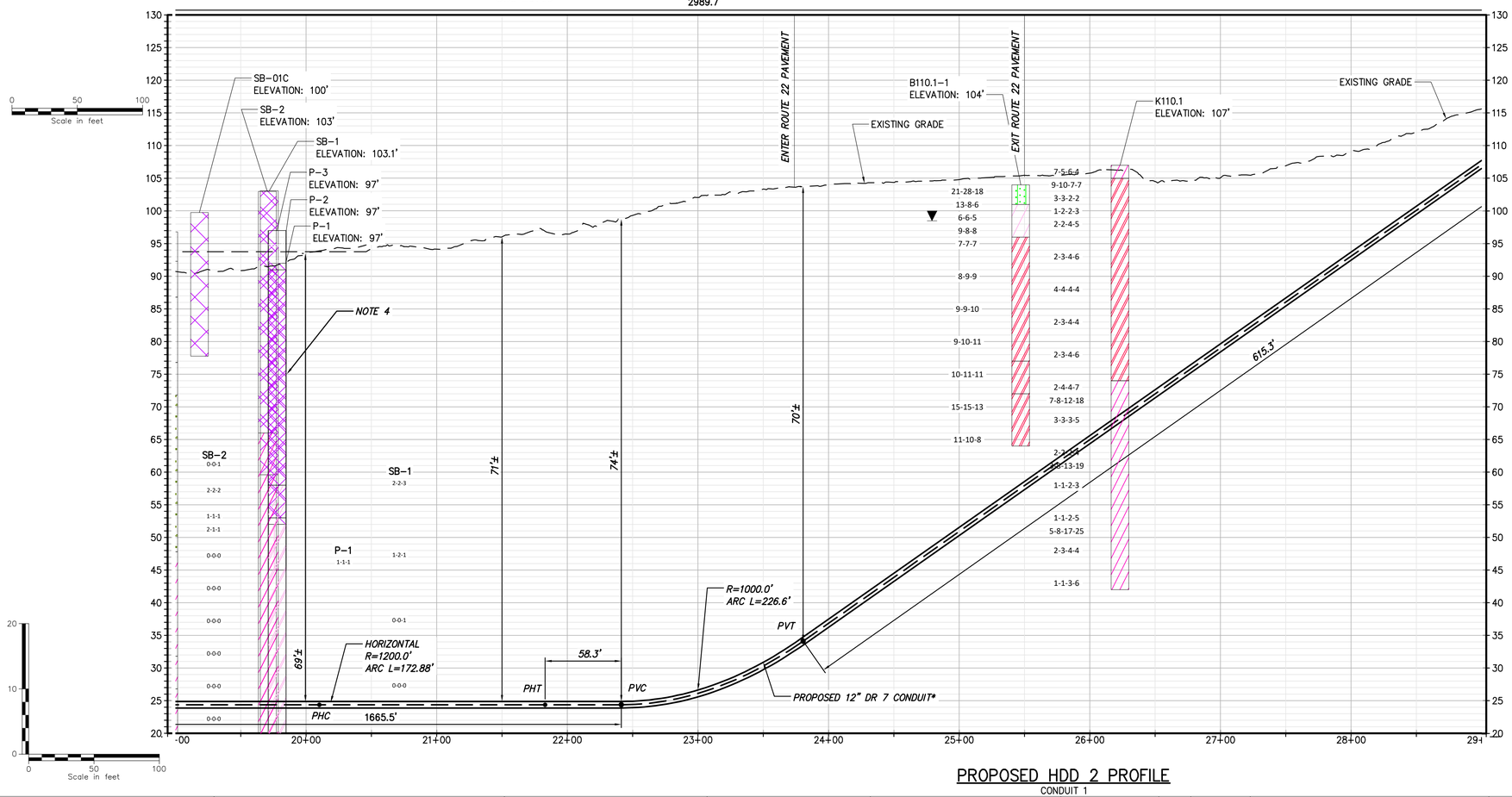
CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 2 - ROUTE 22: DRESDEN - WHITEHALL
PROPOSED HDD PLAN AND PROFILE - HDD 2
SOUTH BAY CROSSING, CONDUIT 1
WHITEHALL, WASHINGTON COUNTY, NY

KIEWIT PROJECT NO.	21162
CHA PROJECT NO.	066076
DRAWING NO.	C-301.1

DRAWN BY: MCS | DESIGNED BY: MB | APPROVED BY: JEO | SCALE AS NOTED | DATE 09/21/2022 | REV. NO. X | SH.NO. XXX OF XXX



PROPOSED HDD 2 PLAN VIEW
CONDUIT 1



PROPOSED HDD 2 PROFILE
CONDUIT 1

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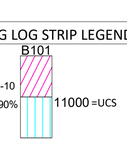
BORING LOG STRIP LEGEND



Legend	
ASPHALT	Asphalt
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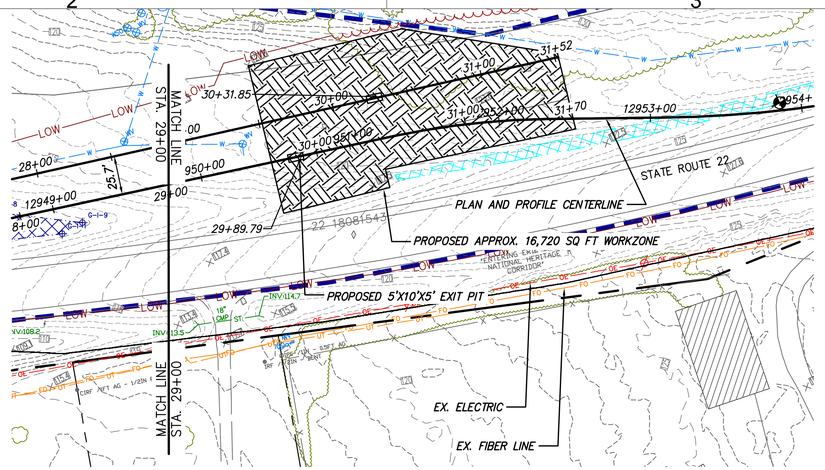
0	09/21/2022	FINAL EM&CP SUBMISSION	MCS	JEO

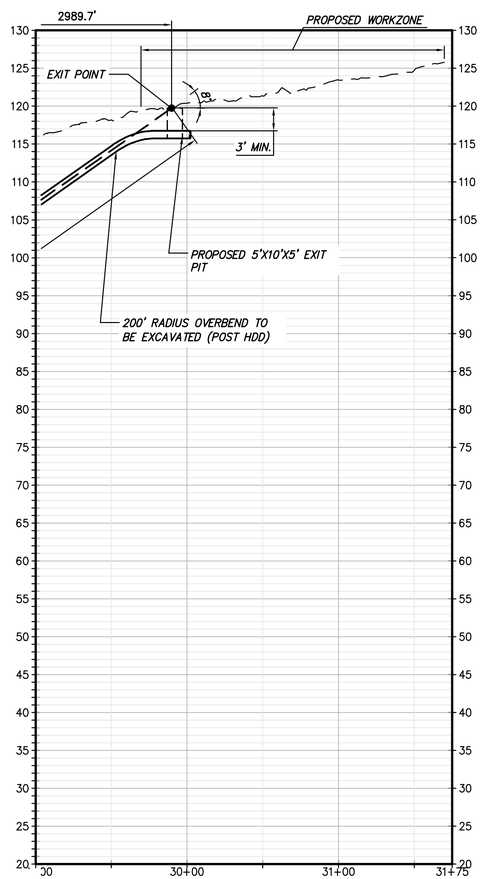
CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 2 - ROUTE 22: DRESDEN - WHITEHALL
PROPOSED HDD PLAN AND PROFILE - HDD 2
SOUTH BAY CROSSING, CONDUIT 1
WHITEHALL, WASHINGTON COUNTY, NY

KIEWIT PROJECT NO.	21162
CHA PROJECT NO.	066076
DRAWING NO.	C-301.2

DRAWN BY: MCS | DESIGNED BY: MB | APPROVED BY: JEO | SCALE AS NOTED | DATE 09/21/2022 | REV. NO. X | SH.NO. XXX OF XXX



PROPOSED HDD 2 PLAN VIEW
CONDUIT 1



PROPOSED HDD 2 PROFILE
CONDUIT 1

* HDD2 CONSISTS OF (2) HVDC ELECTRICAL TRANSMISSION CABLES HOUSED IN INDIVIDUAL 12" HDPE DR 7 IPS CASINGS

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Scale in feet: 0, 50, 100

Scale in feet: 0, 50, 100 (vertical: 0, 10, 20)

Legend	
ASPHALT	Asphalt
Bedrock	Bedrock
Boulder	Boulder
CH	Fat CLAY
CH-MH	SILTY Fat CLAY
CL	Lean CLAY
CL-ML	SILTY CLAY
CONCRETE	Concrete
Fill	Fill
GC	CLAYEY GRAVEL
GC-GM	SILTY CLAYEY GRAVEL
GM	SILTY GRAVEL
GP	Poorly Graded GRAVEL
GP-GC	Poorly Graded Gravel with CLAY
GP-GM	Poorly Graded GRAVEL with SILT
GW	Well Graded GRAVEL
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GW-GM	Well Graded GRAVEL with SILT
Limestone	Limestone
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ML	SILT
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PT	PEAT
Rock	Rock
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SC	CLAYEY SAND
SC-SM	SILT, CLAYEY SAND
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BORING LOG STRIP LEGEND

B101

Blow Counts per 6" =10-10-10

Recovery %/RQD % =95%/90%

11000 =UCS

CHPE Champlain Hudson Power Express

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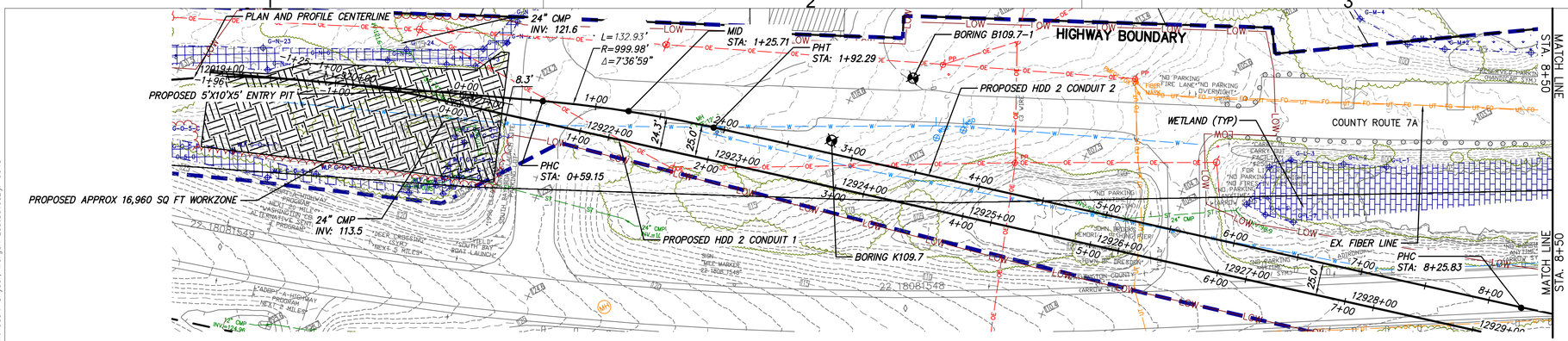

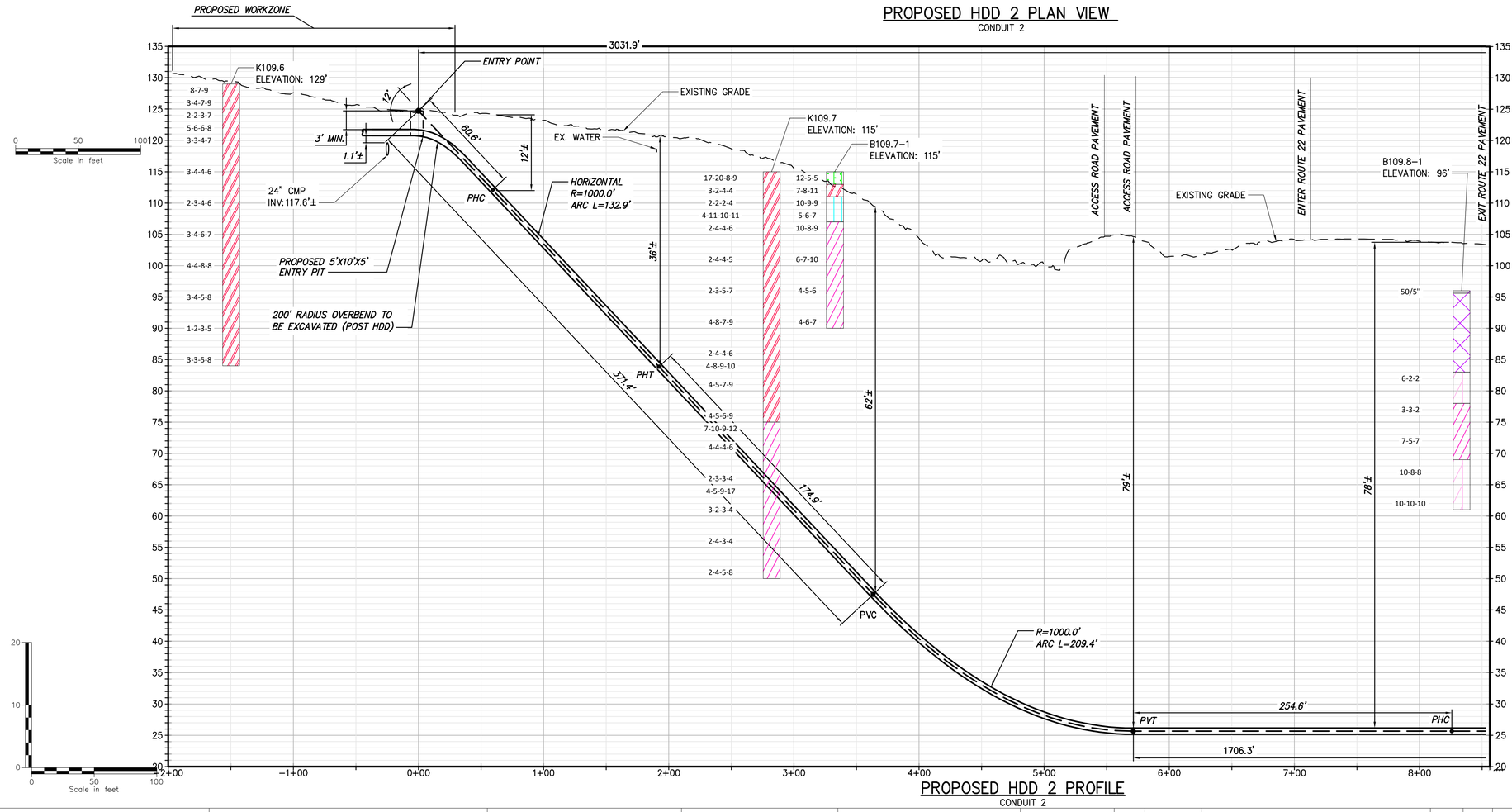

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CHAMPLAIN HUDSON POWER EXPRESS

SEGMENT 2 - ROUTE 22: DRESDEN - WHITEHALL

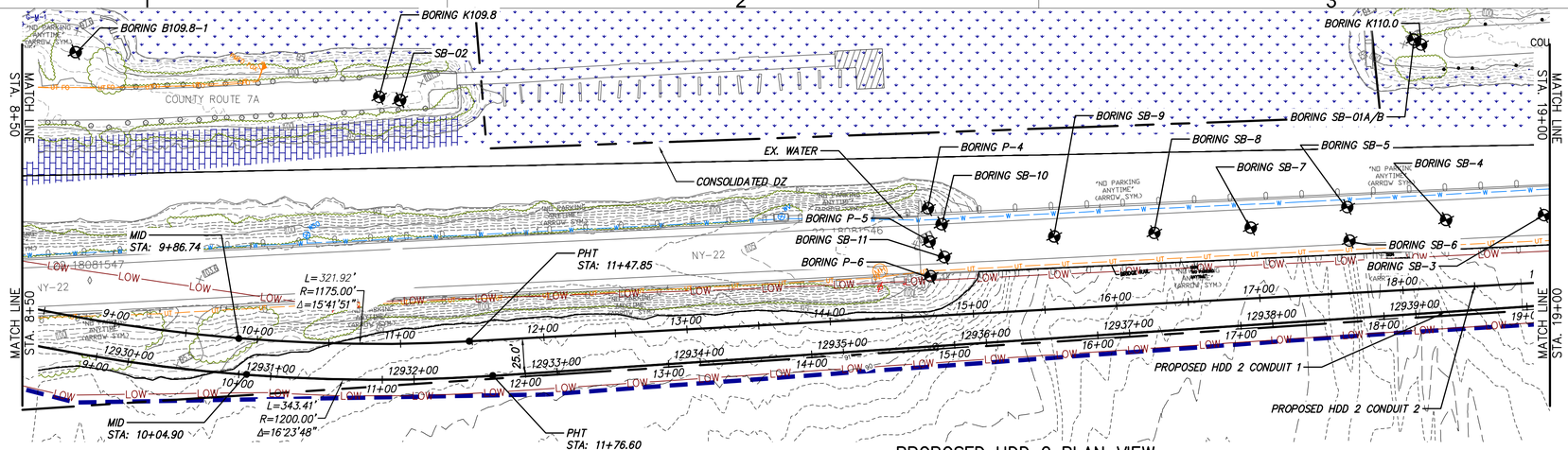
PROPOSED HDD PLAN AND PROFILE - HDD 2

SOUTH BAY CROSSING, CONDUIT 2

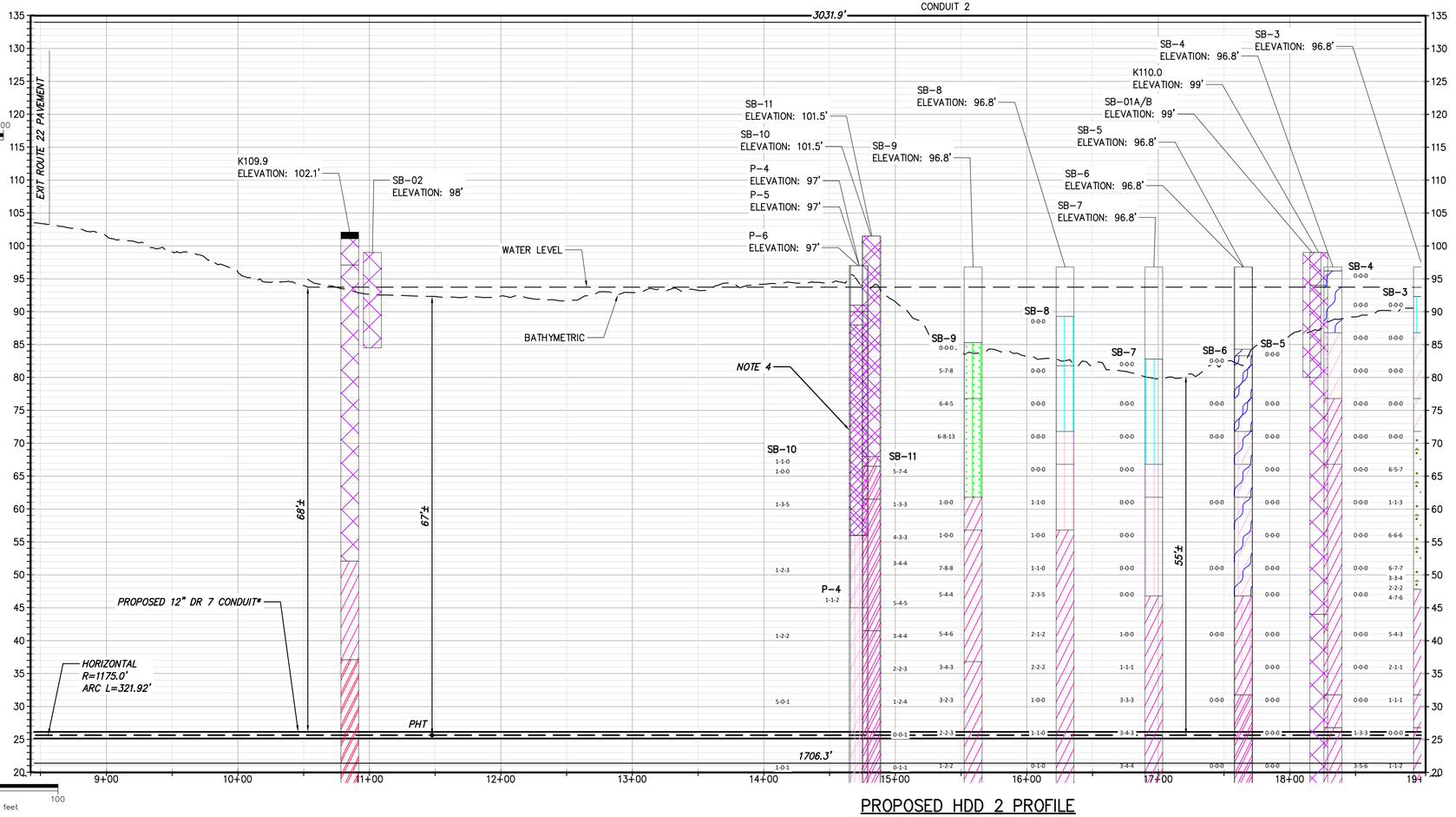
WHITEHALL, WASHINGTON COUNTY, NY

KIEWIT PROJECT NO.	21162
CHA PROJECT NO.	066076
DRAWING NO.	C-301A

DRAWN BY: MCS | DESIGNED BY: MB | APPROVED BY: JEO | SCALE: AS NOTED | DATE: 09/21/2022 | REV. NO. X | SH.NO. XXX OF XXX



PROPOSED HDD 2 PLAN VIEW
CONDUIT 2



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CONDUIT 2

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PROPOSED HDD PLAN AND PROFILE - HDD 2
SOUTH BAY CROSSING, CONDUIT 2
WHITEHALL, WASHINGTON COUNTY, NY

KIEWIT PROJECT NO.	21162
CHA PROJECT NO.	066076
DRAWING NO.	C-301A.1

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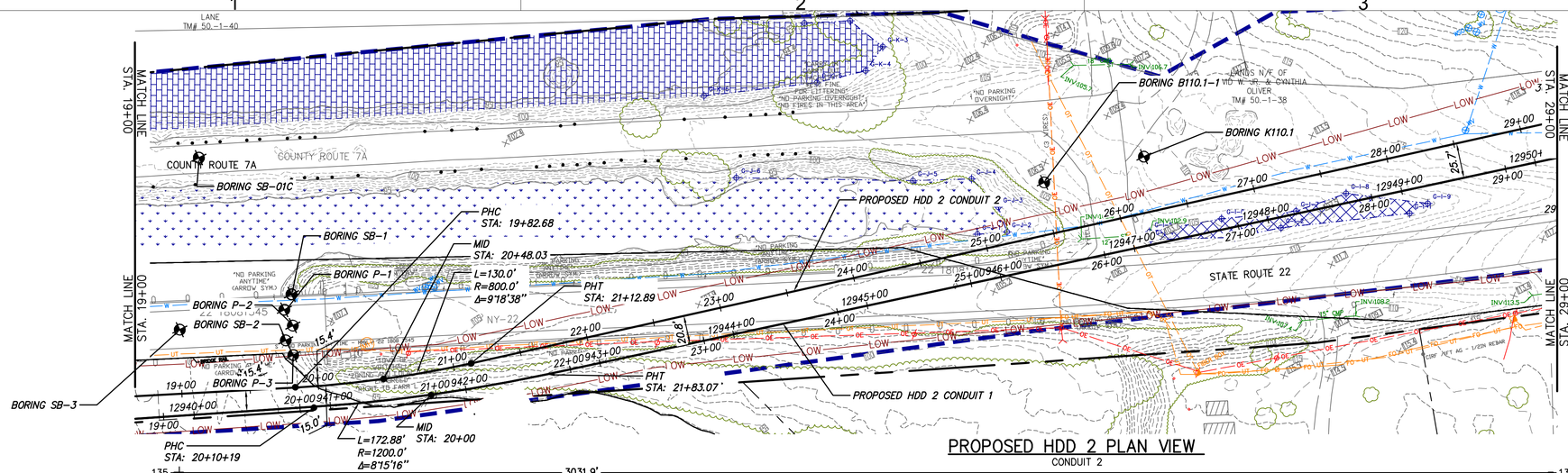
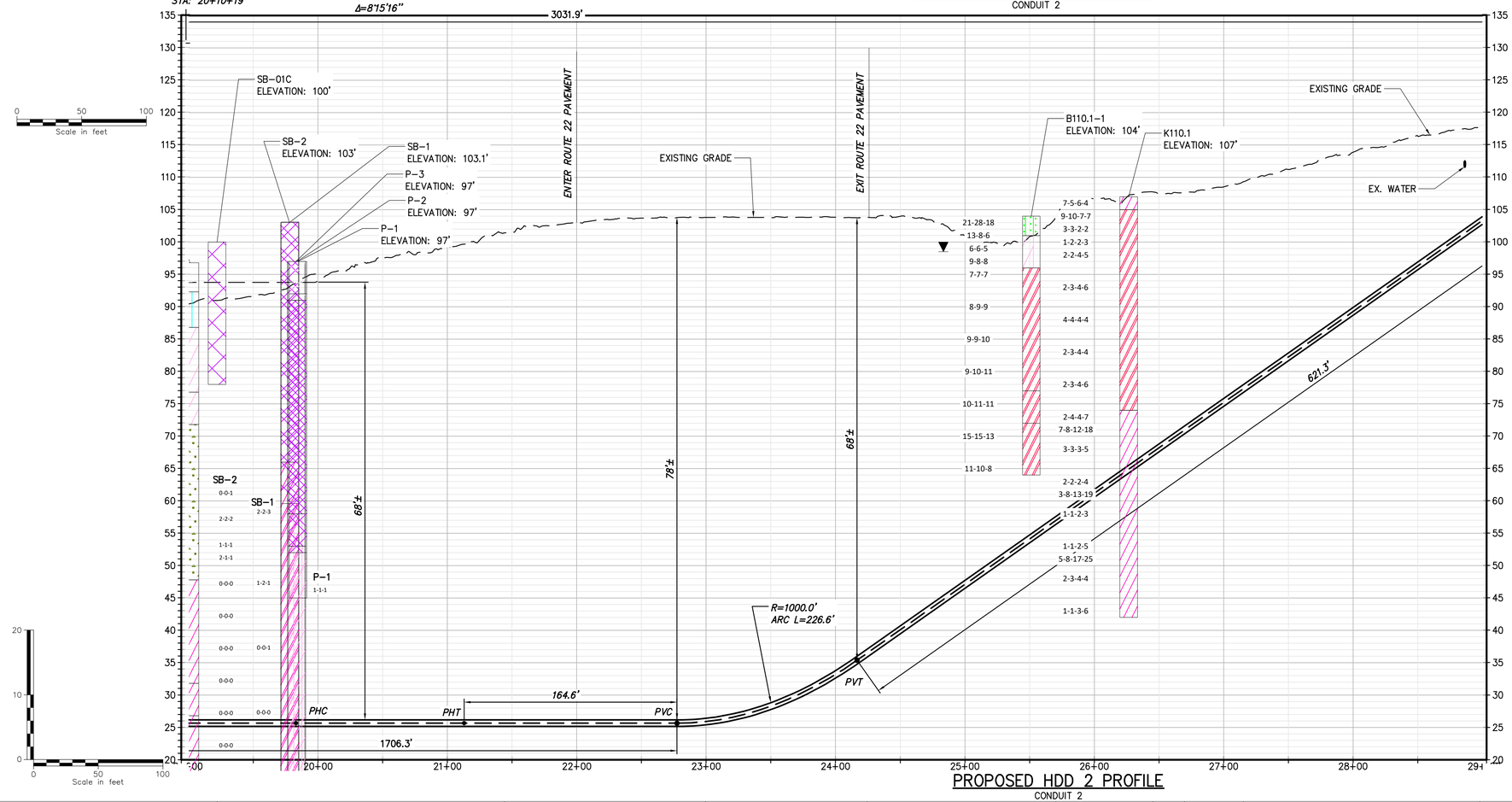


PROPOSED HDD 2 PLAN VIEW
CONDUIT 2

0 50 100
Scale in feet



PROPOSED HDD 2 PROFILE
CONDUIT 2

0 50 100
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SOUTH BAY CROSSING, CONDUIT 2
WHITEHALL, WASHINGTON COUNTY, NY

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DRAWING NO.	C-301A.2

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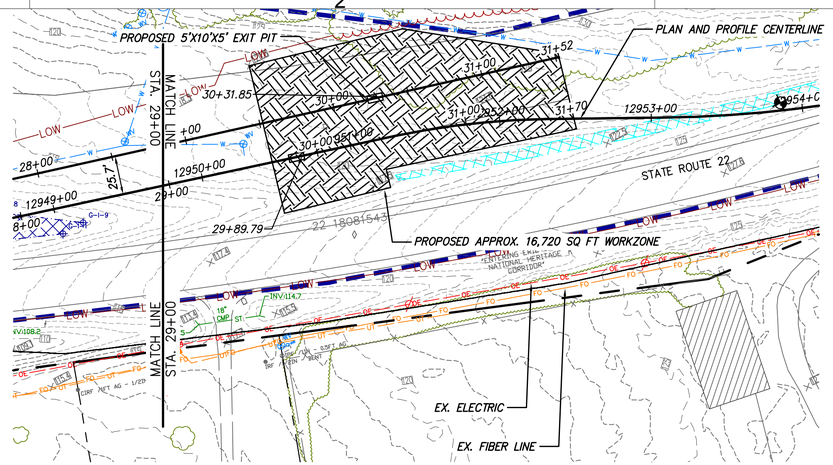
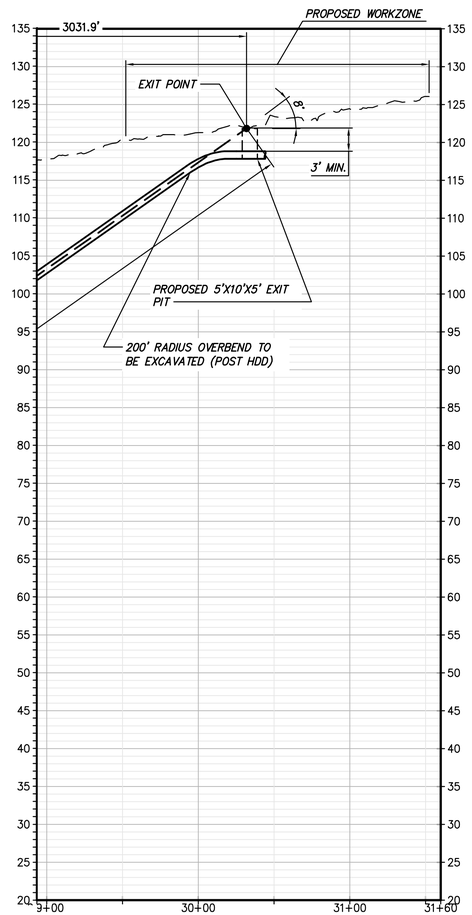
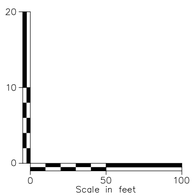
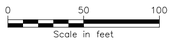


PROPOSED HDD 2 PLAN VIEW
CONDUIT 2



PROPOSED HDD 2 PROFILE
CONDUIT 2





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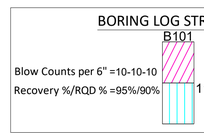

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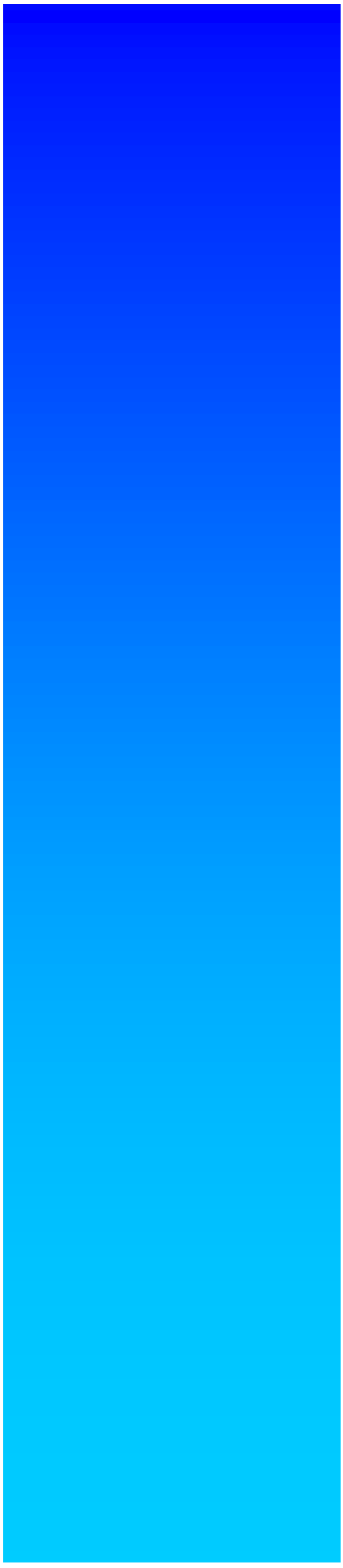


Inadvertent Release Contingency Plan For Horizontal Directional Drilling in Segments 1 & 2 – Packages 1A & 1B

Putnam to Whitehall
Washington County, New York

CHA Project Number: 066076

Prepared for:
Transmission Developers Inc.
1301 Avenue of the Americas, 26th Floor
New York, NY 10019

9/18/2022

Prepared by:
CHA Consulting, Inc.
III Winners Circle
Albany, New York 12205
(518) 453-4500

September 2022

TABLE OF CONTENTS

LIST OF REFERENCED APPENDICES

1.0 INTRODUCTION

CHA Consulting, Inc. (CHA) and the Kiewit Team, with the support of Boscardin Consulting Engineers (BCE), proposes to design and construct approximately 170 horizontal directional drilling (HDD) crossings for a pair of HVDC electrical transmission cables plus a telecommunications line located in upland areas of the Hudson River Valley of New York for Segments 1 through 7 from Putnam Station to Schenectady, NY. Horizontal directional drilling (HDD) methods will be used to route the crossings below congested areas, railroads, under/around obstructions (e.g., existing infrastructure or utilities), and below wetlands and bodies of water. The portions of the cable between HDD bores will be installed in PVC conduits via trenching methods. The trenching construction is addressed in a separate report.

The underground construction of the two HVDC electrical transmission cables is proposed to be housed in individual 10-inch-diameter DR 9 HDPE conduits spaced a distance dependent on depth and soil Thermal Resistivity (TR) values provided by NKT and as shown on drawings plans. A third, typically 2-inch-diameter DR 9 conduit will be bundled with one of the 10-inch-diameter conduits for a telecommunications line. The conduits are to be installed in 16-inch to 22-inch final reamed diameter bore holes. Final conduit diameter and DR values will depend on length and depth of the HDD bores. Longer and deeper bores may require a larger diameter (i.e. 12-inch and 3 inch) and larger DR values (i.e. DR 7) to resist tension stresses during installation and collapsing long-term. This is checked and determined on a case-by-case basis and design sizes are shown on the design drawings.

This Inadvertent Release Contingency Plan (IRCP) is for Segments 1 & 2 – Packages 1A & Package 1B which includes three HDD crossings: HDD #1 crossing Mill Brook culverts and under Lake Road; and HDD #2 crossing under South Bay adjacent to State Route 22.

HDD is a widely used trenchless construction method to install conduits with limited disturbance to the ground around the bore alignment and minimal ground surface impacts above the alignment. The goal for using HDD methods is to install the conduits while controlling and minimizing the amount of impact on water bodies, congested areas, existing underground obstructions, and to the wetlands, to the extent possible.

A primary potential environmental concern associated with HDD involves the inadvertent release of drilling fluids, also referred to as drilling mud, during the drilling process, which is addressed in this plan. The purpose of this plan is to establish general procedures to prevent a fluid release (sometimes referred to as a frac-out) during HDD construction and to present steps to manage, control and minimize the impacts in the event that an inadvertent release of drilling fluid occurs. The objectives of this plan are to:

- Provide an overview of the HDD process with a specific focus on the composition, management and use of drilling fluids;
- Identify controls to be implemented during construction to minimize the potential of an inadvertent release;
- Identify the planned means of monitoring to permit early detection of inadvertent releases;
- Identify planned means to protect areas that are considered environmentally sensitive (rivers, wetlands, other biological resources or cultural resources);
- Establish site-specific environmental protection measures to be utilized prior to, during, and following drilling and conduit installation activities to minimize and control erosion and sediment releases to adjoining wetlands or watercourses;
- Have site specific preplanned general response programs in place at the start of construction that is understood and can be implemented immediately by all field crews in the event of an inadvertent release of drilling fluid occurs; and
- Establish a chain of command for reporting and notifying, in a timely manner, the construction management team, the Certificate Holders, and the proper authorities in the event of an inadvertent release of drilling fluid and of the preplanned actions that are to be implemented.

It is important to note that the plan in this document serves as the guiding framework for confirming that the HDD Construction Subcontractor (HDD Subcontractor) is adhering to the specifications and provisions to be protective of the environment. Since there are a variety of potential measures listed in this document available for preventing inadvertent releases and mitigating the effects of a release should one occur. The specifications require that each HDD Subcontractor submit to the project design team, for its review and acceptance, a supplemental site and HDD Subcontractor specific means and methods plan for each HDD crossing reaffirming and detailing how the HDD Subcontractor will conform with the requirements of this plan and the project specifications to prevent inadvertent releases and to mitigate any effects of a release

should one occur. The supplemental plan by the HDD Subcontractor shall be consistent with the site conditions and constraints, and the HDD Subcontractor's selected means, methods and equipment. The selected HDD Subcontractor will be responsible for incorporating specific permit conditions, applicable regulatory requirements, site specific environmental features, and geotechnical information not available at this time into its submittal. The submittal shall be reviewed and approved by the design team and the Environmental Inspector prior to the start of construction of a specific HDD location.

2.0 DESCRIPTION OF THE HDD PROCESS

The Horizontal Directional Drilling process begins by mechanically excavating shallow (approximately 5 feet wide by 10 feet long by 4 to 5 feet deep entry and exit pits at either end of the directional bore alignment within a designated work area. Typical work areas and equipment layouts are discussed in Design Summary Report. However, final individual work areas and equipment layouts will be site specific and depend on the length of bore, size of drill rig to be used, and site constraints. A small diameter (on the order of 5 to 9 inches in diameter) pilot bore is then drilled from the entry pit using directional boring methods. During the pilot bore, a drilling fluid (typically bentonite and water based with selected NSF certified additives) to improve and modify fluid stability, carrying capacity, and drilling properties to address site-specific ground characteristics and HDD Subcontractor preferences is pumped through nozzles in the drill head to support the hole and to hydraulically transport drill cuttings from the drill bit back to the entry pit. Environmentally acceptable, NSF (formerly National Sanitation Foundation) certified, additives are required by specification for use on this project and those planned for use by the HDD Subcontractor will be checked for compliance by the design team prior to their use.

A guidance system is mounted immediately behind the drilling head to allow the crew to track and steer the path of the drilling so that it follows the preplanned alignment within the specification's permitted tolerances. The drilling fluid holds the cuttings in suspension and carries the drill cuttings back through the annular space between the drill rods and the bore hole wall to the entry pit where it is collected and processed for re-used by a recycling system. The cuttings are separated from the bentonite, using screens, centrifuges, and desanding units which prepares the bentonite for re-use. Once the pilot bore reaches the exit pit, a larger diameter back-reaming head is

then attached to the drill string and pulled back through the pilot hole to enlarge the hole. Depending on the size of the conduit to be installed and the ground conditions, several successively larger reaming passes may be needed. Again, a bentonite and water slurry is pumped into the bore hole during reaming to remove cuttings and to stabilize the bore hole. Lastly, the drill string is pulled back through the bore hole with the new, preassembled conduit attached to it in one continuous process until the lead end of the conduit emerges at the entry pit. Final reaming or swabbing and conduit pull back may be combined.

Specific to this plan, it is important to have an awareness of the function and composition of the HDD drilling fluids. The drilling fluid composition and drilling fluid management are integral components of the HDD process with the following primary purposes:

- Support and stabilize the drill hole,
- Suspend and transport the cuttings from drill bit through the drill hole annulus,
- Control fluid loss through the bore's side walls by forming a filter cake on the bore hole walls,
- Managing and modifying the drilling fluid mix to improve its cutting carrying characteristics, its pumpability, and its hole stabilization and support characteristics,
- Power the downhole cutting tools (e.g., via mud motors if required); and,
- Serve as a coolant and lubricant to the drill bit during the drilling process and serve as a lubricant during the conduit insertion process.

The drilling fluids are composed primarily of potable water, which will likely be obtained from nearby sources selected and permitted by the HDD Subcontractor. As mentioned above, the drilling fluid also contains bentonite clay as a viscosifier. Bentonite is a naturally occurring, nontoxic, inert substance that meets NSF/ANSI 60 NSF Drinking Water Additives Standards and is frequently used for drilling potable water wells. While bentonite is non-toxic and commonly used in farming practices, it has the potential to impact plants, fish and their eggs if discharged to waterways in significant quantities. Frequently, additives are used to: amend the drilling fluid, improve its compatibility with the ground and groundwater chemical characteristics, improve its cutting suspension and carrying characteristics, improve its hole stabilization ability, and reduce seepage loss through the ground characteristics. Environmentally acceptable (i.e. NSF certified) additives are required by specification for this project and before the start of work at a specific HDD, the HDD Subcontractor is required to submit crossing data environmental and toxicity data

including Safety Data Sheets (SDSs) for review and acceptance by the design team regarding any additives to be used.

During the HDD process and subsequent conduit insertion, the drilling fluid pumped downhole will tend to flow along the path of least resistance. Generally, this will be though the annulus between the drill string and the drill hole side wall. However, the bore alignment may encounter ground conditions where the path of least resistance is an existing fracture, fissure, hole of anthropogenic origin, areas with low overburden confinement, areas of hole collapse, or coarse gravel zones in the soil or rock substrate. When this occurs, circulation can be lost or reduced. This is a common occurrence in the HDD process but does not necessarily prevent completion of the bore or result in a release to the environment. However, the environment may be impacted if the fluid inadvertently releases to the surface at a location on a waterway's banks or within a waterway or wetland. Again, additives to amend the properties of the drilling fluid may be used as necessary to prevent and limit releases and losses through such paths of lower flow resistance.

3.0 ORGANIZATION AND STAFFING RESPONSIBILITIES

The organizational chart shown below lists the contact information of the principal organizations involved in this project. The remainder of Section 3 discusses the roles and responsibilities of these principal organizations.

Organizational Chart

Entity	Contact Information
Certificate Holders	Name, Title Phone Email
Construction Manager	TBD
HDD Design/Engineer Team	TBD
HDD Construction Subcontractor	
	TBD
Environmental Inspector	TBD
U.S. Army Corps of Engineers, New York District Office	**USACE** New York District Upstate Regulatory Field Office ATTN; CENAN-OP-UR, Bldg. 10, 3rd Floor North 1 Buffington Street Watervliet, NY 12189-4000 518-266-6350 cenan.rfo@usace.army.mil
New York State Department of Public Service	Matthew Smith Department of Public Service Empire State Plz 3 Albany, NY 12223 (518) 402-5141 matthew.smith@dps.ny.gov
New York State Department of Environmental Conservation	Regional Office(s) Information
	NYSDEC REGION 5 Sub-Office Regional Permit Administrator 232 Golf Course Rd Warrensburg, NY 12885-1172 518-623-1281 dep.r5@dec.ny.gov
New York State Department of Environmental Conservation (Spills)	NYS Spill Hotline: 1-800-457-7362

3.1 RESPONSIBILITIES OF VARIOUS ORGANIZATIONS

The principal organizations involved in this project include the Regulatory Agencies, Certificate Holders, Design Engineer, HDD Construction Subcontractor, Construction Manager, and Environmental Inspector. The roles and responsibilities of the principal organizations are discussed in the following subsections and are shown in the organizational chart included above.

3.2 REGULATORY AGENCIES

The Certificate of Conditions issued by the NY Public Service Commission is the primary regulatory agency for the requirements associated with the project. The Champlain Hudson Power Express (CHPE) Route Project also has permits from the Department of Energy, and the US Army Corps of Engineers, and the New York Water Quality Certification. Various HDDs within this package take place within or adjacent to wetlands, underneath or adjacent to bodies of water, and underneath or adjacent to DOT roads. Measures are discussed throughout this report to control/mitigate any potential releases before environmentally sensitive boundaries are reached or impacted.

3.3 CERTIFICATE HOLDERS

The project Certificate Holders are TDI. TDI's Project Manager will have the overall responsibility to coordinate this project for TDI. The Project Manager, will be responsible for correspondence and coordination among all parties and will have the authority to stop work as necessary.

3.4 DESIGN ENGINEER

The FEED Design Engineer for the HDD Design is CHA and Kiewit in collaboration with BCE. During construction, the yet to be confirmed Design Engineer during construction will be responsible for reviewing and approving required Subcontractor submittals, shop drawings, and material certificates. Power Engineers will also take responsibility for review and acceptance of submittals, and documenting the materials and methods used in performance of the construction work to document that the construction complies with the contract documents.

3.5 THIRD-PARTY ENGINEER

The Third-Party Engineer for the HDD inadvertent return analysis has yet to be confirmed. During construction, the chosen Third-Party Engineer will be assisting Transmission Developers Inc. with the review of the Subcontractors Inadvertent Release Plan and providing technical assistance as needed with the HDD installation.

3.6 CONSTRUCTION MANAGER

The Construction Manager for this project has yet to be selected. The Construction Manager will be responsible for on-site management of the project for the Certificate Holders to ensure overall Subcontractor compliance with the EM&CP documents, environmental permits, and, local and federal regulations.

3.7 HDD CONSTRUCTION SUBCONTRACTOR

The HDD Subcontractors for the various HDD crossings of this project have yet to be selected. The Subcontractor will be responsible for completion of the conduit installation by HDD methods in accordance with the design criteria, contract documents, environmental compliance permits and federal regulations. The Subcontractor will be expected to use the appropriate construction procedures and techniques to complete the project, including supplemental site specific and means and methods specific HDD Subcontractor-prepared Inadvertent Release Prevention and Contingency Plans reviewed and accepted by the design team for each crossing in accordance with the contract documents.

The HDD Drill Operator (Drill Operator) will be responsible for operating the HDD drill rig, and observing and managing changes in annular fluid pressure or loss of circulation. The Drill Operator will communicate with other members of the drill crew as needed when issues arise. The Subcontractor will be responsible for developing the specific lines of communication within their organization and shall dedicate a responsible person(s) for monitoring and communicating inadvertent releases to the Construction Management team and Environmental Inspector.

3.8 ENVIRONMENTAL INSPECTOR

The Environmental Inspector for this project has not yet been determined. In general, the Environmental Inspector will perform full-time observation and documentation during the HDD activities at a specific site. The Environmental Inspector will be responsible for coordination with all county, state and federal resource agencies, compliance with and changes to any environmental permits.

The Environmental Inspector shall have the authority to stop work when the environmental permit conditions are not being followed or when appropriate environmental precautions are being disregarded by the HDD Subcontractor.

3.9 LINES OF COMMUNICATION AND AUTHORITY

Formal lines of communication will generally follow the established lines of authority. However, open communications between all parties will be encouraged to facilitate more efficient communication and coordination.

3.10 TRAINING

The HDD Subcontractor will verify and document that all construction personnel have appropriate environmental training before they begin work. The Environmental Inspector will also conduct a project orientation meeting for staff assigned with specific roles during the HDD installation and will review the site-specific environmental concerns and permit conditions. The Certificate Holders and Design Engineer will also attend the orientation meeting to review the procedures that will be used to document inadvertent releases in accordance with the HDD specifications.

4.0 FLUID RELEASE MINIMIZATION MEASURES

4.1 GEOTECHNICAL INVESTIGATION

The first steps taken to minimize the potential risk of an inadvertent release included conducting a geotechnical investigation at the site to develop an understanding of the ground around the planned HDD bores. Test borings were conducted near the proposed cable alignment within or immediately adjacent to the HDD sites. CHA understand that each boring has been backfilled and sealed with a cement or cement/bentonite grout to limit the risk of a release through an abandoned bore hole during the HDD construction.

4.2 HDD DESIGN

The HDD crossing is being designed to reduce the potential risk of an inadvertent fluid release during construction. General design considerations for HDD include:

- Depth of cover during profile design (based on test borings) to limit the potential inadvertent break through to the water body, road, wetlands, or ground surface;
- Typically, potential exists for releases near the entry and exit pits of a bore. The distance where there is a potential for releases at the ends depends on the soil conditions, the slope of the ground surface and the length of the bore. Generally, the longer and deeper the bore the greater the slurry pressures required to hold the borehole open and to carry the cuttings back to the entry or exit pit;
- Specific provisions regarding design for underwater cable installation (i.e. via the use of temporary dredged cofferdams or steel conduit riser pipes for pressure relief);
- Generally, for the formation of inadvertent releases, the more critical stage of the HDD process tends to be during the initial pilot hole drilling when the annular space between the bore sidewall and the drill string is the smallest and therefore requires large slurry pressures to overcome flow resistance to carry cuttings back to the entry pit;
- Adjusting the drill alignment to miss existing infrastructure including existing utilities, pile foundations, and other obstacles;
- Establishing a drill alignment line that allows for gradual angular changes to minimize pressure build-up and limit pull back stresses and bending stresses in

the conduit, as well as being compatible with the bending capacity of the drill steel;

- Requiring drilling fluid composition, flow rates, and drilling procedures that minimize drilling fluid pressures;
- Requiring drilling fluids that adequately address site-specific drilling concerns while posing the least threat to the environment;
- Requiring monitoring and controlling drilling fluid pressures with down-the-hole sensors during pilot hold drilling; and
- Requiring that, during the performance of any HDD waterbody crossing, contractors monitor the use of NSF certified drilling solution (Article VII: General Condition No. 114 [m]) and, in the event of a detected release of fluid, implement the procedures specified in the approved EM&CP. For any release occurring in a waterbody, the Certificate Holders shall immediately notify DPS Staff and NYSDEC Region 5 Staff of details of the release and the course of action they recommend taking.

4.3 CONTINGENCY PLAN

As mentioned above, prior to construction the selected HDD Subcontractor will be required to submit a supplemental site-and Subcontractor-Specific Inadvertent Release Contingency Plan for review and approval by design team. The project specifications require that the following major elements be addressed in detail in the Subcontractor's Plan:

- Work plan and detailed description of the drilling program (details for executing pilot hole, reaming, pull-back operations, and schedule), this plan shall include necessary procedures for addressing problems that are typically encountered during HDD installations through the anticipated subsurface for each drill location and to prevent inadvertent releases of drilling slurry;
- Drilling fluid composition design and on-hand amendments to alter fluid properties to reduce pressures, potential for plugging, and seepage losses;
- Description of the planned drilling equipment and drill site layout;
- SDS information for all drilling fluid products proposed for use;
- Procedures for drilling fluid pressure control, and fluid and pressure loss monitoring and management to aid in the detection of an inadvertent release (i.e., metering of makeup water, recording of drilling fluid product quantities utilized, fluid return

volumes, fluid and cuttings disposal quantities, turbidity of river water, etc.);

- Contingency plans for addressing inadvertent releases into wetlands, or other sensitive areas, which includes the specific procedures used to halt the release and then contain, clean-up, and remove materials from the release site;
- Notification procedures and chain-of-command in the event of a release;
- Criteria for evaluating the need for a drill hole abandonment and the associated plan for sealing the drill hole if abandoned;
- Drilling fluid management and disposal procedures;
- The work plan and detailed drilling program description should include documentation regarding site restoration, vegetation management, sedimentation and erosion control, and hazardous material usage (if applicable). The intended approach will be in compliance with those measures presented in the Project EM&CP.
- Notice shall be provided to residents, businesses, and building, structure, and facility (including underground, aboveground and underwater facilities) owners and operators within one hundred (100) feet of any HDD staging area or trenching activity with an offer to inspect foundations before, during, and after construction. Additional detail regarding this notice, associated inspections, intended benefits, proof of notice, cost reimbursements and associated construction initiation schedule is included in General Condition 154.

In addition to providing a site-specific Inadvertent Release Contingency Plan, the specifications require that the Subcontractor implement the additional necessary safeguards to minimize the likelihood of a fluid release and management/control should a release occur. This includes having a readily available supply of spill response devices (containment booms, pumps, straw bales, silt fence, sediment logs, sandbags, vacuum trucks, and storage tanks) and any other materials or equipment necessary to contain and clean up inadvertent releases. To maximize protection to sensitive environmental areas these measures shall be pre-positioned at the site, readily available and operational prior to the start of any drilling. If needed, additional spill response measures shall be employed immediately, as secondary measures, in the event of a fluid release.

The workspace layout for HDD materials and equipment will be configured to reduce the likelihood of a release. Final dimensions and equipment layout are to be adjusted based on actual space available and shown on the drawings for each HDD crossing.

4.4 DRILLING FLUIDS MANAGEMENT

As described in the Project EM&CP document, drilling fluid (typically bentonite and water based with selected additives) will be NSF certified and all recycling and reuse regulations will be followed where applicable. The drilling fluid management system and subsequent disposal is the responsibility of the HDD subcontractor performing the HDD. However, the drilling fluid management system and subsequent disposal will adhere to the following requirements:

- Drilling fluid will be processed through an initial cleaning that separates the solid materials from the fluid;
- Solids will be sifted out by a screening apparatus/system and the solids deposited into a roll-off or a dump truck and periodically transported off-site and disposed of at an approved disposal facility determined by the HDD construction subcontractor;
- Drilling fluid that is deemed unacceptable to be reused during construction or left over at the end of drilling will be collected and transferred into a tanker truck for disposal at an approved disposal facility determined by the HDD construction subcontractor;
- Petroleum-based fluids and other potentially hazardous materials associated with drilling operations that are spilled during HDD construction will be contained following the mitigation measures described in the SPCC (Appendix K of the EM&CP) and disposed of at an approved disposal facility as determined by the HDD construction subcontractor and included in the EM&CP;
- Supply of spill containment equipment and measures shall be maintained and readily available around drill rigs, drilling fluid mixing system, entry and exit pits and drilling fluid recycling system, if used, to prevent spills into the surrounding environment. Pumps, vacuum trucks, and/or storage of sufficient size will be in place to contain excess drilling fluid; and,
- Under no circumstances will drilling fluid that has escaped containment be reused in the drilling system.

An overview of the drilling fluid system will be submitted to the Environmental Inspector for approval once determined and prior to any HDD installation activities. The role of the Environmental Inspector is discussed in Chapter 3 of the EM&CP.

4.5 EARLY FLUID RELEASE DETECTION

The HDD method has the potential for seepage or fluid loss into pervious geologic formations that the bore path crosses. This may occur due to the presence of fractures in the rock, low

overburden confinement, or from seepage through porous soils such as coarse gravels or via prior exploratory boreholes. It is important to note that inadvertent releases of drilling fluid can occur even if the down-hole pressures are minimal. Subsurface conditions that could be conducive and lead to inadvertent releases or drill difficulties include:

- Highly permeable soil such as cobbles and gravel;
- Presence of rock joints, solution features, or other subsurface fractures;
- Considerable differences in the elevations of HDD entry and exit points (typically greater than 50 feet);
- Disturbed soil, such unconsolidated fill;
- Soft/weak soils with low overburden confining capacity;
- Low density soils in areas where the HDD bore is relatively shallow;
- Longer bore alignments; and
- The presence of archeological features such as, existing wells, piles and culverts, in close proximity to the HDD bore that may provide a preferential path for the drilling slurry to escape from the bore path.

The risks associated with the above conditions at specific crossings are discussed in Section 9 of this report.

An experienced drill crew is the most effective approach to detecting reaction to drilling fluid seepage prior to a surface release. They can promptly stop the drilling, modify the drilling fluid composition, fluid properties, and pressures to address indications of loss of drill fluid. The HDD Subcontractor is required to utilize experienced drill crews particularly in and adjacent to environmentally sensitive areas. The following factors can be used for identifying the potential for drill fluid release:

- The loss of pressure within the drill hole utilizing a downhole pressure monitoring system;
- A large rapid buildup of pressure within the drill hole utilizing a downhole pressure monitoring system or at the drill rig;
- A substantial reduction in the volume of return fluid (loss of circulation); and
- The lack of drill cuttings returning in the drill fluid

In addition to an experienced drill crew, the HDD Subcontractor will be required to perform periodic (at least twice a day) visual inspection and monitoring of the stream channel bottom and wetlands in the vicinity of the drill bit or reaming bit for signs of an inadvertent release. The Environmental Inspector will monitor the status of each HDD waterbody crossing while construction activities are underway until the crossing has been completed and the stream and stream banks have been restored. In the event of any potential or actual failure of the crossing, the Certificate Holders shall have engaged adequate staff, materials, and equipment to take the necessary steps to prevent or avoid adverse environmental impacts. If visual monitoring indicates a potential release, additional measures such as turbidity measurements and bentonite accumulation measurements both upstream and downstream of the current active location of the drill bit are required.

5.0 INADVERTENT RELEASE MONITORING AND NOTIFICATIONS

The HDD Subcontractor is responsible for monitoring of the drilling operation to detect a potential inadvertent release by observing and documenting the flow characteristics of drilling fluid returns to the HDD entry/exit pits and by visual inspection along the drill path. If drilling fluid to the HDD entry/exit pits are lost, the Subcontractor shall implement the following steps:

- The Drill Operator will monitor and document pertinent drilling parameters and conditions and observe and monitor the drill path for evidence of an inadvertent release, if there is evidence (typically visual) of a release, the Subcontractor will be required to stop the drilling immediately;
- The Subcontractor shall notify the lead Environmental Inspector of any significant loss of drilling fluid returns at the drill rig; and, in the event of a detected release of drilling fluid during the performance of any HDD waterbody crossing, implement the procedures specified in the approved EM&CP. The Certificate Holders shall immediately notify New York State Department of Public Service (NYSDPS) Staff and New York State Department of Environmental Conservation of details of the release and the course of action they recommend taking.
- The subcontractor will take steps to modify the drill fluid properties and pressures to reduce the potential of drill fluid loss or release; and
- The Drill Operator will take steps to restore drilling fluid circulation in accordance with the requirements of the HDD technical specifications.

If a fluid release is identified, an immediate response is necessary and the Subcontractor is

required to take proper corrective actions to minimize impacts, particularly to environmentally sensitive resources (e.g. watercourse, waterbodies, and wetlands).

6.0 INADVERTENT RELEASE RESPONSE (UPLAND AND ROAD AREAS)

A common reason for upward movement and release of drill fluid is from borehole collapse or blockage and a resulting increase in the pressure exerted by drill pumps. Lowering drill fluid pressure is a first step to limiting the extent of a release and can be accomplished by stopping drill rig pumps and allowing pressure to bleed off. With no pumping pressure in the hole, surface seepage will generally stop immediately, then the Subcontractor can trip the drill steel back a selected distance and attempt to clear cuttings from the annulus to re-establish circulation.

The HDD Subcontractor will be required to contain/isolate and remove any fluid that has escaped to the ground or mudline surface. On land this can be done through use of berms, straw bales, shovels as needed, or silt fence to contain the release in conjunction with excavating a small sump pit and/or use of vacuum collection equipment, if needed. Sufficient spill-absorbent material will also be required on-site.

If a release is identified in an upland area, the Subcontractor will be required to respond immediately as described above to limit the extents of the release. After containment is established, cleanup and removal can be conducted by hand, with vacuum trucks, or other equipment. The Environmental Inspector will be present during clean up and removal activities, as they may need to be conducted outside of the pre-authorized temporary workspace areas. The Environmental Inspector, Construction Manager, and the HDD Subcontractor will work together closely to determine the best course of action for inadvertent releases occurring within upland areas.

Upon containment of the release, the HDD Subcontractor will be required to evaluate the cause of the seepage and develop mitigation strategies to limit the likelihood of recurrence. The location of the seepage and the area around the seep will be monitored upon the re-start of the HDD operations for changes in conditions. The segments of borehole nearest the entry and exit points and other areas of low overburden cover tend to be the most susceptible to surface seepage as they have the least amount of soil confinement. These locations will generally be in areas of

dry land where seepage detection is easily identified and contained. If areas of high risk for inadvertent releases are identified during the HDD design phase, they can be protected from an uncontrolled release through use of strategically placed confinement/filter beds, straw bales, silt fence, or earth berms place prior to the start of drilling or the use of conductor conduits if at entry and exit areas.

7.0 INADVERTENT RELEASE RESPONSE (WETLAND, RAILROAD, AND OPEN WATER BODY AREAS)

For any release occurring in a waterbody, the Certificate Holders shall immediately notify DPS Staff and NYSDEC of details of the release and the course of action they recommend taking. During the performance of any HDD waterbody crossing, contractors monitor the use of an approved drilling solution and, in the event of a detected release of fluid, implement the procedures specified in the approved EM&CP. If an inadvertent release occurs when working beneath the waterway, wetland, or railroad the HDD Subcontractor will be required to cease drilling operations and reduce pressures in borehole immediately, and notify the Environmental Inspector, the Railroad (if within railroad property), the construction management team and the Certificate Holders. The Environmental Inspector, with input from the Drill Operator, will evaluate the potential impact of the release on a site-specific basis and will determine the appropriate course of action. Prior to construction, the HDD Subcontractor is required to develop a detailed, site-specific submittal for general in-stream or in-rail response methods and pre-place necessary materials and equipment at or near the site prior to construction. Specific response actions will be determined in consultation with the Environmental Inspector and HDD Subcontractor and could include the following:

- Shutting down or slowing the drill fluid pumps;
- Modifying the drill fluid properties, add agents to reduce drilling fluid pressures and/or to plug/seal release path;
- Tripping the drill steel back a selected distance and attempt to clear cuttings from the annulus to re-establish circulation
- Stopping drilling activities for 24 hours to allow the bentonite in the subsurface pathways to gel and seal the pathways;
- Evaluate the current drill methods to identify site specific improvements to lower the risk of additional inadvertent releases and,
- Implementation of proper in-wetlands and in upland, road and railroad, hand-placed sedimentation control measures including, but not limited to straw bales, vacuum trucks, silt curtains, containment cells, turbidity curtains, or if suitable, sand bags and confinement/filter beds. These activities will require that qualified construction personnel and other support equipment, and supplies be prepositioned and readily available at or near the site.

- Use of a relief well installed at the location of the release. A well or pit equipped with a subsurface pump to control slurry pressures and future releases at that location by evacuating drilling fluid as it accumulates can also be used. The relief well can be utilized to immediately lower the borehole pressures in the event of an inadvertent release and later to control and manage the release as the drilling continues.

8.0 DRILL HOLE ABANDONMENT PLAN

In the event the HDD Subcontractor must abandon the drilled hole, a plan to fill the abandoned hole will be implemented as detailed in the HDD Subcontractor's supplemental Inadvertent Release Contingency Plan and an alternative plan/alignment for crossing shall be evaluated. If it becomes necessary to abandon a partially completed hole, the abandoned hole will be filled with a mixture of high-yield bentonite, water, and drill spoil. The first ten feet of the bore path will be compacted and filled with soil or a cement-bentonite mix to prevent future settlement. The Subcontractor submitted site-specific abandonment plan shall be approved by the Design Engineer and the Construction Manager prior to being performed in the field.

After the abandoned hole has been filled, an alternative entry and exit hole and bore path alignment will be evaluated by the HDD Subcontractor, Construction Manager, and the Design Engineer. The new alignment shall be offset from the abandoned hole by at least 10 feet (except at the ends where a 5- foot offset may be used) to help limit the risk of steering difficulties due to the presence of a hydraulic connection causing drill fluid loss to the abandoned hole.

9.0 CROSSING SPECIFIC DISCUSSION

9.1 HDD CROSSING #1 – LAKE ROAD

HDD #1 consists of two, straight (in plan view) HDD bores, each approximately 896 and 881 feet long as shown in Appendix C. The HDD bores will pass approximately 29 to 32 feet below the bottoms of a pair of 12-foot-diameter culverts stream which conduct the Mill Brook under Lake Road. The approximate center of the HDD bores located under the culverts at latitude 43.7222°N and longitude -73.4182°W, in Putnam, NY. The ground surface elevations along the path of HDD #1 gently undulates between approximately El. 266 and El. 292 (reference datum NAVD 1988). Waterbodies and wetlands are present between approximately Sta. 10147+60 and Sta. 10148+60 (at about El. 268) and between approximately Sta. 10152+80 and Sta. 10153+25 (at about El. 276).

The bores will have no horizontal curves. The vertical curves of the bore path are designed so that the bore will pass beneath Lake Road and the culverts under Lake Road. The proposed work at this location must be constructed in accordance with the Article VII Certificate and associated EM&CP.

Ground conditions at HDD #1 - Borings GTB-PD7 & GTB-PD7A are located along the proposed HDD alignment between approximately Sta. 10146+50 and Sta. 10148+00. These two [2] ranged

in depth to approximately 50 feet and are shown on Appendix C. Based on the borings, the soil profile for the HDD #1 BoreAid analyses was divided into two [2] layers: medium dense silt and very soft to soft lean clay. The soil profiles used for BoreAid analyses of the HDDs in this segment are shown in Appendix A.

Specific design considerations for HDD #1 include:

- General depth of soil cover under the culverts and the adjacent Mill Brook is 26 to 32 feet near the centers of the bore paths. Preliminary analysis of the bores indicates the lowest maximum allowable pressure capacity in the middle of the bores to be approximately 45 psi. The total circulating pressure estimated to occur in the middle of the bore ranges from 34 to 42 psi assumed standard HDD drilling methods. In the remainder of the bore the maximum allowable pressure ranges from approximately 0 to 80 psi and the approximate applied slurry pressure during drilling ranges from 0 to 42 psi. A sketch showing the maximum allowable pressure and the applied pressure is provided in the summary BoreAid analyses in the attached Appendix A.

- It appears that a potential for releases at the starting and ending 10-20 feet near the exit pits exist. These should be relatively easily controlled through the use of conductive conduit, straw bales, silt fences, erosion control measures and vacuum trucks.
- The entry and exit points are established outside the wetland or waterway boundary to permit detection and response, in the event of a release, before environmentally sensitive boundaries are reached or impacted. Erosion and sediment control measures will be placed between the entry/exit location and any watercourses, waterbodies, and environmentally sensitive areas as an additional precaution.

In our opinion the conditions conducive to inadvertent releases that may exist this at this site based on the ground conditions described in the borings at the site include:

- Highly permeable soil such as cobbles and gravel in the stream bottom - In our opinion, based on the geomorphology of the area, the presence of sufficient highly permeable soils of sufficient thickness is not likely and the risk of a release due to this condition is low.
- Soft soils with low overburden capacity encountered in the borings – The borings

indicate that 5 feet of clay immediately below the culverts is a medium stiff to stiff clay which combined with the depth of the bores below the culverts and the results of the BoreAid analyses leads to our opinion that the risk of a release due to this condition is low also.

9.2 HDD CROSSING #2 – SOUTH BAY

HDD #2 consists of two, curved (in plan view) HDD bores located under the Champlain Canal-South Bay, south of the State Route 22 bridge across the canal. The bores are approximately 2989 and 3032 feet long as shown Appendix C. The HDD bores will pass approximately 54 to 55 feet below the low mudline of the canal. The horizonal alignment of HDD #2 was revised from north of the bridge to south of the bridge to avoid archeological ruins in bottom of the canal and to avoid deep (up to 95 feet deep) deposits of rock fill that were place in the bottom of the canal in unsuccessful attempts to support two earlier bridges located north of the current bridge. The rock fill is generally not compatible with the HDD method of construction and if encountered, creates a greater risk for inadvertent releases. The approximate center of the HDD bores under the Champlain Canal-South Bay are at latitude 43.5425°N and longitude -73.4314°W, in Whitehall, NY. The ground surface elevations along the path of HDD #2 ranges from approximately El. 125 at the west end of the bore alignment, to approximately Elevation 82 at the mudline in the middle of the canal, to El. 120 at the east end of the bore alignment (reference datum NAVD 1988). Approximately 1500 feet of the bore alignment will be under the waters of the Champlain Canal – South Bay.

The bores will have both horizontal and vertical curves, but no segments of the bore path are designed with compound curves (segments with compound curves would have both horizontal and vertical curves). The design curves for both the horizontal and vertical paths of the alignment have a minimum radius of approximately 1000 feet to limit steering issues in the soft soils at this site.

The proposed work at HDD #2 will be located underneath the South Bay of the Champlain Canal and adjacent wetlands and uplands. No work is proposed within the water body. Both work zones are adjacent to wetlands, but have been configured to avoid them as much as possible. Steps must be taken to protect and limit disturbance to the wetlands, and to restore the wetlands after the

HDD work is completed should they be disturbed. The proposed work at this location must be constructed in accordance with the Article VII Certificate and associated EM&CP.

The Certificate Holders have received permits for the project including a modified Section 404 permit from the USACE.

Ground conditions at HDD #2 - Based on borings drilled for this project and historic borings for the State Route 22 bridge construction, the soil profile the for HDD #2 BoreAid analyses was divided into four [4] layers: Loose Silt, Upper Soft Clay, Medium Stiff Clay, and Lower Soft Clay. The Rock Fill encountered during recent borings from the existing causeway is not expected to be present along the south of Bridge alignment selected. The soil profiles used for BoreAid analyses of the HDDs in this segment are presented in Appendix A.

Archeological ruins and remains of old bridges were noted north of the bridge at HDD #2. Remains of approximately 10 sunken ships or barges, some circa 1812, and a 1913 bridge are located just north of the jetties, see Appendix B. In addition, the records appear to indicate that barges were sunk as part of the foundation system for the 1913 bridge in addition to dumpling gravel, cobbles and boulders and pushing them down into the soft sediments. The locations of these ruins and related obstructions are not expected to be present along the south of bridge alignment selected as shown in the recent geophysical survey report as discussed in the Design Summary Report.

Specific design considerations for HDD #2 include:

- Depth of cover during profile design (based on soil borings) to limit the potential inadvertent break through to the water body, road, wetlands, or ground surface. General depth of cover under the Canal mudline is 50 or more feet with a depth of cover of about 54 feet near the center of the bore path. Preliminary analysis of the bore, assuming typical drilling methods, indicates that the lowest maximum allowable pressure capacity in the middle of the bore is approximately 68 psi and the pressure estimated to occur in the bore in the middle portion ranges from 75 to 70 psi assumed standard HDD drilling methods. In the remainder of the bore the maximum allowable pressure ranges from approximately 0 to 80 psi and the approximate applied slurry pressure during drilling ranges from 0 to 71 psi. A sketch showing the maximum allowable pressure and the applied pressure is provided in the summary BoreAid analyses in the attached Appendix A.
- It appears that a potential for releases in the last 300 to 400 feet of the bores near as each

bore approaches the exit pit exist, regardless of the direction of the bore E-W or W-E. This is related to the length and depth of the bores and the slope of the ground surface up from the water's edge to the entry and exit pits about 30 feet higher.

- Generally, for the formation of inadvertent releases, the more critical stage of the HDD process tends to be during the initial pilot hole drilling when the annular space between the bore sidewall and the drill string is the smallest.
- Adjusting the drill alignment to miss existing infrastructure including existing utilities, and other obstacles,
- Establishing a drill alignment line that allows for gradual angular changes to minimize pressure build-up,
- Requiring drilling fluid composition and drilling procedures that minimize drilling fluid pressures,
- Requiring drilling fluids that adequately address site-specific drilling concerns while posing the least threat to the environment,
- Requiring monitoring and controlling drilling fluid pressures with down-the-hole sensors during pilot hole drilling,
- Requiring the use of intersect bore method (drilling the pilot bore from each end and meeting in the middle) to reduced slurry pressures at the exit end during pilot bore drilling, thereby reducing the potential for a released at the exit end of the pilot bore, and
- The use of conductor conduits, temporary steel conduit approximately 30 inches diameter and 100 feet long at each end of each bore to contain drilling fluids during drilling reaming and pullback.

Appendix A

BoreAid HDD Simulation Output

Generated Output

WARNING: The accuracy of the data obtained by the BoreAid® system is highly dependent upon accurate data gathering, data input and proper use of the software. Vermeer is not responsible for that information. BoreAid® data is not intended to replace the need for future on-site utility locating, measuring and verification procedures, which are essential for accurate placement of new underground installations and avoidance of existing utilities.

CALL YOUR ONE-CALL SYSTEM FIRST

WARNING: Always contact your local One-Call system before the start of your digging project. The BoreAid® system is intended to be used with other utility locating methods, such as the use of the One-Call system and the exposing of existing utilities by potholing.

Locate utilities before drilling. Call 811 (U.S. only) or 1-888-258-0808 (U.S. or Canada) or local utility companies or national regulating authority.

Before you start any digging project, do not forget to call the local One-Call system in your area and any utility company that does not subscribe to the One-Call system. For areas not represented by One-Call Systems International, contact the appropriate utility companies or national regulating authority to locate and mark the underground installations. If you do not call, you may have an accident or suffer injuries; cause interruption of services; damage the environment; or experience job delays.

OSHA CFR 29 1926.651 requires that the estimated location of underground utilities be determined before beginning the excavation or underground drilling operation. When the actual excavation or bore approaches an estimated utility location, the exact location of the underground installation must be determined by a safe, acceptable and dependable method. If the utility cannot be precisely located, it must be shut off by the utility company.

Project Summary

General:	HDD #1
	Ref: Lake Road - New York
	P1A
	Start Date: 12-10-2021
	End Date: 12-10-2021
Designer:	TAR
	CHA
Description:	Lake Road HDD - New York

Input Summary

Start Coordinate	(0.00, 0.00, 291.00) ft
End Coordinate	(884.00, 0.00, 289.76) ft
Project Length	884.00 ft
Pipe Type	HDPE
OD Classification	IPS
Pipe OD	10.750 in
Pipe DR	9.0
Pipe Thickness	1.19 in
Rod Length	15.00 ft
Rod Diameter	3.5 in
Drill Rig Location	(0.00, 0.00, 0.00) ft

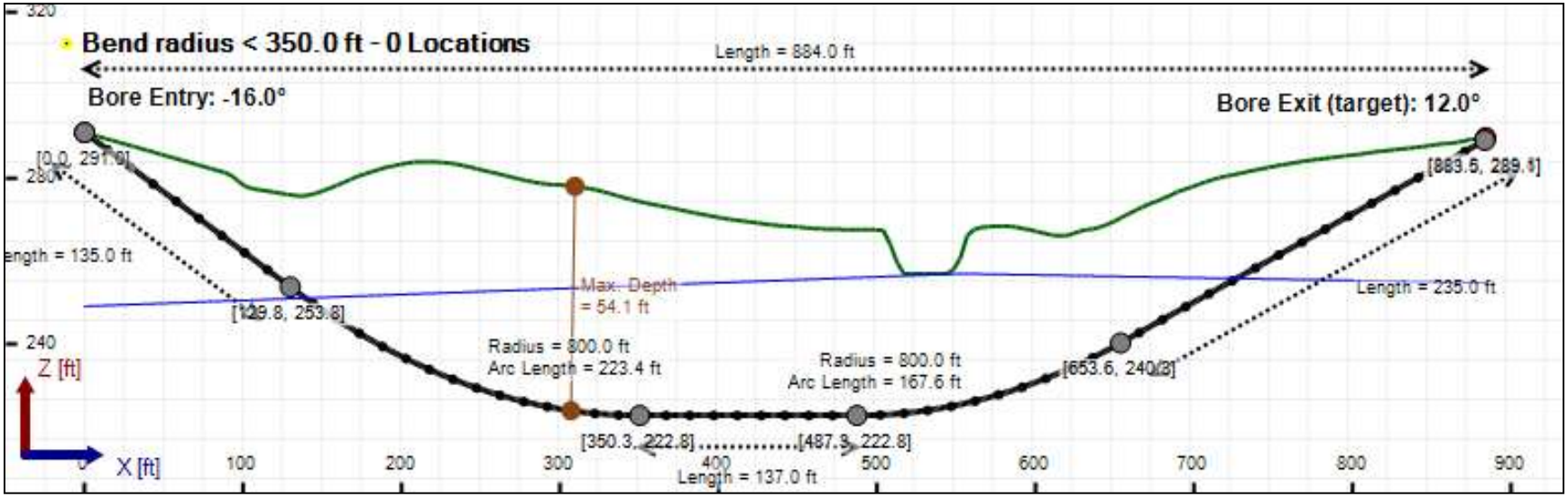
Soil Summary

Number of Layers: 2

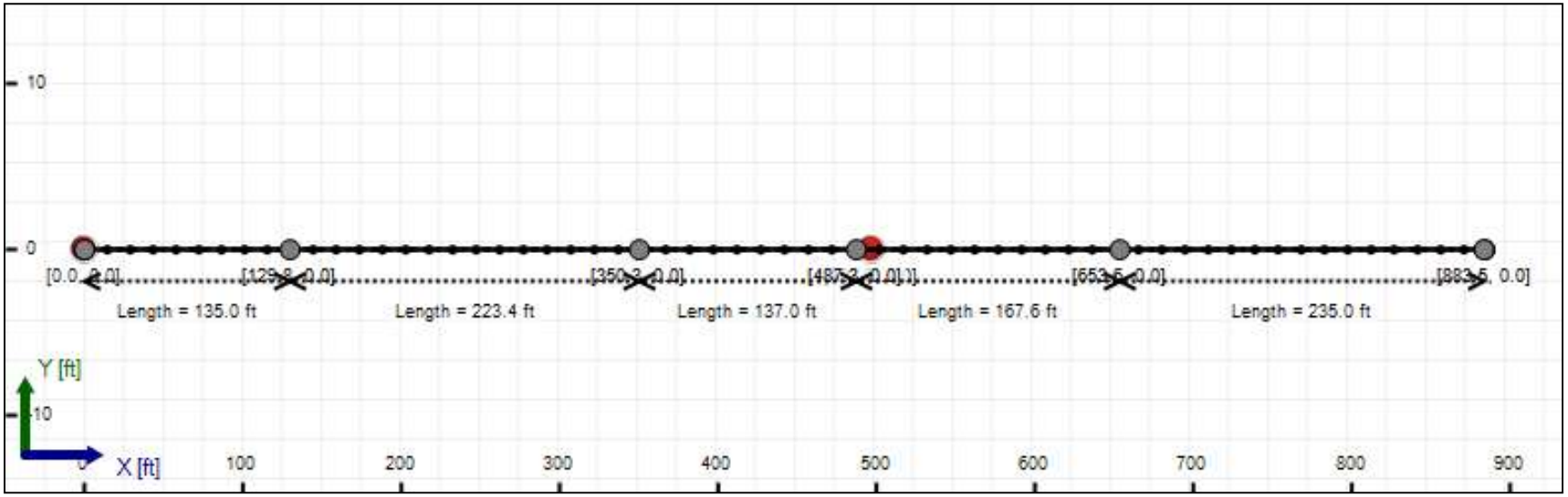
Soil Layer #1 USCS, Silt (M), ML
From Assistant
Unit Weight: 0.0521 (dry), 0.0637 (sat) [lb/in3]
Phi: 32.00, S.M.: 100.00, Coh: 0.00 [psi]

Soil Layer #2 USCS, Clay (C), CL
From Assistant
Unit Weight: 0.0405 (dry), 0.0579 (sat) [lb/in3]
Phi: 0.00, S.M.: 200.00, Coh: 3.13 [psi]

Bore Cross-Section View



Bore Plan View



Load Verifier Input Summary:

Pipe Application: Electrical Cable

Pipe Type: HDPE

Classification: IPS

Pipe OD: 10" (10.75")

Pipe DR: 9

Pipe Length: 899.99 ft

Internal Pressure: 0 psi

Borehole Diameter: 1.34400002161662 ft

Silo Width: 1.34400002161662 ft

Surface Surcharge: 0 psi

Short Term Modulus: 57500 psi

Long Term Modulus: 28200 psi

Short Term Poisson Ratio: 0.35

Long Term Poisson Ratio: 0.45

Pipe Unit Weight: 0.03430 lb/in3

Allowable Tensile Stress (Short Term): 1200 psi

Allowable Tensile Stress (Long Term): 1100 psi

Allowable Compressive Stress (Short Term): 1150 psi

Allowable Compressive Stress (Long Term): 1150 psi

Surface-pipe friction coefficient at entrance: 0.5

Surface-pipe friction coefficient in borehole: 0.3

Pipe-soil friction angle: 30

Slurry Unit Weight: 0.05419 lb/in3

Hydrokinetic Pressure: 10 psi

Ballast Unit Weight: 0.03613 lb/in3

In-service Load Summary:

Pressure [psi]	Deformed	Collapsed
Earth Pressure	4.1	23.2
Water Pressure	14.4	12.8
Surface Surcharge	0.0	0.0
Internal Pressure	0.0	0.0
Net Pressure	18.5	36.0
Deflection		
Earth Load Deflection	1.239	6.782
Buoyant Deflection	0.132	0.132
Reissner Effect	0	0
Net Deflection	1.371	6.914
Compressive Stress [psi]		
Compressive Wall Stress	83.2	162.2

Installation Load Summary:

Forces/Stresses	@Maximum Force	Absolute Maximum
Pullback Force [lb]	17030.0	17030.0
Pullback Stress [psi]	474.9	474.9
Pullback Strain	8.260E-3	8.260E-3
Bending Stress [psi]	0.0	32.2
Bending Strain	0	5.599E-4
Tensile Stress [psi]	474.9	505.4
Tensile Strain	8.260E-3	9.349E-3

Net External Pressure = 34.2 [psi]

Buoyant Deflection = 0.1

Hydrokinetic Force = 567.6 lb

In-service Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	1.371	7.5	5.5	OK
Unconstrained Collapse [psi]	44.0	123.4	2.8	OK
Compressive Wall Stress [psi]	83.2	1150.0	13.8	OK

Installation Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.065	7.5	115.8	OK
Unconstrained Collapse [psi]	54.3	227.5	4.2	OK
Tensile Stress [psi]	505.4	1200.0	2.4	OK

Maximum Allowable Bore Pressure Summary

Ream Number	Initial Diameter	Final Diameter	Estimated Maximum Pressure (Avg.)	Estimated Maximum Pressure (Local)
Pilot Bore	0.00 in	8.00 in	79.569 psi	59.712 psi
1	8.00 in	12.00 in	79.537 psi	59.621 psi
2	12.00 in	16.13 in	79.492 psi	59.489 psi

Note: The maximum bore pressures presented in this table are the maximum values along the length of the bore and not the maximum allowable at any point. The estimated maximum pressures should be compared to the estimated circulating pressures along the bore to determine potential locations of inadvertant returns.

Estimated Circulating Pressure Summary

Active	Shear Rate [rpm]	Shear Stress [Fann Degrees]
No	600	37
No	300	32
No	200	29
Yes	100	25
Yes	6	17
No	3	15

Flow Rate (Q): 40.00 US (liquid) gallon/min

Drill Fluid Density: 0.040 lb/in3

Rheological model: Bingham-Plastic

Plastic Viscosity (PV): 25.53

Yield Point (YP): 16.49

Effective Viscosity (cP): 1202.0

Virtual Site