SIMARANO DRIVE
ROADWAY IMPROVEMENT PROJECT
IN THE CITY OF
MARLBOROUGH
MIDDLESEX COUNTY

CITY OF MARLBOROUGH BID NUMBER: ED 2014-21

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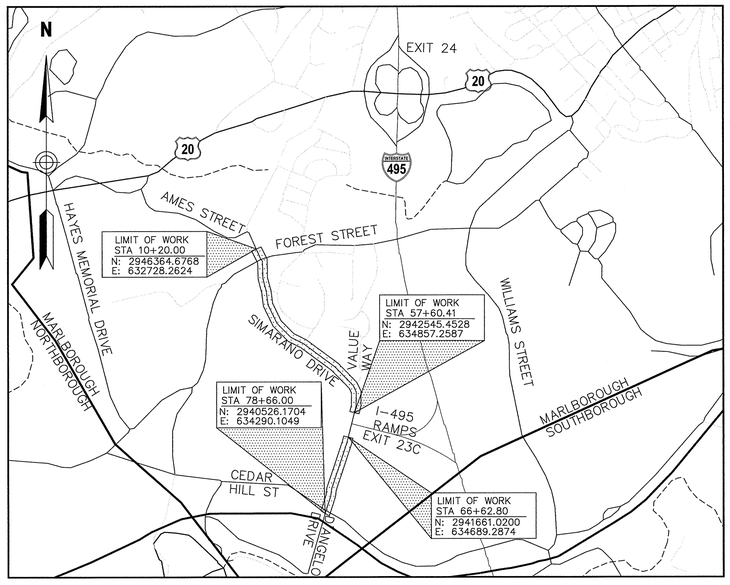


1,500 0 1,500 3,000
SCALE (IN FEET) 1"=1,500'

LENGTH OF PROJECT = 6846.00 FEET = 1.297 MILES

JUNE 19, 2014

REFERENCE MANUALS

THE MASSDOT 1988 STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES AS SUPPLEMENTED AND AMENDED; THE INTERIM SUPPLEMENTAL SPECIFICATIONS DATE JUNE 25, 2013; THE MASSDOT 2012 CONSTRUCTION STANDARD DETAILS; THE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) WITH MASSACHUSETTS AMENDMENTS AND THE STANDARD MUNICIPAL TRAFFIC CODE; THE 1968 MASSDOT STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING; AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, AS AMENDED, WILL GOVERN.

DESIGN DESIGNATION

DESIGN SPEED	= 40 MPH
ADT (2013)	= 6,200 VPD
ADT (2023)	= 14,700 VPD
K	= 0.13
D	= 52% NB
T (PEAK HOUR)	= 1% (NORTH OF 495 RAMPS)
	= 6% (SOUTH OF 495 RAMPS)
T (AVERAGE DAY)	= 1% (NORTH OF 495 RAMPS)
	= 6% (SOUTH OF 495 RAMPS)
DHV	= 1911 VPH
DDHV	= 994 VPH
FUNCTIONAL CLASS	= URBAN MINOR ARTERIAL

NO.	REVISIONS	DATE

COMMONWEALTH OF MASSACHUSETTS
BRIAN C. BROGNAN
CIVIL
No. 39004
REGISTERED PROFESSIONAL ENGINEER

6/16/14
ENGINEER DATE

VHB
Vanasse Hangen Brustlin, Inc.
Transportation • Land Development
Environmental Services
Union Station, Suite 219
2 Washington Square
Worcester, MA 01604
508 752 1001 FAX 508 752 1278

DESIGNED BY MS/CAC	APPROVED BY BB	SHEET OF 1 142
DRAWN BY MS	DTG CHECKED BY CAC	VHB CAD FILE NAME 12477-COV.DWG
CHECKED BY BB/SEK	DATE JUNE 19, 2014	JOB NO. 12477

GENERAL SYMBOLS

EXISTING	PROPOSED	
CB (OR GI, LB)	CB	CATCH BASIN (OR GUTTER INLET, OR LEACHING BASIN)
CBCI (OR GICI)	CBCI (OR GICI)	CATCH BASIN (OR GUTTER INLET) WITH CURB INLET (GUTTERMOUTH)
		EDGESTONE-TYPE NOTED
		EDGE OF ROAD
EHH	EHH	ELECTRIC HANDHOLE (NUMBER AS NOTED)
EMH	EMH	ELECTRIC MANHOLE "
TMH	TMH	TELEPHONE MANHOLE "
WMH	WMH	WATER MANHOLE "
SMH	SMH	SEWER MANHOLE "
DMH	DMH	DRAINAGE MANHOLE "
GG	GG	GAS GATE
WG	WG	WATER GATE
CS	CS	CURB STOP
Hyd	HYD	HYDRANT
FA	FA	FIRE ALARM BOX
PM	PM	PARKING METER
LP	LP	STREET LIGHT POLE
UP	UP	UTILITY POLE
Guy	GUY	GUY POLE
12" RCP D	D 21'-12"RCP	DRAIN PIPE (UNDER 24")
	D 21'-24"RCP	DRAIN PIPE (DOUBLE LINE 24" AND OVER)
8" VCP S	S 82'-8"VCP	SEWER MAIN " "
E	E	ELECTRIC DUCT " "
4" HP G	G 8"GAS	GAS MAIN " "
8" C.I. W	W 12"DI	WATER MAIN " "
T	T	TELEPHONE DUCT " "
MB	MB	MAIL BOX
		HIGHWAY GUARD (TYPE NOTED)
x x	x o	FENCE (SIZE AND TYPE NOTED)
MHB	MHB	HIGHWAY/PROPERTY BOUND (TYPE NOTED)
LABEL/DATE	LABEL/DATE	CITY, TOWN, OR COUNTY LAYOUT
		STATE HIGHWAY LAYOUT (S.H.L.O.)
		EASEMENT LINE
℄ NAME	℄	PROPERTY LINE
NAME N00°00'00"E		CITY, TOWN, OR COUNTY BOUNDARY
		STATE BOUNDARY
+57.59 10 P.C. N00°00'00"E		BASE OR SURVEY LINE
		CONSTRUCTION BASELINE
20' BZ		20 FOOT BUFFER TO BORDERING VEGETATED WETLANDS
100' BZ		100 FOOT BUFFER TO BORDERING VEGETATED WETLANDS
		TREE (SIZE AND TYPE NOTED)
		APPROXIMATE FULL DEPTH AREA
	B-1	BORINGS, PAVEMENT CORES
	TP-1	TEST PIT
		BALES OF HAY FOR EROSION CONTROL

TRAFFIC SIGNAL SYMBOLS

EXISTING	PROPOSED	
		CONTROL CABINET GROUND MOUNTED (WITHOUT & WITH CONCRETE PAD)
		CONTROL CABINET POLE MOUNTED
		FLASHING BEACON CONTROL & METER PEDESTAL
TS		SIGNAL POST & BASE
		MAST ARM, SHAFT, & BASE (ARM LENGTH AS NOTED)
	A	VEHICULAR SIGNAL HEAD (ALPHA-NUMERIC DESIGNATION NOTED)
	A	VEHICULAR SIGNAL HEAD OPTICALLY PROGRAMMED "
		LIMIT OF VISIBILITY OF OPTICALLY PROGRAMMED SIGNAL HEAD
	A	FLASHING BEACON
		PEDESTRIAN SIGNAL HEAD
PB	PB	PULL BOX 12" x 12"
		PEDESTRIAN PUSH BUTTON
		PRE-EMPTION DETECTOR
		PRE-EMPTION STROBE
		VIDEO DETECTION CAMERA
	Ø	CONTROLLER PHASE
		INDUCTIVE LOOP DETECTOR
m		MAGNETIC DETECTOR (LANE, MULTI-LANE, DIRECTIONAL AS NOTED)
T T		MAGNETOMETER
		CONDUIT (COND.)
		CONDUIT CROSSING ROADWAY WITH CONTROLLED DENSITY FILL
x x	x x	"x" DUCT (CONCRETE ENCASED)
		OVERHEAD CABLE
		DIRECT BURIED CABLE

PAVEMENT MARKINGS AND SIGNING SYMBOLS

EXISTING	PROPOSED	
		PAVEMENT ARROW AND LEGEND
CW	CW	CROSSWALK, 2-12" WHITE LINES (WIDTH NOTED)
SL	SL	STOP LINE, 12" WHITE LINE 4.0' BEHIND CW (TYP)
		YIELD LINE, 24" x 36" WHITE TRIANGLE, 36" O.C.
SWCHL		SOLID WHITE CHANNELIZING LINE-SIZE AS NOTED
SYCHL		SOLID YELLOW CHANNELIZING LINE-SIZE AS NOTED
BWLL		BROKEN WHITE LANE LINE - 6"
SWLL		SOLID WHITE LANE LINE - 6"
DYCL		DOUBLE YELLOW CENTERLINE - 4"
SYEL		SOLID YELLOW EDGE LINE - 6"
SWEL		SOLID WHITE EDGE LINE - 6"
BYLL		BROKEN YELLOW LANE LINE - 6"
RRFBS		RECTANGULAR RAPID FLASHING BEACON SYSTEM
		BICYCLE LANE
		BICYCLE DETECTION LEGEND
Sign		SIGN AND POST
		DELINEATOR

GENERAL

ABAN	ABANDON
ADJ	ADJUST
APPROX	APPROXIMATE
BIT	BITUMINOUS
BOS	BOTTOM OF SLOPE
(BO)	BY OTHERS
BVW	BORDERING VEGETATED WETLANDS
DPCR	MISCELLANEOUS POST
CEM	CEMENT
CLF	CHAINLINK FENCE
CONC	CONCRETE
ELEV	ELEVATION
EOP	EDGE OF PAVEMENT
EXIST	EXISTING
FND	FOUNDATION
GRAN	GRANITE
HMA	HOT MIX ASPHALT
LOAM	LOAM BORROW
LT	LEFT
MAX	MAXIMUM
MIN	MINIMUM
NTS	NOT TO SCALE
PGL	PROFILE GRADE LINE
PROP	PROPOSED
PVM'T	PAVEMENT
REM	REMOVE
REMOD	REMODEL
RET	RETAIN
R&D	REMOVE AND DISCARD
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
RT	RIGHT
STA	STATION
TEMP	TEMPORARY
TOS	TOP OF SLOPE
TYP	TYPICAL

UTILITIES

ACCMP	ASHPALT COATED CORRIGATED METAL PIPE
CAP	CORRUGATED ALUMINUM PIPE
CIP	CAST IRON PIPE
CIT	CHANGE IN TYPE
COND	CONDUIT
DIP	DUCTILE IRON PIPE
FES	FLARED END SECTION
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
HDPE	HIGH DENSITY POLYETHYLENE PIPE
HW	HEADWALL
HYD	HYDRANT
INV	INVERT
PVC	POLYVINYLCHLORIDE PIPE
PWW	PAVED WATER WAY
RCP	REINFORCED CONCRETE PIPE
TSV&B	TAPPING SLEEVE VALVE AND BOX
UP	UTILITY POLE

ABBREVIATIONS

ALIGNMENT/GRADING

CC	CENTER OF CURVE
HP	HIGH POINT
LP	LOW POINT
MAG	MAGNETIC PK NAIL
PC	POINT OF CURVE
PI	POINT OF INTERSECTION
PKN	PK NAIL
PNT	POINT
PCC	POINT OF COMPOUND CURVE
PRC	POINT OF REVERSE CURVE
PT	POINT OF TANGENT
25.45	SPOT ELEVATION
B.O.M.O.	BOLT OVER MAIN OUTLET

PROFILES

AD	ALGEBRAIC DIFFERENCE IN RATES OF GRADE
ELEV	ELEVATION
HSD	HEADLIGHT SIGHT DISTANCE
K	RATE OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVC	POINT OF VERTICAL CURVE
PVT	POINT OF VERTICAL TANGENT
PVRC	POINT OF VERTICAL REVERSE CURVE
PVCC	POINT OF VERTICAL COMPOUND CURVE
SSD	STOPPING SIGHT DISTANCE
VC	VERTICAL CURVE

MARLBOROUGH
SIMARANO DRIVE
LEGEND & GENERAL NOTES
SHEET 2 OF 142

GENERAL NOTES

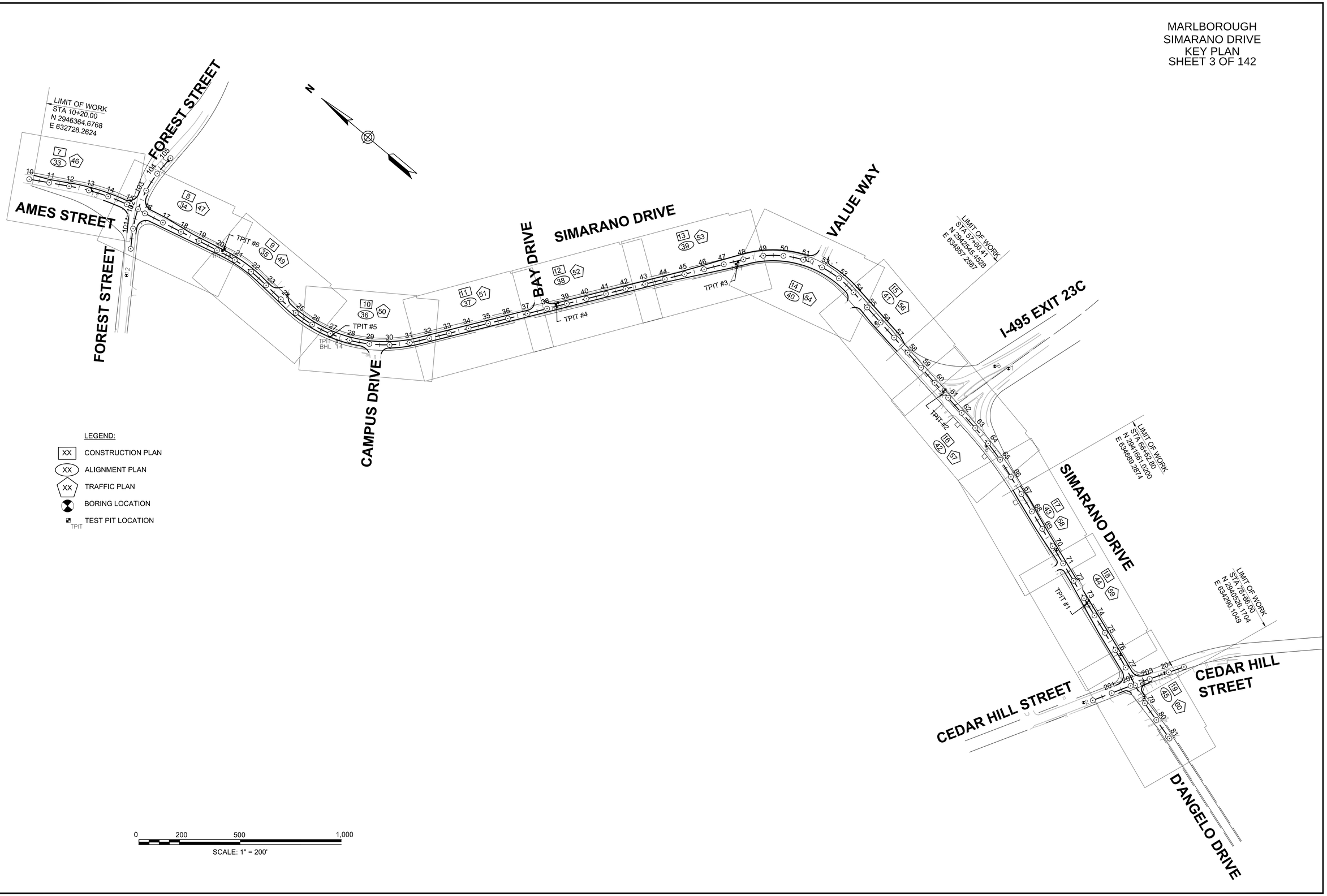
1. TOPOGRAPHICAL INFORMATION FROM A SURVEY BY VANASSE HANGEN BRUSTLIN, INC., WATERTOWN, MASSACHUSETTS IN AUGUST AND SEPTEMBER OF 2013.
2. HORIZONTAL DATUM IS BASED ON MASS GRID SYSTEM, NAD 1983. ELEVATIONS SHOWN REFER TO NAVD OF 1988.
3. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. THE CONTRACTOR SHALL CONTACT DIGSAFE TO REQUEST EXISTING UTILITY MARKOUT IN THE FIELD.
4. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
5. THE CONTRACTOR SHALL ALTER THE MASONRY OF THE TOP SECTION OF ALL EXISTING DRAINAGE STRUCTURES AS NECESSARY FOR CHANGES IN GRADE, AND RESET ALL WATER AND DRAINAGE FRAMES, GRATES AND BOXES TO THE PROPOSED FINISH SURFACE GRADE. REQUIRED NEW MASONRY SHALL BE CLAY BRICK CONFORMING TO M4.05.2.
6. THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES.
7. EXISTING UTILITY POLES WILL BE RELOCATED BY OTHERS.
8. TREES AND SHRUBS WITHIN THE LIMITS OF GRADING SHALL BE REMOVED ONLY UPON APPROVAL OF THE ENGINEER.
9. AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT NO EXPENSE TO THE OWNER.
10. THE TERM "PROPOSED" (PROP) MEANS WORK TO BE CONSTRUCTED USING NEW MATERIALS OR, WHERE APPLICABLE, RE-USING EXISTING MATERIALS IDENTIFIED AS "REMOVE AND RESET" (R&R).
11. JOINTS BETWEEN NEW HOT MIX ASPHALT ROADWAY PAVEMENT TOP COURSE AND SAWCUT EXISTING PAVEMENT SHALL BE SEALED WITH HMA JOINT SEALANT.
12. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS INDICATED OTHERWISE ON THE DRAWINGS.
13. ALL LATERAL DRAIN PIPES SHALL BE INSTALLED WITH A PITCH OF .01 FOOT PER FOOT (MINIMUM) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
14. ALL EXISTING GRANITE CURB & EDGING SHALL BE RE-USED IN THE PROPOSED WORK, EXCEPT CURVED STONES OF A DIFFERENT RADIUS THAN PROPOSED CURB.
15. ALL PROPOSED BITUMINOUS CONCRETE CURB SHALL BE MASSDOT TYPE 3.
16. EXISTING STATE, COUNTY, CITY, AND TOWN LOCATION LINES AND PRIVATE PROPERTY LINES HAVE BEEN ESTABLISHED FROM AVAILABLE INFORMATION AND THEIR EXACT LOCATION ARE NOT GUARANTEED.
17. THE CONTRACTOR SHALL PLACE SILT SACKS ON ALL CATCH BASINS PRIOR TO ANY MAJOR CONSTRUCTION OPERATIONS PER THE SILT SACK DETAIL ON SHEET 75. SILT SACKS SHALL BE INSTALLED ON ALL EXISTING CATCH BASINS DOWN SLOPE OF THE PROJECT LIMITS.
18. ALL EXISTING CORRUGATED METAL PIPE UNDER THE PROPOSED ROADWAY SHALL BE REMOVED AND REPLACED WITH REINFORCED CONCRETE PIPE OF THE SAME SIZE AS SHOWN ON THE PLANS OR APPROVED BY THE ENGINEER. PROPOSED CONCRETE PIPE SHALL BE CONNECTED TO THE EXISTING CORRUGATED METAL PIPE AS SHOWN ON THE DETAILS OR BY A METHOD APPROVED BY THE ENGINEER.

TRAFFIC SIGNAL SYSTEMS

R	STEADY CIRCULAR RED
Y	STEADY CIRCULAR YELLOW
G	STEADY CIRCULAR GREEN
FR	FLASHING CIRCULAR RED
FR	FLASHING RED ARROW
FY	FLASHING CIRCULAR YELLOW
FY	FLASHING YELLOW ARROW
G	STEADY VERTICAL GREEN ARROW
X	STEADY LEFT ARROW (RED, YELLOW OR GREEN PREFIX)
X	STEADY RIGHT ARROW (RED, YELLOW OR GREEN PREFIX)
W	STEADY WALK-WHITE
DW	STEADY DON'T WALK-PORTLAND ORANGE
FDW	FLASHING DON'T WALK-PORTLAND ORANGE
RRFB	RECTANGULAR RAPID FLASHING BEACON

MARLBOROUGH
SIMARANO DRIVE
KEY PLAN
SHEET 3 OF 142

12477 - KEY.DWG Plotted on 4-Jun-2014 4:00 PM



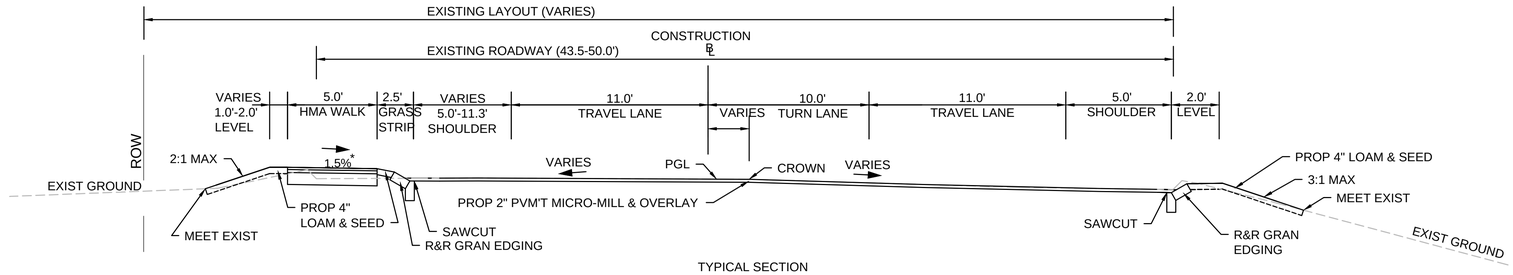
LEGEND:

- XX — CONSTRUCTION PLAN
- XX — ALIGNMENT PLAN
- XX — TRAFFIC PLAN
- BORING LOCATION
- TPIT — TEST PIT LOCATION

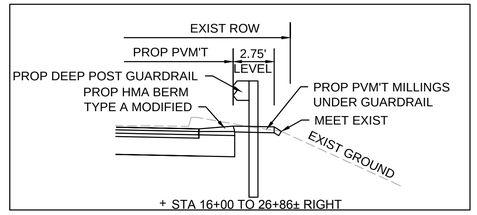
0 200 500 1,000

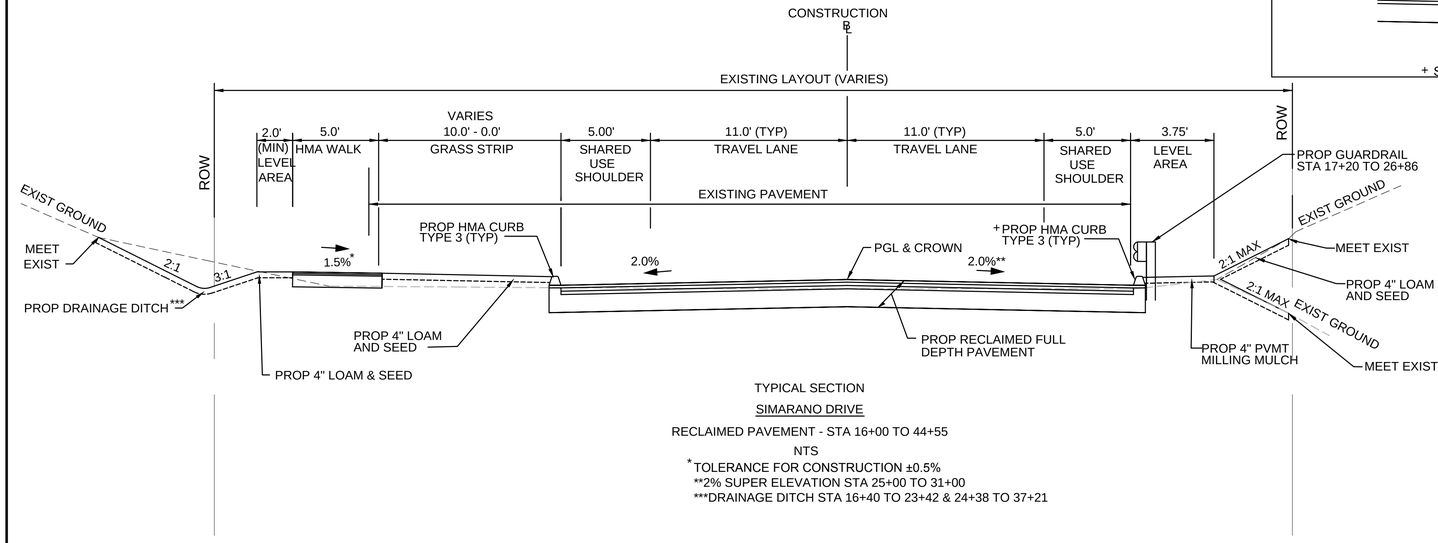
SCALE: 1" = 200'

12477 - TYP.DWG Plotted on 3-Jun-2014 3:39 PM

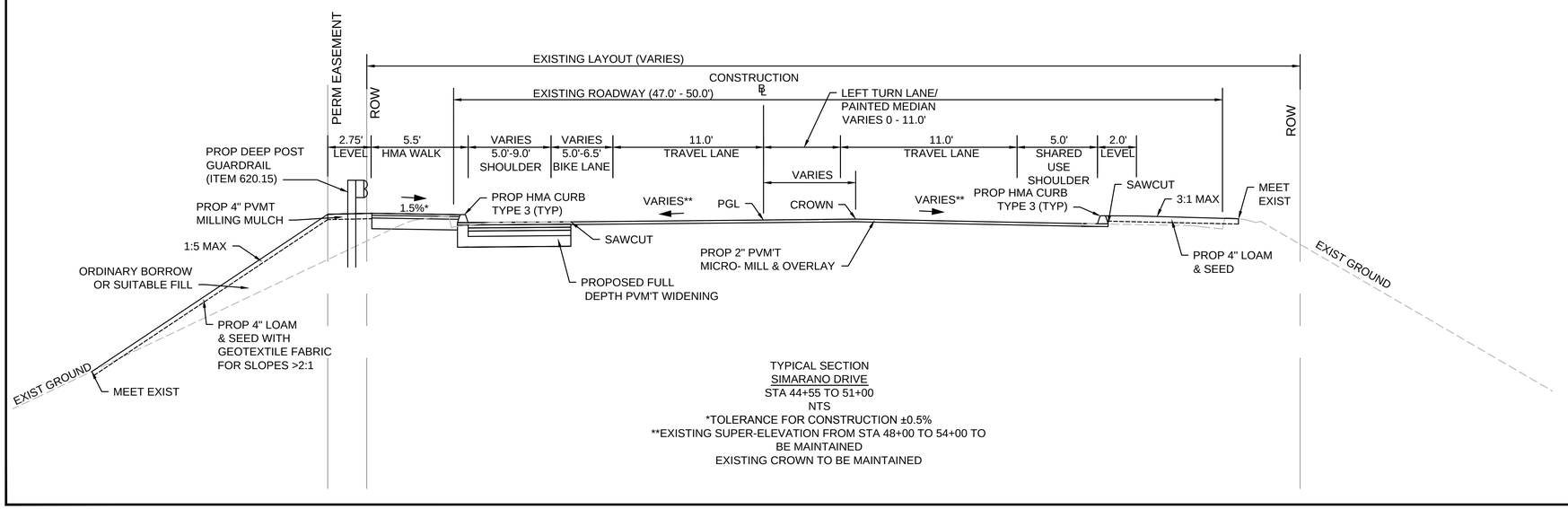


TYPICAL SECTION
AMES STREET
STA 10+20 TO 16+00
NTS
*TOLERANCE FOR CONSTRUCTION ±0.5%
EXISTING CROWN TO BE MAINTAINED





TYPICAL SECTION
SIMARANO DRIVE
RECLAIMED PAVEMENT - STA 16+00 TO 44+55
NTS
*TOLERANCE FOR CONSTRUCTION ±0.5%
**2% SUPER ELEVATION STA 25+00 TO 31+00
***DRAINAGE DITCH STA 16+40 TO 23+42 & 24+38 TO 37+21



TYPICAL SECTION
SIMARANO DRIVE
STA 44+55 TO 51+00
NTS
*TOLERANCE FOR CONSTRUCTION ±0.5%
**EXISTING SUPER-ELEVATION FROM STA 48+00 TO 54+00 TO BE MAINTAINED
EXISTING CROWN TO BE MAINTAINED

PAVEMENT NOTES:

PROPOSED FULL DEPTH PAVEMENT (STA 71+40 TO 77+25)

SURFACE: 4" HOT MIX ASPHALT
(1 ¾" SUPERPAVE SURFACE COURSE - 12.5 (SSC-12.5)
2 ¼" SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC-19.0))

BASE: 2 ½" HOT MIX ASPHALT
SUPERPAVE INTERMEDIATE COURSE -19.0 (SIC-19.0)
AS BASE COURSE

SUBBASE: 4" DENSE GRADED CRUSHED STONE OVER
8" GRAVEL BORROW, TYPE b OR RECLAIMED BASE.

ASPHALT EMULSION FOR TACK COAT (RS-1) AT
0.05 GAL/SY OVER EXISTING PAVEMENT.

PROPOSED RECLAIMED PAVEMENT (RECLAIM 18") (STA 16+00 TO 44+55)

SURFACE: 4" HOT MIX ASPHALT
(1 ¾" SUPERPAVE SURFACE COURSE - 12.5 (SSC-12.5)
2 ¼" SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC-19.0))

BASE: 2 ½" HOT MIX ASPHALT
SUPERPAVE INTERMEDIATE COURSE -19.0 (SIC-19.0)
AS BASE COURSE

SUBBASE: 4" DENSE GRADED CRUSHED STONE

8" RECLAIMED BASE MATERIAL

ASPHALT EMULSION FOR TACK COAT (RS-1) AT
0.05 GAL/SY OVER EXISTING PAVEMENT.

PROPOSED FULL DEPTH PAVEMENT - WIDENING LESS THAN 4' (AS REQUIRED)

SURFACE: 4" HOT MIX ASPHALT
(1 ¾" SUPERPAVE SURFACE COURSE - 12.5 (SSC-12.5)
2 ½" SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC-19.0))

BASE: 6" HIGH EARLY STRENGTH CONCRETE

SUBBASE: 8" GRAVEL BORROW, TYPE b OR RECLAIMED BASE.

ASPHALT EMULSION FOR TACK COAT (RS-1) AT
0.05 GAL/SY OVER EXISTING PAVEMENT.

PROPOSED PAVEMENT MICRO-MILLING & OVERLAY
(STA 10+20 TO 16+00, STA 44+55 TO 57+60, STA 66+62 TO 71+40, STA 77+25 TO 78+66)

SURFACE: 2" HOT MIX ASPHALT
(2" SUPERPAVE SURFACE COURSE - 12.5 (SSC-12.5))

ASPHALT EMULSION FOR TACK COAT (RS-1) AT
0.07 GAL/SY OVER EXISTING PAVEMENT OR MILLED SURFACE.

PAVEMENT MICRO-MILLING 2" DEPTH

PROPOSED CEMENT CONCRETE PAVEMENT/ WHEELCHAIR RAMP

SURFACE: 6" CEMENT CONCRETE
AIR ENTRAINED 4000 PSI, 3/4", 610

FOUNDATION: 8" GRAVEL BORROW, TYPE b OR RECLAIMED BASE

PROPOSED HMA DRIVE

SURFACE: 3 ½" HOT MIX ASPHALT
(1 ½" SUPERPAVE SURFACE COURSE - 9.5 (SSC-9.5))
2" SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC-12.5))

SUBBASE: 8" GRAVEL BORROW TYPE b OR RECLAIMED BASE

PROPOSED HMA WALK

SURFACE: 2 ½" HOT MIX ASPHALT
(1" SUPERPAVE SURFACE COURSE - 9.5 (SSC-9.5))
1 ½ " SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC-12.5))

SUBBASE: 8" GRAVEL BORROW TYPE b OR RECLAIMED BASE

MARLBOROUGH
SIMARANO DRIVE
TYPICAL SECTIONS & PAVEMENT NOTES
SHEET 5 OF 142

REFER TO SHEET 4 FOR PAVEMENT NOTES

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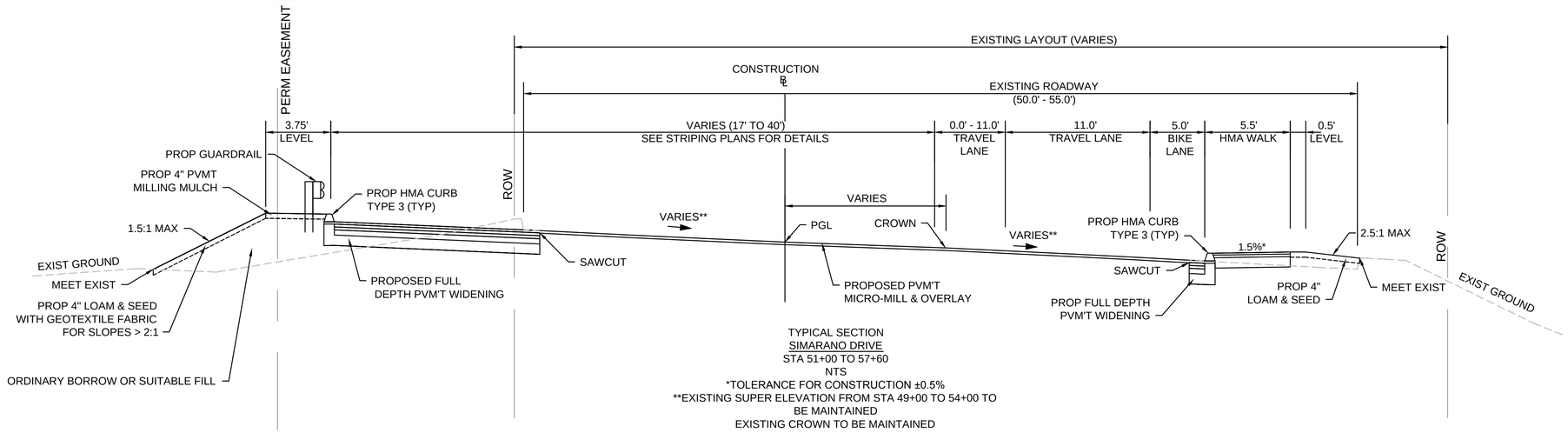
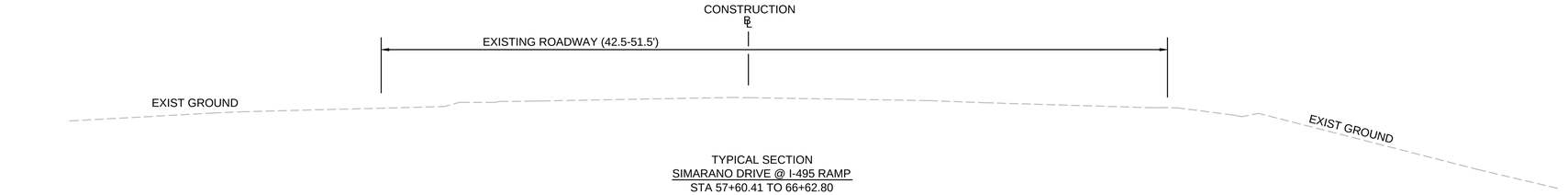
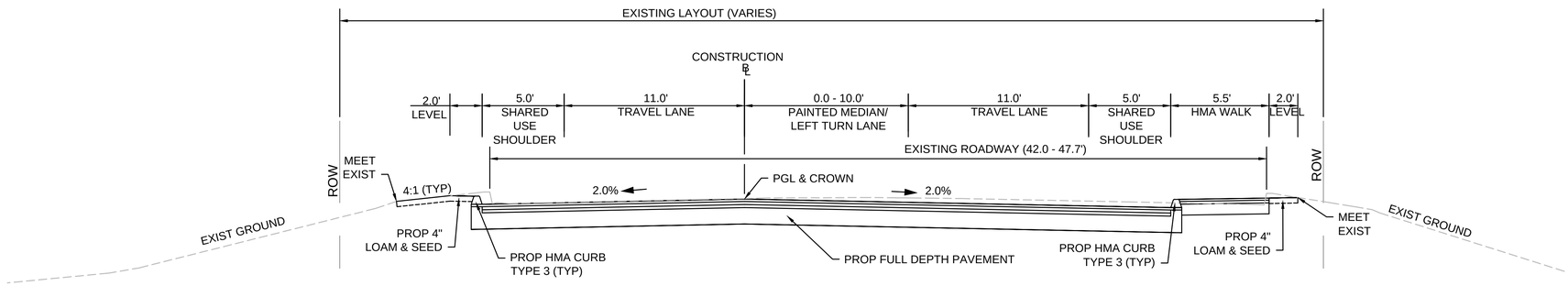


TYPICAL SECTION
SIMARANO DRIVE
STA 51+00 TO 57+60
NTS
*TOLERANCE FOR CONSTRUCTION ±0.5%
**EXISTING SUPER ELEVATION FROM STA 49+00 TO 54+00 TO BE MAINTAINED
EXISTING CROWN TO BE MAINTAINED



TYPICAL SECTION
SIMARANO DRIVE @ I-495 RAMP
STA 57+60.41 TO 66+62.80
NO WORK IS TO BE PERFORMED BETWEEN THESE LIMITS
NTS



TYPICAL SECTION
SIMARANO DRIVE
STA 71+40 TO 77+25
NTS
*TOLERANCE FOR CONSTRUCTION ±0.5%

MARLBOROUGH
SIMARANO DRIVE
TYPICAL SECTIONS & PAVEMENT NOTES
SHEET 6 OF 142

REFER TO SHEET 4 FOR PAVEMENT NOTES

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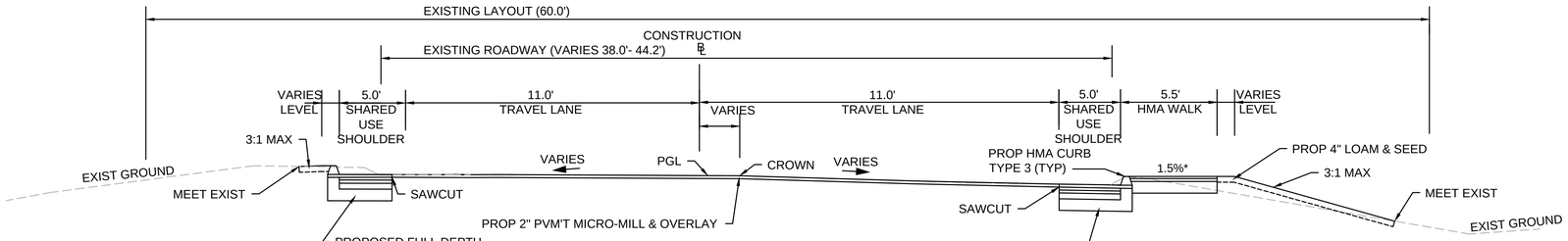
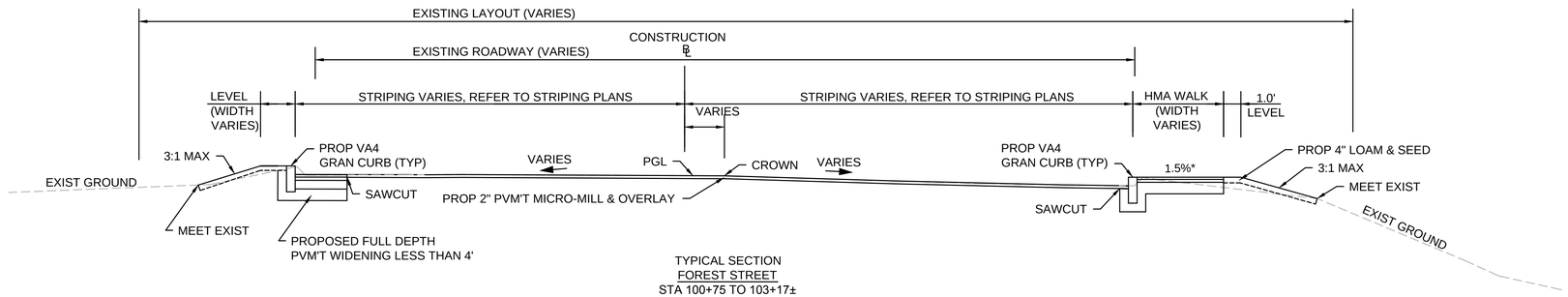
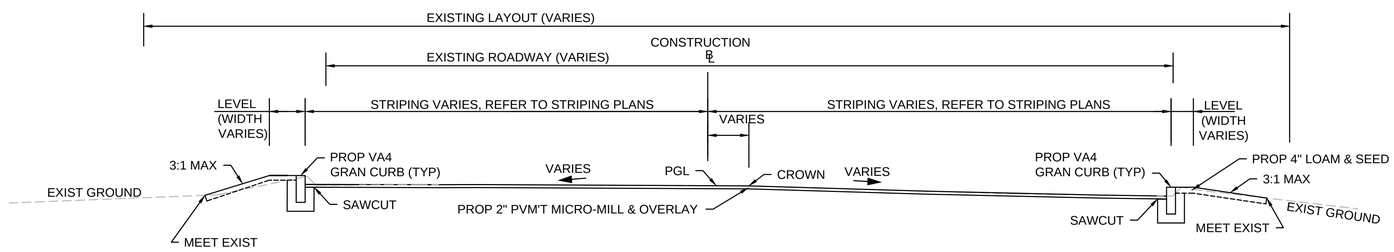


TYPICAL SECTION
SIMARANO DRIVE
STA 66+62.80 TO 71+40± & 77+25 TO 78+66±
NTS
*TOLERANCE FOR CONSTRUCTION ±0.5%
EXISTING CROWN TO BE MAINTAINED



TYPICAL SECTION
FOREST STREET
STA 100+75 TO 103+17±
NTS
*TOLERANCE FOR CONSTRUCTION ±0.5%
EXISTING CROWN TO BE MAINTAINED

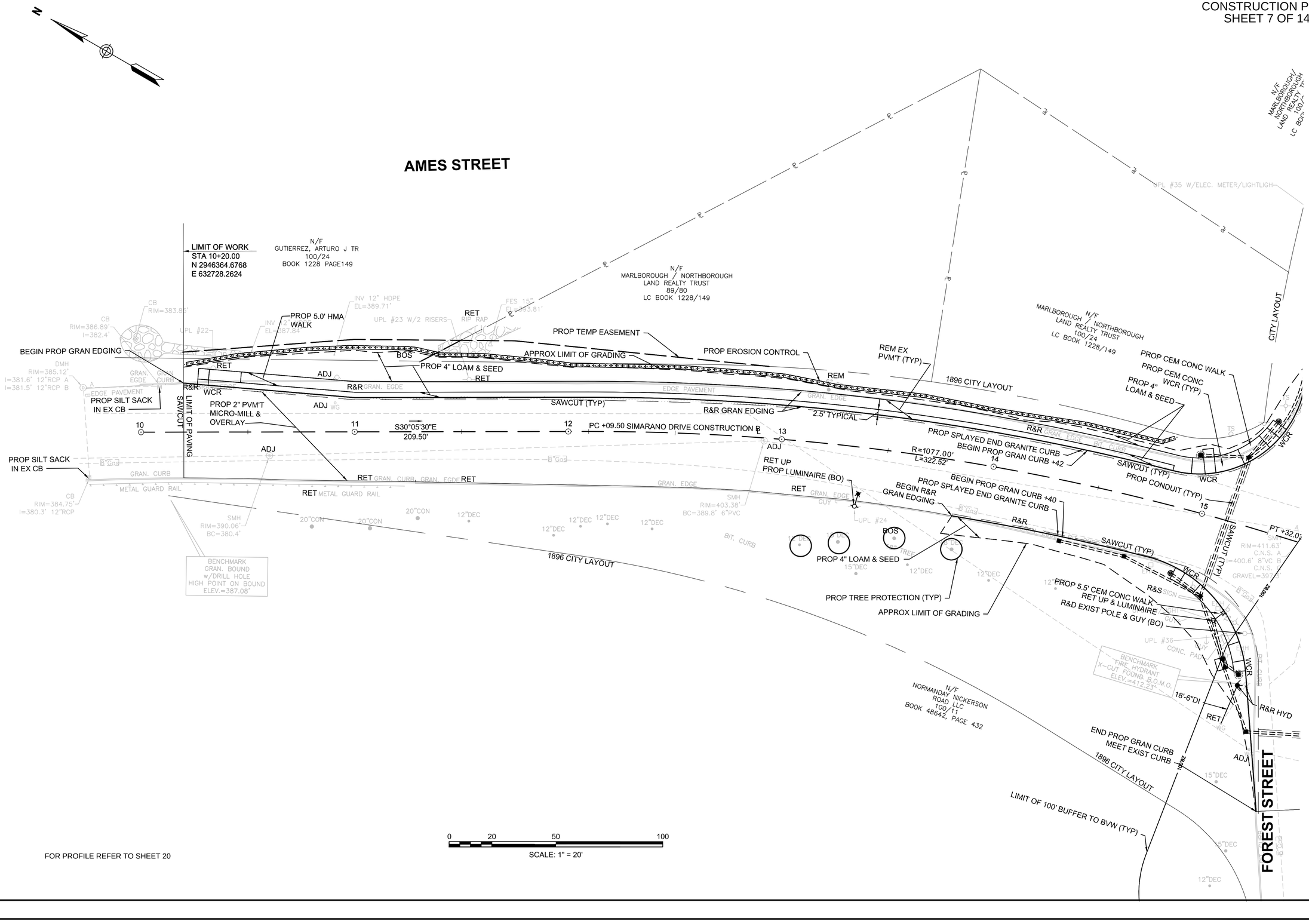


TYPICAL SECTION
CEDAR HILL STREET
STA 201+32 TO 203+99±
NTS
EXISTING CROWN TO BE MAINTAINED

HIGHWAY GUARD DETAILS	TRAFFIC SIGNAL CONDUIT	WATER SUPPLY ALTERATIONS	DRAINAGE DETAILS
NONE	SEE SHEET 46	SEE BELOW	SEE BELOW

MARLBOROUGH
SIMARANO DRIVE
CONSTRUCTION PLANS
SHEET 7 OF 142

12477-GEN.DWG Plotted on 4-Jun-2014 3:44 PM



12477-GEN.DWG Plotted on 4-Jun-2014 3:45 PM

HIGHWAY GUARD DETAILS
DEEP POST HWY GUARD
STA 16+69 TO 26+86 RT
TANGENT END 16+69 RT

TRAFFIC SIGNAL CONDUIT
SEE SHEET 47

WATER SUPPLY ALTERATIONS
SEE BELOW

DRAINAGE DETAILS
SEE BELOW

DRAINAGE STRUCTURE DATA

NO.	TYPE	STATION	RIM ELEV.	INV IN ELEV.	INV OUT ELEV.	REMARKS
1	CBCI	16+50.0 LT	411.06	–	406.73	
2	CIT	16+40.9 LT	410.98	406.65 (1) 406.60 (3)	406.50	CIT CB TO DMH REMODEL
3	DI	16+40.7 38.5' LT	409.85	–	406.70	
4	CBCI	16+34.00 RT	410.20	–	405.80	
5	CIT	16+43 RT	410.18	405.70 (4) 405.10 (6)	404.6 (EX)*	CIT CB TO DMH REMODEL
6	DMH	16+42.20 15.5' RT	410.80	405.30 (2) 406.40 (7)	405.20	
7	DMH	20+31.00 7.0' RT	426.24	421.90 (8) 421.90 (9)	421.80	
8	CBCI	20+50.00 LT	426.73	–	422.40	
9	CBCI	20+50.00 RT	426.73	–	422.40	

* OUTFALL INVERT MAY BE HIGHER – ELEVATION OF 404.68

FOREST STREET
SIMARANO DRIVE
CITY LAYOUT
1896 CITY LAYOUT
FOREST STREET CONSTRUCTION B
R=610.00'
L=373.28'
CONT. ON SHEET 7
CONT. ON SHEET 9
LIMIT OF PAVING
SAWCUT
END PROP GRAN CURB MEET EXIST CURB +86
SAWCUT MEET EXIST
PROP 4" LOAM & SEED
PROP HMA WALK (WIDTH VARIES)
PROP DRAINAGE EASEMENT
PROP BOUND (TYP)
END GRAN CURB BEGIN HMA CURB BEGIN 6.0' HMA WALK +20
PROP 6.0' HMA WALK
PROP CEM CONC WALK
PROP CEM CONC WCR (TYP)
PROP 4" LOAM & SEED
SAWCUT (TYP)
PROP CONDUIT (TYP)
PROP 2" PVM'T MICRO- MILL & OVERLAY
LIMIT OF PVM'T MICRO- MILLING & OVERLAY
PT +32.03
PC +58.16
5'-12" RCP, 2.00%
13'-12" RCP, MEET EXIST SLOPE
6'-12" RCP, 1.33%
41'-12"RCP, 2.93%
R&R UP (BO)
PROP LUMINAIRE (BO)
CIT & REMOD
CBCI
DMH
6'-12"RCP, 1.67%
REMOD CIT
6'-12" RCP, 1.67%
BEGIN PROP HIGHWAY GUARD +69 (SEE NOTE 1)
PROP RECLAIMED FULL DEPTH PVM'T
PROP MODIFIED HMA BERM
PROP HMA CURB TYPE 3 (TYP)
S12°56'00"E 499.01'
SIMARANO DRIVE CONSTRUCTION B
BEGIN 5.0' HMA WALK +74
388'-12" RCP, 4.30%
52'-18" RCP, MEET EXIST SLOPE
PROP PVM'T MILLING MULCH UNDER GUARDRAIL (TYP)
R&D EXIST GUARDRAIL
LIMIT OF 20' BUFFER TO BVW (TYP)
PROP EROSION CONTROL BARRIER
LIMIT OF BVW
END GRAN CURB BEGIN HMA BERM +40
PROP CLEARING & GRUBBING STA 19+00 TO 23+45 LT
PROP PERM EASEMENT
APPROX LIMIT OF GRADING
PROP DRAINAGE DITCH STA 16+40 TO 23+42
PROP BOUND (TYP)
LIMIT OF 100' BUFFER TO BVW (TYP)
RET UP PROP LUMINAIRE (BO)
REM EX PVM'T (TYP)
R&S EXIST F&G
PROP DI F&G
PROP SILT SACK
PROP HMA SURFACE
PROP 5.0' HMA WALK
PROP 4" LOAM & SEED
PROP DRAINAGE DITCH STA 16+40 TO 23+42
PROP TEMP EASEMENT
CBCI
25'-12" RCP, 2.00%
DMH
16'-12" RCP, 3.12%
CBCI
CONNECT PIPE TO EXIST CMP
APPROX LIMIT OF GRADING
PROP DEEP POST HIGHWAY GUARD (SEE NOTE 1)
METAL GUARD RAIL R&D
1896 CITY LAYOUT
PROP PVM'T MILLING MULCH UNDER GUARDRAIL (TYP)
PROP 5.5' CEM CONC WALK
RET UP & LUMINAIRE
R&D EXIST POLE & GUY (BO)
R&R HYD
18'-6"DI
PROP SILT SACK IN EX CB
N55°44'51"E 96.56'
END PROP GRAN CURB MEET EXIST CURB
BEGIN PROP GRAN CURB MEET EXIST CURB
LIMIT OF 100' BUFFER TO BVW (TYP)
FOR PROFILE REFER TO SHEET 21
#35 W/ELEC. METER/LIGHTLIGH
MARINORLAND R, LC BOOK
EDGE PAVE
BENCHMARK FIRE HYDRANT X-CUT FOUND B.O.M.O. ELEV.=412.23'
N/F ATLANTIC – MARLBOROUGH REALTY TRUST 101/2 BOOK 57382/127
N/F NEIL FOSSILE 100/10 BOOK 17427, PAGE 241
N/F HINES GLOBAL REIT MARLBOROUGH CAMPUS II 100/19 BOOK 57756, PAGE 1
WF#2-117
WF#2-118
WF#2-119
WF#2-120
WF#2-121
WF#2-122
CB RIM=410.18' I=404.6' 12"CMP
INV 12" CMP EL=404.68
CB RIM=408.05' I=405.1'
DMH RIM=408.46' I=404.9' 10"RCP I=403.0' 12"RCP A I=402.9' 12"RCP B
SMH RIM=408.22' BC=397.9' 6"PVC
UPL #36
UPL #37
UPL #21 W/2 RISERS
GUY
CONC. PAD
GRAVEL=397.7
C.N.S. A
C.N.S. B
400.6' 8"VC B
RIM=411.63'

NOTE:
1. PROPOSED DEEP POST GUARDRAIL FROM STA 16+69 TO 26+86 IS LOCATED IN CLOSE RANGE OF AN EXISTING 8" GAS LINE. THE CONTRACTOR SHALL LOCATE THE GAS LINE PRIOR TO INSTALLING GUARDRAIL. THE EXISTING GAS LINE CROSSES THE PROPOSED GUARDRAIL IN MULTIPLE LOCATIONS. MASSDOT DETAIL E 401.12.0 SHALL BE USED IN LOCATIONS WHERE THE GUARDRAIL CROSSES THE EXISTING GAS LINE.

0 20 50 100
SCALE: 1" = 20'

12477-GEN.DWG Plotted on 4-Jun-2014 3:45 PM

HIGHWAY GUARD DETAILS
DEEP POST HWY GUARD
STA 16+69 TO 26+86 RT
TANGENT END 26+49 RT

TRAFFIC SIGNAL CONDUIT
SEE SHEET 49

WATER SUPPLY ALTERATIONS
SEE BELOW

DRAINAGE DETAILS
SEE BELOW

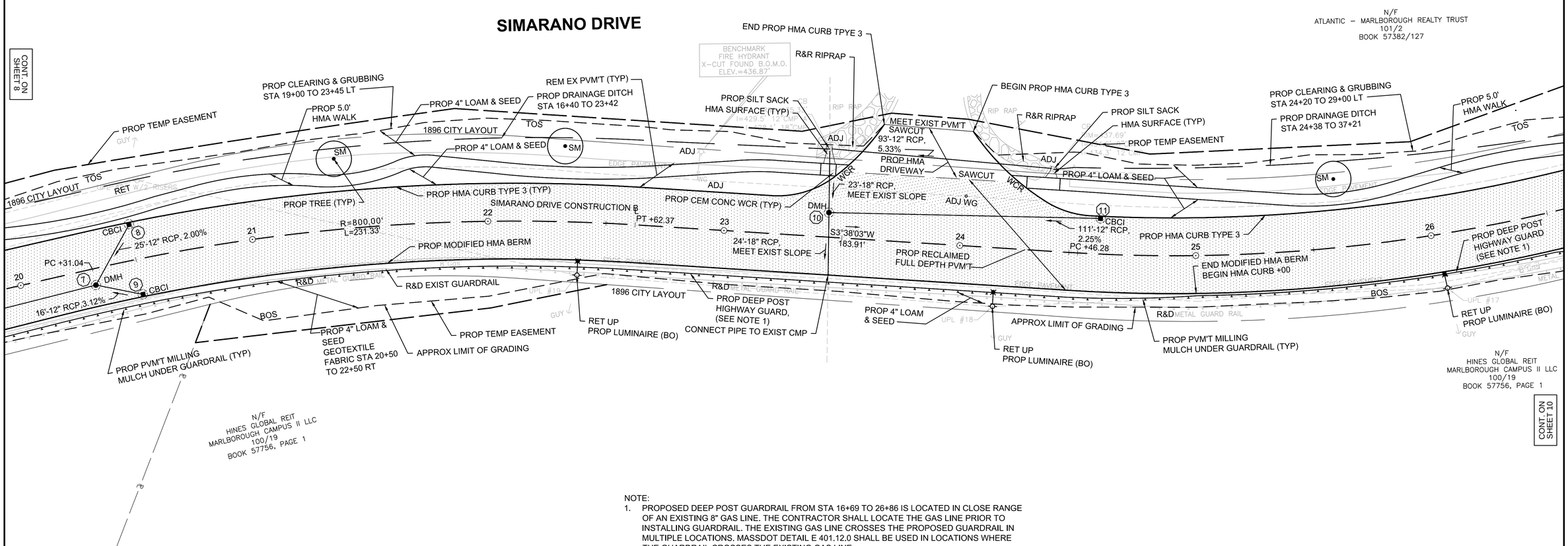
N

DRAINAGE STRUCTURE DATA

NO.	TYPE	STATION	RIM ELEV.	INV IN ELEV.	INV OUT ELEV.	REMARKS
⟨10⟩	DMH	23+44.00, 10.38' LT	436.31	427.60 EX DI 432.00 ⟨11⟩	427.50	
⟨11⟩	CBCI	24+59.00 LT	439.85	–	435.50	

PLANTING SCHEDULE

QTY	KEY	BOTANICAL NAME	COMMON NAME	SIZE
3	SM	ACER SACCHARUM MARSH	MAPLE – SUGAR	2–2 1/2"



NOTE:
1. PROPOSED DEEP POST GUARDRAIL FROM STA 16+69 TO 26+86 IS LOCATED IN CLOSE RANGE OF AN EXISTING 8" GAS LINE. THE CONTRACTOR SHALL LOCATE THE GAS LINE PRIOR TO INSTALLING GUARDRAIL. THE EXISTING GAS LINE CROSSES THE PROPOSED GUARDRAIL IN MULTIPLE LOCATIONS. MASSDOT DETAIL E 401.12.0 SHALL BE USED IN LOCATIONS WHERE THE GUARDRAIL CROSSES THE EXISTING GAS LINE.

0 20 50 100
SCALE: 1" = 20'

FOR PROFILE REFER TO SHEET 22

12477-GEN.DWG Plotted on 4-Jun-2014 3:45 PM

HIGHWAY GUARD DETAILS
DEEP POST HWY GUARD
STA 16+69 TO 26+86 RT
TANGENT END 26+49 RT

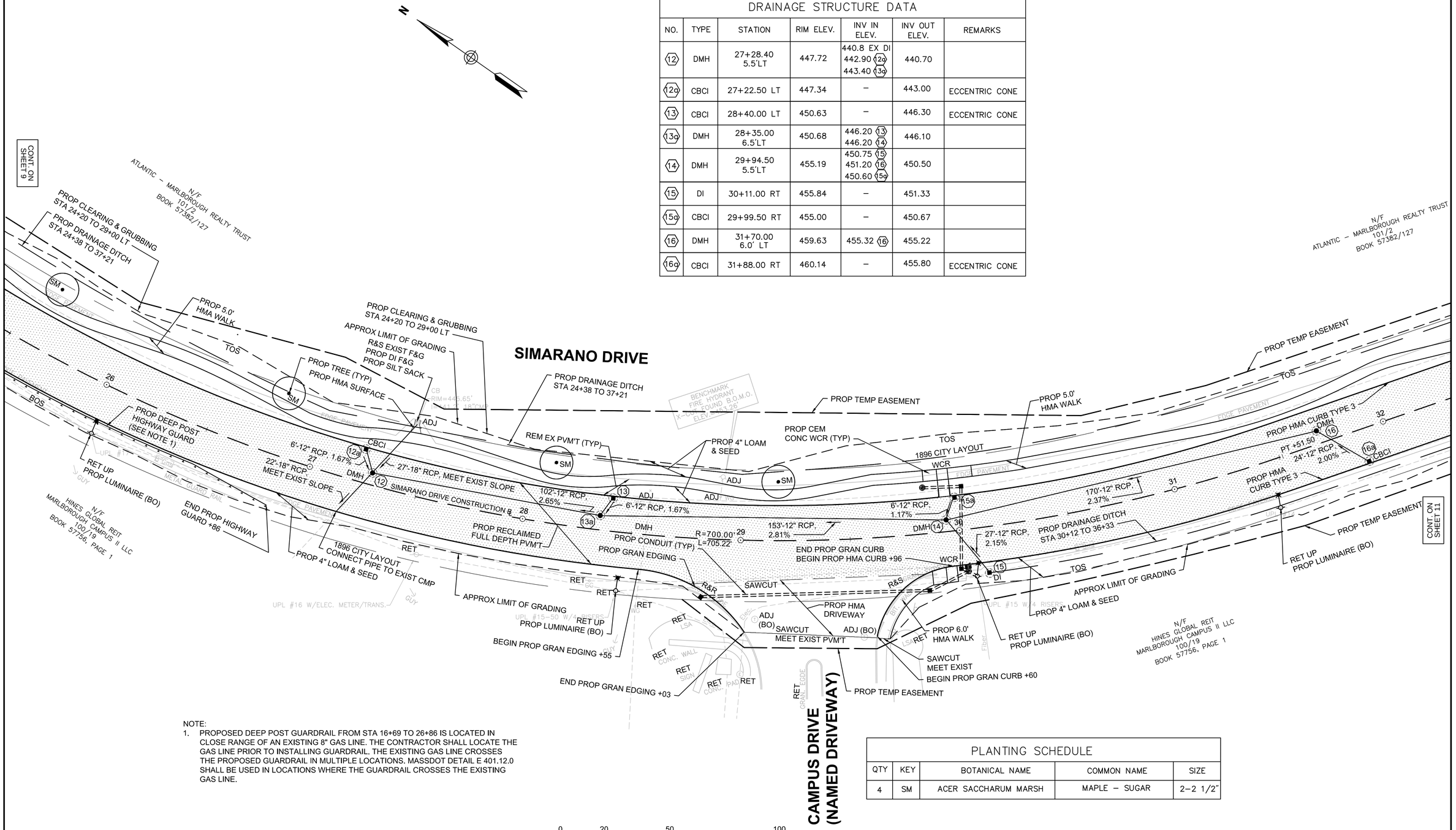
TRAFFIC SIGNAL CONDUIT
SEE SHEET 50

WATER SUPPLY ALTERATIONS
NONE

DRAINAGE DETAILS
SEE BELOW

DRAINAGE STRUCTURE DATA

NO.	TYPE	STATION	RIM ELEV.	INV IN ELEV.	INV OUT ELEV.	REMARKS
12	DMH	27+28.40 5.5'LT	447.72	440.8 EX DI 442.90 (12a) 443.40 (13a)	440.70	
12a	CBCI	27+22.50 LT	447.34	–	443.00	ECCENTRIC CONE
13	CBCI	28+40.00 LT	450.63	–	446.30	ECCENTRIC CONE
13a	DMH	28+35.00 6.5'LT	450.68	446.20 (13) 446.20 (14)	446.10	
14	DMH	29+94.50 5.5'LT	455.19	450.75 (15) 451.20 (16) 450.60 (15a)	450.50	
15	DI	30+11.00 RT	455.84	–	451.33	
15a	CBCI	29+99.50 RT	455.00	–	450.67	
16	DMH	31+70.00 6.0' LT	459.63	455.32 (16)	455.22	
16a	CBCI	31+88.00 RT	460.14	–	455.80	ECCENTRIC CONE



NOTE:
1. PROPOSED DEEP POST GUARDRAIL FROM STA 16+69 TO 26+86 IS LOCATED IN CLOSE RANGE OF AN EXISTING 8" GAS LINE. THE CONTRACTOR SHALL LOCATE THE GAS LINE PRIOR TO INSTALLING GUARDRAIL. THE EXISTING GAS LINE CROSSES THE PROPOSED GUARDRAIL IN MULTIPLE LOCATIONS. MASSDOT DETAIL E 401.12.0 SHALL BE USED IN LOCATIONS WHERE THE GUARDRAIL CROSSES THE EXISTING GAS LINE.

PLANTING SCHEDULE

QTY	KEY	BOTANICAL NAME	COMMON NAME	SIZE
4	SM	ACER SACCHARUM MARSH	MAPLE – SUGAR	2–2 1/2"

0 20 50 100
SCALE: 1" = 20'

FOR PROFILE REFER TO SHEET 23

12477-GEN.DWG Plotted on 4-Jun-2014 3:45 PM

HIGHWAY GUARD DETAILS	TRAFFIC SIGNAL CONDUIT	WATER SUPPLY ALTERATIONS	DRAINAGE DETAILS
NONE	SEE SHEET 51	SEE BELOW	SEE BELOW

N

DRAINAGE STRUCTURE DATA

NO.	TYPE	STATION	RIM ELEV.	INV IN ELEV.	INV OUT ELEV.	REMARKS
17	CBCI	36+80 RT	455.03	–	450.80	
18	CBCI	36+90 LT	454.54	450.60 (17)	450.60	ECCENTRIC CONE
18a	EX DI	37+18 LT	453.00	450.40 (18)	450.35 (EX)	

PLANTING SCHEDULE

QTY	KEY	BOTANICAL NAME	COMMON NAME	SIZE
3	SM	ACER SACCHARUM MARSH	MAPLE – SUGAR	2–2 1/2"

CONT. ON SHEET 10

N/F
ATLANTIC – MARLBOROUGH REALTY TRUST
101/2
BOOK 57382/127

SIMARANO DRIVE

PROP TEMP EASEMENT
REM EX PVM'T (TYP)
APPROX LIMIT OF GRADING
PROP DRAINAGE DITCH STA 24+38 TO 37+21
PROP TEMP EASEMENT
TOS
EDGE PAVEMENT
SM
ADJ
ADJ
ADJ (BO)
1896 CITY LAYOUT
TOS
PROP 4" LOAM & SEED
SM
PROP 5.0' HMA WALK
PROP HMA CURB TYPE 3
DMH
PT +51.50
24'-12" RCP, 2.00%
16
32
33
34
SIMARANO DRIVE CONSTRUCTION ℄
35
36
37
PROP HMA CURB TYPE 3
16a
CBCI
PROP RECLAIMED FULL DEPTH PVM'T
PROP 4" LOAM & SEED
PROP HMA CURB TYPE 3
17
CBCI
28'-12" RCP, 0.71%
PROP RECLAIMED FULL DEPTH PVM'T
RET
TOS
RET
EDGE PAVEMENT
UPL #12 W/TRANS
REM EX PVM'T (TYP)
1896 CITY LAYOUT
UPL #11 W/UTILITY BOX
PROP TEMP EASEMENT
PROP DRAINAGE DITCH STA 30+12 TO 34+50
APPROX LIMIT OF GRADING
END PROP DRAINAGE DITCH STA 34+50 MEET EXIST DITCH
RET UP PROP LUMINAIRE (BO)
RET UP PROP LUMINAIRE (BO)

N/F
ATLANTIC – MARLBOROUGH REALTY TRUST
101/2
BOOK 57382/127

FUTURE CURB (BO)
FUTURE ISLAND (BO)
MEET EXIST PVM'T SAWCUT
EXIST DRIVEWAY CURB
END PROP HMA CURB TYPE 3
INV 15" CMP EL=450.35±
PROP SILT SACK
RET
DPCR
PROP HMA SURFACE
18a
EX DI
ADJ
PROP HMA DRIVEWAY
ADJ (BO)
30'-12" RCP, 0.67%
SWALE
WCR
SAWCUT
97'-15" RCP, MEET EXIST SLOPE
CBCI
18

BAY DRIVE (NAMED DRIVEWAY)

N/F
HINES GLOBAL REIT
MARLBOROUGH CAMPUS II LLC
100/19
BOOK 57756, PAGE 1

CONT. ON SHEET 12

0 20 50 100
SCALE: 1" = 20'

FOR PROFILE REFER TO SHEET 24

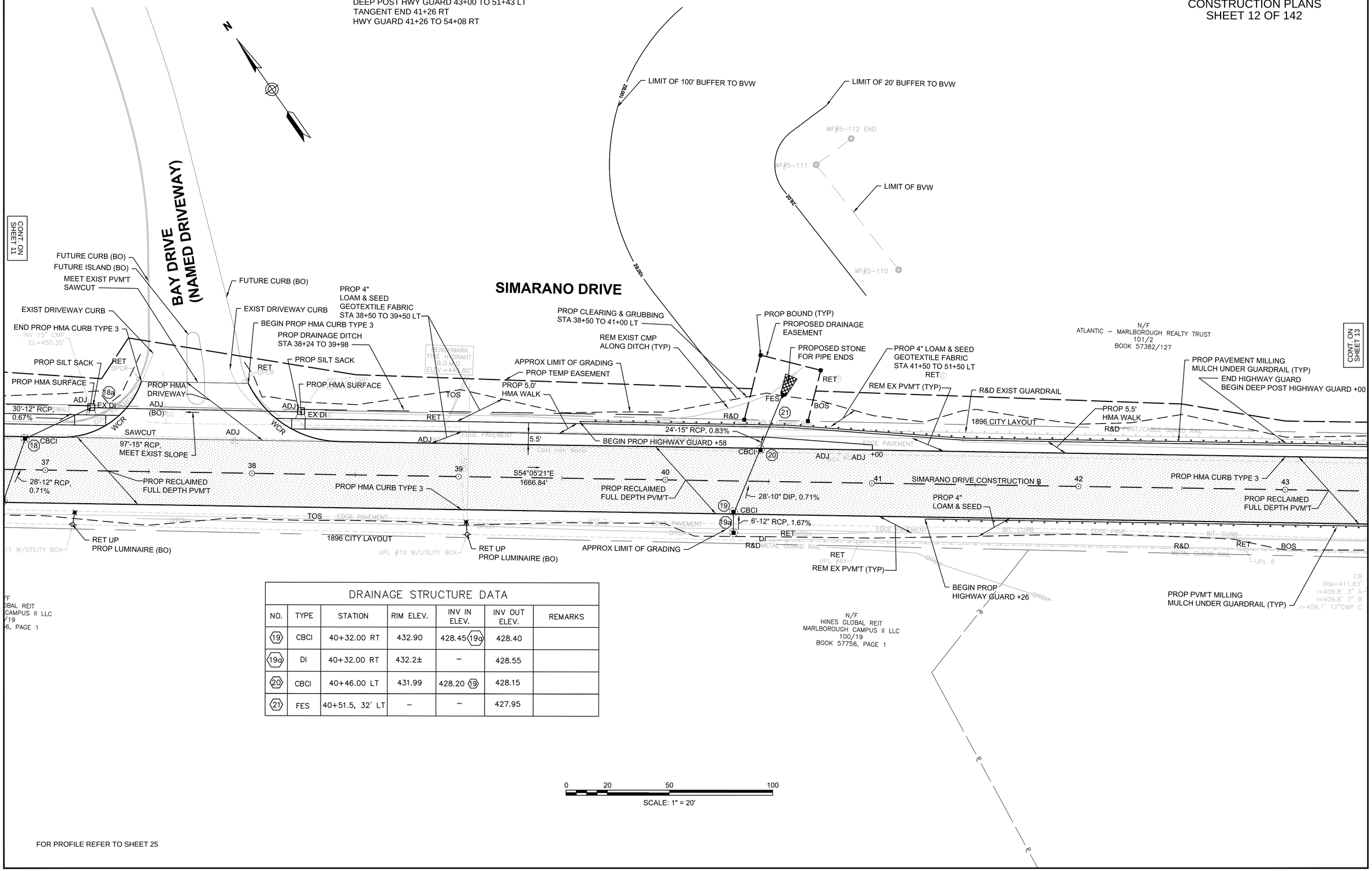
HIGHWAY GUARD DETAILS
TANGENT END 39+58 LT
HWY GUARD 39+58 TO 43+00 LT
DEEP POST HWY GUARD 43+00 TO 51+43 LT
TANGENT END 41+26 RT
HWY GUARD 41+26 TO 54+08 RT

TRAFFIC SIGNAL CONDUIT
SEE SHEET52

WATER SUPPLY ALTERATIONS
NONE

DRAINAGE DETAILS
SEE BELOW

MARLBOROUGH
SIMARANO DRIVE
CONSTRUCTION PLANS
SHEET 12 OF 142



DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV IN ELEV.	INV OUT ELEV.	REMARKS
19	CBCI	40+32.00 RT	432.90	428.45 19a	428.40	
19a	DI	40+32.00 RT	432.2±	–	428.55	
20	CBCI	40+46.00 LT	431.99	428.20 19	428.15	
21	FES	40+51.5, 32' LT	–	–	427.95	

FOR PROFILE REFER TO SHEET 25

12477-GEN.DWG Plotted on 4-Jun-2014 3:46 PM

12477-GEN.DWG Plotted on 4-Jun-2014 3:46 PM

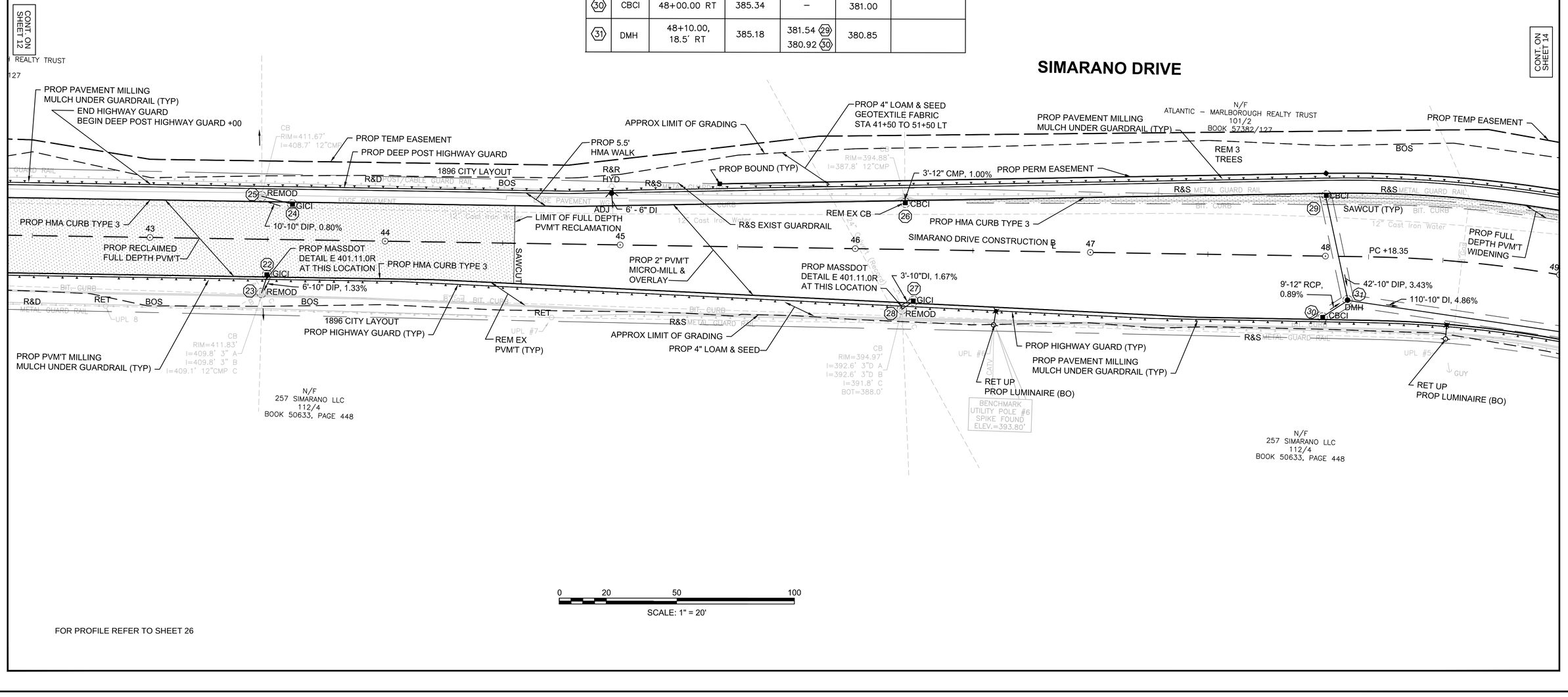
HIGHWAY GUARD DETAILS
HWY GUARD 39+58 TO 43+00 LT
DEEP POST HWY GUARD 43+00 TO 51+43 LT
TANGENT END 42+40 RT
HWY GUARD 42+40 TO 54+08 RT

TRAFFIC SIGNAL CONDUIT
SEE SHEET 53

WATER SUPPLY ALTERATIONS
NONE

DRAINAGE DETAILS
SEE BELOW

DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV IN ELEV.	INV OUT ELEV.	REMARKS
22	GICI	43+50.00 RT	411.83	–	409.33	
23	EX CB	43+47.30, 23.0' RT	412.60	409.25 22	409.17	REMOD
24	GICI	43+60.00 LT	411.51	–	409.0	
25	EX CB	43+48.00, 18.5' LT	412.50	408.92 24	408.7	REMOD
26	CBCI	46+21.00 LT	394.96	–	387.8 EX	REM EX CB
27	GICI	46+25.00 RT	394.77	–	391.95	
28	EX CB	46+20.5, 25.5' RT	412.50	391.90 27	391.8 EX	REMOD
29	CBCI	48+00.00 LT	385.86	–	382.36	
30	CBCI	48+00.00 RT	385.34	–	381.00	
31	DMH	48+10.00, 18.5' RT	385.18	381.54 29 380.92 30	380.85	



FOR PROFILE REFER TO SHEET 26

12477-GEN.DWG Plotted on 4-Jun-2014 3:46 PM

HIGHWAY GUARD DETAILS

HWY GUARD 39+58 TO 43+00 LT
DEEP POST HWY GUARD 43+00 TO 51+43 LT
TERMINAL END 51+43 LT
DEEP POST HWY GUARD 52+10 TO 54+24 LT
TERMINAL END 52+10 LT
TANGENT END 53+88 LT
HWY GUARD 42+40 TO 54+08 RT
TERMINAL END 54+08 RT

TRAFFIC SIGNAL CONDUIT

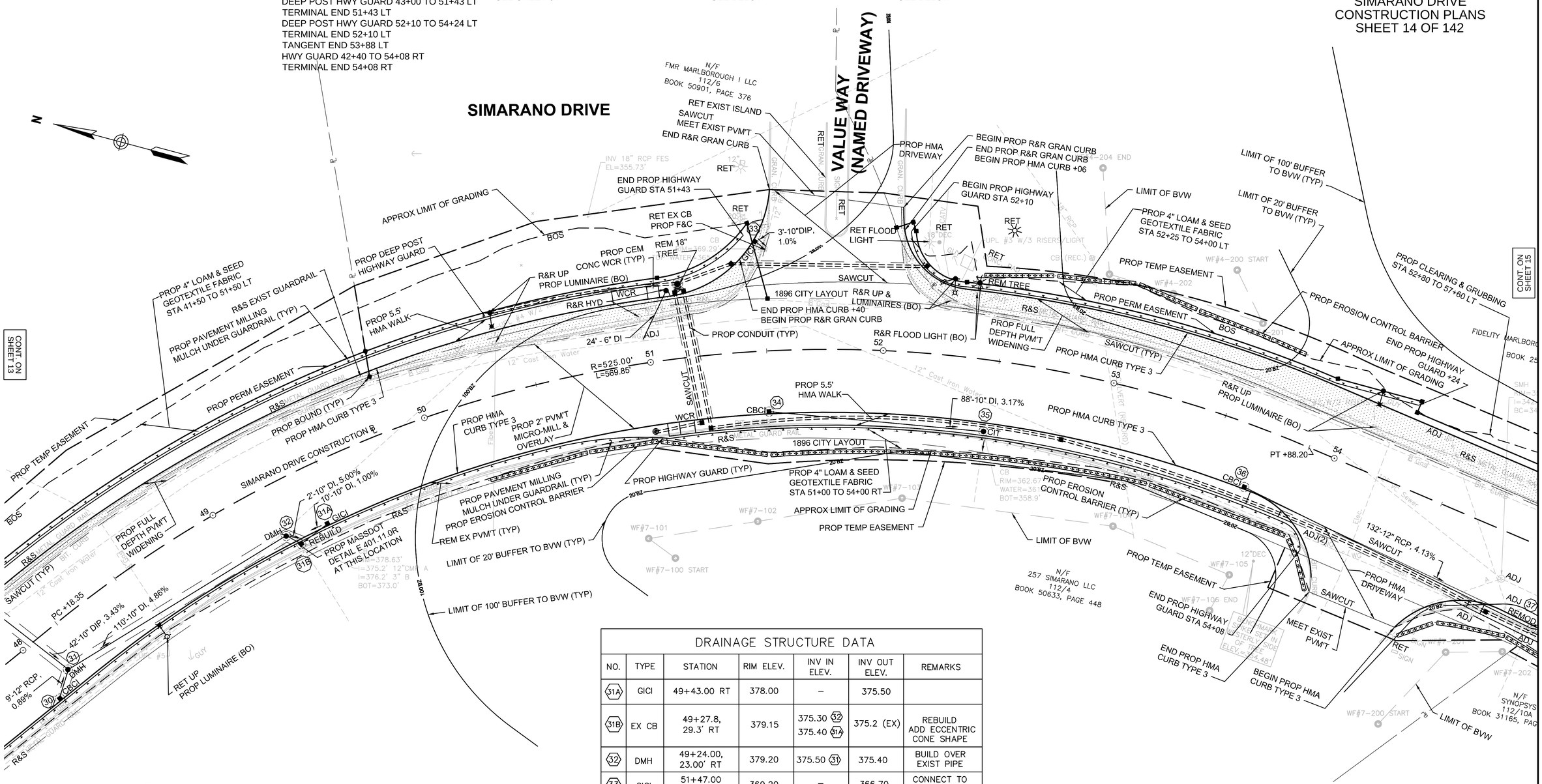
SEE SHEET 54

WATER SUPPLY ALTERATIONS

SEE BELOW

DRAINAGE DETAILS

SEE BELOW



DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV IN ELEV.	INV OUT ELEV.	REMARKS
31A	GICI	49+43.00 RT	378.00	–	375.50	
31B	EX CB	49+27.8, 29.3' RT	379.15	375.30 (32) 375.40 (31A)	375.2 (EX)	REBUILD ADD ECCENTRIC CONE SHAPE
32	DMH	49+24.00, 23.00' RT	379.20	375.50 (31)	375.40	BUILD OVER EXIST PIPE
33	GICI	51+47.00 46.70' LT	369.20	–	366.70	CONNECT TO EX CB
34	CBCI	51+50.00 RT	367.62	–	363.29	
35	CIT	52+47.3, 30.7' RT	363.46	360.50* (34)	ASSUMED* 360.0 (EX)	CIT CB TO DMH REMODEL
36	CBCI	53+68.5 RT	357.28	–	352.95	

0 20 50 100
SCALE: 1" = 20'

12477-GEN.DWG Plotted on 4-Jun-2014 3:46 PM

HIGHWAY GUARD DETAILS

HWY GUARD 52+10 TO 54+24 LT
TANGENT END 53+88 LT
HWY GUARD 42+40 TO 54+08 RT
TERMINAL END 54+08 RT

TRAFFIC SIGNAL CONDUIT

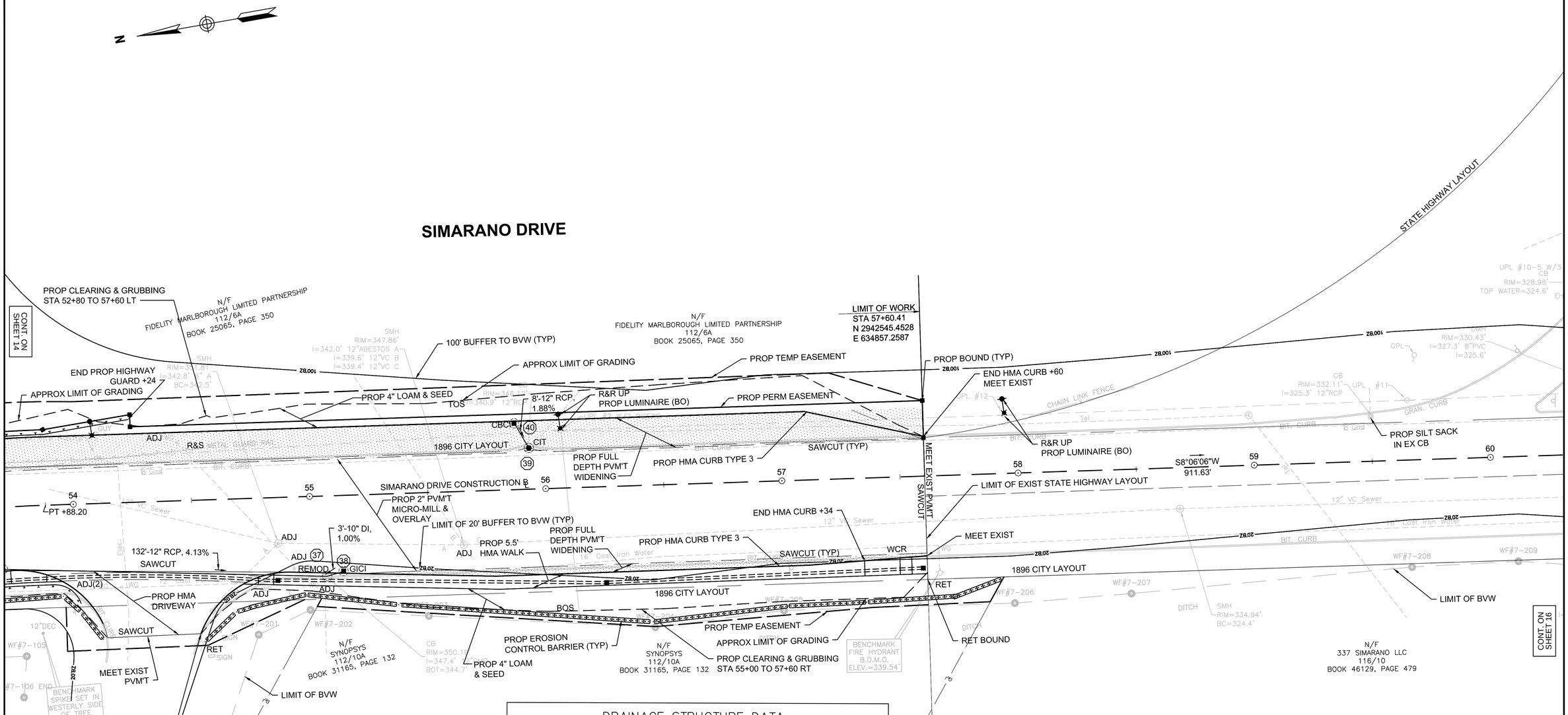
SEE SHEET 56

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

SEE BELOW



DRAINAGE STRUCTURE DATA

NO.	TYPE	STATION	RIM ELEV.	INV IN ELEV.	INV OUT ELEV.	REMARKS
37	EX CB	55+06, 34.1' RT	350.90	347.47 (38) 347.50 (36)	347.4 (EX)	REMODEL
38	GICI	55+13.30 RT	350.00	–	347.50	
39	CIT	55+93, 17.3 LT	346.12	341.40 (40)	340.9 (EX)	
40	CBCI	55+87.56 LT	346.35	–	341.55	

NOTE:
NO WORK SHALL BE PERFORMED WITHIN STATE HIGHWAY LAYOUT

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

SEE SHEET 57

WATER SUPPLY ALTERATIONS

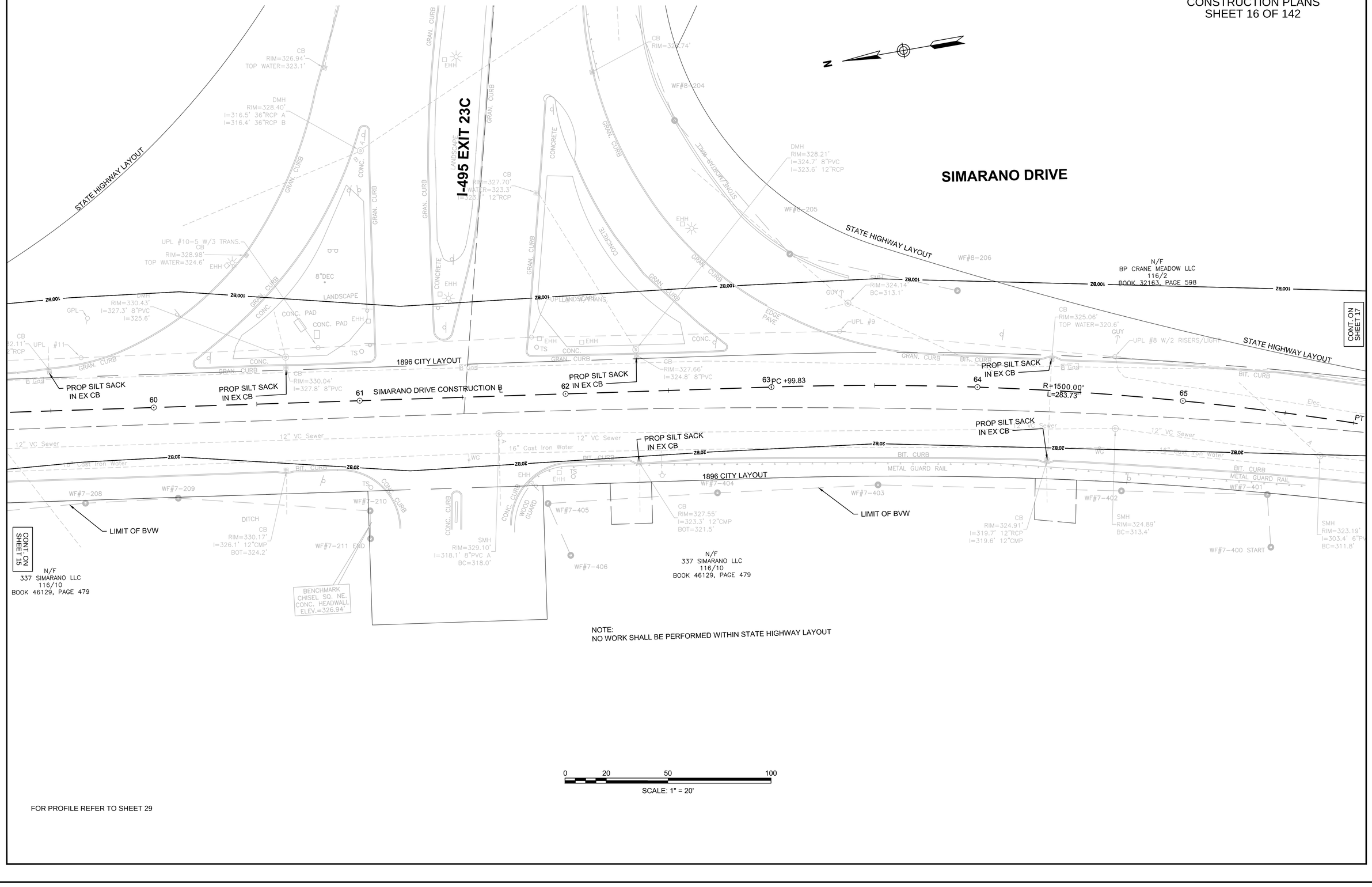
NONE

DRAINAGE DETAILS

NONE

MARLBOROUGH
SIMARANO DRIVE
CONSTRUCTION PLANS
SHEET 16 OF 142

12477-GEN.DWG Plotted on 4-Jun-2014 3:47 PM



NOTE:
NO WORK SHALL BE PERFORMED WITHIN STATE HIGHWAY LAYOUT

FOR PROFILE REFER TO SHEET 29

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

SEE SHEET 58

WATER SUPPLY ALTERATIONS

SEE BELOW

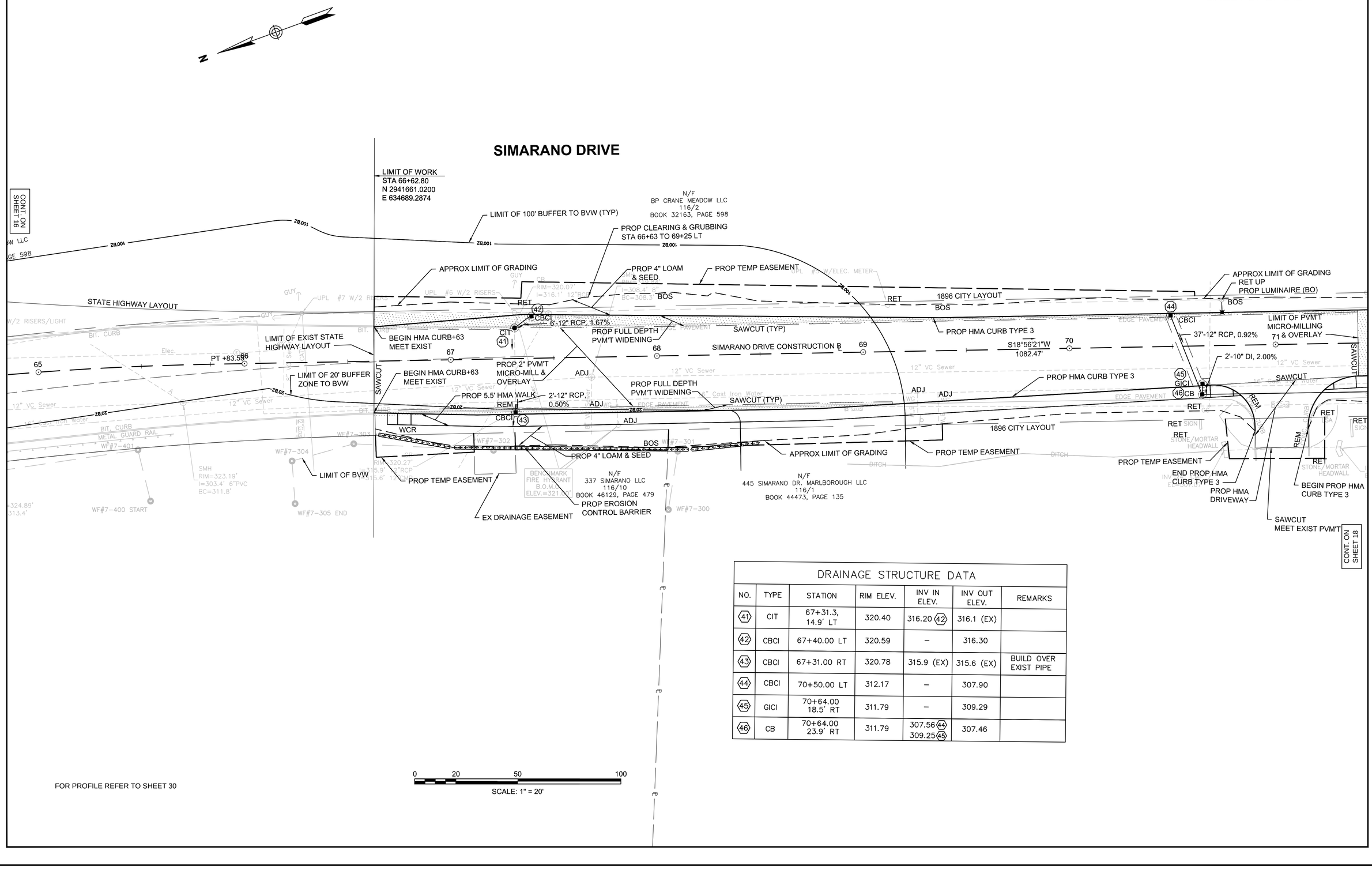
DRAINAGE DETAILS

SEE BELOW

MARLBOROUGH
SIMARANO DRIVE
CONSTRUCTION PLANS
SHEET 17 OF 142

12477-GEN.DWG Plotted on 4-Jun-2014 4:09 PM

SIMARANO DRIVE



DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV IN ELEV.	INV OUT ELEV.	REMARKS
41	CIT	67+31.3, 14.9' LT	320.40	316.20 (42)	316.1 (EX)	
42	CBCI	67+40.00 LT	320.59	–	316.30	
43	CBCI	67+31.00 RT	320.78	315.9 (EX)	315.6 (EX)	BUILD OVER EXIST PIPE
44	CBCI	70+50.00 LT	312.17	–	307.90	
45	GICI	70+64.00 18.5' RT	311.79	–	309.29	
46	CB	70+64.00 23.9' RT	311.79	307.56 (44) 309.25 (45)	307.46	

FOR PROFILE REFER TO SHEET 30

0 20 50 100

SCALE: 1" = 20'

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

SEE SHEET 59

WATER SUPPLY ALTERATIONS

NONE

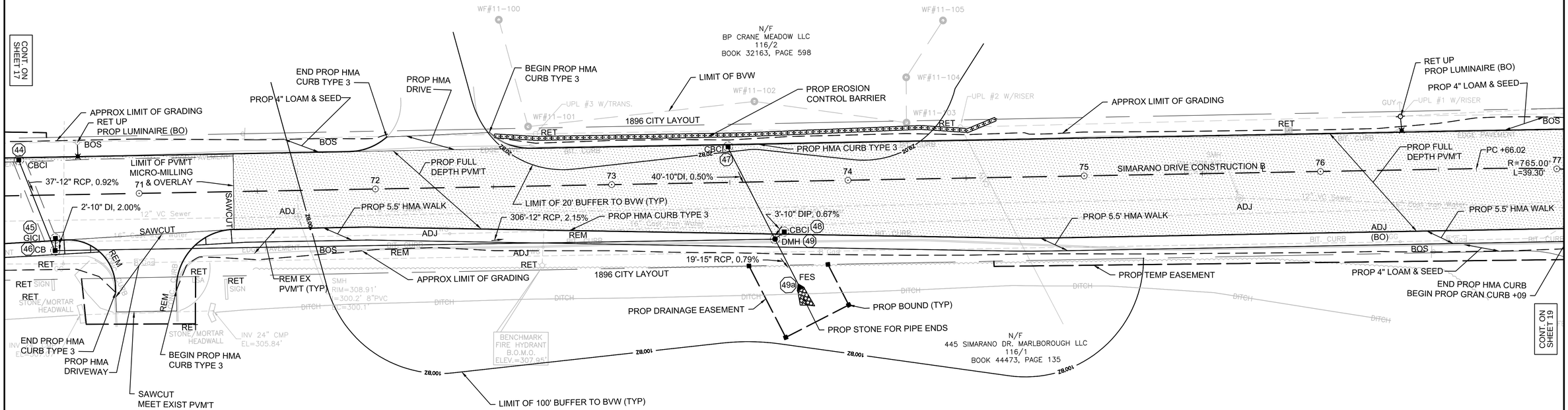
DRAINAGE DETAILS

SEE BELOW

MARLBOROUGH
SIMARANO DRIVE
CONSTRUCTION PLANS
SHEET 18 OF 142

12477-GEN.DWG Plotted on 4-Jun-2014 4:12 PM

SIMARANO DRIVE



DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV IN ELEV.	INV OUT ELEV.	REMARKS
44	CBCI	70+50.00 LT	312.17	–	307.84	
45	GICI	70+64.00 18.5' RT	311.79	–	309.29	
46	CB	70+64.00 23.9' RT	312.36	307.56 (44) 309.25 (45)	307.46	
47	CBCI	73+50.00 LT	304.11	–	300.95	
48	CBCI	73+73.00 21.2' RT	303.74	–	300.84	ECCENTRIC CONE
49	CB	73+68.00 24.2' RT	304.05	300.75 (47) 300.82 (48) 300.89 (46)	300.75	6' DIAMETER
49a	FES	73+78.00 43.5' RT	–	–	300.60	

0 20 50 100

SCALE: 1" = 20'

FOR PROFILE REFER TO SHEET 31

N/F
445 SIMARANO DR. MARLBOROUGH LLC
116/1
BOOK 44473, PAGE 135

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

SEE SHEET 60

WATER SUPPLY ALTERATIONS

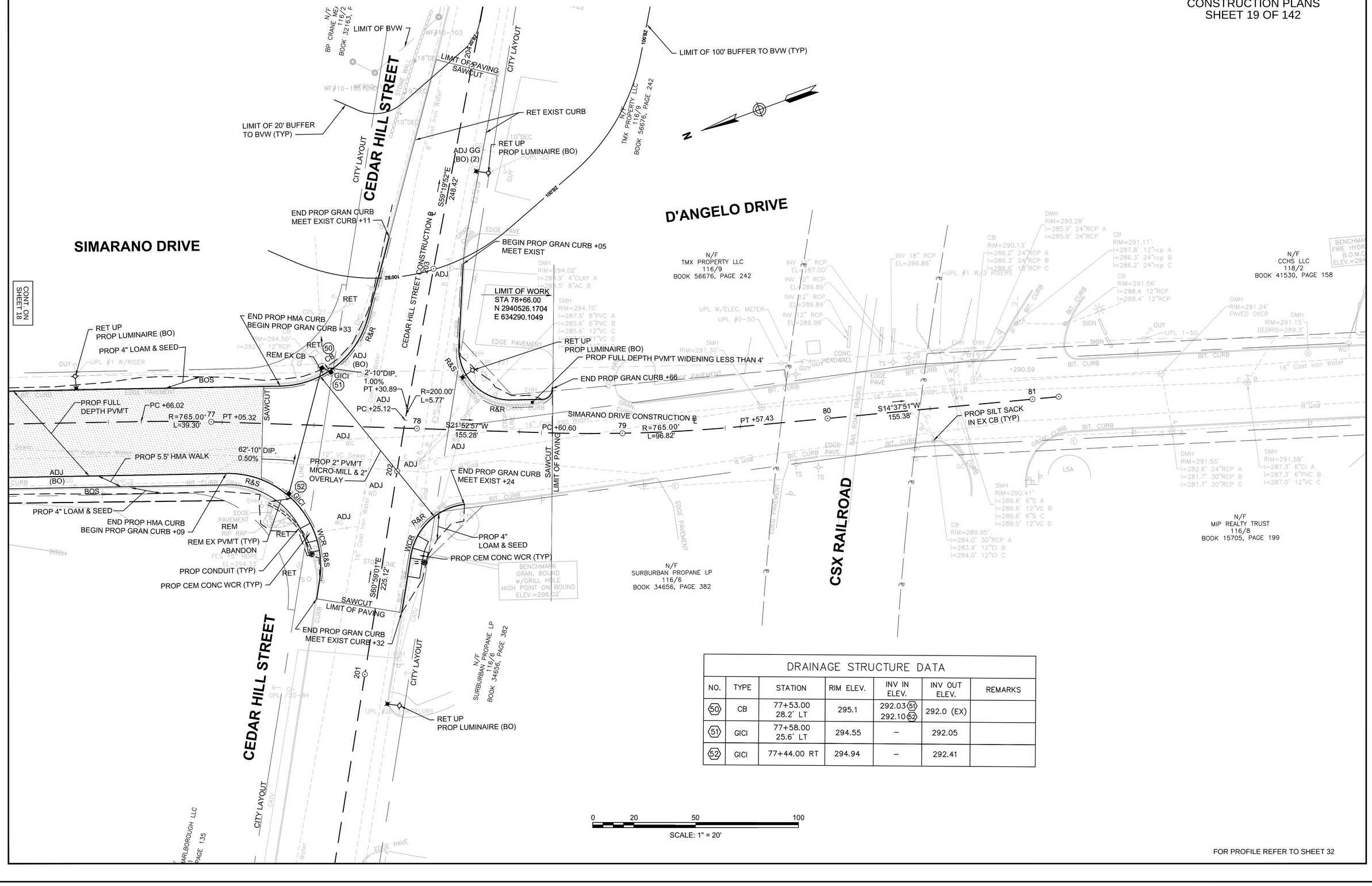
NONE

DRAINAGE DETAILS

SEE BELOW

MARLBOROUGH
SIMARANO DRIVE
CONSTRUCTION PLANS
SHEET 19 OF 142

12477-GEN.DWG Plotted on 4-Jun-2014 4:15 PM



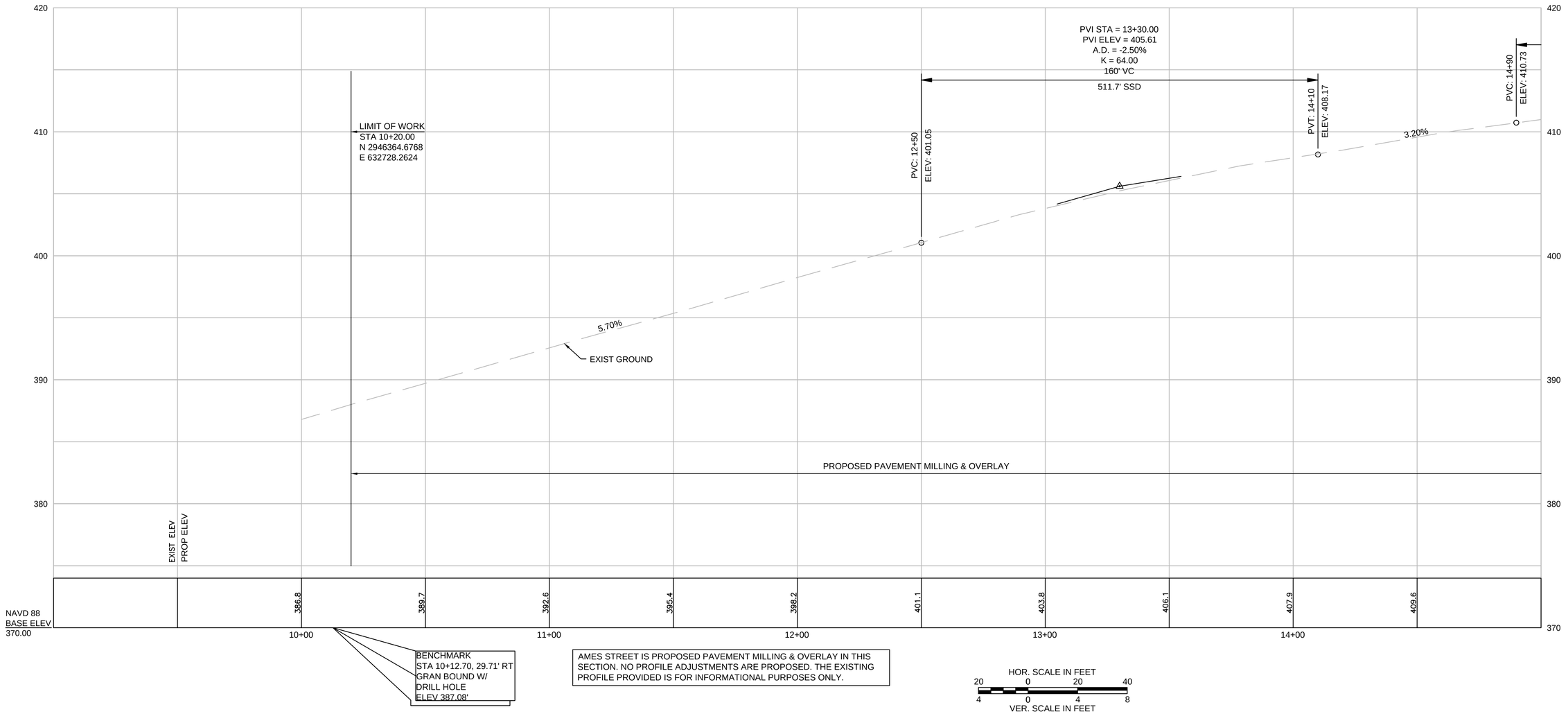
DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV IN ELEV.	INV OUT ELEV.	REMARKS
50	CB	77+53.00 28.2' LT	295.1	292.03 (51) 292.10 (52)	292.0 (EX)	
51	GICI	77+58.00 25.6' LT	294.55	–	292.05	
52	GICI	77+44.00 RT	294.94	–	292.41	

FOR PROFILE REFER TO SHEET 32

MARLBOROUGH
SIMARANO DRIVE
PROFILES
SHEET 20 OF 142

12477 - PROF.DWG Plotted on 4-Jun-2014 2:52 PM

AMES STREET



BENCHMARK
STA 10+12.70, 29.71' RT
GRAN BOUND W/
DRILL HOLE
ELEV 387.08'

AMES STREET IS PROPOSED PAVEMENT MILLING & OVERLAY IN THIS SECTION. NO PROFILE ADJUSTMENTS ARE PROPOSED. THE EXISTING PROFILE PROVIDED IS FOR INFORMATIONAL PURPOSES ONLY.

HOR. SCALE IN FEET
20 0 20 40
4 0 4 8
VER. SCALE IN FEET

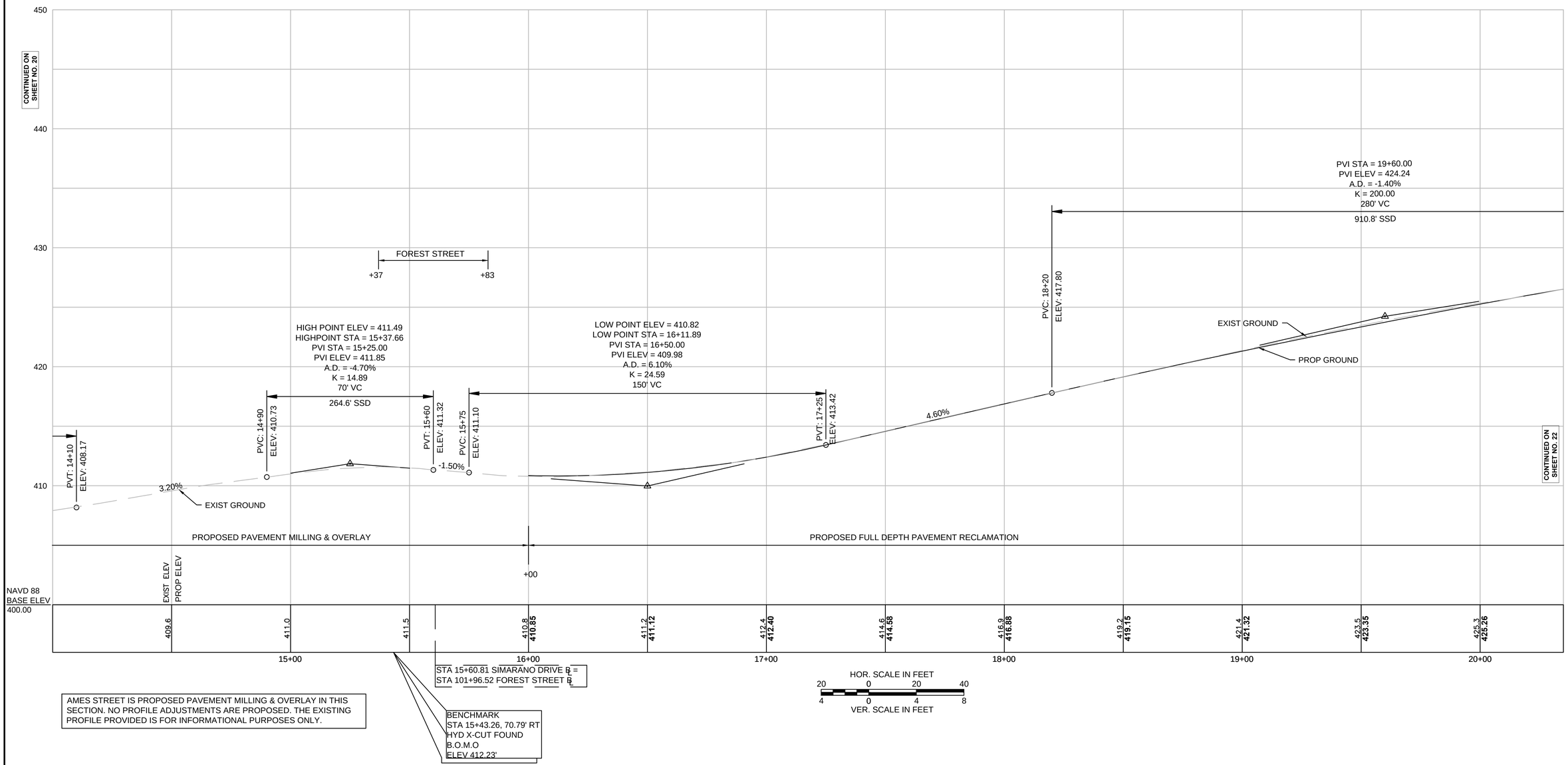
FOR CONSTRUCTION PLAN REFER TO SHEET 7

MARLBOROUGH
SIMARANO DRIVE
PROFILES
SHEET 21 OF 142

12477 - PROF.DWG Plotted on 4-Jun-2014 2:52 PM

SIMARANO DRIVE

AMES STREET



STA 15+60.81 SIMARANO DRIVE Ɛ =
STA 101+96.52 FOREST STREET Ɛ

HOR. SCALE IN FEET
20 0 20 40
VER. SCALE IN FEET
4 0 4 8

AMES STREET IS PROPOSED PAVEMENT MILLING & OVERLAY IN THIS SECTION. NO PROFILE ADJUSTMENTS ARE PROPOSED. THE EXISTING PROFILE PROVIDED IS FOR INFORMATIONAL PURPOSES ONLY.

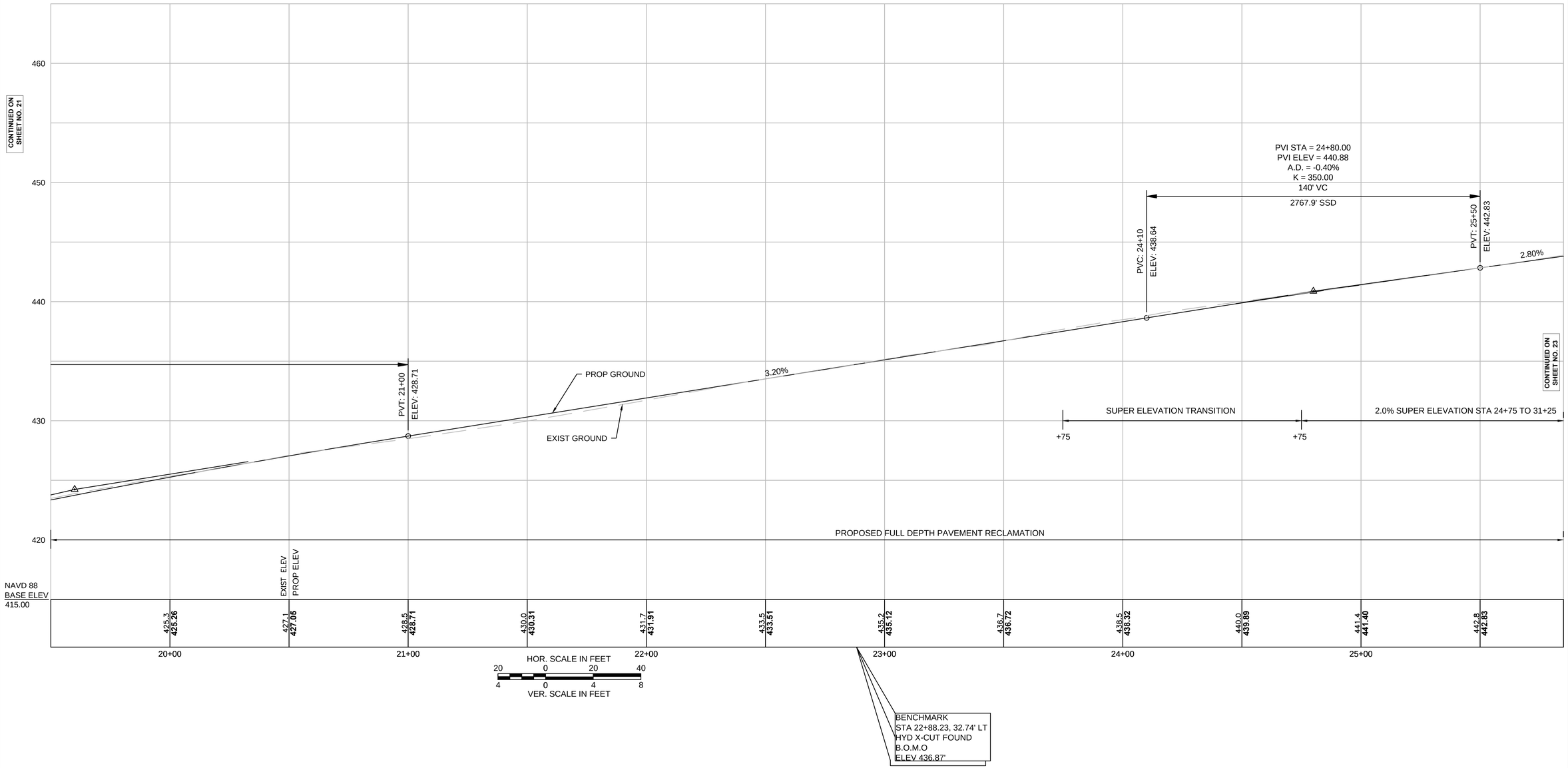
BENCHMARK
STA 15+43.26, 70.79' RT
HYD X-CUT FOUND
B.O.M.O
ELEV 412.23'

FOR CONSTRUCTION PLANS REFER TO SHEET 8

MARLBOROUGH
SIMARANO DRIVE
PROFILES
SHEET 22 OF 142

12477 - PROF.DWG Plotted on 4-Jun-2014 2:52 PM

SIMARANO DRIVE

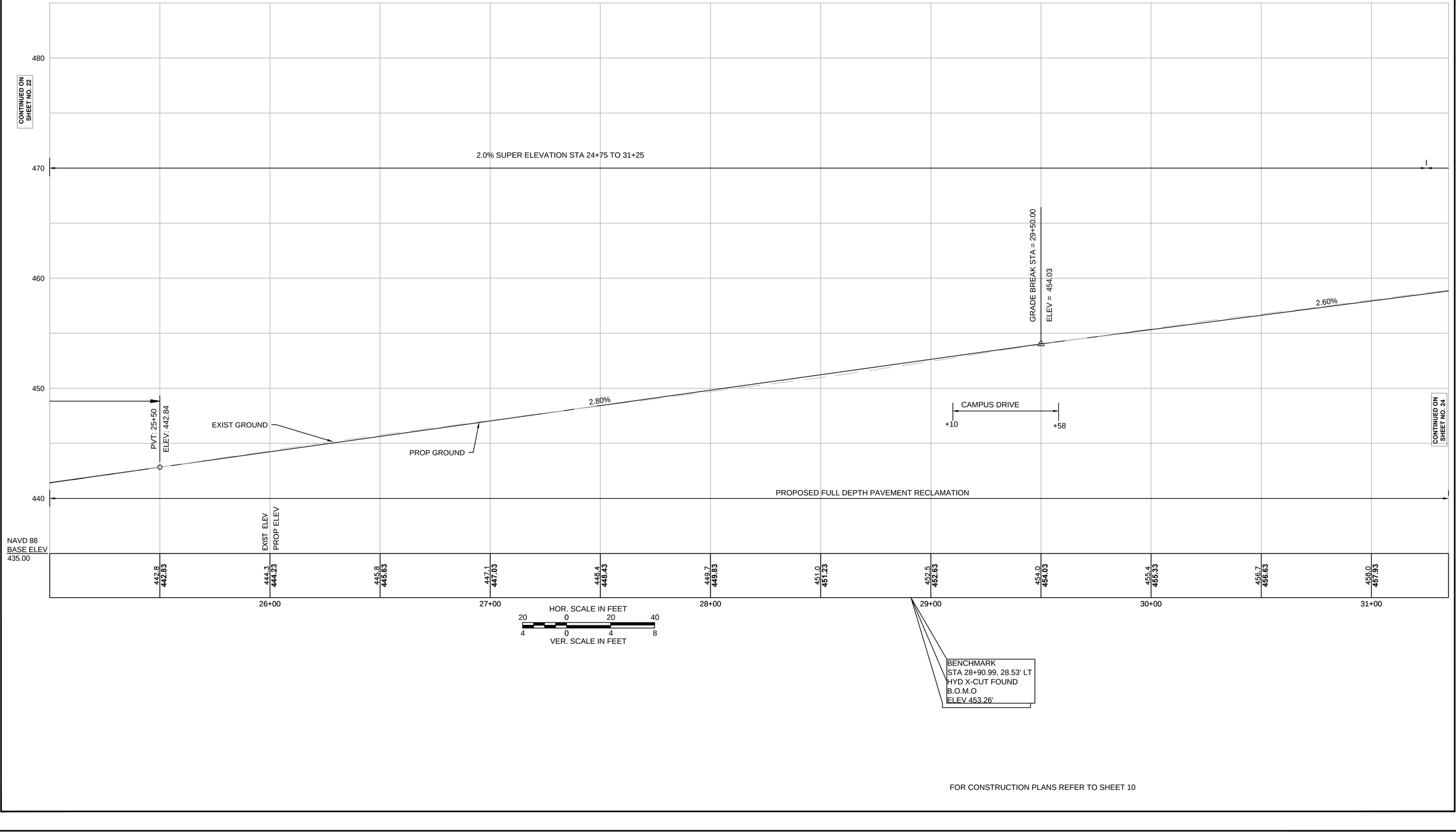


FOR CONSTRUCTION PLANS REFER TO SHEET 9

MARLBOROUGH
SIMARANO DRIVE
PROFILES
SHEET 23 OF 142

12477 - PROF.DWG Plotted on 4-Jun-2014 2:52 PM

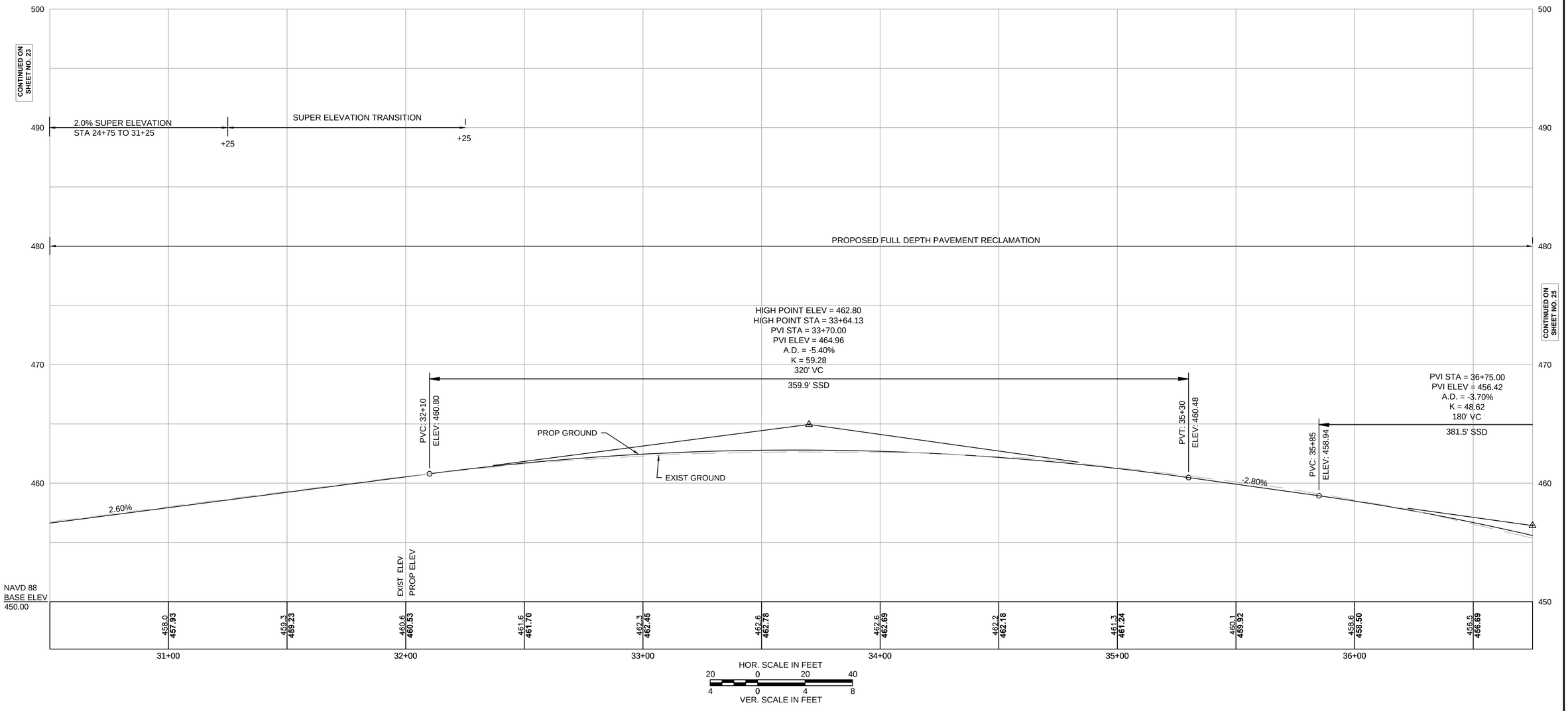
SIMARANO DRIVE



FOR CONSTRUCTION PLANS REFER TO SHEET 10

12477 - PROF.DWG Plotted on 4-Jun-2014 2:53 PM

SIMARANO DRIVE

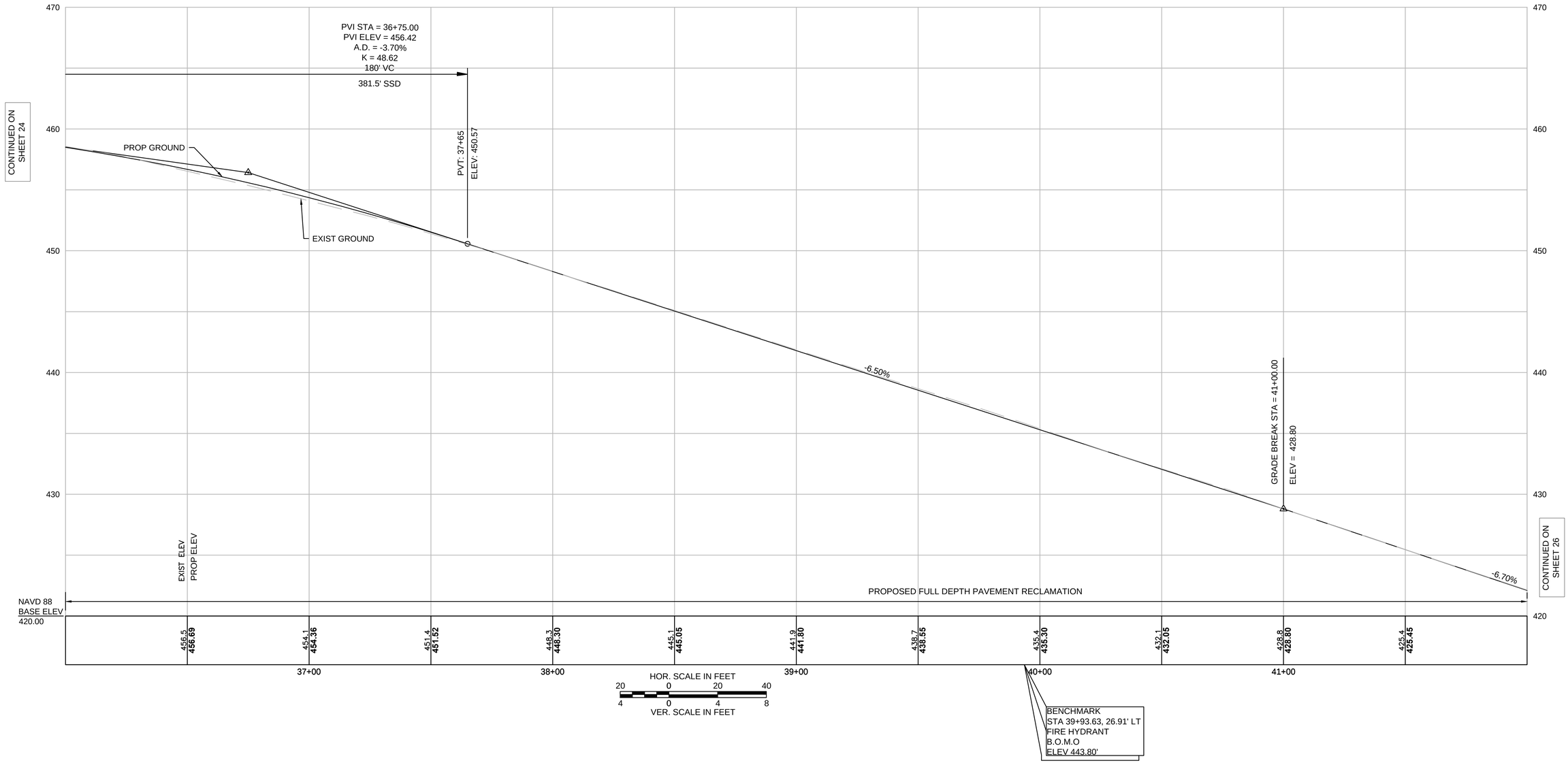


FOR CONSTRUCTION PLANS REFER TO SHEET 11

MARLBOROUGH
SIMARANO DRIVE
PROFILES
SHEET 25 OF 142

12477 - PROF.DWG Plotted on 4-Jun-2014 2:53 PM

SIMARANO DRIVE

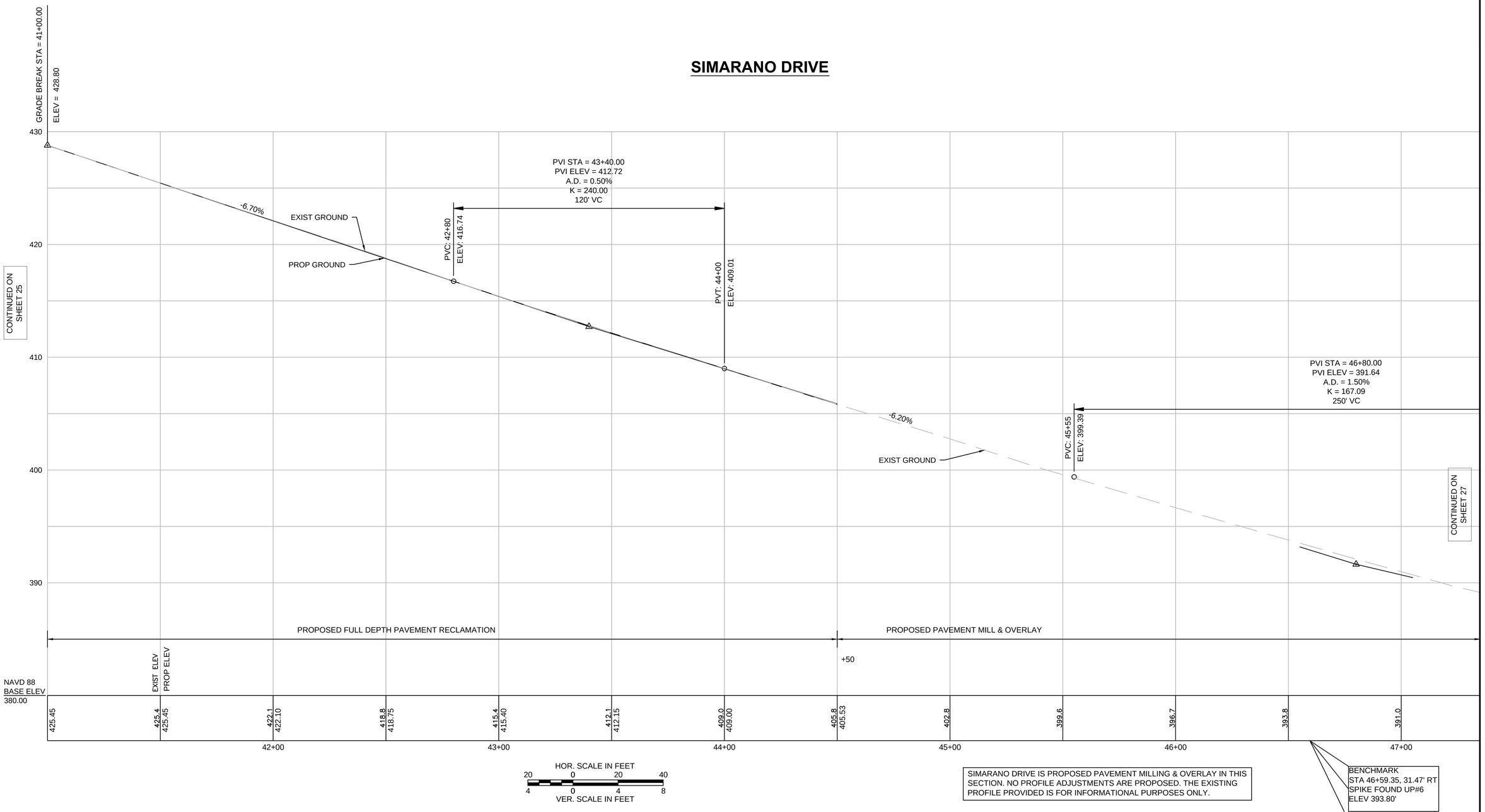


FOR CONSTRUCTION PLANS REFER TO SHEET 12

MARLBOROUGH
SIMARANO DRIVE
PROFILES
SHEET 26 OF 142

12477 - PROF.DWG Plotted on 4-Jun-2014 2:53 PM

SIMARANO DRIVE



HOR. SCALE IN FEET
20 0 20 40
VER. SCALE IN FEET
4 0 4 8

SIMARANO DRIVE IS PROPOSED PAVEMENT MILLING & OVERLAY IN THIS SECTION. NO PROFILE ADJUSTMENTS ARE PROPOSED. THE EXISTING PROFILE PROVIDED IS FOR INFORMATIONAL PURPOSES ONLY.

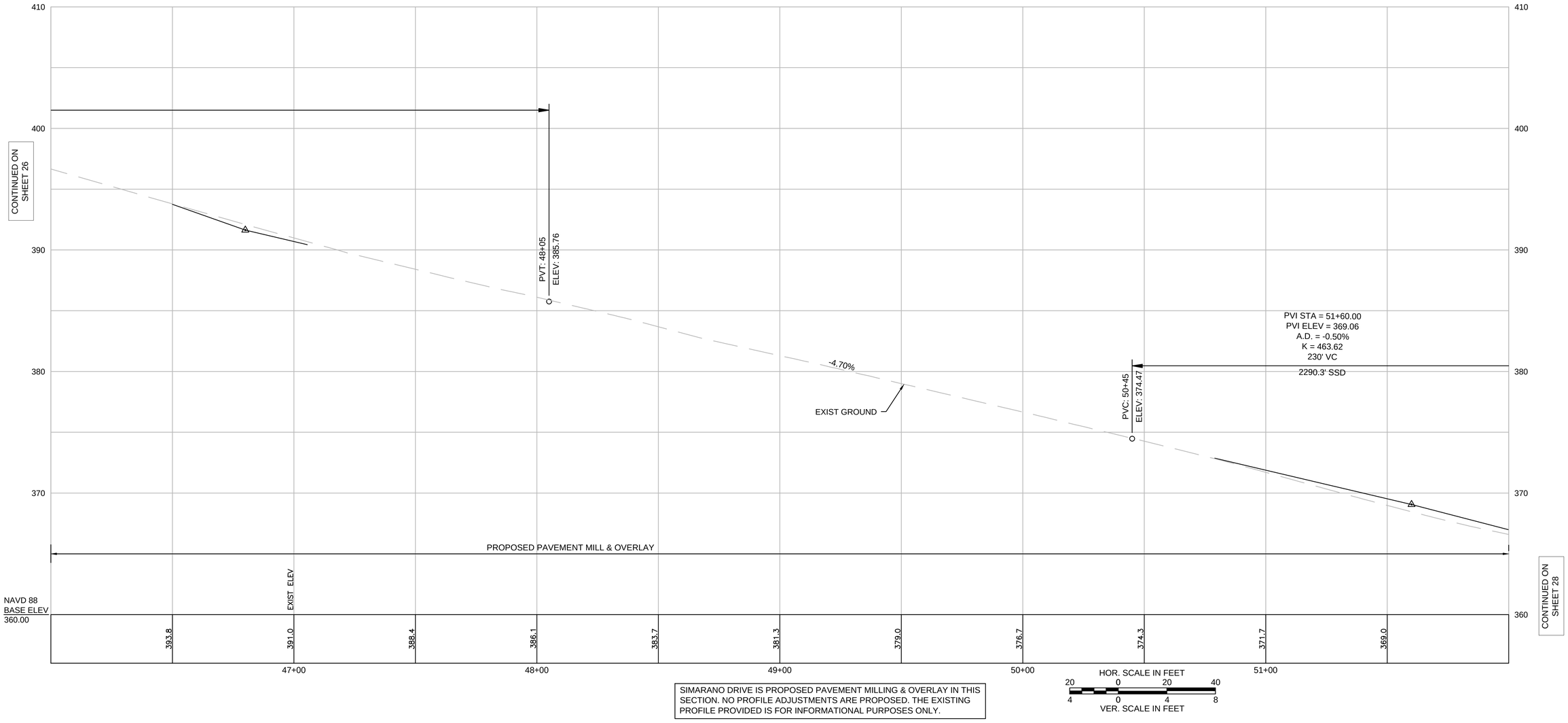
BENCHMARK
STA 46+59.35, 31.47' RT
SPIKE FOUND UP#6
ELEV 393.80'

FOR CONSTRUCTION PLANS REFER TO SHEETS 12 & 13

MARLBOROUGH
SIMARANO DRIVE
PROFILES
SHEET 27 OF 142

12477 - PROF.DWG Plotted on 4-Jun-2014 2:53 PM

SIMARANO DRIVE



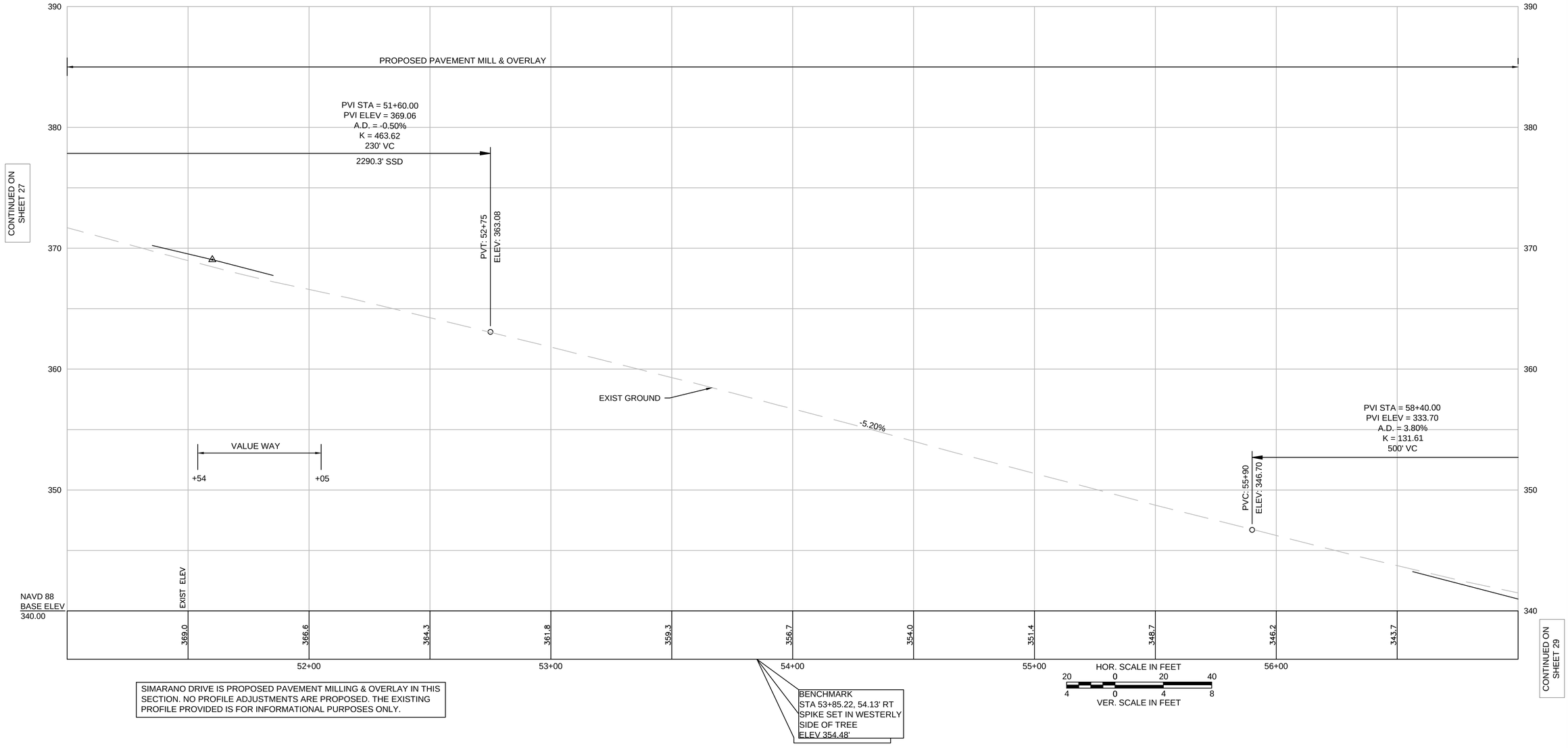
SIMARANO DRIVE IS PROPOSED PAVEMENT MILLING & OVERLAY IN THIS SECTION. NO PROFILE ADJUSTMENTS ARE PROPOSED. THE EXISTING PROFILE PROVIDED IS FOR INFORMATIONAL PURPOSES ONLY.

FOR CONSTRUCTION PLANS REFER TO SHEET 14

MARLBOROUGH
SIMARANO DRIVE
PROFILES
SHEET 28 OF 142

12477 - PROF.DWG Plotted on 4-Jun-2014 2:53 PM

SIMARANO DRIVE



SIMARANO DRIVE IS PROPOSED PAVEMENT MILLING & OVERLAY IN THIS SECTION. NO PROFILE ADJUSTMENTS ARE PROPOSED. THE EXISTING PROFILE PROVIDED IS FOR INFORMATIONAL PURPOSES ONLY.

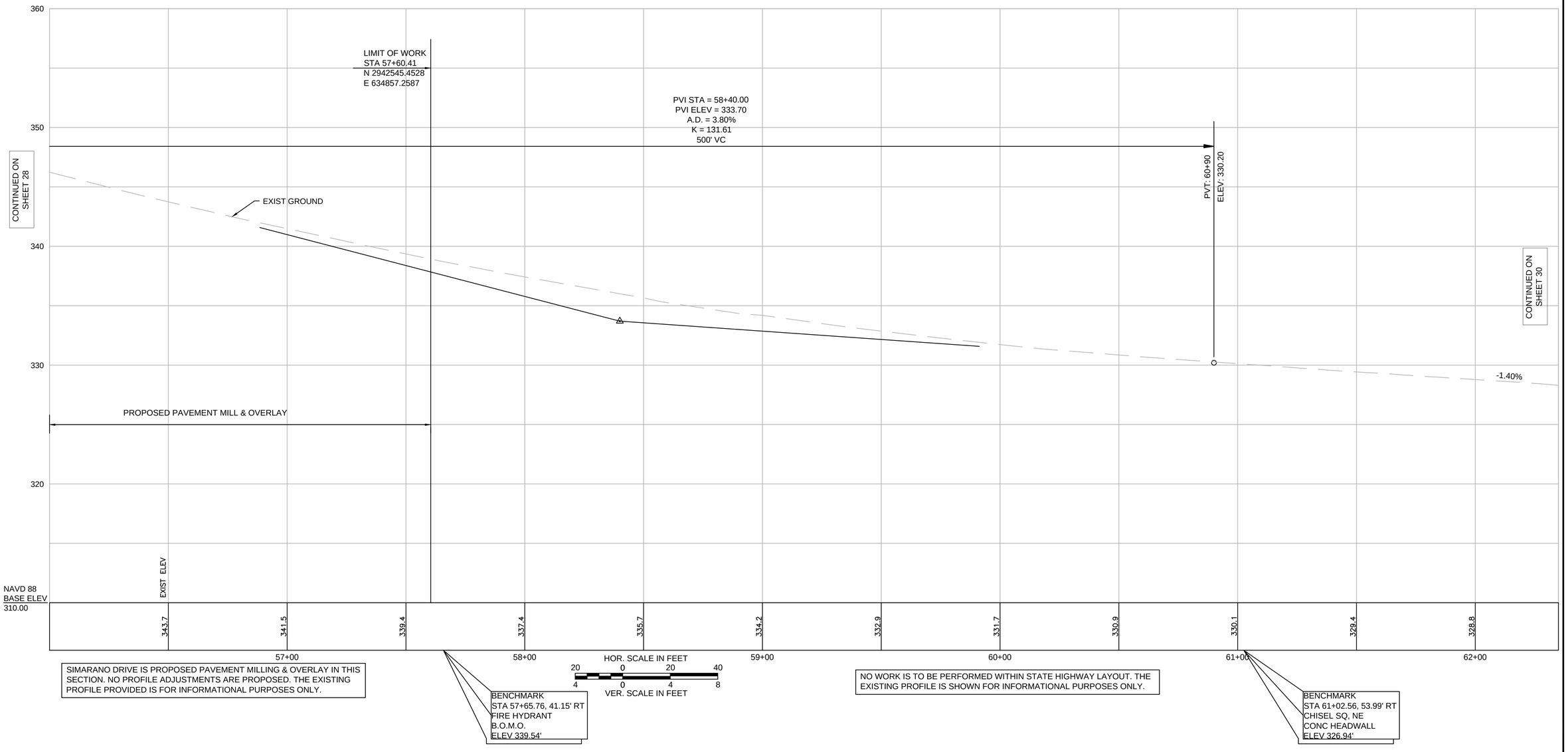
BENCHMARK
STA 53+85.22, 54.13' RT
SPIKE SET IN WESTERLY
SIDE OF TREE
ELEV 354.48'

FOR CONSTRUCTION PLANS REFER TO SHEETS 14& 15

MARLBOROUGH
SIMARANO DRIVE
PROFILES
SHEET 29 OF 142

12477 - PROF.DWG Plotted on 4-Jun-2014 2:53 PM

SIMARANO DRIVE



SIMARANO DRIVE IS PROPOSED PAVEMENT MILLING & OVERLAY IN THIS SECTION. NO PROFILE ADJUSTMENTS ARE PROPOSED. THE EXISTING PROFILE PROVIDED IS FOR INFORMATIONAL PURPOSES ONLY.

BENCHMARK
STA 57+65.76, 41.15' RT
FIRE HYDRANT
B.O.M.O.
ELEV 339.54'

NO WORK IS TO BE PERFORMED WITHIN STATE HIGHWAY LAYOUT. THE EXISTING PROFILE IS SHOWN FOR INFORMATIONAL PURPOSES ONLY.

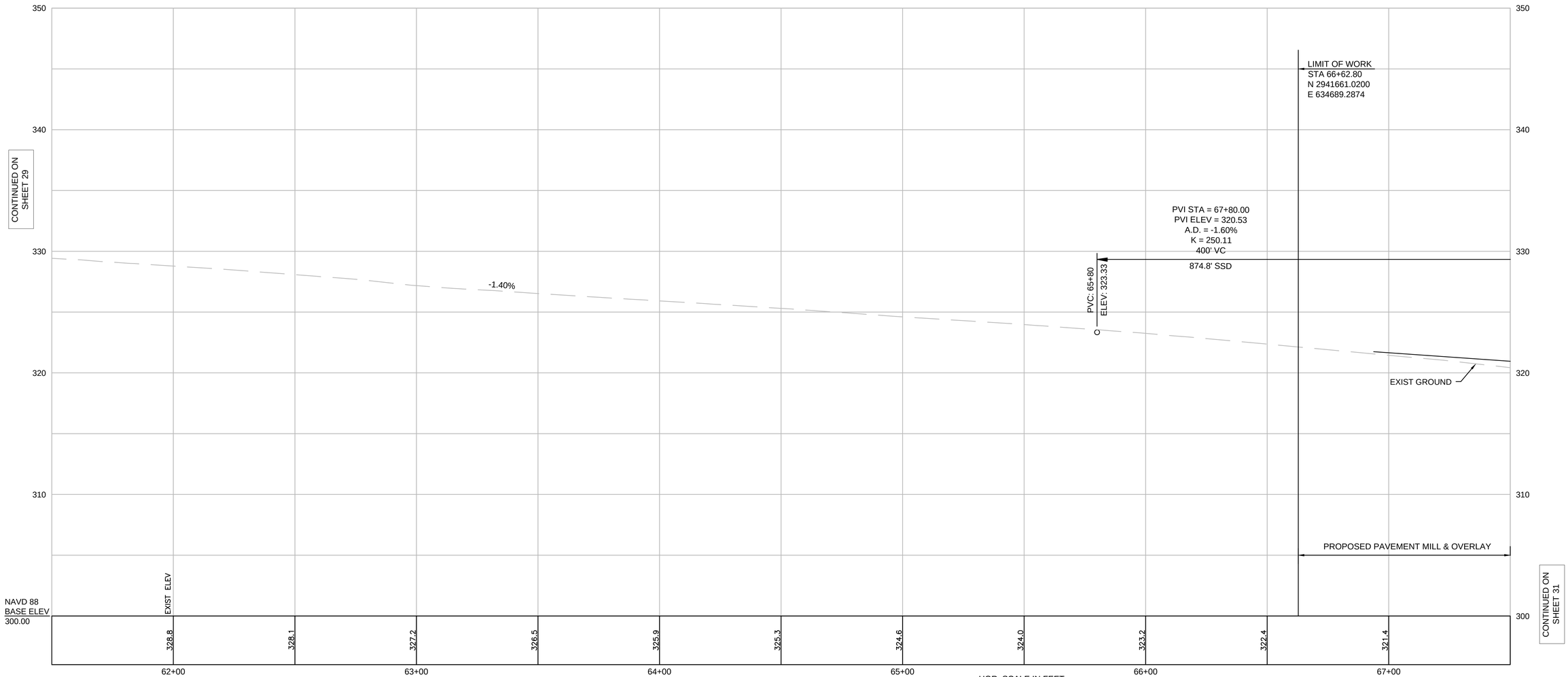
BENCHMARK
STA 61+02.56, 53.99' RT
CHISEL SQ, NE
CONC HEADWALL
ELEV 326.94'

FOR CONSTRUCTION PLANS REFER TO SHEETS 15 & 16

MARLBOROUGH
SIMARANO DRIVE
PROFILES
SHEET 30 OF 142

12477 - PROF.DWG Plotted on 4-Jun-2014 2:54 PM

SIMARANO DRIVE



NO WORK IS TO BE PERFORMED WITHIN STATE HIGHWAY LAYOUT. THE EXISTING PROFILE IS SHOWN FOR INFORMATIONAL PURPOSES ONLY.

HOR. SCALE IN FEET
20 0 20 40
VER. SCALE IN FEET
4 0 4 8

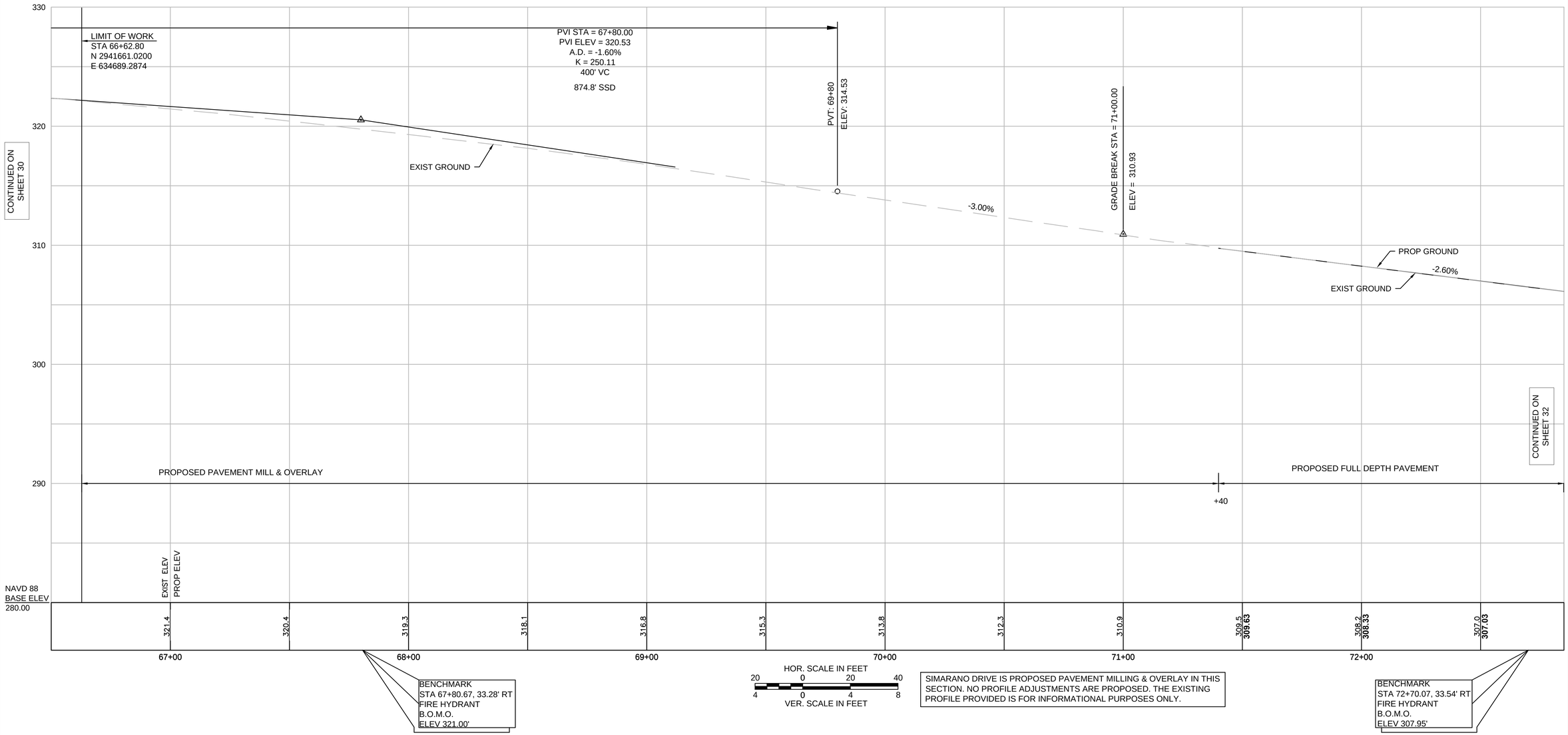
SIMARANO DRIVE IS PROPOSED PAVEMENT MILLING & OVERLAY IN THIS SECTION. NO PROFILE ADJUSTMENTS ARE PROPOSED. THE EXISTING PROFILE PROVIDED IS FOR INFORMATIONAL PURPOSES ONLY.

FOR CONSTRUCTION PLANS REFER TO SHEET 17

MARLBOROUGH
SIMARANO DRIVE
PROFILES
SHEET 31 OF 142

12477 - PROF.DWG Plotted on 4-Jun-2014 2:54 PM

SIMARANO DRIVE



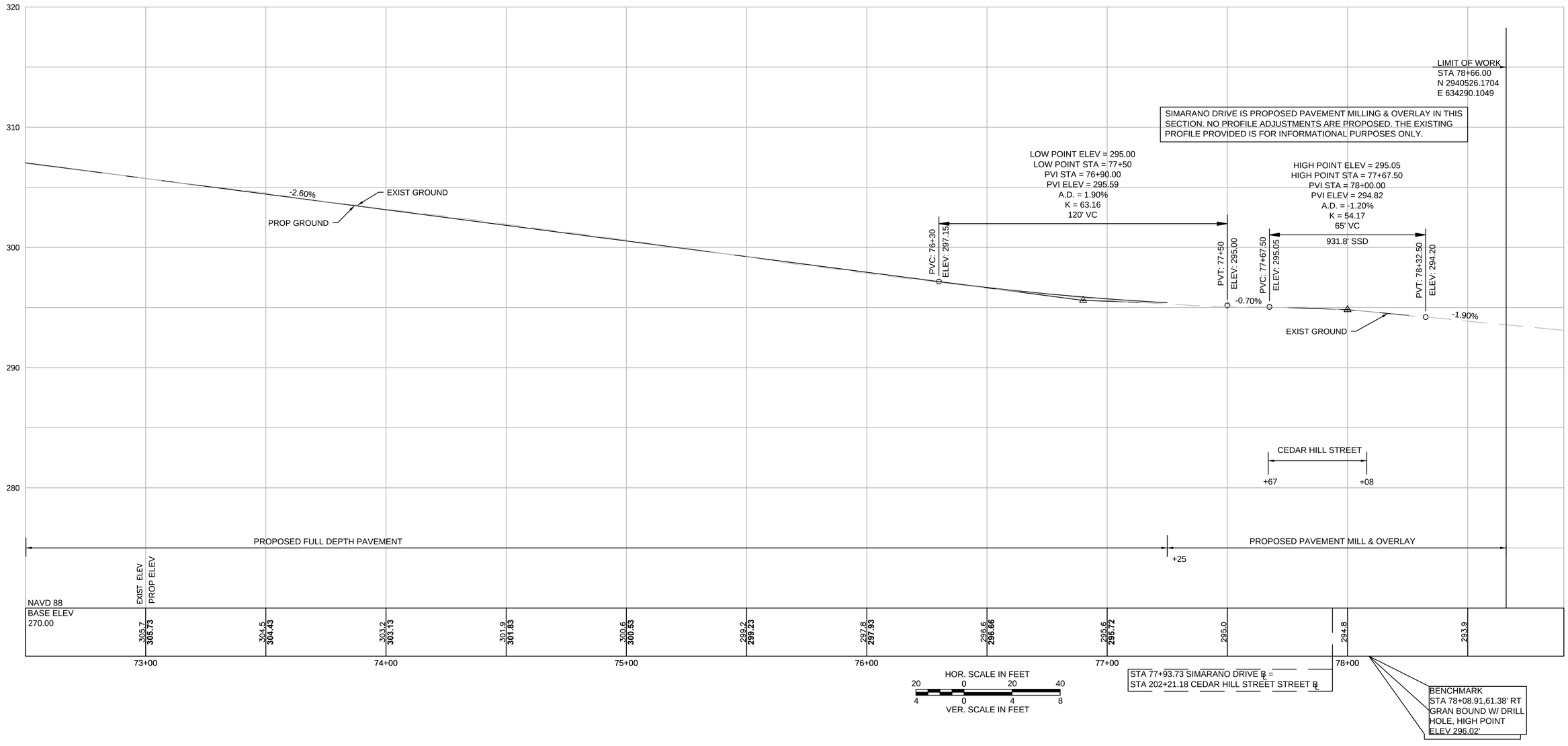
FOR CONSTRUCTION PLANS REFER TO SHEET 17

MARLBOROUGH
SIMARANO DRIVE
PROFILES
SHEET 32 OF 142

CONTINUED ON SHEET 31

12477 - PROF.DWG Plotted on 4-Jun-2014 2:54 PM

SIMARANO DRIVE

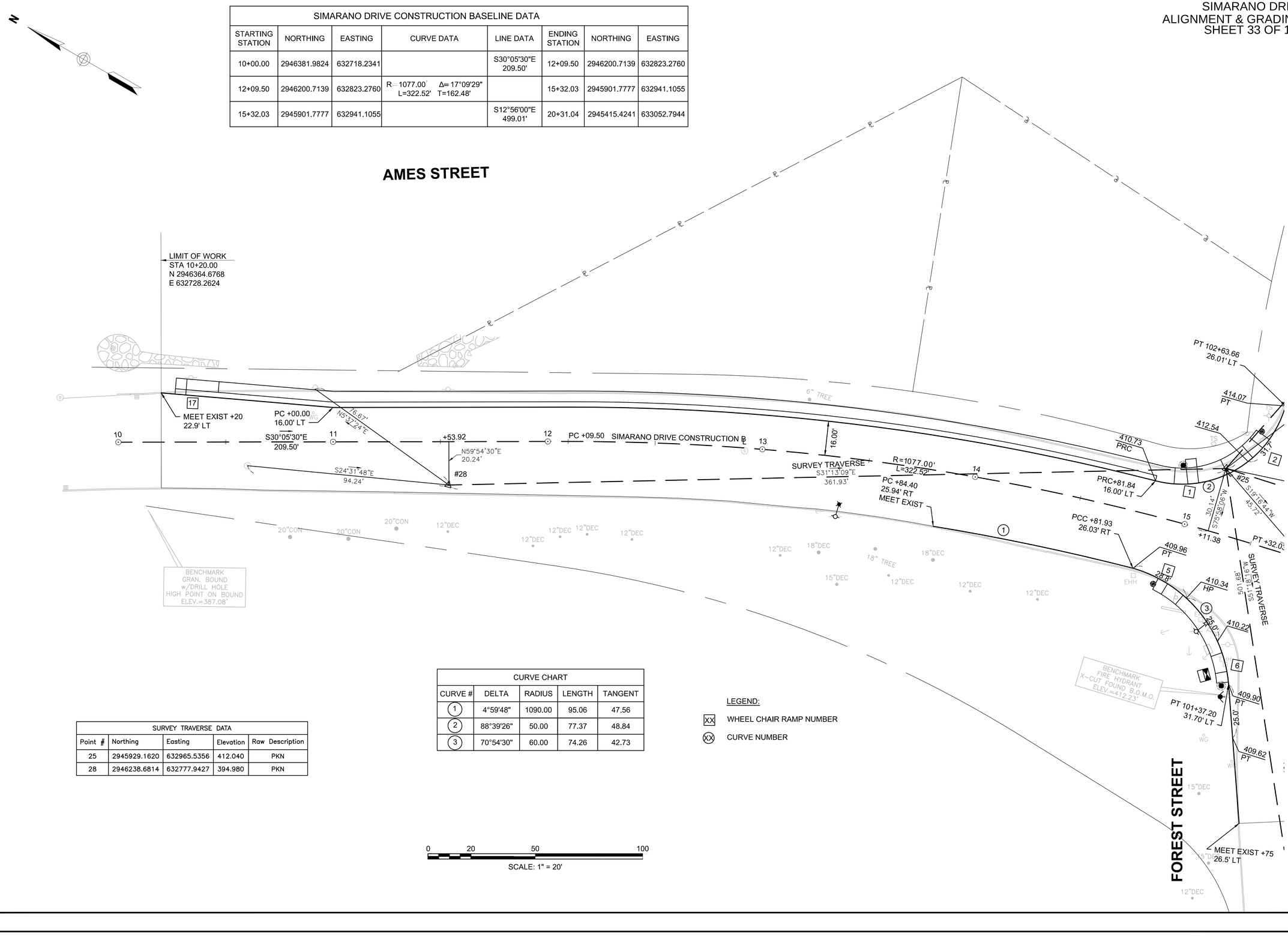


FOR CONSTRUCTION PLANS REFER TO SHEETS 18 & 19

MARLBOROUGH
SIMARANO DRIVE
ALIGNMENT & GRADING PLANS
SHEET 33 OF 142

12477 - ALIGN.DWG Plotted on 4-Jun-2014 3:07 PM

SIMARANO DRIVE CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
10+00.00	2946381.9824	632718.2341		S30°05'30"E 209.50'	12+09.50	2946200.7139	632823.2760
12+09.50	2946200.7139	632823.2760	R=1077.00' Δ=17°09'29" L=322.52' T=162.48'		15+32.03	2945901.7777	632941.1055
15+32.03	2945901.7777	632941.1055		S12°56'00"E 499.01'	20+31.04	2945415.4241	633052.7944



SURVEY TRAVERSE DATA				
Point #	Northing	Easting	Elevation	Raw Description
25	2945929.1620	632965.5356	412.040	PKN
28	2946238.6814	632777.9427	394.980	PKN

CURVE CHART				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
(1)	4°59'48"	1090.00	95.06	47.56
(2)	88°39'26"	50.00	77.37	48.84
(3)	70°54'30"	60.00	74.26	42.73

LEGEND:

[XX] WHEEL CHAIR RAMP NUMBER

(XX) CURVE NUMBER

0 20 50 100

SCALE: 1" = 20'

MARLBOROUGH
SIMARANO DRIVE
ALIGNMENT & GRADING PLANS
SHEET 34 OF 142

12477 - ALIGN.DWG Plotted on 4-Jun-2014 3:07 PM

LEGEND:

XX WHEEL CHAIR RAMP NUMBER

(XX) CURVE NUMBER

CURVE CHART				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
2	88°39'26"	50.00	77.37	48.84
3	70°54'30"	60.00	74.26	42.73
4	92°36'23"	50.00	80.81	52.33
5	106°36'11"	45.00	83.73	60.38
6	4°29'17"	500.00	39.16	19.59
7	4°29'17"	500.00	39.16	19.59

FOREST ST CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
100+00.00	2945776.6958	632777.2907		N55°44'51"E 58.16'	100+58.16	2945809.4312	632825.3647
100+58.16	2945809.4312	632825.3647	R=610.00' Δ=35°03'40" L=373.28' T=192.69'		104+31.44	2945915.1649	633177.3057
104+31.44	2945915.1649	633177.3057		S89°11'29"E 69.46'	105+00.90	2945914.1847	633246.7557

SIMARANO SIDEWALK CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
500+00.00	2945576.1943	633037.4287	R=802.50' Δ=4°42'22" L=65.91' T=32.98'		500+65.91	2945512.6475	633054.8671
500+65.91	2945512.6475	633054.8671	R=497.50' Δ=4°18'20" L=37.38' T=18.70'		501+03.30	2945476.6391	633064.8839
501+03.30	2945476.6391	633064.8839	R=57.50' Δ=8°01'12" L=8.05' T=4.03'		501+11.35	2945468.7048	633066.1950
501+11.35	2945468.7048	633066.1950		S5°22'22"E 17.30'	501+28.64	2945451.4854	633067.8145
501+28.64	2945451.4854	633067.8145	R=303.45' Δ=12°10'30" L=64.48' T=32.36'		501+93.12	2945388.4942	633081.0151
501+93.12	2945388.4942	633081.0151		S14°51'28"E 17.99'	502+11.11	2945371.1079	633085.6275
502+11.11	2945371.1079	633085.6275	R=150.00' Δ=18°55'15" L=49.53' T=24.99'		502+60.65	2945322.0166	633090.2657
502+60.65	2945322.0166	633090.2657	R=77.03' Δ=27°21'00" L=36.77' T=18.74'		502+97.42	2945286.0589	633096.0721

SURVEY TRAVERSE DATA				
Point #	Northing	Easting	Elevation	Raw Description
24	2945511.1430	633057.0540	422.860	PKN
25	2945929.1620	632965.5356	412.040	PKN
29	2945894.0032	633140.2225	418.050	PKN

SIMARANO DRIVE CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
12+09.50	2946200.7139	632823.2760	R=1077.00' Δ=17°09'29" L=322.52' T=162.48'		15+32.03	2945901.7777	632941.1055
15+32.03	2945901.7777	632941.1055		S12°56'00"E 499.01'	20+31.04	2945415.4241	633052.7944
20+31.04	2945415.4241	633052.7944	R=800.00' Δ=16°34'03" L=231.33' T=116.48'		22+62.37	2945185.6605	633071.4811

0 20 50 100

SCALE: 1" = 20'

CONT. ON SHEET 33

CONT. ON SHEET 35

MARLBOROUGH
SIMARANO DRIVE
ALIGNMENT & GRADING PLANS
SHEET 35 OF 142

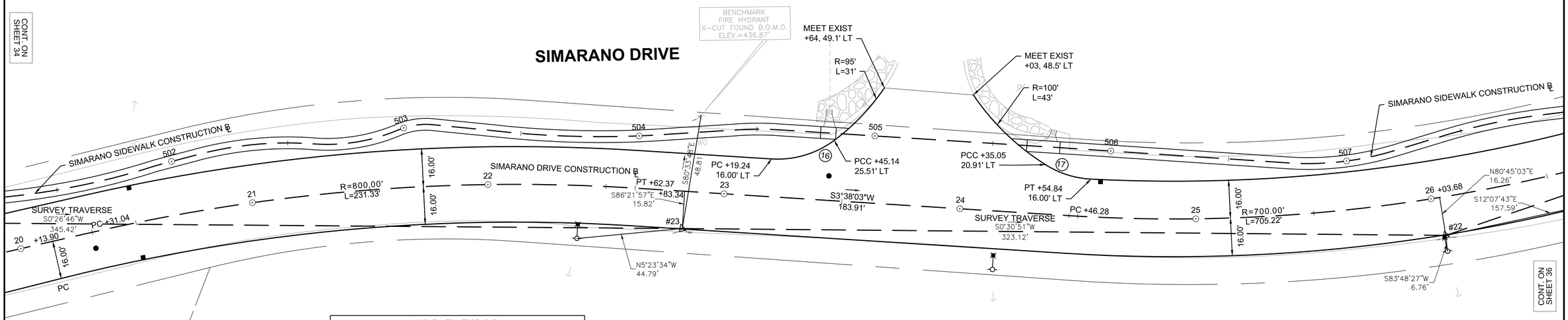
12477 - ALIGN.DWG Plotted on 4-Jun-2014 3:08 PM

N

SIMARANO SIDEWALK CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
502+60.65	2945322.0166	633090.2657	R=77.03' Δ=27°21'00" L=36.77' T=18.74'		502+97.42	2945286.0589	633096.0721
502+97.42	2945286.0589	633096.0721	R=30.00' Δ=29°56'13" L=15.67' T=8.02'		503+13.09	2945270.7246	633098.3134
503+13.09	2945270.7246	633098.3134		S5°40'03"W 24.63'	503+37.72	2945246.2194	633095.8815
503+37.72	2945246.2194	633095.8815	R=404.93' Δ=10°44'46" L=75.95' T=38.09'		504+13.67	2945170.3982	633094.4036
504+13.67	2945170.3982	633094.4036		S3°38'06"E 27.43'	504+41.09	2945143.0252	633096.1425
504+41.09	2945143.0252	633096.1425	R=125.00' Δ=7°53'53" L=17.23' T=8.63'		504+58.32	2945125.8082	633096.2372

SIMARANO SIDEWALK CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
504+58.32	2945125.8082	633096.2372		S3°38'03"W 25.17'	504+83.50	2945100.6871	633094.6417
504+83.50	2945100.6871	633094.6417		S3°38'03"W 102.51'	505+86.00	2944998.3851	633088.1442
505+86.00	2944998.3851	633088.1442		S3°50'12"W 89.24'	506+75.25	2944909.3412	633082.1727
506+75.25	2944909.3412	633082.1727	R=125.00' Δ=20°42'14" L=45.17' T=22.83'		507+20.42	2944864.7075	633087.2703
507+20.42	2944864.7075	633087.2703		S16°52'03"E 22.28'	507+42.69	2944843.3903	633093.7337
507+42.69	2944843.3903	633093.7337	R=250.00' Δ=9°55'52" L=43.33' T=21.72'		507+86.03	2944801.0419	633102.6593
507+86.03	2944801.0419	633102.6593		S6°56'10"E 36.43'	508+22.46	2944764.8737	633107.0593

CONT. ON SHEET 34



SURVEY TRAVERSE DATA				
Point #	Northing	Easting	Elevation	Raw Description
22	2944842.6265	633051.4645	445.220	PKN
23	2945165.7335	633054.3643	434.300	PKN

CURVE CHART				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
(16)	40°20'52"	40.00	28.17	14.70
(17)	23°43'16"	40.00	42.80	21.71

SIMARANO DRIVE CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
15+32.03	2945901.7777	632941.1055		S12°56'00"E 499.01'	20+31.04	2945415.4241	633052.7944
20+31.04	2945415.4241	633052.7944	R=800.00' Δ=16°34'03" L=231.33' T=116.48'		22+62.37	2945185.6605	633071.4811
22+62.37	2945185.6605	633071.4811		S3°38'03"W 183.91'	24+46.28	2945002.1193	633059.8239
24+46.28	2945002.1193	633059.8239	R=700.00' Δ=57°43'24" L=705.22' T=385.81'		31+51.50	2944390.7974	633347.8496

0 20 50 100
SCALE: 1" = 20'

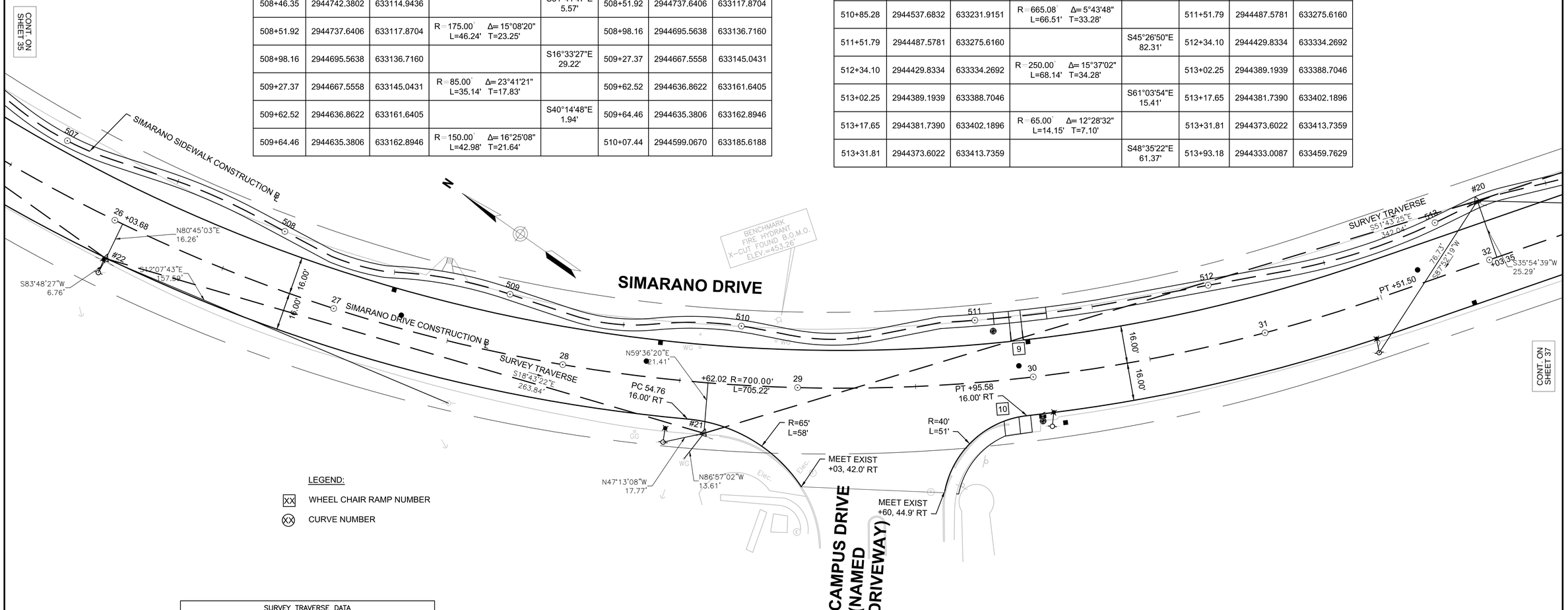
LEGEND:
XX WHEEL CHAIR RAMP NUMBER
(XX) CURVE NUMBER

MARLBOROUGH
SIMARANO DRIVE
ALIGNMENT & GRADING PLANS
SHEET 36 OF 142

12477 - ALIGN.DWG Plotted on 4-Jun-2014 3:08 PM

SIMARANO SIDEWALK CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
507+20.42	2944864.7075	633087.2703		S16°52'03"E 22.28'	507+42.69	2944843.3903	633093.7337
507+42.69	2944843.3903	633093.7337	R=250.00' Δ=9°55'52" L=43.33' T=21.72'		507+86.03	2944801.0419	633102.6593
507+86.03	2944801.0419	633102.6593		S6°56'10"E 36.43'	508+22.46	2944764.8737	633107.0593
508+22.46	2944764.8737	633107.0593	R=106.21' Δ=12°53'09" L=23.89' T=11.99'		508+46.35	2944742.3802	633114.9436
508+46.35	2944742.3802	633114.9436		S31°41'47"E 5.57'	508+51.92	2944737.6406	633117.8704
508+51.92	2944737.6406	633117.8704	R=175.00' Δ=15°08'20" L=46.24' T=23.25'		508+98.16	2944695.5638	633136.7160
508+98.16	2944695.5638	633136.7160		S16°33'27"E 29.22'	509+27.37	2944667.5558	633145.0431
509+27.37	2944667.5558	633145.0431	R=85.00' Δ=23°41'21" L=35.14' T=17.83'		509+62.52	2944636.8622	633161.6405
509+62.52	2944636.8622	633161.6405		S40°14'48"E 1.94'	509+64.46	2944635.3806	633162.8946
509+64.46	2944635.3806	633162.8946	R=150.00' Δ=16°25'08" L=42.98' T=21.64'		510+07.44	2944599.0670	633185.6188

SIMARANO SIDEWALK CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
510+07.44	2944599.0670	633185.6188		S23°49'40"E 13.30'	510+20.74	2944586.9048	633190.9900
510+20.74	2944586.9048	633190.9900	R=95.00' Δ=22°16'07" L=36.92' T=18.70'		510+57.66	2944556.8354	633212.0153
510+57.66	2944556.8354	633212.0153		S46°05'48"E 27.62'	510+85.28	2944537.6832	633231.9151
510+85.28	2944537.6832	633231.9151	R=665.08' Δ=5°43'48" L=66.51' T=33.28'		511+51.79	2944487.5781	633275.6160
511+51.79	2944487.5781	633275.6160		S45°26'50"E 82.31'	512+34.10	2944429.8334	633334.2692
512+34.10	2944429.8334	633334.2692	R=250.00' Δ=15°37'02" L=68.14' T=34.28'		513+02.25	2944389.1939	633388.7046
513+02.25	2944389.1939	633388.7046		S61°03'54"E 15.41'	513+17.65	2944381.7390	633402.1896
513+17.65	2944381.7390	633402.1896	R=65.00' Δ=12°28'32" L=14.15' T=7.10'		513+31.81	2944373.6022	633413.7359
513+31.81	2944373.6022	633413.7359		S48°35'22"E 61.37'	513+93.18	2944333.0087	633459.7629



LEGEND:

XX WHEEL CHAIR RAMP NUMBER

XX CURVE NUMBER

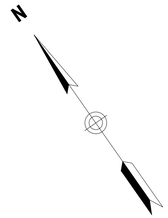
SURVEY TRAVERSE DATA				
Point #	Northing	Easting	Elevation	Raw Description
20	2944380.8707	633404.6674	459.640	PKN
21	2944592.7481	633136.1543	452.330	PKN
22	2944842.6265	633051.4645	445.220	PKN

SIMARANO DRIVE CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
24+46.28	2945002.1193	633059.8239	R=700.00' Δ=57°43'24" L=705.22' T=385.81'		31+51.50	2944390.7974	633347.8496

0 20 50 100

SCALE: 1" = 20'

12477 - ALIGN.DWG Plotted on 4-Jun-2014 3:08 PM



LEGEND:

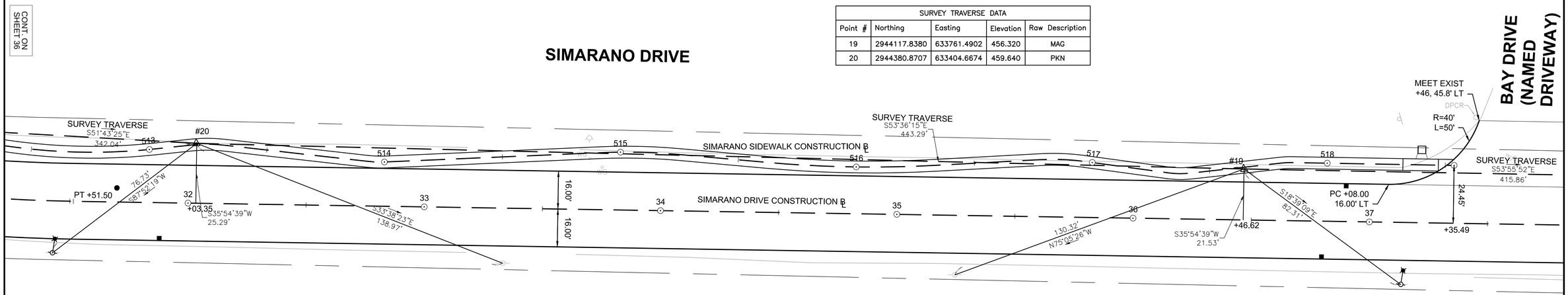
XX WHEEL CHAIR RAMP NUMBER

XX CURVE NUMBER

SIMARANO DRIVE CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
31+51.50	2944390.7974	633347.8496		S54°05'21"E 1666.84'	48+18.35	2943413.1544	634697.8789

SURVEY TRAVERSE DATA				
Point #	Northing	Easting	Elevation	Raw Description
19	2944117.8380	633761.4902	456.320	MAG
20	2944380.8707	633404.6674	459.640	PKN

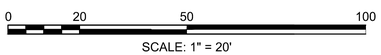
CONT. ON SHEET 36



CONT. ON SHEET 38

SIMARANO SIDEWALK CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
512+34.10	2944429.8334	633334.2692	R=250.00' Δ=15°37'02" L=68.14' T=34.28'		513+02.25	2944389.1939	633388.7046
513+02.25	2944389.1939	633388.7046		S61°03'54"E 15.41'	513+17.65	2944381.7390	633402.1896
513+17.65	2944381.7390	633402.1896	R=65.00' Δ=12°28'32" L=14.15' T=7.10'		513+31.81	2944373.6022	633413.7359
513+31.81	2944373.6022	633413.7359		S48°35'22"E 61.37'	513+93.18	2944333.0087	633459.7629
513+93.18	2944333.0087	633459.7629	R=45.00' Δ=8°52'46" L=6.97' T=3.49'		514+00.15	2944328.8187	633465.3291
514+00.15	2944328.8187	633465.3291		S57°28'08"E 91.40'	514+91.55	2944279.6660	633542.3908
514+91.55	2944279.6660	633542.3908	R=250.00' Δ=7°34'42" L=33.07' T=16.56'		515+24.62	2944260.0946	633569.0140

SIMARANO SIDEWALK CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
515+24.62	2944260.0946	633569.0140		S49°53'25"E 37.36'	515+61.98	2944236.0240	633597.5891
515+61.98	2944236.0240	633597.5891	R=500.00' Δ=8°11'38" L=71.51' T=35.81'		516+33.49	2944194.0172	633655.3796
516+33.49	2944194.0172	633655.3796		S58°05'04"E 44.43'	516+77.92	2944170.5305	633693.0896
516+77.92	2944170.5305	633693.0896	R=100.00' Δ=10°48'37" L=18.87' T=9.46'		516+96.78	2944159.1086	633708.0717
516+96.78	2944159.1086	633708.0717		S47°16'27"E 35.61'	517+32.39	2944134.9491	633734.2294
517+32.39	2944134.9491	633734.2294	R=40.00' Δ=14°03'57" L=9.82' T=4.93'		517+42.21	2944129.2342	633742.1846
517+42.21	2944129.2342	633742.1846		S61°20'24"E 38.81'	517+81.02	2944110.6210	633776.2387
517+81.02	2944110.6210	633776.2387	R=27.50' Δ=7°20'13" L=3.52' T=1.76'		517+84.54	2944108.7391	633779.2123
517+84.54	2944108.7391	633779.2123		S54°00'11"E 69.18'	518+53.72	2944068.0787	633835.1832



SCALE: 1" = 20'

12477 - ALIGN.DWG Plotted on 4-Jun-2014 3:08 PM

SIMARANO SIDEWALK CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
517+84.54	2944108.7391	633779.2123		S54°00'11"E 69.18'	518+53.72	2944068.0787	633835.1832

SURVEY TRAVERSE DATA				
Point #	Northing	Easting	Elevation	Raw Description
18	2943872.9971	634097.6337	430.850	PKN

CONT. ON SHEET 37

CONT. ON SHEET 39

WF#5-112 END

WF#5-111

WF#5-110

BAY DRIVE (NAMED DRIVEWAY)

SIMARANO DRIVE

MEET EXIST +46, 45.8' LT

DPCR

R=40' L=50'

MEET EXIST +98, 43.5' LT

DPCR

R=50' L=55'

BENCHMARK FIRE HYDRANT B.O.M.O. ELEV.=443.80'

SURVEY TRAVERSE S53°55'52"E 415.86'

PC +08.00 16.00' LT

PT +23.17 16.00' LT

24.45'

+35.49

16.00'

16.00'

16.00'

16.00'

37

38

39

40

41

42

43

SIMARANO DRIVE CONSTRUCTION ℄

S54°05'21"E 1666.84'

#18

+62.48

S35°54'39"W 20.38'

S31°37'21"W 58.45'

S30°11'07"E 22.95'

SURVEY TRAVERSE S46°36'21"E 373.67'

WG

SIMARANO DRIVE CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
31+51.50	2944390.7974	633347.8496		S54°05'21"E 1666.84'	48+18.35	2943413.1544	634697.8789

LEGEND:

XX WHEEL CHAIR RAMP

XX CURVE NUMBER NUMBER

0 20 50 100

SCALE: 1" = 20'

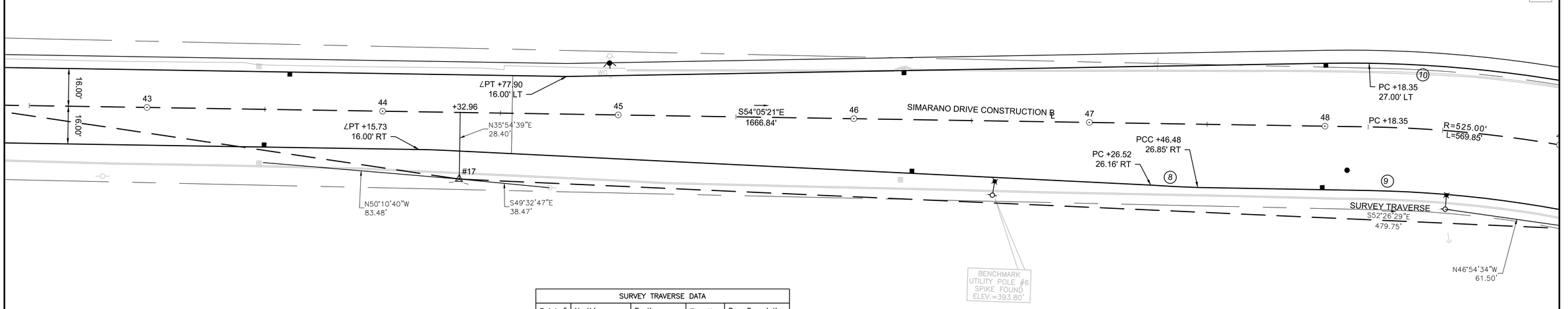
12477 - ALIGN.DWG Plotted on 4-Jun-2014 3:08 PM

SIMARANO DRIVE CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
31+51.50	2944390.7974	633347.8496		S54°05'21"E 1666.84'	48+18.35	2943413.1544	634697.8789
48+18.35	2943413.1544	634697.8789	R=525.00' Δ=62°11'27" L=569.85' T=316.64'		53+88.20	2942913.9528	634909.7143

CONT. ON SHEET 38

CONT. ON SHEET 40

SIMARANO DRIVE



SURVEY TRAVERSE DATA				
Point #	Northing	Easting	Elevation	Raw Description
17	2943616.2805	634369.1588	407.110	STAKE & NAIL

CURVE CHART				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
(8)	2°17'17"	500.00	19.97	9.99
(9)	60°20'35"	498.00	524.49	289.51
(10)	34°10'01"	552.00	329.17	169.64

LEGEND:

XX WHEEL CHAIR RAMP NUMBER

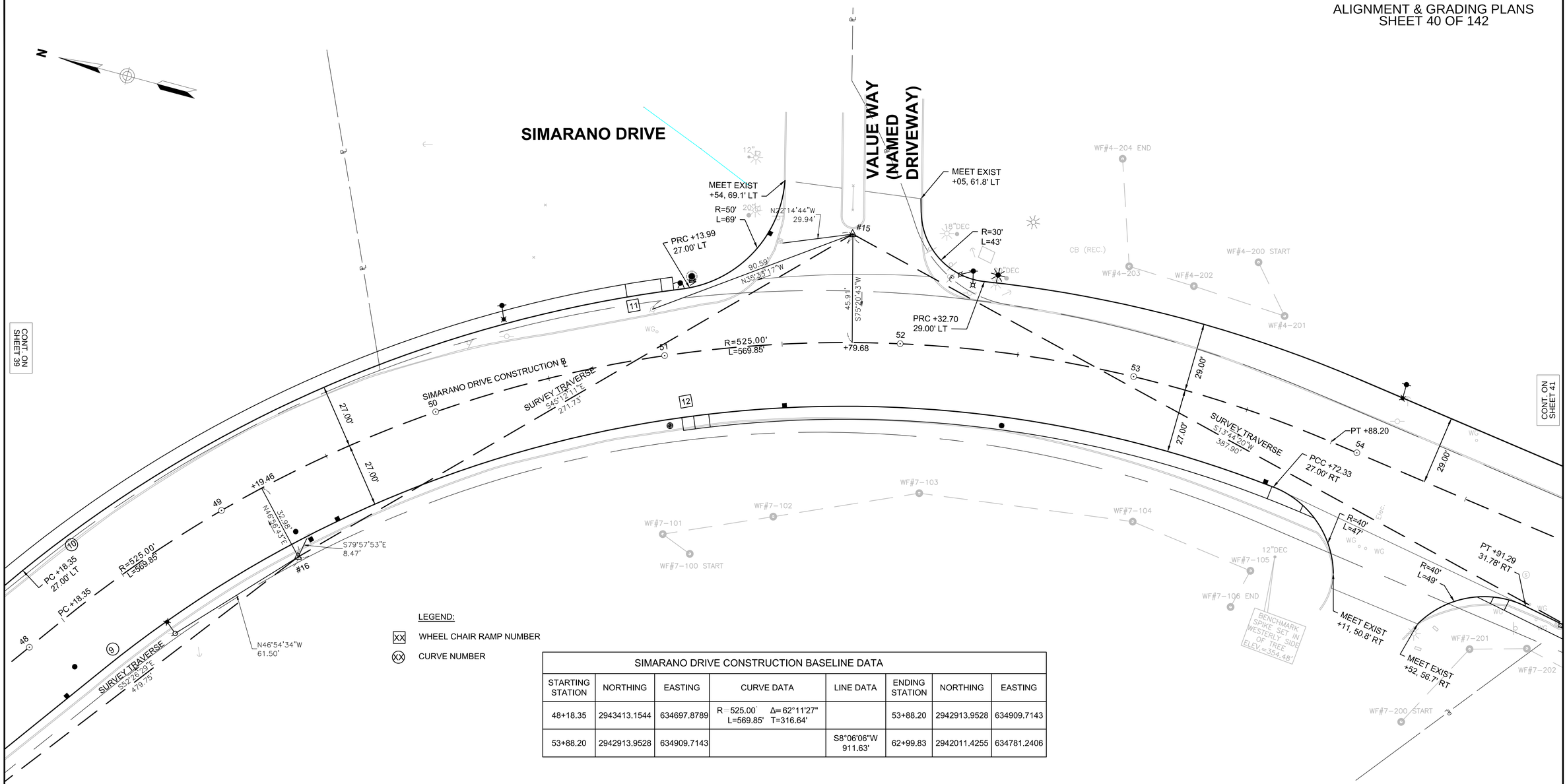
(XX) CURVE NUMBER

0 20 50 100

SCALE: 1" = 20'

MARLBOROUGH
SIMARANO DRIVE
ALIGNMENT & GRADING PLANS
SHEET 40 OF 142

12477 - ALIGN.DWG Plotted on 4-Jun-2014 3:08 PM



LEGEND:

- ⊠ WHEEL CHAIR RAMP NUMBER
- ⊗ CURVE NUMBER

SIMARANO DRIVE CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
48+18.35	2943413.1544	634697.8789	R=525.00' Δ=62°11'27" L=569.85' T=316.64'		53+88.20	2942913.9528	634909.7143
53+88.20	2942913.9528	634909.7143		S8°06'06"W 911.63'	62+99.83	2942011.4255	634781.2406

CURVE CHART				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
⑨	60°20'35"	498.00	524.49	289.51
⑩	34°10'01"	552.00	329.17	169.64

SURVEY TRAVERSE DATA				
Point #	Northing	Easting	Elevation	Raw Description
15	2943132.3777	634942.2927	368.770	MAG
16	2943323.8378	634749.4709	379.340	STAKE & NAIL

0 20 50 100

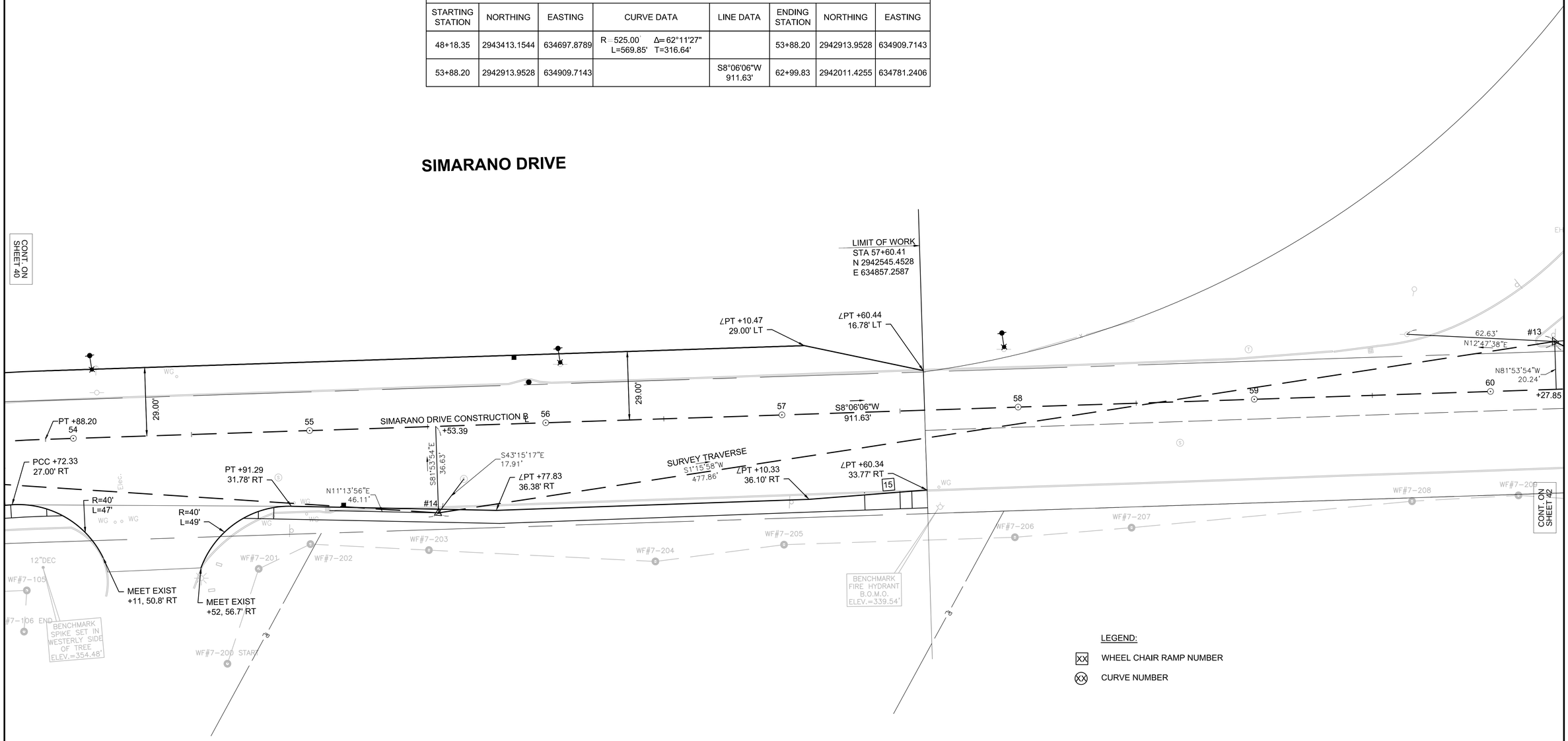
SCALE: 1" = 20'

MARLBOROUGH
SIMARANO DRIVE
ALIGNMENT & GRADING PLANS
SHEET 41 OF 142

12477 - ALIGN.DWG Plotted on 4-Jun-2014 3:09 PM

SIMARANO DRIVE CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
48+18.35	2943413.1544	634697.8789	R=525.00' Δ=62°11'27" L=569.85' T=316.64'		53+88.20	2942913.9528	634909.7143
53+88.20	2942913.9528	634909.7143		S8°06'06"W 911.63'	62+99.83	2942011.4255	634781.2406

SIMARANO DRIVE



LEGEND:

- XX — WHEEL CHAIR RAMP NUMBER
- (XX) — CURVE NUMBER

0 20 50 100

SCALE: 1" = 20'

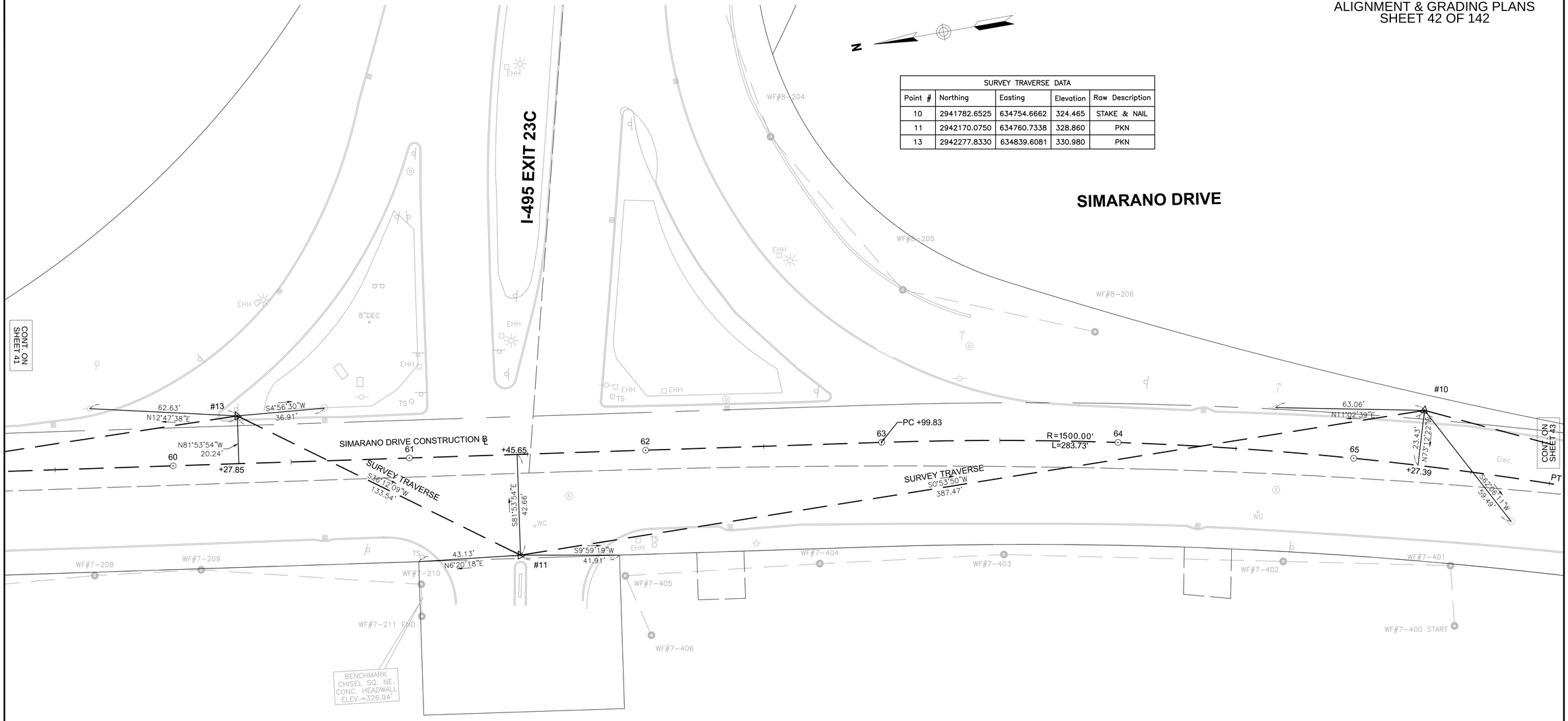
SURVEY TRAVERSE DATA				
Point #	Northing	Easting	Elevation	Raw Description
13	2942277.8330	634839.6081	330.980	MAG
14	2942755.5763	634850.1672	348.540	STAKE & NAIL

MARLBOROUGH
SIMARANO DRIVE
ALIGNMENT & GRADING PLANS
SHEET 42 OF 142

12477 - ALIGN.DWG Plotted on 4-Jun-2014 3:09 PM

N

SURVEY TRAVERSE DATA				
Point #	Northing	Easting	Elevation	Raw Description
10	2941782.6525	634754.6662	324.465	STAKE & NAIL
11	2942170.0750	634760.7338	328.860	PKN
13	2942277.8330	634839.6081	330.980	PKN



SIMARANO DRIVE CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
53+88.20	2942913.9528	634909.7143		S8°06'06"W 911.63'	62+99.83	2942011.4255	634781.2406
62+99.83	2942011.4255	634781.2406	R=1500.00' Δ=10°50'15" L=283.73' T=142.29'		65+83.55	2941735.9718	634715.0064

LEGEND:

XX WHEEL CHAIR RAMP NUMBER

(XX) CURVE NUMBER

0 20 50 100

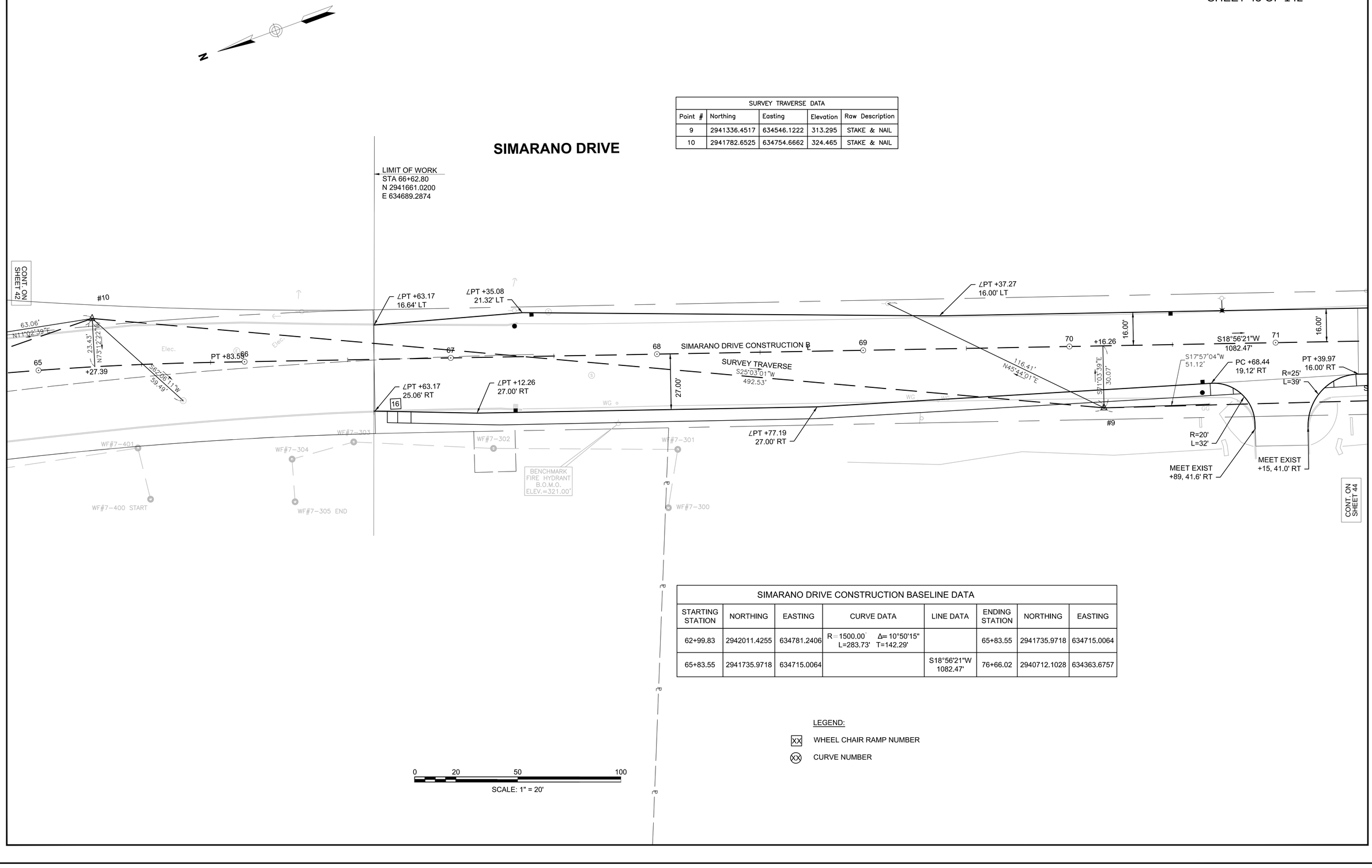
SCALE: 1" = 20'

MARLBOROUGH
SIMARANO DRIVE
ALIGNMENT & GRADING PLANS
SHEET 43 OF 142

12477 - ALIGN.DWG Plotted on 4-Jun-2014 3:09 PM

SIMARANO DRIVE

SURVEY TRAVERSE DATA				
Point #	Northing	Easting	Elevation	Raw Description
9	2941336.4517	634546.1222	313.295	STAKE & NAIL
10	2941782.6525	634754.6662	324.465	STAKE & NAIL



SIMARANO DRIVE CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
62+99.83	2942011.4255	634781.2406	R=1500.00' Δ=10°50'15" L=283.73' T=142.29'		65+83.55	2941735.9718	634715.0064
65+83.55	2941735.9718	634715.0064		S18°56'21"W 1082.47'	76+66.02	2940712.1028	634363.6757

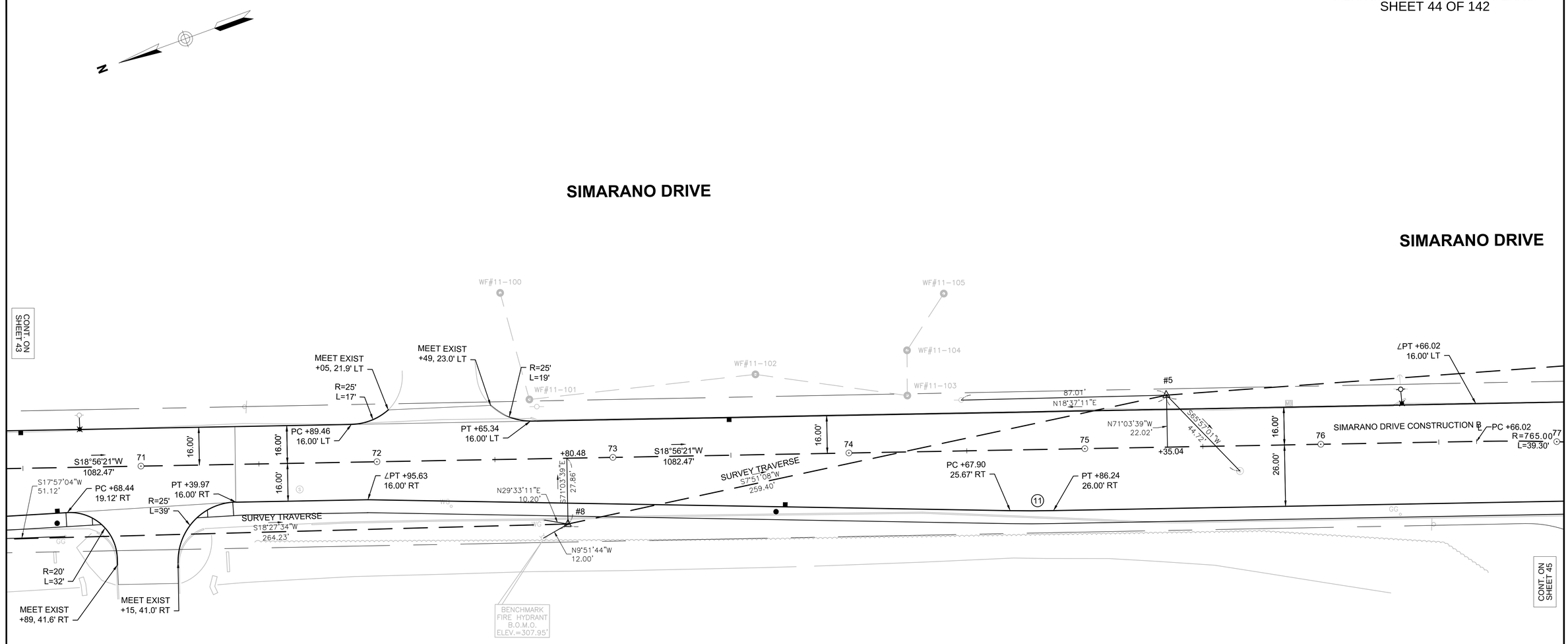
LEGEND:

XX WHEEL CHAIR RAMP NUMBER

(XX) CURVE NUMBER

MARLBOROUGH
SIMARANO DRIVE
ALIGNMENT & GRADING PLANS
SHEET 44 OF 142

12477 - ALIGN.DWG Plotted on 4-Jun-2014 3:09 PM



SIMARANO DRIVE CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
65+83.55	2941735.9718	634715.0064		S18°56'21"W 1082.47'	76+66.02	2940712.1028	634363.6757
76+66.02	2940712.1028	634363.6757	R=765.00' Δ=2°56'36" L=39.30' T=19.65'		77+05.32	2940675.2738	634349.9711

CURVE CHART				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
(11)	2°02'13"	516.00	18.34	9.17

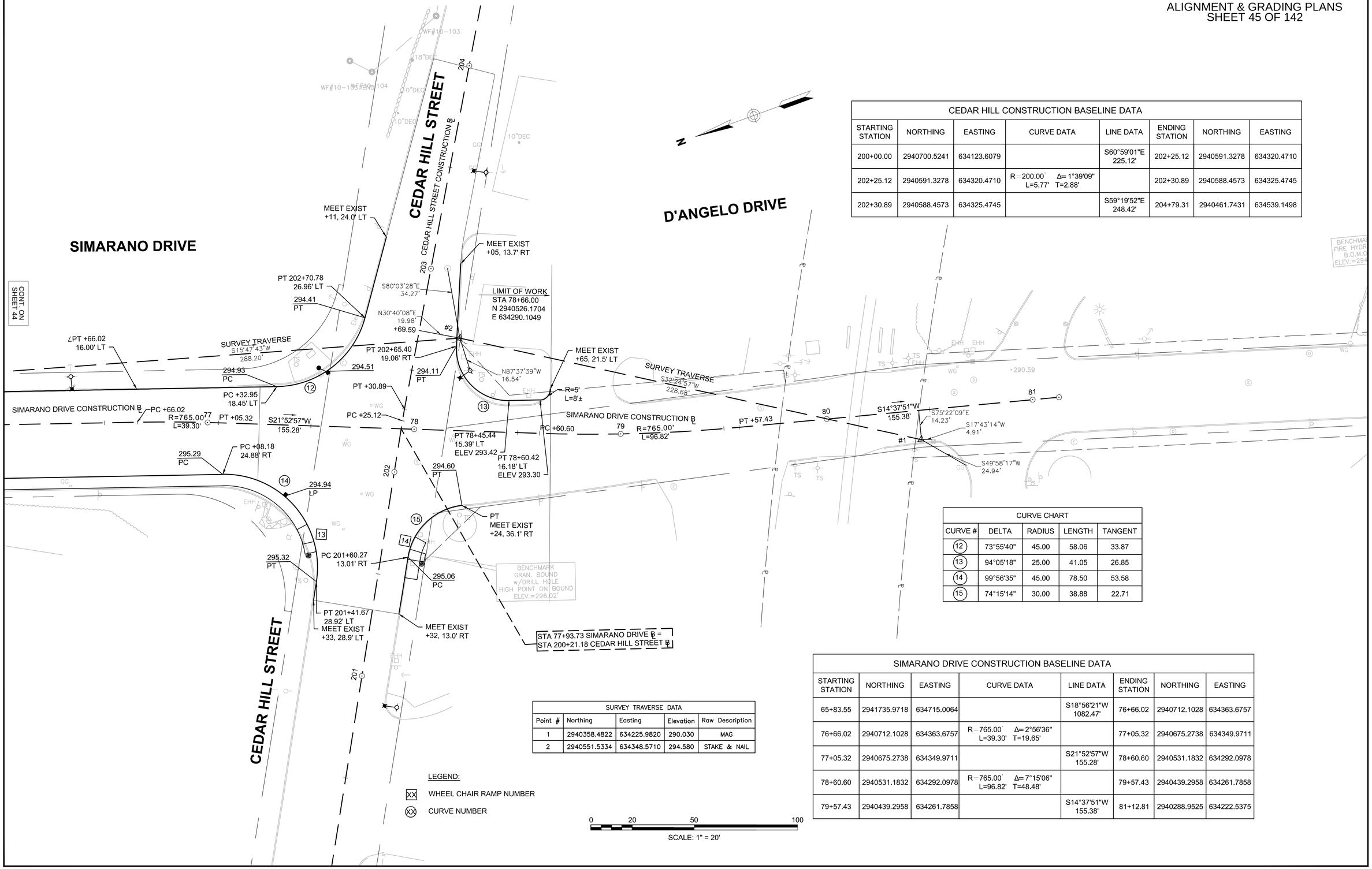
SURVEY TRAVERSE DATA				
Point #	Northing	Easting	Elevation	Raw Description
5	2940828.8491	634427.0190	299.480	STAKE & NAIL
8	2941085.8169	634462.4580	306.555	STAKE & NAIL

0 20 50 100
SCALE: 1" = 20'

LEGEND:
[XX] WHEEL CHAIR RAMP NUMBER
(XX) CURVE NUMBER

MARLBOROUGH
SIMARANO DRIVE
ALIGNMENT & GRADING PLANS
SHEET 45 OF 142

12477 - ALIGN.DWG Plotted on 4-Jun-2014 3:09 PM



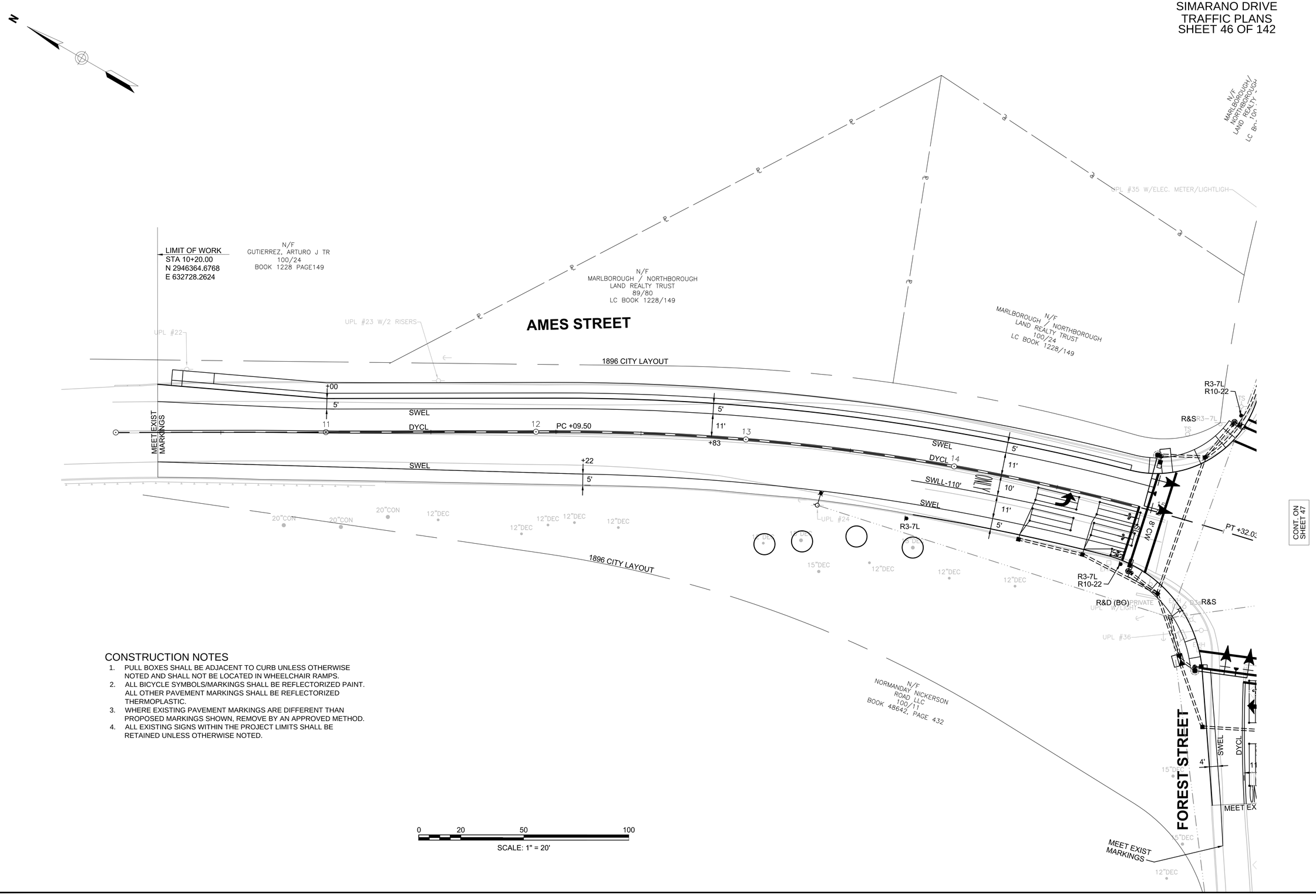
CEDAR HILL CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
200+00.00	2940700.5241	634123.6079		S60°59'01"E 225.12'	202+25.12	2940591.3278	634320.4710
202+25.12	2940591.3278	634320.4710	R=200.00' Δ=1°39'09" L=5.77' T=2.88'		202+30.89	2940588.4573	634325.4745
202+30.89	2940588.4573	634325.4745		S59°19'52"E 248.42'	204+79.31	2940461.7431	634539.1498

CURVE CHART				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
12	73°55'40"	45.00	58.06	33.87
13	94°05'18"	25.00	41.05	26.85
14	99°56'35"	45.00	78.50	53.58
15	74°15'14"	30.00	38.88	22.71

SURVEY TRAVERSE DATA				
Point #	Northing	Easting	Elevation	Raw Description
1	2940358.4822	634225.9820	290.030	MAG
2	2940551.5334	634348.5710	294.580	STAKE & NAIL

SIMARANO DRIVE CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
65+83.55	2941735.9718	634715.0064		S18°56'21"W 1082.47'	76+66.02	2940712.1028	634363.6757
76+66.02	2940712.1028	634363.6757	R=765.00' Δ=2°56'36" L=39.30' T=19.65'		77+05.32	2940675.2738	634349.9711
77+05.32	2940675.2738	634349.9711		S21°52'57"W 155.28'	78+60.60	2940531.1832	634292.0978
78+60.60	2940531.1832	634292.0978	R=765.00' Δ=7°15'06" L=96.82' T=48.48'		79+57.43	2940439.2958	634261.7858
79+57.43	2940439.2958	634261.7858		S14°37'51"W 155.38'	81+12.81	2940288.9525	634222.5375

MARLBOROUGH
SIMARANO DRIVE
TRAFFIC PLANS
SHEET 46 OF 142



CONSTRUCTION NOTES

1. PULL BOXES SHALL BE ADJACENT TO CURB UNLESS OTHERWISE NOTED AND SHALL NOT BE LOCATED IN WHEELCHAIR RAMPS.
2. ALL BICYCLE SYMBOLS/MARKINGS SHALL BE REFLECTORIZED PAINT. ALL OTHER PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC.
3. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
4. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS OTHERWISE NOTED.

12477 - STRP.DWG Plotted on 4-Jun-2014 3:10 PM

MARLBOROUGH
SIMARANO DRIVE
TRAFFIC PLANS
SHEET 47 OF 142

12477 - STRP.DWG Plotted on 4-Jun-2014 3:10 PM

SIMARANO DRIVE

FOREST STREET

MARLB NORTH LAND REC 100' LC BOOK

1896 CITY LAYOUT

CITY LAYOUT

#35 W/ELEC. METER/LIGHTLIGH

MEET EXIST MARKINGS

PROP 8' TS POST
W/PED SIGNAL HEAD
W/APS PED PUSH BUTTON
R10-3e(R)
STA 15+22.0, 51.5' LT

PROP TS POLE
W/25' MAST ARM
W/PED SIGNAL HEAD
W/APS PED PUSH BUTTON
W/R10-3e(L)
W/D3-1, D3-3
STA 14+92.5, 26.0' LT

PROP 8' TS POST
W/PED SIGNAL HEAD
W/APS PED PUSH BUTTON
R10-3e(R)
STA 14+93.0, 31.0' RT

PROP POWER SOURCE

PROP SERVICE CONNECTION

PROP TS 2 TYPE 1 TS CONTROLLER
IN A TYPE 6 BASE MOUNTED CABINET
W/FOUNDATION & CONCRETE PAD
W/GPS SYNCH DEVICE
STA 15+30.0, 64.5' RT

PROP TS POLE
W/25' MAST ARM
W/PED SIGNAL HEAD
W/APS PED PUSH BUTTON
W/R10-3e(L)
STA 15+38.5, 67.5' RT

MEET EXIST
MARKINGS

PROP EMERGENCY
PRE-EMPTION DETECTOR (TYP)

PROP TS POLE
W/35' MAST ARM
W/PED SIGNAL HEAD
W/APS PED PUSH BUTTON
W/R10-3e(L)
STA 15+89.5, 49.5' LT

PROP 8' TS POST
W/PED SIGNAL HEAD
W/APS PED PUSH BUTTON
R10-3e(L)
STA 16+09.5, 36.0' LT

PROP EMERGENCY
PRE-EMPTION STROBE

PROP TS POLE
W/30' MAST ARM
W/PED SIGNAL HEAD
W/APS PED PUSH BUTTON
W/R10-3e(L)
W/D3-1, D3-2
STA 16+21.0, 35.5' RT

PROP 8' TS POST
W/PED SIGNAL HEAD
W/APS PED PUSH BUTTON
W/R10-3e(L)
STA 16+08.5, 53.5' RT

PROP PERM EASEMENT

N/F
ATLANTIC – MARLBOROUGH REALTY TRUST
101/2
BOOK 57382/127

N/F
NEIL FOSSILE
100/10
BOOK 17427, PAGE 241

N/F
HINES GLOBAL REIT
MARLBOROUGH CAMPUS II
100/19
BOOK 57756, PAGE 1

12" SYCHL
(SEE DETAIL ON SHEET 74)

FOR DETAIL SEE SHEET 74

2' BWL
W/4' GAPS

PT +32.03

PC +31.04

CONT. ON SHEET 46

CONT. ON SHEET 49

SCALE: 1" = 20'

CONSTRUCTION NOTES

1. SEE SHEET 48 FOR TRAFFIC SIGNAL DATA.
2. EACH LOOP GROUP SHALL BE SPLICED IN SINGLE PULL BOX AND WIRED TO SEPARATE CONTROLLER INPUT.
3. PULL BOXES SHALL BE ADJACENT TO CURB UNLESS OTHERWISE NOTED AND SHALL NOT BE LOCATED IN WHEELCHAIR RAMPS.
4. ALL BICYCLE SYMBOLS/MARKINGS SHALL BE REFLECTORIZED PAINT. ALL OTHER PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC.
5. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
6. TRAFFIC SIGNAL FOUNDATIONS TO BE LOCATED BY STATION AND OFFSET.
7. THE TOP OF ALL MAST ARM FOUNDATIONS IN SIDEWALK AREAS SHALL BE LOCATED FLUSH WITH FINISH GRADE TO ELIMINATE TRIPPING HAZARDS AND TO MAXIMIZE PATH OF TRAVEL. SEE DETAILS ON SHEET 69.
8. THE TOP OF ALL MAST ARM FOUNDATIONS LOCATED IN GRASSY AREAS SHALL BE LOCATED 3"± ABOVE FINISHED GRADE AS NOTED IN THE STANDARD DETAILS ON SHEET 69.
9. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS OTHERWISE NOTED.
10. TS POST/POLE, WITH PEDESTRIAN PUSH BUTTON, NOT LOCATED WITHIN A PAVED SURFACE SHALL BE POSITIONED SO AS TO PROVIDE A 10" MAX CLEAR REACH ZONE BETWEEN THE PEDESTRIAN PUSH BUTTON AND THE PAVED SURFACE PER 521 CMR AND AS SHOWN IN THE CONSTRUCTION DETAILS ON SHEET 74.

12477 - STRP.DWG Plotted on 4-Jun-2014 3:10 PM

	ø2	ø4	ø6	ø8	ø9(PED)*	
	PERM	PERM	PERM	PERM		

SEQUENCE AND TIMING FOR FULL ACTUATED CONTROL (ISOLATED)

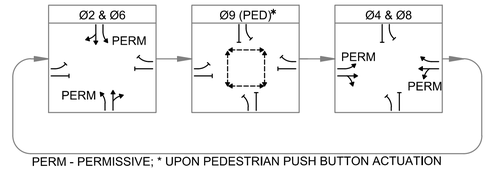
APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	10	11	12	13	14	15	16	17	18	FLASH
FOREST STREET	EB	A,B	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	FY
FOREST STREET	WB	C,D	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	FY
SIMARANO DRIVE	NB	E,F	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	FR
AMES STREET	SB	G,H	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	FR
PEDESTRIAN X–ING	ALL	P1–P8	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W/FDW	DW	DW	OUT
TIMING IN SECONDS																		
MINIMUM GREEN (INITIAL)			10			6			10			6						CONFLICT FLASH OPERATION ONLY
PASSAGE TIME (VEHICLE)			2			2			2			2						
MAXIMUM 1			30			35			30			35						
MAXIMUM 2			30			35			30			35						
YELLOW CLEARANCE				4			3			4			3			3		
RED CLEARANCE					2			2			2			2			1	
PEDESTRIAN WALK															7			
PEDESTRIAN CLEARANCE															16			
DETECTOR MEMORY			NON–LOCK			NON–LOCK			NON–LOCK			NON–LOCK			–			
RECALL			SOFT			OFF			SOFT			OFF			–			
MODE																		

NOTES:
1. AUTOMATIC FLASHING OPERATION PER 2009 M.U.T.C.D., AS AMENDED.
2. * UPON PEDESTRIAN PUSH BUTTON ACTUATION
3. PERM = PERMISSIVE
4. ø4 & ø8 DUAL ENTRY
5. MAXIMUM 1 = NORMAL OPERATION
6. MAXIMUM 2 = NOT USED
7. STOP AND GO OPERATION FOR 24 HOURS PER DAY. FLASHING OPERATION FOR EMERGENCY ONLY.

SEQUENCE & TIMING NOTES:

1. IF THE ASSIGNED RIGHT OF WAY FOR ANY TRAFFIC MOVEMENT IS TO REMAIN IN EFFECT DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATIONS FOR THAT TRAFFIC MOVEMENT WILL NOT CHANGE DURING THE CLEARANCE INTERVAL.
2. THE RIGHT OF WAY MAY BE ASSIGNED TO ANY PHASE OR ANY COMBINATION OF NON-CONFLICTING PHASES.
3. IF CALLS EXIST ON ALL PHASES, THE ASSIGNMENT OF RIGHT OF WAY SHALL BE IN ACCORDANCE WITH THE PREFERENTIAL PHASE SEQUENCE.
4. IF THE ASSIGNED RIGHT-OF-WAY FOR ANY TRAFFIC MOVEMENT IS TO CHANGE DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATION FOR THAT MOVEMENT WILL DISPLAY THE APPROPRIATE CLEARANCE INTERVALS.

PREFERENTIAL PHASE SEQUENCE



PERM - PERMISSIVE; * UPON PEDESTRIAN PUSH BUTTON ACTUATION

EMERGENCY VEHICLE PRE-EMPTION OPERATION

1. EMERGENCY VEHICLE PRE-EMPTION SIGNALS SHALL BE OPTICALLY TRANSMITTED BY OPTICAL EMITTERS MOUNTED IN EMERGENCY VEHICLES AND RECEIVED BY OPTICAL DETECTORS LOCATED AT EACH INTERSECTION.
2. PRE-EMPTION SIGNALS SHALL BE SERVICED ON A PRIORITY BASIS WITH DETECTORS D1, D2, D3 OR D4 ASSIGNED DESCENDING PRIORITIES AS FOLLOWS: (D1 HIGHEST AND D4 LOWEST)
3. IN RESPONSE TO A PRE-EMPTION SIGNAL RECEIVED AT AN INTERSECTION BY OPTICAL DETECTOR D1 (OR D2, D3, D4) THE CONTROLLER SHALL HOLD OR ADVANCE TO AND HOLD IN EMERGENCY VEHICLE PRE-EMPTION PHASE #1 (OR #2, #3, #4) GREEN FOR A MINIMUM OF TEN (10) SECONDS OR UNTIL PRE-EMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME PRE-EMPTION PHASE CLEARANCES FOR THE ASSOCIATED PHASE(S) AS SHOWN IN THE SEQUENCE AND TIMING CHART AND SERVICE SUBSEQUENT EMERGENCY VEHICLE PRE-EMPTION PHASES AS NECESSARY.
4. MINIMUM GREEN AND NORMAL VEHICLE CLEARANCE SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PRE-EMPTION DEMAND.
5. PRE-EMPTION STROBE SHALL BE ILLUMINATED WHENEVER ANY EMERGENCY VEHICLE PRE-EMPTION GREEN IS ON.

PRE-EMPTION PHASING & PRIORITY

DETECTOR & PRIORITY	PRE-EMPT PHASE ASSIGNMENT	MOVEMENT	VEHICLE PHASE ASSIGNMENT
D1	1		Ø6
D2	2		Ø8
D3	3		Ø2
D4	4		Ø4

LIST OF MAJOR ITEMS REQUIRED

FOREST STREET AT SIMARANO DRIVE/AMES STREET

PAY ITEM	QUANTITY	DESCRIPTION
816.01	1	8Ø TS 2 TYPE 1 CONTROLLER IN A TYPE 6 BASE MOUNTED CABINET INCLUDING FOUNDATION AND CONCRETE PAD
	1	GPS TIME SYNCH UNIT
	2	TS 25' MAST ARM TYPE 2, HEAVY LOADING, STEEL, INCL. FOUNDATION
	1	TS 30' MAST ARM TYPE 2, HEAVY LOADING, STEEL, INCL. FOUNDATION
	1	TS 35' MAST ARM TYPE 2, HEAVY LOADING, STEEL, INCL. FOUNDATION
	4	TS POST 8' STANDARD INCL. FOUNDATION
	8	SIGNAL HEAD, 3-SECTION, 12" LENSES
	8	PEDESTRIAN SIGNAL HEAD
	6	APS PEDESTRIAN PUSH BUTTON W/R10-3e(L) AND SIGN SADDLE
	2	APS PEDESTRIAN PUSH BUTTON W/R10-3e(R) AND SIGN SADDLE
	5	TYPE C, 2-CHANNEL CARD RACK LOOP DETECTOR AMPLIFIER
	18	WIRE LOOP DETECTOR
	4	EMERGENCY PRE-EMPTION OPTICAL DETECTORS & DETECTOR CABLE
	1	EMERGENCY PRE-EMPTION 4 CHANNEL PHASE SELECTOR
	1	EMERGENCY PRE-EMPTION SYSTEM CHASSIS
	1	EMERGENCY PRE-EMPTION STROBE (WHITE LENS)
	1	SERVICE CONNECTION (OVERHEAD)
	11	PULL BOX-12"x12"

PLUS NECESSARY DUCT, CABLE, LABOR, MISCELLANEOUS MATERIAL AND EQUIPMENT TO COMPLETE THE INSTALLATION AND PROVIDE AN OPERATING TRAFFIC CONTROL SIGNAL.

LOOP DETECTOR DATA

DETECTOR NO.	NO. SECTION/ SIZE	NO. OF TURNS	OPERATIONS	DELAY /EXT	CALL PHASE	LOOP CONNECTION
1	2-6'X20' QUADRUPOLE	2-4-2	PRESENCE	0	Ø2	SERIES
2	2-6'X20' QUADRUPOLE	2-4-2	PRESENCE	0	Ø2	SERIES
3	2-6'X20' QUADRUPOLE	2-4-2	PRESENCE	0	Ø6	SERIES
4	2-6'X20' QUADRUPOLE	2-4-2	PRESENCE	0	Ø6	SERIES
5	2-6'X20' QUADRUPOLE	2-4-2	PRESENCE	0	Ø8	SERIES
6	2-6'X20' QUADRUPOLE	2-4-2	PRESENCE	0	Ø8	SERIES
7	1-3'X6'	4	PRESENCE	0	Ø8	BIKE/ SINGLE
8	2-6'X20' QUADRUPOLE	2-4-2	PRESENCE	0	Ø4	SERIES
9	1-3'X6'	4	PRESENCE	0	Ø4	BIKE/ SINGLE
10	2-6'X20' QUADRUPOLE	2-4-2	PRESENCE	5 SEC DELAY	Ø4	SERIES

NOTES: 1. DELAY AND EXTENSION TIMINGS SHALL BE PROGRAMMED IN THE CONTROLLER ONLY

SIGNAL HEAD DATA

A,B,C,D,E,F,G,H	P1-P8
R Y G	W/COUNTDOWN TIMER
ALL 12" LENS	

NOTES:
1. ALL SIGNAL HEADS SHALL BE RIGID MOUNTED.
2. ALL SIGNAL HEADS SHALL BE EQUIPPED WITH 5"± LOUVERED BACKPLATES.
3. ALL SIGNAL HEADS SHALL BE EQUIPPED TUNNEL VISORS.
4. ALL SIGNAL DISPLAYS SHALL BE EQUIPPED W/L.E.D. MODULES.

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CONT. ON SHEET 47

N

SIMARANO DRIVE

FOR DETAIL SEE SHEET 74

1896 CITY LAYOUT

R1-1

R&S
R1-1

8' CW

PRIVATE

R3-17

5'
11'
11'
5'

PT +62.37

PC +46.28

PC +31.04

SWEL

DYCL

SWEL

SWEL

DYCL

SWEL

20 21 22 23 24 25 26

UPL #20 W/2 RISERS

UPL #19

UPL #18

UPL #17

1896 CITY LAYOUT

R3-17

R3-17

R3-17

N/F
ATLANTIC – MARLBOROUGH REALTY TRUST
101/2
BOOK 57382/127

N/F
HINES GLOBAL REIT
MARLBOROUGH CAMPUS II LLC
100/19
BOOK 57756, PAGE 1

N/F
HINES GLOBAL REIT
MARLBOROUGH CAMPUS II LLC
100/19
BOOK 57756, PAGE 1

CONT. ON SHEET 50

CONSTRUCTION NOTES

1. ALL BICYCLE SYMBOLS/MARKINGS SHALL BE REFLECTORIZED PAINT. ALL OTHER PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC.
2. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
3. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS OTHERWISE NOTED.

0 20 50 100

SCALE: 1" = 20'

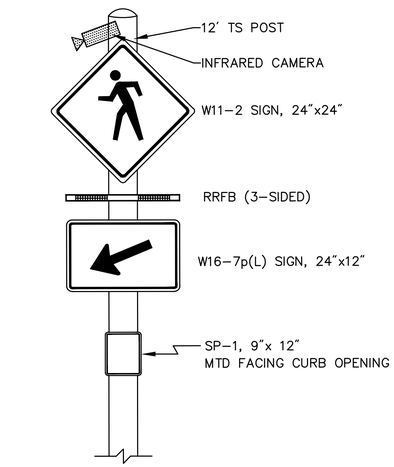
12477 - STRP-DWG Plotted on 4-Jun-2014 3:11 PM

CONSTRUCTION NOTES

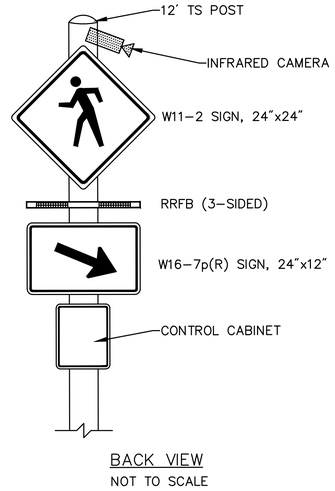
1. PULL BOXES SHALL BE ADJACENT TO CURB UNLESS OTHERWISE NOTED AND SHALL NOT BE LOCATED IN WHEELCHAIR RAMPS.
2. ALL BICYCLE SYMBOLS/MARKINGS SHALL BE REFLECTORIZED PAINT. ALL OTHER PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC.
3. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
4. TRAFFIC SIGNAL FOUNDATIONS TO BE LOCATED BY STATION AND OFFSET.
5. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS OTHERWISE NOTED.

OPERATIONAL NOTES:

1. RRFBS SHALL WIG-WAG FLASH WHEN ACTIVATED BY INFRARED CAMERA.
2. DURATION OF RRFB UPON RECEIPT OF VALID INFRARED CAMERA ACTUATION SHALL BE INITIALLY SET FOR 15 SECONDS.
3. THE SYSTEM SHALL BE CAPABLE OF PROVIDING A FLASHING RATE OF 70 TO 80 CYCLES PER MINUTE.
4. SEE SPECIAL PROVISIONS, ITEM 824.401, FOR MORE DETAILS.



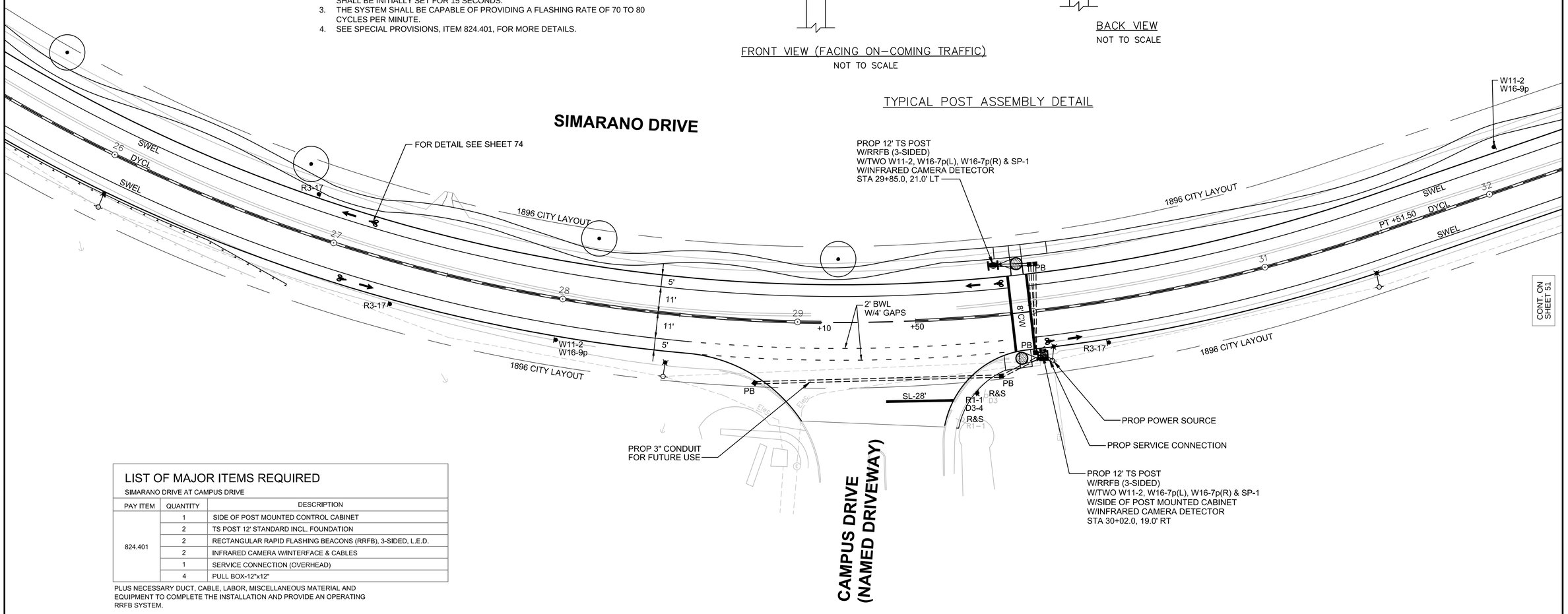
FRONT VIEW (FACING ON-COMING TRAFFIC)
NOT TO SCALE



BACK VIEW
NOT TO SCALE

TYPICAL POST ASSEMBLY DETAIL

CONT. ON SHEET 49



CONT. ON SHEET 51

LIST OF MAJOR ITEMS REQUIRED

SIMARANO DRIVE AT CAMPUS DRIVE

PAY ITEM	QUANTITY	DESCRIPTION
824.401	1	SIDE OF POST MOUNTED CONTROL CABINET
	2	TS POST 12' STANDARD INCL. FOUNDATION
	2	RECTANGULAR RAPID FLASHING BEACONS (RRFB), 3-SIDED, L.E.D.
	2	INFRARED CAMERA W/INTERFACE & CABLES
	1	SERVICE CONNECTION (OVERHEAD)
	4	PULL BOX-12"x12"

PLUS NECESSARY DUCT, CABLE, LABOR, MISCELLANEOUS MATERIAL AND EQUIPMENT TO COMPLETE THE INSTALLATION AND PROVIDE AN OPERATING RRFB SYSTEM.

0 20 50 100
SCALE: 1" = 20'

MARLBOROUGH
SIMARANO DRIVE
TRAFFIC PLANS
SHEET 51 OF 142

12477 - STRP.DWG Plotted on 4-Jun-2014 3:11 PM

N

N/F
ATLANTIC – MARLBOROUGH REALTY TRUST
101/2
BOOK 57382/127

CONT. ON SHEET 50

SIMARANO DRIVE

N/F
ATLANTIC – MARLBOROUGH REALTY TRUST
101/2
BOOK 57382/127

BAY DRIVE (NAMED DRIVEWAY)

DPCR
PRIVATE
SL-33'
8' CW
SWEL
DYCL
SWEL

W11-2
W16-9p
R3-17
R3-17
R3-17
R3-17

PT +51.50
DYCL
SWEL

32
33
34
35
36
37

5'
11'
11'
5'

1896 CITY LAYOUT
1896 CITY LAYOUT

UPL #14
UPL #13
UPL #12 W/TRANS
UPL #11 W/UTILITY BOX

FOR DETAIL SEE SHEET 74

CONT. ON SHEET 52

N/F
HINES GLOBAL REIT
MARLBOROUGH CAMPUS II LLC
100/19
BOOK 57756, PAGE 1

CONSTRUCTION NOTES

1. ALL BICYCLE SYMBOLS/MARKNGS SHALL BE REFLECTORIZED PAINT. ALL OTHER PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC.
2. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
3. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS OTHERWISE NOTED.

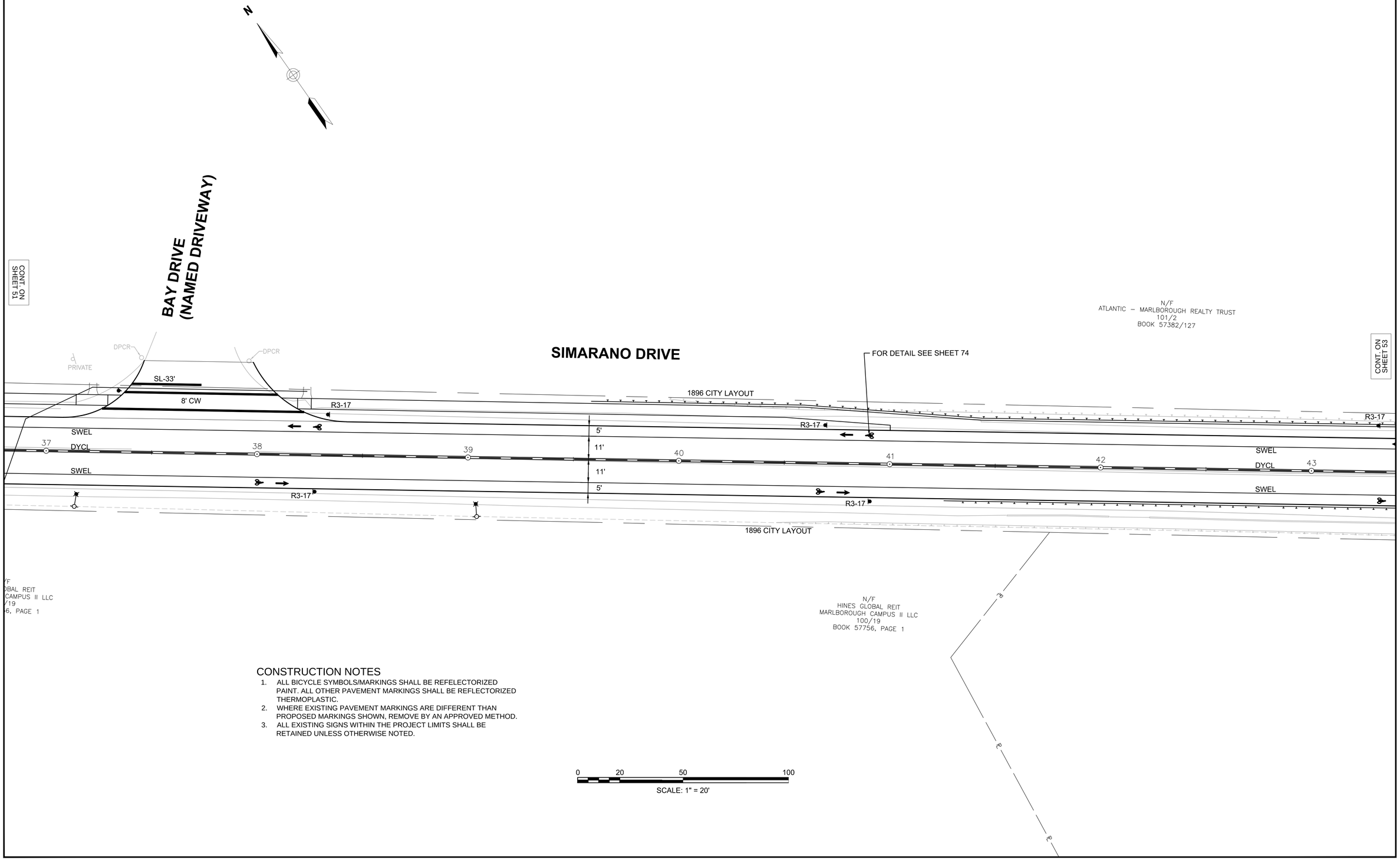
0 20 50 100

SCALE: 1" = 20'

MARLBOROUGH
SIMARANO DRIVE
TRAFFIC PLANS
SHEET 52 OF 142

12477 - STRP.DWG Plotted on 4-Jun-2014 3:11 PM

CONT. ON SHEET 51



CONT. ON SHEET 53

CONSTRUCTION NOTES

1. ALL BICYCLE SYMBOLS/MARKINGS SHALL BE REFELECTORIZED PAINT. ALL OTHER PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC.
2. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
3. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS OTHERWISE NOTED.

0 20 50 100

SCALE: 1" = 20'

12477 - STRP.DWG Plotted on 4-Jun-2014 3:11 PM

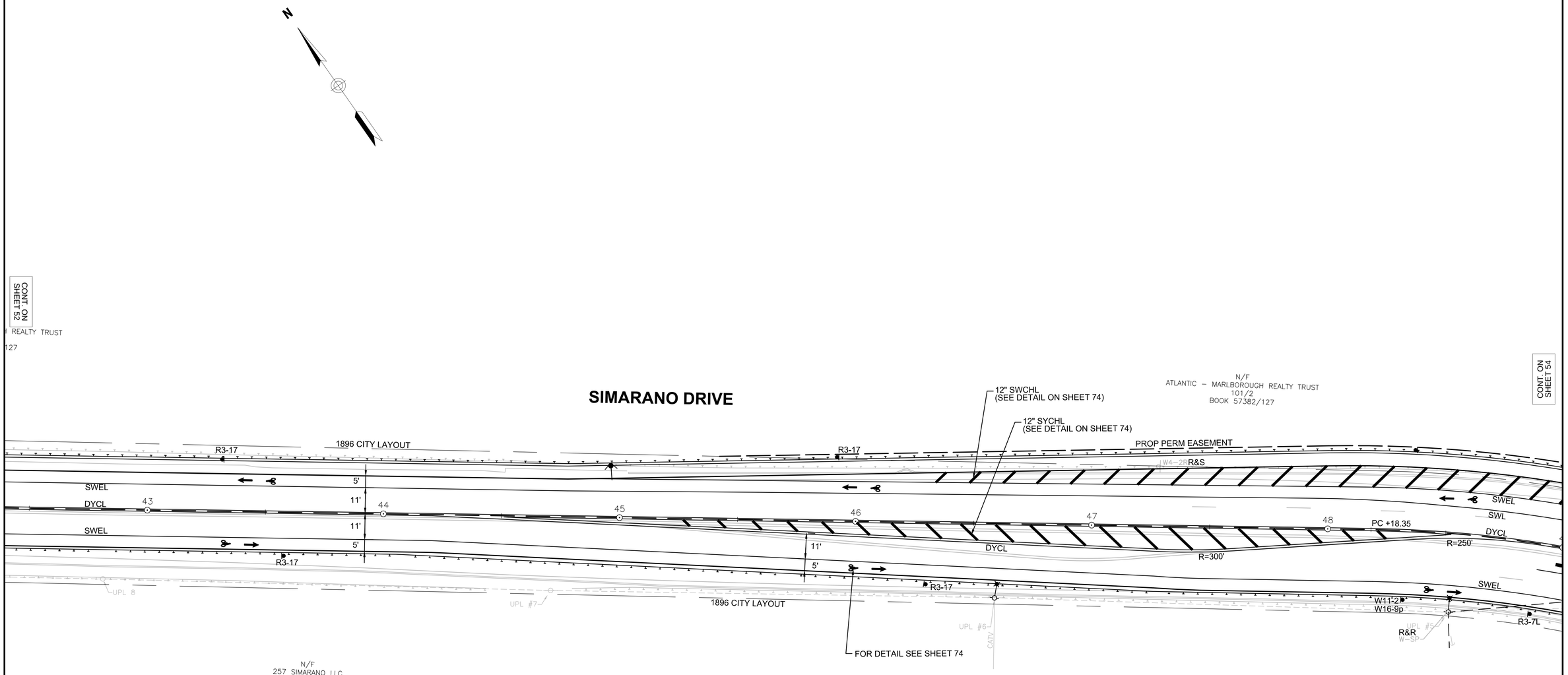
CONT. ON SHEET 52

REALTY TRUST
127

CONT. ON SHEET 54

N/F
ATLANTIC – MARLBOROUGH REALTY TRUST
101/2
BOOK 57382/127

SIMARANO DRIVE



N/F
257 SIMARANO LLC
112/4
BOOK 50633, PAGE 448

N/F
257 SIMARANO LLC
112/4
BOOK 50633, PAGE 448

CONSTRUCTION NOTES

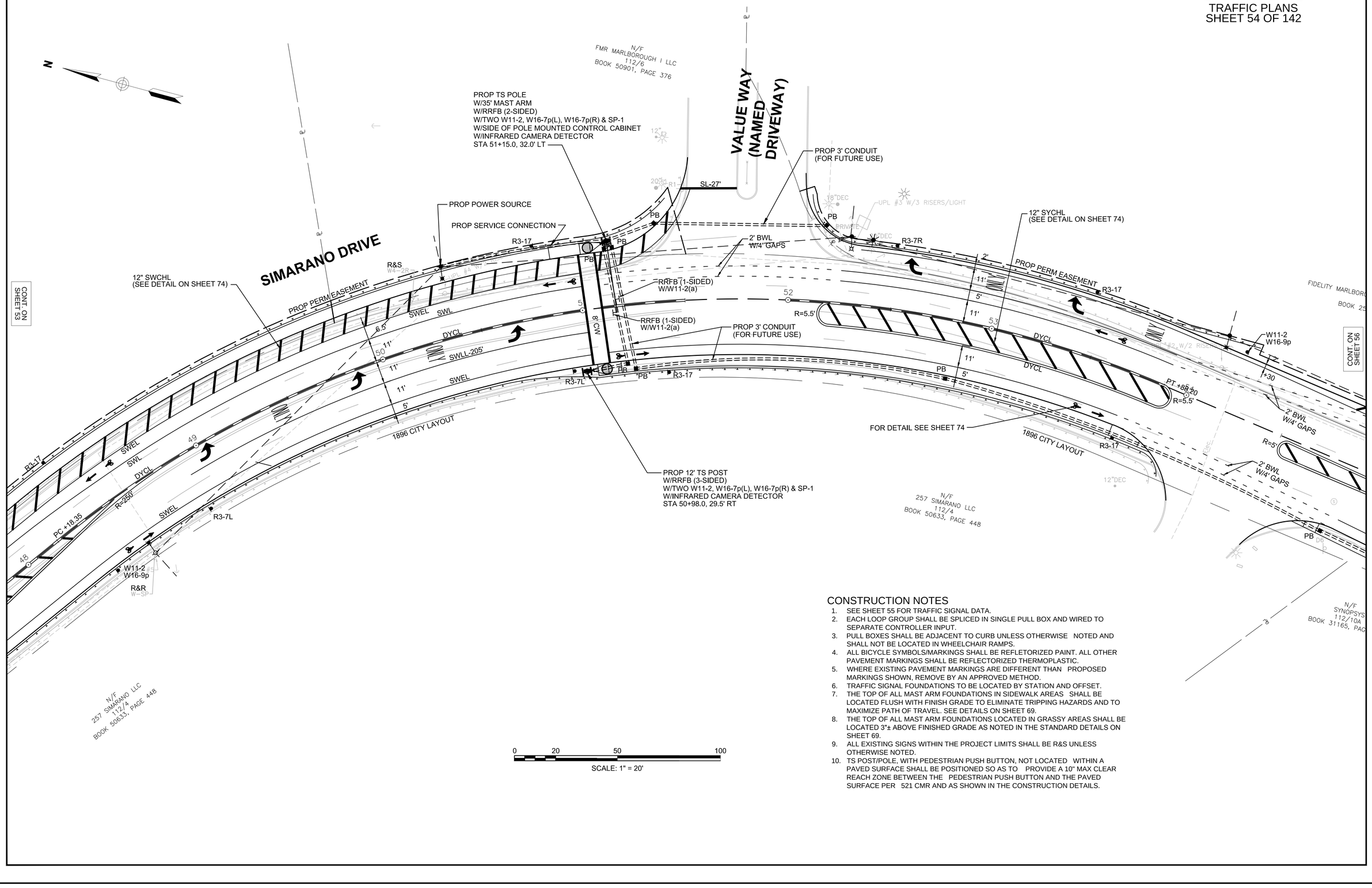
1. ALL BICYCLE SYMBOLS/MARKINGS SHALL BE REFLECTORIZED PAINT. ALL OTHER PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC.
2. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
3. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS OTHERWISE NOTED.

0 20 50 100

SCALE: 1" = 20'

MARLBOROUGH
SIMARANO DRIVE
TRAFFIC PLANS
SHEET 54 OF 142

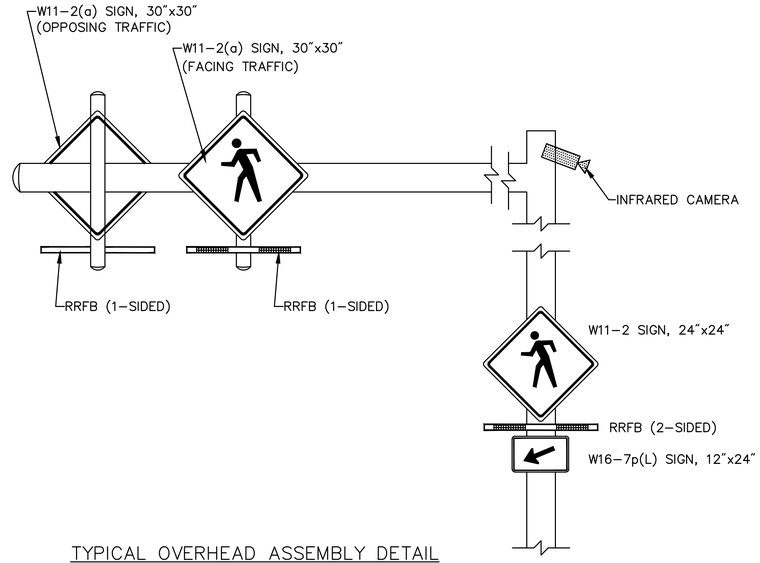
12477 - STRP.DWG Plotted on 4-Jun-2014 3:11 PM



CONSTRUCTION NOTES

1. SEE SHEET 55 FOR TRAFFIC SIGNAL DATA.
2. EACH LOOP GROUP SHALL BE SPLICED IN SINGLE PULL BOX AND WIRED TO SEPARATE CONTROLLER INPUT.
3. PULL BOXES SHALL BE ADJACENT TO CURB UNLESS OTHERWISE NOTED AND SHALL NOT BE LOCATED IN WHEELCHAIR RAMPS.
4. ALL BICYCLE SYMBOLS/MARKINGS SHALL BE REFLETORIZED PAINT. ALL OTHER PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC.
5. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
6. TRAFFIC SIGNAL FOUNDATIONS TO BE LOCATED BY STATION AND OFFSET.
7. THE TOP OF ALL MAST ARM FOUNDATIONS IN SIDEWALK AREAS SHALL BE LOCATED FLUSH WITH FINISH GRADE TO ELIMINATE TRIPPING HAZARDS AND TO MAXIMIZE PATH OF TRAVEL. SEE DETAILS ON SHEET 69.
8. THE TOP OF ALL MAST ARM FOUNDATIONS LOCATED IN GRASSY AREAS SHALL BE LOCATED 3"± ABOVE FINISHED GRADE AS NOTED IN THE STANDARD DETAILS ON SHEET 69.
9. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE R&S UNLESS OTHERWISE NOTED.
10. TS POST/POLE, WITH PEDESTRIAN PUSH BUTTON, NOT LOCATED WITHIN A PAVED SURFACE SHALL BE POSITIONED SO AS TO PROVIDE A 10" MAX CLEAR REACH ZONE BETWEEN THE PEDESTRIAN PUSH BUTTON AND THE PAVED SURFACE PER 521 CMR AND AS SHOWN IN THE CONSTRUCTION DETAILS.

12477 - STRP.DWG Plotted on 4-Jun-2014 3:11 PM



TYPICAL OVERHEAD ASSEMBLY DETAIL
NOT TO SCALE

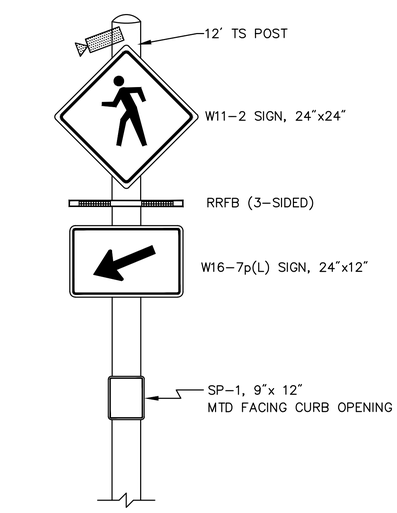
OPERATIONAL NOTES:
1. RRFBS SHALL WIG-WAG FLASH WHEN ACTIVATED BY INFRARED CAMERA.
2. DURATION OF RRFB UPON RECEIPT OF VALID INFRARED CAMERA ACTUATION SHALL BE INITIALLY SET FOR 25 SECONDS.
3. THE SYSTEM SHALL BE CAPABLE OF PROVIDING A FLASHING RATE OF 70 TO 80 CYCLES PER MINUTE.
4. SEE SPECIAL PROVISIONS, ITEM 824.402, FOR MORE DETAILS.

LIST OF MAJOR ITEMS REQUIRED

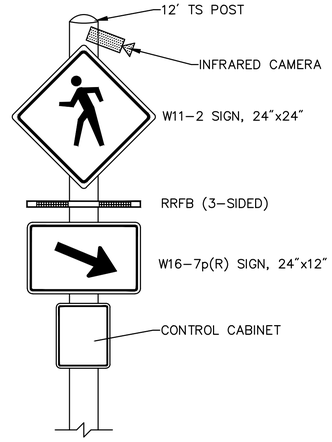
SIMARANO DRIVE AT VALUE WAY

PAY ITEM	QUANTITY	DESCRIPTION
824.402	1	SIDE OF POLE MOUNTED CONTROL CABINET
	1	TS 35' MAST ARM TYPE 2, HEAVY LOADING, STEEL, INCL. FOUNDATION
	1	TS POST 12' STANDARD INCL. FOUNDATION
	1	RECTANGULAR RAPID FLASHING BEACONS (RRFB), 3-SIDED, L.E.D. (POST MOUNTED)
	1	RECTANGULAR RAPID FLASHING BEACONS (RRFB), 2-SIDED, L.E.D. (POLE MOUNTED)
	2	RECTANGULAR RAPID FLASHING BEACONS (RRFB), 1-SIDED, L.E.D. (MAST ARM MOUNTED)
	2	INFRARED CAMERA DETECTOR W/INTERFACE & CABLES
	1	SERVICE CONNECTION (OVERHEAD)
	10	PULL BOX-12"x12"

PLUS NECESSARY DUCT, CABLE, LABOR, MISCELLANEOUS MATERIAL AND EQUIPMENT TO COMPLETE THE INSTALLATION AND PROVIDE AN OPERATING RRFB SYSTEM.



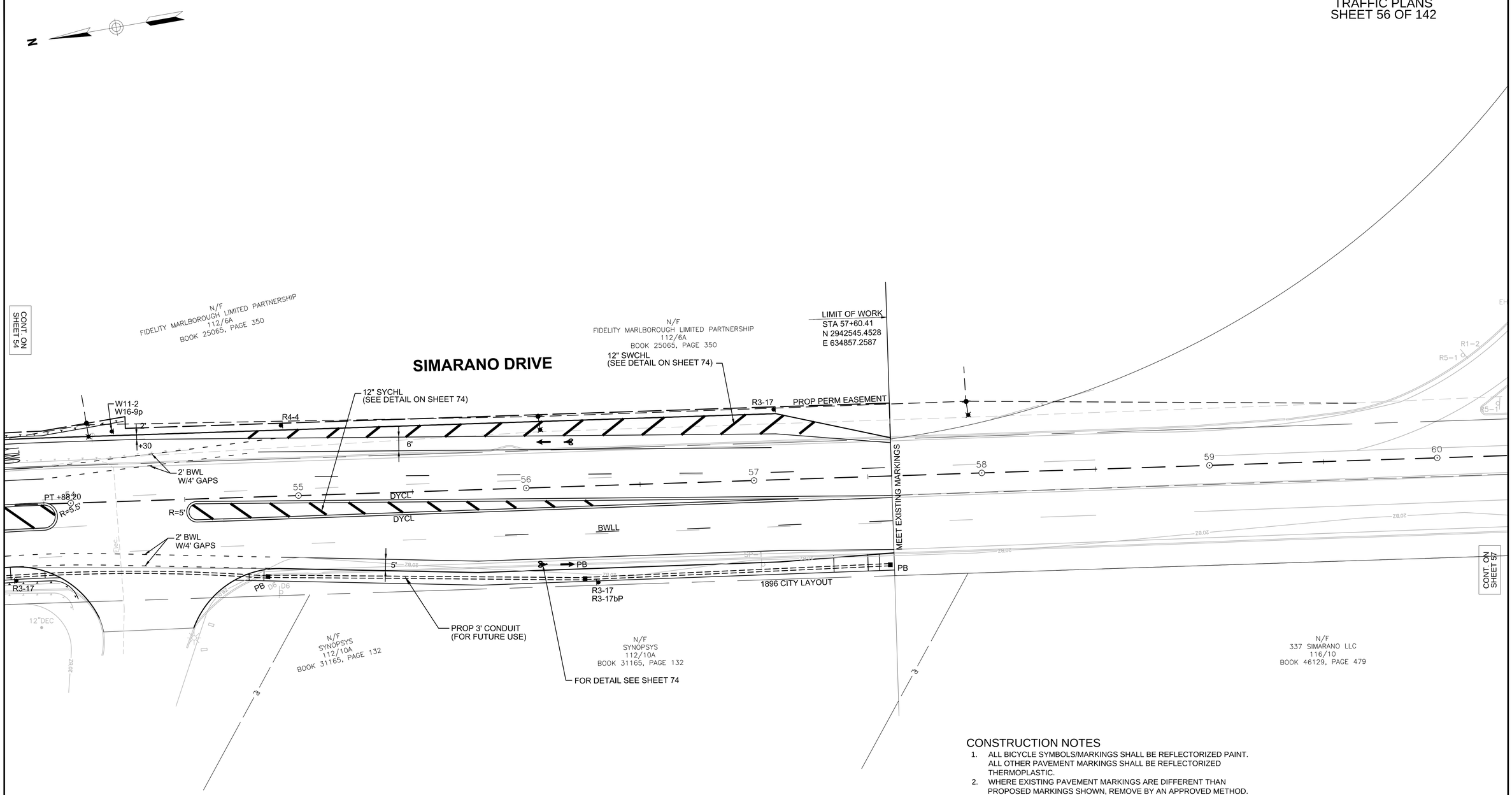
FRONT VIEW (FACING ON-COMING TRAFFIC)
NOT TO SCALE



BACK VIEW
NOT TO SCALE

TYPICAL POST ASSEMBLY DETAIL

MARLBOROUGH
SIMARANO DRIVE
TRAFFIC PLANS
SHEET 56 OF 142



CONSTRUCTION NOTES

1. ALL BICYCLE SYMBOLS/MARKINGS SHALL BE REFLECTORIZED PAINT. ALL OTHER PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC.
2. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
3. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS OTHERWISE NOTED.

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MARLBOROUGH
SIMARANO DRIVE
TRAFFIC PLANS
SHEET 57 OF 142

12477 - STRP.DWG Plotted on 4-Jun-2014 3:12 PM

N

I-495 EXIT 23C

SIMARANO DRIVE

CONT. ON SHEET 56

CONT. ON SHEET 58

1896 CITY LAYOUT

PC +99.83

64+42.11

PT

60 61 62 63 64 65

OM-1 R3-3 R3-8L R4-7 R4-10L R1-2 R5-1 R6-1 R5-1' D6 D8 D3-S6 R4-2R

WF#8-204 WF#8-205 WF#8-206

WF#7-208 WF#7-209 WF#7-210 WF#7-211 END WF#7-400 START WF#7-401 WF#7-402 WF#7-403 WF#7-404 WF#7-405 WF#7-406

UPL #10-5 W/3 TRANS. UPL #11 UPL #1 W/TRANS. UPL #9 UPL #8 W/2 RISERS/LIGHT

"ADOPT HIGHWAY" 8"DEC GPL EHH TS SP-1 STOP LINE PRIVATE

SWL SYL DYL WG Elec. 20"BZ

N/F
BP CRANE MEADOW LLC
116/2
BOOK 32163, PAGE 598

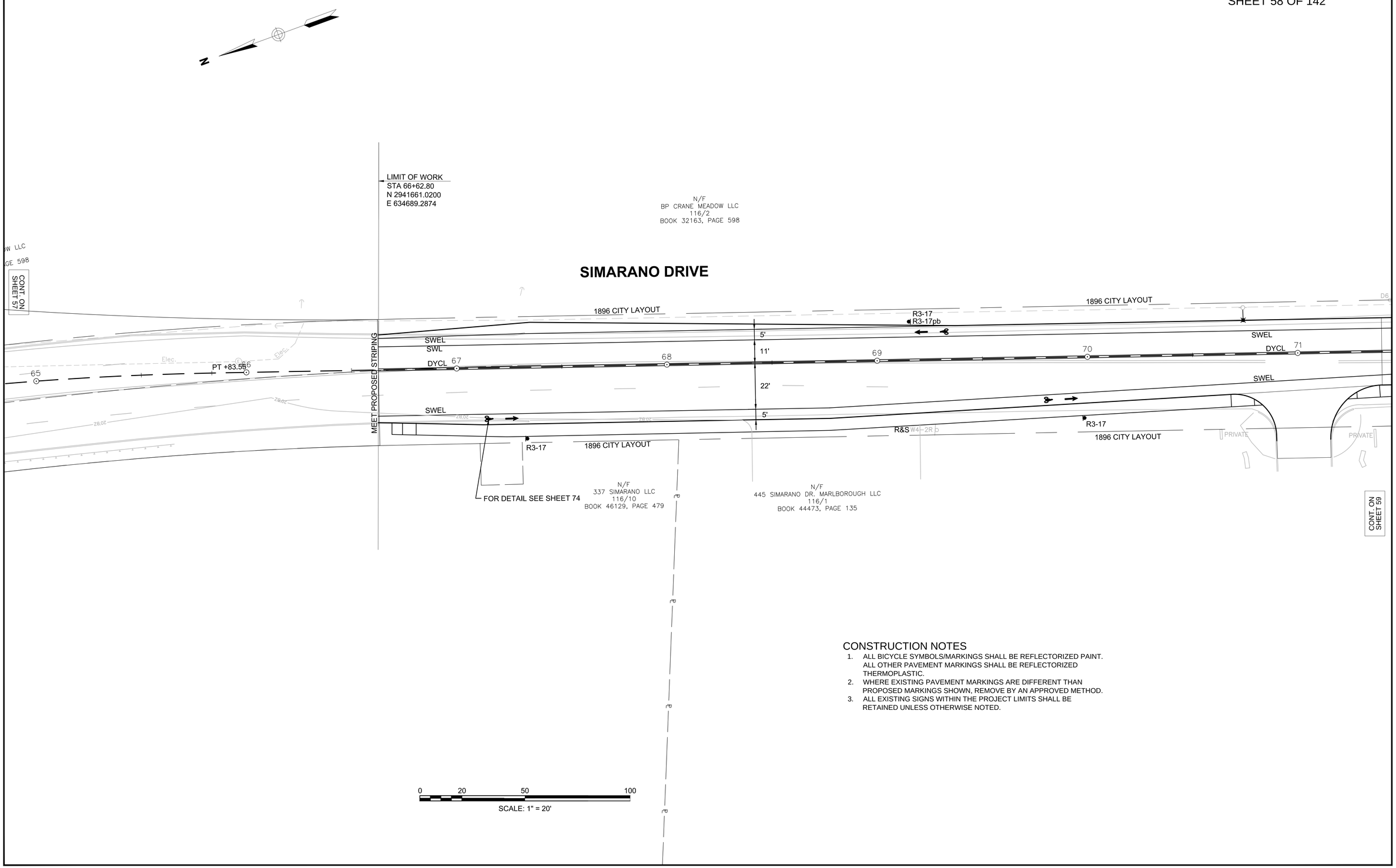
N/F
337 SIMARANO LLC
116/10
BOOK 46129, PAGE 479

N/F
337 SIMARANO LLC
116/10
BOOK 46129, PAGE 479

0 20 50 100

SCALE: 1" = 20'

MARLBOROUGH
SIMARANO DRIVE
TRAFFIC PLANS
SHEET 58 OF 142



CONSTRUCTION NOTES

1. ALL BICYCLE SYMBOLS/MARKINGS SHALL BE REFLECTORIZED PAINT. ALL OTHER PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC.
2. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
3. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS OTHERWISE NOTED.

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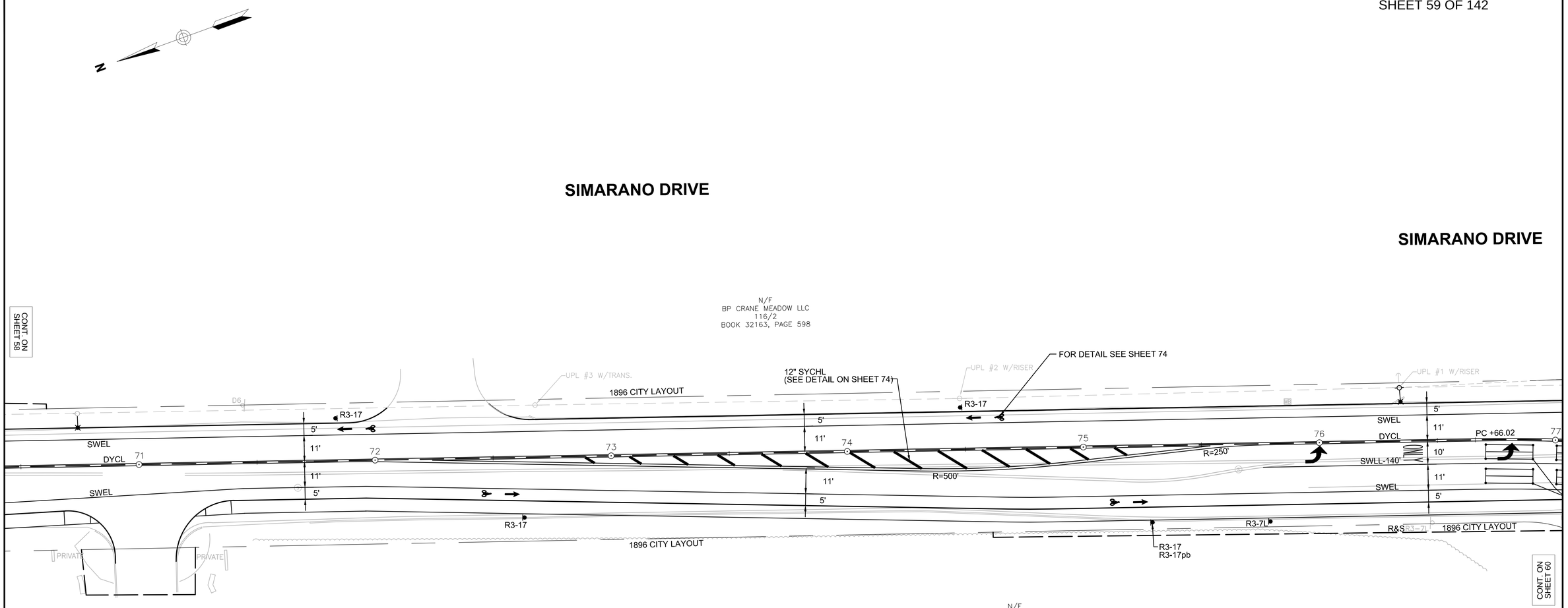
MARLBOROUGH
SIMARANO DRIVE
TRAFFIC PLANS
SHEET 59 OF 142

12477 - STRP.DWG Plotted on 4-Jun-2014 3:12 PM

SIMARANO DRIVE

SIMARANO DRIVE



CONSTRUCTION NOTES

1. EACH LOOP GROUP SHALL BE SPLICED IN SINGLE PULL BOX AND WIRED TO SEPARATE CONTROLLER INPUT.
2. ALL BICYCLE SYMBOLS/MARKINGS SHALL BE REFLECTORIZED PAINT. ALL OTHER PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC.
3. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
4. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS OTHERWISE NOTED.

0 20 50 100

SCALE: 1" = 20'

N/F
445 SIMARANO DR. MARLBOROUGH LLC
116/1
BOOK 44473, PAGE 135

MARLBOROUGH
SIMARANO DRIVE
TRAFFIC PLANS
SHEET 60 OF 142

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SIMARANO DRIVE

CEDAR HILL STREET

D'ANGELO DRIVE

RAILROAD

CONT. ON SHEET 59

MODIFY EXIST TS CONTROLLER TO ACCOMMODATE PROPOSED PHASING & TIMINGS SHOWN
PROP GPS SYNCH DEVICE

LIMIT OF WORK
STA 78+66.00
N 2940526.1704
E 634290.1049

EXIST RR CABINET

MEET EXIST MARKINGS

12" SYCHL
(SEE DETAIL ON SHEET 74)

PROP 8' TS POST
W/PED SIGNAL HEAD
W/PED PUSH BUTTON
R10-3e(L)
STA 77+51.0, 63.0' RT

PROP 8' TS POST
W/PED SIGNAL HEAD
W/PED PUSH BUTTON
R10-3e(R)
STA 78+06.0, 65.0' RT

BREAK INTO EXIST PB

BREAK INTO EXIST PB

MEET EXIST MARKINGS

R3-7L
R10-22

N/F
BP CRANE MEP
116/2
BOOK 32163, F

N/F
TMX PROPERTY LLC
116/9
BOOK 56676, PAGE 242

N/F
CCHS LLC
118/2
BOOK 41530, PAGE 158

N/F
SURBURBAN PROPANE LP
116/6
BOOK 34656, PAGE 382

N/F
MIP REALTY TRUST
116/8
BOOK 15705, PAGE 199

N/F
MARLBOROUGH LLC
PAGE 135

CONSTRUCTION NOTES

1. SEE SHEET 61 FOR TRAFFIC SIGNAL DATA.
2. RETAIN ALL EXISTING TS EQUIPMENT AND ALL TS CONDUIT UNLESS OTHERWISE NOTED.
3. EACH LOOP GROUP SHALL BE SPLICED IN SINGLE PULL BOX AND WIRED TO SEPARATE CONTROLLER INPUT.
4. PULL BOXES SHALL BE ADJACENT TO CURB UNLESS OTHERWISE NOTED AND SHALL NOT BE LOCATED IN WHEELCHAIR RAMPS.
5. ALL BICYCLE SYMBOLS/MARKINGS SHALL BE REFLECTORIZED PAINT. ALL OTHER PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC.
6. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
7. TRAFFIC SIGNAL FOUNDATIONS TO BE LOCATED BY STATION AND OFFSET.
8. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS OTHERWISE NOTED.
9. TS POST/POLE, WITH PEDESTRIAN PUSH BUTTON, NOT LOCATED WITHIN A PAVED SURFACE SHALL BE POSITIONED SO AS TO PROVIDE A 10" MAX CLEAR REACH ZONE BETWEEN THE PEDESTRIAN PUSH BUTTON AND THE PAVED SURFACE PER 521 CMR AND AS SHOWN IN THE CONSTRUCTION DETAILS.

0 20 50 100
SCALE: 1" = 20'

MARLBOROUGH
SIMARANO DRIVE
TRAFFIC PLANS
SHEET 61 OF 142

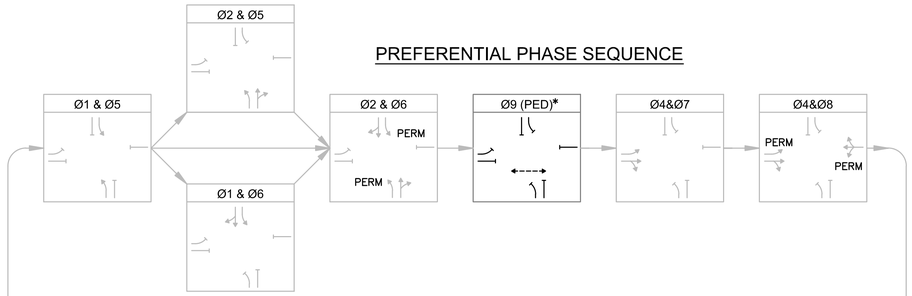
12477 - STRP.DWG Plotted on 4-Jun-2014 3:13 PM

	ø1	ø2	ø4	ø5	ø6	ø7	ø8	ø9(PED)*	RAILROAD PRE–EMPTION				
		PERM	PERM		PERM				VARIES			PERM	PERM

SEQUENCE AND TIMING FOR FULL ACTUATED CONTROL (ISOLATED)																							CLEARANCE PHASE					DWELL PHASE			
APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	FLASH
CEDAR HILL ST	WB	A	R	R	R	G	Y	R	R	R	R	G–R	Y–R	R	R	R	R	R	R	R	R	R	R	R	R	R	Y–/R OR Y	R	R	R	R	G	Y	R	FY
CEDAR HILL ST	WB	B	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	Y	R	R	R	R	G	Y	R	FY
CEDAR HILL ST	EB	C	G–R	Y–R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	Y–/R OR Y	R	R	R	R	G	Y	R	FY
CEDAR HILL ST	EB	D	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	Y	R	R	R	R	G	Y	R	FY
SIMARANO DR	SB	E	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	G–R	Y–R	R	R	R	R	R	R	R	Y–/R OR Y	R	R	R	R	R	R	R	FR
SIMARANO DR	SB	F	R	R	R	G	Y	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	Y	R	R	R	R	R	R	R	FR
D'ANGELO DR	NB	G,H	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	G	G	G	Y	R	R	R	R	FR
D'ANGELO DR	SB	J,K	G	Y	R	G	Y	R	G	Y	R	G	Y	R	G	Y	R	G	Y	R	G	Y	R	G	Y	R	Y	R	R	R	R	R	R	R	FR
D'ANGELO DR	NB	L,M	G	Y	R	G	Y	R	G	Y	R	G	Y	R	G	Y	R	G	Y	R	G	Y	R	G	Y	R	Y	R	R	R	R	R	R	R	FR
PEDESTRIAN X–ING	ALL	P1–P2	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W/FDW	DW	DW	FDW	DW	DW	DW	DW	DW	DW	DW	OUT
TIMING IN SECONDS																																			
MINIMUM GREEN (INITIAL)			6			10			6			6			10			6			6								16						CONFLICT FLASH OPERATION ONLY
PASSAGE TIME (VEHICLE)			2			2			2			2			2			2			2								2						
MAXIMUM 1			20			30			30			15			30			15			25								24			**			
MAXIMUM 2			15			30			30			15			30			15			30														
YELLOW CLEARANCE				4			4			4			4			4			4			4			3			4				4		
RED CLEARANCE					1			1			1			1			1			1			1			1		1			1			1	
PEDESTRIAN WALK																								7											
PEDESTRIAN CLEARANCE																								10			10								
DETECTOR MEMORY			NON–LOCK			NON–LOCK			NON–LOCK			NON–LOCK			NON–LOCK			NON–LOCK			NON–LOCK			–											
RECALL			OFF			SOFT			OFF			OFF			SOFT			OFF			OFF			OFF											
MODE																																			

NOTES:
1. AUTOMATIC FLASHING OPERATION PER 2009 M.U.T.C.D., AS AMENDED.
2. * UPON PEDESTRIAN PUSH BUTTON ACTUATION
3. ** DURATION OF THE RAILROAD PRE–EMPT DWELL SHALL BE PROGRAMMED WITH AUTHORIZED CONRAIL AND CITY OF MARLBOROUGH PERSONNEL.
4. PERM = PERMISSIVE
5. ø4 & ø8 DUAL ENTRY
6. MAXIMUM 1 = NORMAL OPERATION
7. MAXIMUM 2 = NOT USED
8. STOP AND GO OPERATION FOR 24 HOURS PER DAY. FLASHING OPERATION FOR EMERGENCY ONLY.

PREFERENTIAL PHASE SEQUENCE



PERM - PERMISSIVE; * UPON PEDESTRIAN PUSH BUTTON ACTUATION

LOOP DETECTOR DATA

DETECTOR NO.	NO. SECTION/ SIZE	NO. OF TURNS	OPERATIONS	DELAY /EXT	CALL PHASE	LOOP CONNECTION
1	2-6'X20' QUADRUPOLE	2-4-2	PRESENCE	0	Ø6	SERIES
2	2-6'X20' QUADRUPOLE *SEE NOTE 2	2-4-2	PRESENCE	0	Ø1	SERIES
3	2-6'X20' QUADRUPOLE	2-4-2	PRESENCE	0	Ø4	SERIES
4	2-6'X20' QUADRUPOLE *SEE NOTE 3	2-4-2	PRESENCE	0	Ø7	SERIES
5	2-6'X20' QUADRUPOLE	2-4-2	PRESENCE	0	Ø2	SERIES
6	2-6'X20' QUADRUPOLE *SEE NOTE 4	2-4-2	PRESENCE	0	Ø5	SERIES
7	2-6'X20' QUADRUPOLE	2-4-2	PRESENCE	0	Ø8	SERIES
8	1-6'X6'	4	PRESENCE	0	Ø4	BIKE/ SINGLE

NOTES: 1. DELAY AND EXTENSION TIMINGS SHALL BE PROGRAMMED IN THE CONTROLLER ONLY
2. DETECTOR 2 SHALL CALL PHASE 1 AND THEN SWITCH AND EXTEND PHASE 6.
3. DETECTOR 4 SHALL CALL PHASE 7 AND THEN SWITCH AND EXTEND PHASE 4.
4. DETECTOR 6 SHALL CALL PHASE 5 AND THEN SWITCH AND EXTEND PHASE 2.

LIST OF MAJOR ITEMS REQUIRED

SIMARANO DRIVE AT CEDAR HILL STREET/D'ANGELO DRIVE/NORTHBORO ROAD

PAY ITEM	QUANTITY	DESCRIPTION
816.02	1	MODIFY EXISTING CONTROLLER (EAGLE EPAC M41) TO ACCOMMODATE PROPOSED PHASING & TIMING SHOWN
	1	GPS TIME SYNCH UNIT
	2	TS POST 8' STANDARD INCL. FOUNDATION
	2	PEDESTRIAN SIGNAL HEAD
	1	APS PEDESTRIAN PUSH BUTTON W/R10-3e(L) AND SIGN SADDLE
	1	APS PEDESTRIAN PUSH BUTTON W/R10-3e(R) AND SIGN SADDLE
	1	TYPE C, 2-CHANNEL CARD RACK LOOP DETECTOR AMPLIFIER
	15	WIRE LOOP DETECTOR

PLUS NECESSARY DUCT, CABLE, LABOR, MISCELLANEOUS MATERIAL AND EQUIPMENT TO COMPLETE THE INSTALLATION AND PROVIDE AN OPERATING TRAFFIC CONTROL SIGNAL.

SEQUENCE & TIMING NOTES:

1. IF THE ASSIGNED RIGHT OF WAY FOR ANY TRAFFIC MOVEMENT IS TO REMAIN IN EFFECT DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATIONS FOR THAT TRAFFIC MOVEMENT WILL NOT CHANGE DURING THE CLEARANCE INTERVAL.
2. THE RIGHT OF WAY MAY BE ASSIGNED TO ANY PHASE OR ANY COMBINATION OF NON-CONFLICTING PHASES.
3. IF CALLS EXIST ON ALL PHASES, THE ASSIGNMENT OF RIGHT OF WAY SHALL BE IN ACCORDANCE WITH THE PREFERENTIAL PHASE SEQUENCE.
4. IF THE ASSIGNED RIGHT-OF-WAY FOR ANY TRAFFIC MOVEMENT IS TO CHANGE DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATION FOR THAT MOVEMENT WILL DISPLAY THE APPROPRIATE CLEARANCE INTERVALS.

PRE-EMPTION PHASING & PRIORITY

DETECTOR & PRIORITY	PRE-EMPT PHASE ASSIGNMENT	MOVEMENT	VEHICLE PHASE ASSIGNMENT
D1	1		Ø2&Ø5
D2	2		Ø1&Ø6
D3	3		Ø4&Ø7
D4	4		Ø8

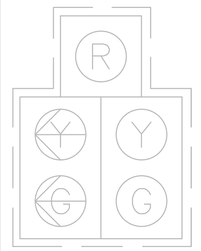
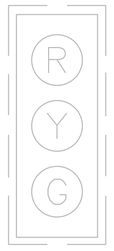
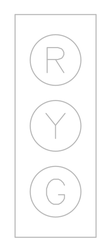
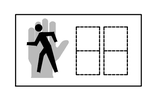
EMERGENCY VEHICLE PRE-EMPTION OPERATION

1. EMERGENCY VEHICLE PRE-EMPTION SIGNALS SHALL BE OPTICALLY TRANSMITTED BY OPTICAL EMITTERS MOUNTED IN EMERGENCY VEHICLES AND RECEIVED BY OPTICAL DETECTORS LOCATED AT EACH INTERSECTION.
2. PRE-EMPTION SIGNALS SHALL BE SERVICED ON A PRIORITY BASIS WITH DETECTORS D1, D2, D3 OR D4 ASSIGNED DESCENDING PRIORITIES AS FOLLOWS: (D1 HIGHEST AND D4 LOWEST)
3. IN RESPONSE TO A PRE-EMPTION SIGNAL RECEIVED AT AN INTERSECTION BY OPTICAL DETECTOR D1 (OR D2, D3, D4) THE CONTROLLER SHALL HOLD OR ADVANCE TO AND HOLD IN EMERGENCY VEHICLE PRE-EMPTION PHASE #1 (OR #2, #3, #4) GREEN FOR A MINIMUM OF TEN (10) SECONDS OR UNTIL PRE-EMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME PRE-EMPTION PHASE CLEARANCES FOR THE ASSOCIATED PHASE(S) AS SHOWN IN THE SEQUENCE AND TIMING CHART AND SERVICE SUBSEQUENT EMERGENCY VEHICLE PRE-EMPTION PHASES AS NECESSARY.
4. MINIMUM GREEN AND NORMAL VEHICLE CLEARANCE SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PRE-EMPTION DEMAND.
5. PRE-EMPTION STROBE SHALL BE ILLUMINATED WHENEVER ANY EMERGENCY VEHICLE PRE-EMPTION GREEN IS ON.
6. RAILROAD PRE-EMPTION SHALL OVERRIDE EMERGENCY VEHICLE PRE-EMPTION.

RAILROAD OPERATION

1. UPON RAILROAD PRE-EMPTION, THE CONTROLLER SHALL TERMINATE ANY CONFLICTING VEHICULAR PHASE(S) WITH THE APPROPRIATE CHANGE INTERVALS AND IMMEDIATELY SERVE THE PRE-EMPTION.
2. RAILROAD PRE-EMPTION SHALL OVERRIDE EMERGENCY VEHICLE PRE-EMPTION.
3. THE RAILROAD PRE-EMPTION CLEARANCE PHASE WILL REQUIRE A MINIMUM OF 26 SECONDS (5 SECONDS TO THE CROSS STREET TRAFFIC CLEARANCE PHASE AND A MINIMUM OF 21 SECONDS TO THE TRACK CLEAR PHASE).
4. FOLLOWING RAILROAD PRE-EMPTION, CONTROLLER SHALL RESUME NORMAL OPERATION STARTING WITH PHASE 4&8.

EXISTING/ PROPOSED SIGNAL HEAD DATA

A,C,E	B,D,F,G,H	J,K,L,M	P1-P2
			 W/COUNTDOWN TIMER
ALL 12" LENS			

NOTES:
1. ALL PROPOSED SIGNAL DISPLAYS SHALL BE EQUIPPED W/L.E.D. MODULES.

MARLBOROUGH
SIMARANO DRIVE
TRAFFIC SIGN SUMMARY
SHEET 62 OF 142

TRAFFIC SIGN SUMMARY

IDENTIFICATION NUMBER	SIZE OF SIGN WIDTH	SIZE OF SIGN HEIGHT	TEXT	TEXT DIMENSIONS (INCHES) LETTER HEIGHT	TEXT DIMENSIONS (INCHES) VERTICAL SPACING	TEXT DIMENSIONS (INCHES) ARROW RTE. MKR.	NUMBER OF SIGNS REQUIRED	COLOR BACKGROUND	COLOR LEGEND	COLOR BORDER	POST SIZE AND NUMBER REQUIRED	UNIT AREA (S.F.)	AREA IN SQUARE FEET
R1-1	30"	30"	STOP	SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION"; AS AMENDED			3	WHITE	RED/ BLACK	BLACK	3-P5	5.18	15.54
R3-7L	30"	30"	LEFT LANE MUST TURN LEFT				8	WHITE	BLACK	BLACK	8-P5	6.25	50.00
R3-7R	30"	30"	RIGHT LANE MUST TURN RIGHT				3	WHITE	BLACK	BLACK	3-P5	6.25	18.75
R3-17	24"	18"	BIKE LANE				38	WHITE	BLACK	BLACK	38-P5	3.00	114.00
R3-17pb	24"	8"	END				4	WHITE	BLACK	BLACK	4 MTD W/OTHERS	1.33	5.32
R4-4	36"	30"	BEGIN RIGHT TURN LANE YIELD TO BIKES				2	WHITE	BLACK	BLACK	2-P5	7.50	15.00
R10-3e(L)	9"	15"	START CROSSING Watch For Vehicles / DON'T START Finish Crossing If Started TIME REMAINING To Finish Crossing / DON'T CROSS / PUSH BUTTON TO CROSS				7	WHITE	WHITE/ BLACK/ ORANGE	BLACK	7 MTD ON TS POST/POLE	INCLUDED UNDER ITEMS 816.01 & 816.02	
R10-3e(R)	9"	15"	START CROSSING Watch For Vehicles / DON'T START Finish Crossing If Started TIME REMAINING To Finish Crossing / DON'T CROSS / PUSH BUTTON TO CROSS				3	WHITE	WHITE/ BLACK ORANGE	BLACK	3 MTD ON TS POST/POLE	INCLUDED UNDER ITEMS 816.01 & 816.02	
R10-22	18"	24"	TO REQUEST GREEN WAIT ON	AS PER MASSDOT STANDARD			5	WHITE	BLACK	BLACK	5 MTD W/OTHERS	3.00	15.00
W11-2	24"	24"		SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION"; AS AMENDED			12	YELLOW	BLACK	BLACK	4-P5 8 MTD ON TS POST/POLE	4.00	48.00
W11-2(a)	30"	30"					2	YELLOW	BLACK	BLACK	2 MTD ON MAST ARM	6.25	12.50
W16-7p(L)	24"	12"					4	YELLOW	BLACK	BLACK	4 MTD ON TS POST/POLE	2.00	8.00
W16-7p(R)	24"	12"					4	YELLOW	BLACK	BLACK	4 MTD ON TS POST/POLE	2.00	8.00
W16-9p	24"	12"	AHEAD				4	YELLOW	BLACK	BLACK	4 MTD W/OTHERS	2.00	8.00
SP-1	12"	9"	WAIT FOR VEHICLES TO STOP BEFORE CROSSING	1"C / 1"C / 1"C / 1"C / 1"C	1.5" / 1" / 1" / 1" / 1" / 1.5"	N/A	4	YELLOW	BLACK	BLACK	4 MTD ON TS POLE	0.75	3.00

IDENTIFICATION NUMBER	SIZE OF SIGN WIDTH	SIZE OF SIGN HEIGHT	TEXT	TEXT DIMENSIONS (INCHES) LETTER HEIGHT	TEXT DIMENSIONS (INCHES) VERTICAL SPACING	TEXT DIMENSIONS (INCHES) ARROW RTE. MKR.	NUMBER OF SIGNS REQUIRED	COLOR BACKGROUND	COLOR LEGEND	COLOR BORDER	POST SIZE AND NUMBER REQUIRED	UNIT AREA (S.F.)	AREA IN SQUARE FEET
D3-1*	VARIES	12"	Forest St	6"/3"	1.5" / 1.5"	N/A	2	BLUE	WHITE	WHITE	2 MTD ON TS POLE	INCLUDED UNDER ITEM 874	
D3-2*	VARIES	12"	Simarano Dr	6"/3"	1.5" / 1.5"	N/A	1	BLUE	WHITE	WHITE	1 MTD ON TS POLE	INCLUDED UNDER ITEM 874	
D3-3*	VARIES	12"	Ames St	6"/3"	1.5" / 1.5"	N/A	1	BLUE	WHITE	WHITE	1 MTD ON TS POLE	INCLUDED UNDER ITEM 874	
D3-4*	VARIES	12"	Campus Dr	6"/3"	1.5" / 1.5"	N/A	1	BLUE	WHITE	WHITE	1 MTD W/OTHERS	INCLUDED UNDER ITEM 874	

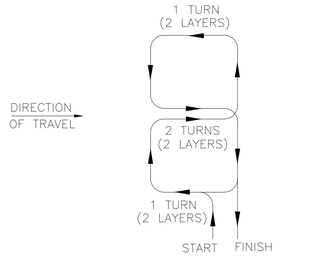
NOTES:
1. SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION" FOR TEXT DIMENSIONS, AS AMENDED; THE MASSDOT SIGN LISTINGS 1993 EDITION, AS AMENDED.
2. * PER CITY OF MARLBOROUGH STANDARNDS.

12477 - SS.DWG Plotted on 3-Jun-2014 3:51 PM

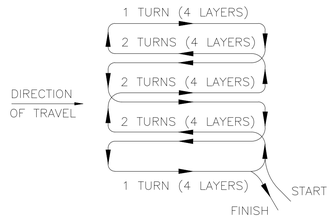
MARLBOROUGH
SIMARANO DRIVE
TRAFFIC DETAILS
BICYCLE LOOP DETECTOR DETAILS
SHEET 63 OF 142

12477 - BIKE.DWG 3-Jun-2014

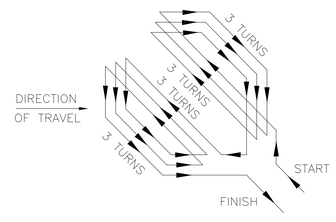
WINDING DETAILS



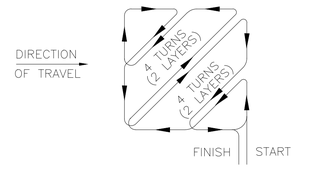
TYPE Q DETECTOR



TYPE D–Q DETECTOR

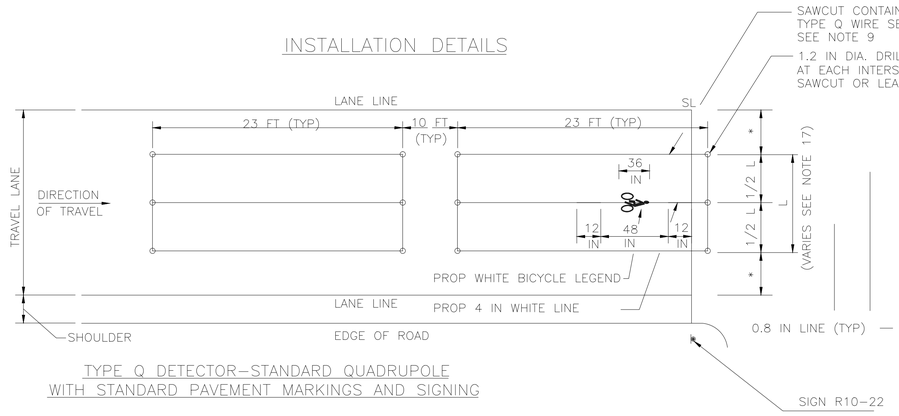


TYPE D–1 DETECTOR

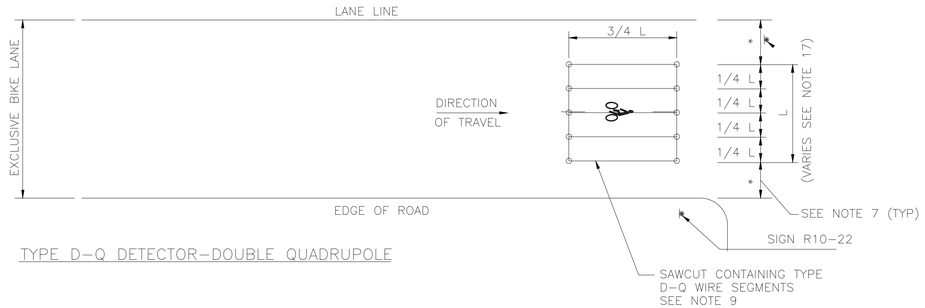


TYPE D–2 DETECTOR

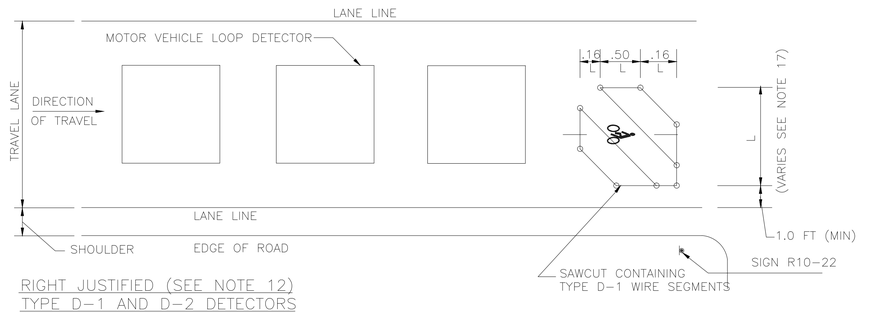
INSTALLATION DETAILS



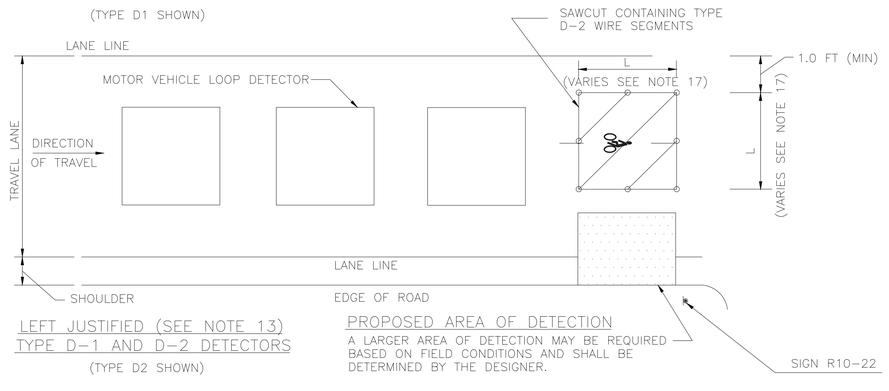
TYPE Q DETECTOR–STANDARD QUADRUPOLE
WITH STANDARD PAVEMENT MARKINGS AND SIGNING



TYPE D–Q DETECTOR–DOUBLE QUADRUPOLE



RIGHT JUSTIFIED (SEE NOTE 12)
TYPE D–1 AND D–2 DETECTORS
(TYPE D1 SHOWN)



LEFT JUSTIFIED (SEE NOTE 13)
TYPE D–1 AND D–2 DETECTORS
(TYPE D2 SHOWN)

PROPOSED AREA OF DETECTION
A LARGER AREA OF DETECTION MAY BE REQUIRED BASED ON FIELD CONDITIONS AND SHALL BE DETERMINED BY THE DESIGNER.

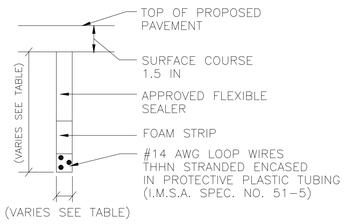
SIGN R10–22

SIGN BORDER:
R=1.5, TH=0.5, INS=.38

WHITE BACKGROUND
BLACK LEGEND AND LINES

NOTE: ALL SIGN DIMENSIONS IN INCHES

NOTE: SIGN PANEL NOT SHOWN TO SCALE



SECTION THRU LOOP DETECTOR

SAWCUT SLOT DEPTH GUIDE		
TURNS OF WIRE	SLOT SIZE	
	DEPTH (IN)	WIDTH (IN)
1	1.5	0.5
2	1.5	0.5
3	1.5	0.5
4	2.0	0.5
5	2.0	0.5
6	2.0	0.5
7	2.0	0.5
8	2.0	0.5

BICYCLE LOOP DETECTOR DETAILS

NOTES:

1. REFER TO VEHICLE LOOP DETECTOR DETAIL SHEET FOR ADDITIONAL NOTES AND CONSTRUCTION DETAILS.
2. ALL DETAILS ARE GRAPHICAL WITH NO SCALE.
3. THE NUMBER, SIZE, LOCATION AND LENGTH OF DETECTION AREA VARIES AND SHALL BE DETERMINED BY THE DESIGNER REFER TO TRAFFIC SIGNAL PLAN.
4. BICYCLE LOOPS SHALL BE CONNECTED TO SEPARATE LOOP DETECTOR AMPLIFIERS CAPABLE OF HIGHER LEVELS OF SENSITIVITY.
5. BICYCLE LOOPS SHALL BE INSTALLED IN THE BASE COURSE OF EXISTING PAVEMENT. THE EXISTING PAVEMENT SHALL BE COLD PLANED TO THE BASE COURSE AND SAWCUT FOR LOOP INSTALLATION.
6. SIGNS AND PAVEMENT MARKINGS SHALL BE INSTALLED FOR ALL BICYCLE DETECTORS TO INFORM CYCLISTS OF THE DETECTION AREA.
7. * OFFSETS FROM LANE LINE EQUAL UNLESS OTHERWISE NOTED. SEE PLANS.
8. TYPE Q DETECTORS SHALL BE WIRED IN A FIGURE EIGHT PATTERN WITH A DOUBLE LAYER DESIGN ("2–4–2") WITH 2 TURNS IN THE PERIMETER SLOTS AND 4 TURNS IN THE CENTER SLOT AS SHOWN IN THE WINDING DETAIL.
9. BICYCLES WILL BE DETECTED WITHIN 4 IN. OF THE INTERIOR LONGITUDINAL LOOP WIRES FOR TYPE Q AND D–Q DETECTORS.
10. PROVIDE 3 TURNS FOR TYPE D–1 DETECTORS.
11. INSTALL 2 LAYERS OF WIRE WOUND IN THE SAME DIRECTION IN BOTH LAYERS FOR TYPE D–2 DETECTORS. THE RESULT IS 4 TURNS IN EACH DIAGONAL.
12. RIGHT JUSTIFIED LOOP DETECTORS SHALL BE CONSIDERED FOR THE FOLLOWING CONDITIONS:
    a) BICYCLE STOPPING ON THE RIGHT SIDE OF A THRU TRAVEL LANE.
    b) BICYCLE STOPPING ON THE RIGHT SIDE OF AN EXCLUSIVE LEFT TURN LANE.
13. LEFT JUSTIFIED LOOP DETECTORS SHALL BE CONSIDERED FOR THE FOLLOWING CONDITIONS:
    a) BICYCLE STOPPING ON THE LEFT SIDE OF A SHARED LEFT/THRU LANE.
    b) BICYCLE STOPPING JUST TO THE RIGHT OF THE CENTERLINE WHEN TURNING LEFT ON A TWO–LANE ROADWAY.
14. RECTANGULAR LOOP DETECTORS SHALL BE CONSIDERED FOR BICYCLES STOPPING ON EITHER THE LEFT OR RIGHT SIDE OF A TWO–LANE ROADWAY. THE MINIMUM OFFSET FROM LANE LINE OR CURB LINE SHALL BE 1.0 FT.
15. PAVEMENT CORES OR TEST PITS MAY BE REQUIRED TO DETERMINE THE DEPTH OF EXISTING PAVEMENT AND CONFIRM THAT THE DETECTION OPTION CHOSEN AND CORRESPONDING WINDING PATTERN CAN BE ACCOMMODATED.
16. THESE DETAILS APPLY TO BICYCLE LOOPS INSTALLED IN ROADWAYS. PUSH BUTTON ACTUATION SHALL BE CONSIDERED FOR RECREATIONAL BIKE PATHS.
17. THE MINIMUM DIMENSION FOR L SHALL BE 6 FT MIN. FOR DETECTORS TYPE D–Q, D–1 & D–2. FINAL DIMENSIONS SHALL BE DETERMINED BY THE DESIGN ENGINEER.

MARLBOROUGH
SIMARANO DRIVE
TRAFFIC DETAILS
LOOP DETECTOR DETAILS
SHEET 64 OF 142

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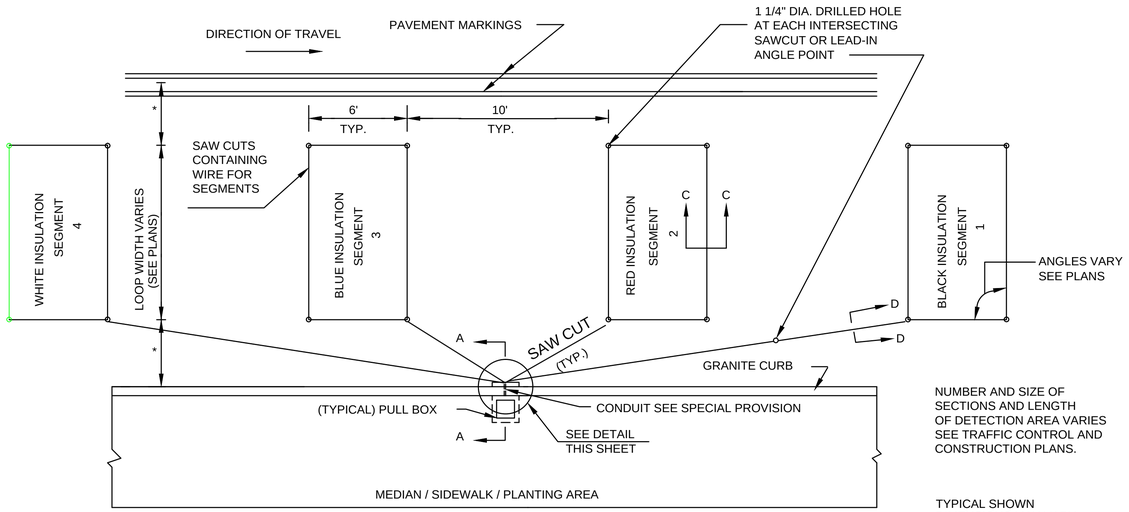
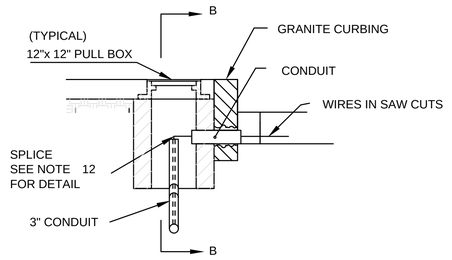


* OFFSETS FROM CURB TO LOOP AND EDGE OF LANE TO LOOP EQUAL IF NOT SHOWN.

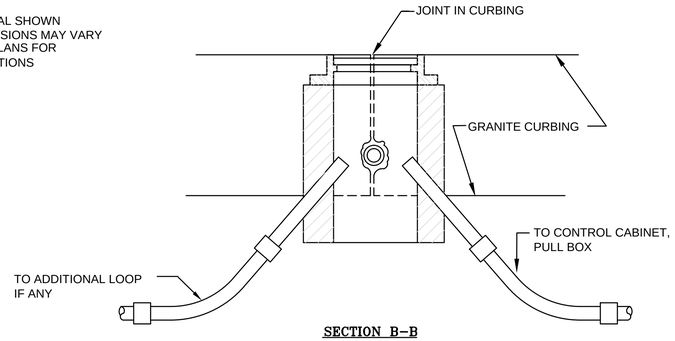
NUMBER AND SIZE OF SECTIONS AND LENGTH OF DETECTION AREA VARIES SEE TRAFFIC CONTROL AND CONSTRUCTION PLANS.

TYPICAL SHOWN DIMENSIONS MAY VARY SEE PLANS FOR VARIATIONS

PLAN OF SEGMENTED DETECTOR DETAIL
NOT TO SCALE



SECTION A–A
NOT TO SCALE

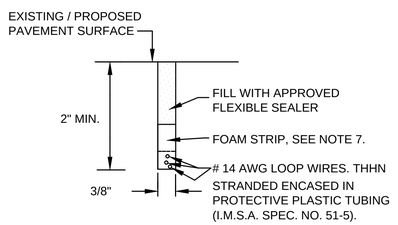


SECTION B–B
NOT TO SCALE

SECTION C–C & D–D

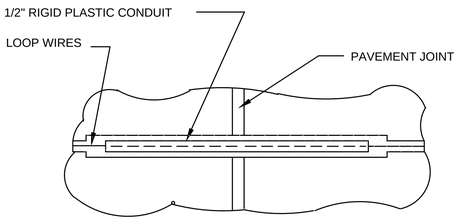
LOOPS IN BINDER COURSE OR EXISTING PAVEMENT TO BE RESURFACED
NOT TO SCALE

VERTICAL SECTION
TREATMENT AT PAVEMENT JOINTS
NOT TO SCALE

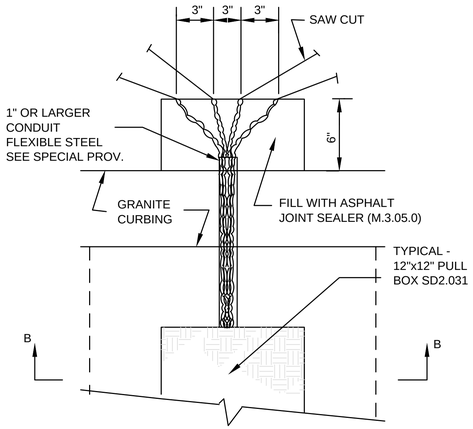


SECTION C–C & D–D

LOOPS IN SURFACE COURSE
NOT TO SCALE



PLAN
TREATMENT AT PAVEMENT JOINTS
NOT TO SCALE



DETAIL – PLAN VIEW
NOT TO SCALE

DETECTOR NOTES

1. IN HANDHOLE, SPLICE ALL SEGMENTS TO TYPE II-SHIELDED LOOP DETECTOR DETECTOR LEAD-IN CABLE. SEGMENTS SHALL BE SPLICED IN PARALLEL, IN SERIES, OR IN A COMBINATION OF PARALLEL & SERIES AS SHOWN ON THE PLAN SHEET FOR EACH DETECTOR. NUMBER OF TURNS OF WIRE SHALL ALSO BE AS SHOWN ON THE PLAN SHEET FOR EACH DETECTOR. SEE NOTE 12.

2. SEE SPECIAL PROVISIONS FOR REQUIREMENTS OF DETECTOR AMPLIFIER

3. LEAD IN WIRES SHALL BE TWISTED FROM SEGMENT TO SPLICE WITH SHIELDED CABLE FIVE TURNS PER FOOT. LEAD-IN SHALL BE TYPE II (M8. 16. II).

4 BEFORE STARTING ANY SPLICING, THE ELECTRICAL CONTRACTOR SHALL FURNISH DATA SHEETS ON THE MATERIALS AND/OR METHODS TO BE USED IN ACCORDANCE WITH THE DEPARTMENTS STANDARD OPERATING PROCEDURES FOR APPROVAL OF SHOP DRAWINGS SEE SECTION 815.64, ESPECIALLY PARAGRAPH 1.

5 THE METALLIC SHIELD WHICH SHALL ENCASE THE DETECTOR LEADS FROM A SPLICE (TYPICALLY LOCATED IN A PULL BOX NEAR THE ROADWAY COMPONENT OF THE DETECTOR) TO THE CONTROLLER, AND THE DRAIN WIRE UNDER THE METALLIC SHIELD, SHALL NOT BE GROUNDED TO THE EARTH GROUNDING BUSS IN THE CONTROLLER, AND THE SHIELD AND DRAIN WIRE SHALL BE CAREFULLY INSULATED FROM THE TRANSFORMER NEUTRAL OR FROM EARTH GROUND AT ALL POINTS ALONG IT'S LENGTH. SPECIFICALLY, THIS INCLUDES CAREFUL INSULATION OF THE EXPOSED PORTION OF THE SHIELD AND THE AND THE DRAIN WIRE AT THE END AWAY FROM THE CONTROLLER WHERE IT IS SPLICED TO WIRES LEADING TO THE ROADWAY COMPONENT OF THE DETECTOR. THIS IS IMPORTANT TO AVOID A GROUND RETURN LOOP.

6. FILL ALL CONDUIT OPENINGS WITH DUCT SEAL.

7. AFTER SAW CUTS ARE COMPLETE, BLOW OUT WATER WITH OIL - FREE COMPRESSED AIR UNTIL CUTS ARE CLEAN AND DRY. INSERT WIRE INTO CLEAN SLOT WITH A BLUNT, SMOOTH, ROUND EDGED TOOL OF WOOD OR PLASTIC SUCH AS A PAINT STIRRER. DO NOT USE A SCREWDRIVER, THEN INSERT FOAM PLASTIC HOLD DOWN STRIPS, SIMILAR TO ETHA FOAM SB STRIPS SHALL BE ABOUT 2" LONG, PLACED IN THE SLOT ABOUT EVERY 2 FEET THEN POUR SEALER, TAKING CARE TO ELIMINATE BUBBLES.

8. THE COMBINED ROADWAY LOOP, TWISTED LEAD-IN WIRES, SPLICE AND SHIELDED LEAD-IN CABLE SHALL HAVE A RESISTANCE TO GROUND OF AT LEAST 100 MEGOHMS. SEE SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS.

9. FOR INSTALLATION OF SINGLE (ONE SEGMENT) SMALL WIRE LOOP DETECTOR DETAIL IS THE SAME

10. CUT LOOPS IN BINDER AND FILL WITH APPROVED FLEXIBLE SEALER.

11. DETECTOR WIRE SHALL BE A DIFFERENT COLOR FOR EACH SEGMENT OF A DETECTOR GROUP. SEE DETAIL

12. SPLICING PATTERN P = SERIES/PARALLEL: SPLICE SEGMENTS 1 AND 3 OF AN INDIVIDUAL DETECTOR IN SERIES. SPLICE SEGMENTS 2 AND 4 IN SERIES. SPLICE THE RESULTANT TWO GROUPS IN PARALLEL. SPLICE THE RESULTANT COMBINATION TO ONE LEAD-IN CABLE. CONNECT THIS CABLE TO AN OTHERWISE UNUSED AMPLIFIER CHANNEL.

SPLICING PATTERN S = SERIES: SPLICE ALL SEGMENTS (TYPICALLY FOUR, BUT MAY BE LESS) OF AN INDIVIDUAL DETECTOR IN SERIES. SPLICE THE RESULTANT COMBINATION TO ONE LEAD-IN CABLE TO AN OTHERWISE UNUSED AMPLIFIER CHANNEL.

THIS PLAN NOT DESIGNED BY VANASSE HANGEN BRUSTLIN, INC. IT WAS PROVIDED BY MASSDOT AND ALL INFORMATION CONTAINED HEREIN IS ASSUMED TO BE CORRECT.

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION

MARLBOROUGH
SIMARANO DRIVE
TRAFFIC DETAILS
MAST ARM DETAILS
SHEET 65 OF 142

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INDEX

SHEET NO.	DESCRIPTION
1	Title Sheet
2	Light, Medium & Short Span Load Diagrams
3	Heavy Load Diagrams
4	Details
5	Cored Pier Foundations

THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, HIGHWAY DIVISION 1988 STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, THE ENGLISH EDITION OF SUPPLEMENTAL SPECIFICATIONS DATED JUNE 6, 2006, THE AMENDMENTS TO THE STANDARD AND SUPPLEMENTAL SPECIFICATIONS, THE 1977 CONSTRUCTION STANDARDS, THE ENGLISH EDITION OF SUPPLEMENTAL DRAWINGS DATED APRIL 2003, THE 2001 "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS" WITH LATEST REVISIONS, THE 2003 "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" WITH LATEST REVISIONS, THE 1990 "STANDARD DRAWINGS FOR SIGNS AND SUPPORTS," AND THE 2004 EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, WILL GOVERN.

MAST ARM & FOUNDATION

Details Standard Drawings

NOTES

1. For these standard drawings the Design Wind Speed for all Mast Arm Structures shall be **130 MPH**.

2. For these standard drawings the Design Wind Speed for mast arm foundations located in the following counties: Plymouth, Bristol, Barnstable, Dukes, and Nantucket counties in District 5 and Berkshire county in District 1 shall be **130 MPH**. The design wind speed for mast arm foundations for the remainder of the state shall be **110 MPH.**

3. For these standard drawings the mast arm structure design life shall be 25 years.

4. For these standard drawings the Fatigue Category no. 2 was used and truck induced gusts were excluded in the design.

5. These standard drawings do not apply for mast arm structures at intersections with an ADT greater than 40,000 vehicles and a truck percentage of greater than 10%. The responsibility for the design of mast structures and foundations will rest with the design engineer. The structure design life will be 50 years and the fatigue category shall be no. 1. The design wind speed criteria shall be as shown in Notes Nos. 1 & 2. The design will be submitted to MassDOT for review and comment.

6. For strain pole, dual mast arm designs, or mast arms longer than 45 feet, notes 1, 2, 3 and 4 will apply, if ADT (>40,000 vehicles) and truck percentage (10%) criterion is met, note 5 design criteria (50 year design life, fatigue category no. 1, wind design speed notes 1 and 2) will apply. The responsibility for the design of these structures and foundations will rest with the design engineer. The design will be submitted to MassDOT for review and comment.

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NO.	REVISION	DATE

Moving Massachusetts Forward. massDOT Highway

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISON

RECOMMENDED FOR APPROVAL

Neil E. Boudreau 2/11/11
TRAFFIC ENGINEER DATE

[signature] 2/17/11
BRIDGE ENGINEER DATE

Frank A. Tramontozzi 2/24/2011
CHIEF ENGINEER DATE

MARLBOROUGH
SIMARANO DRIVE
TRAFFIC DETAILS
MAST ARM DETAILS
SHEET 66 OF 142

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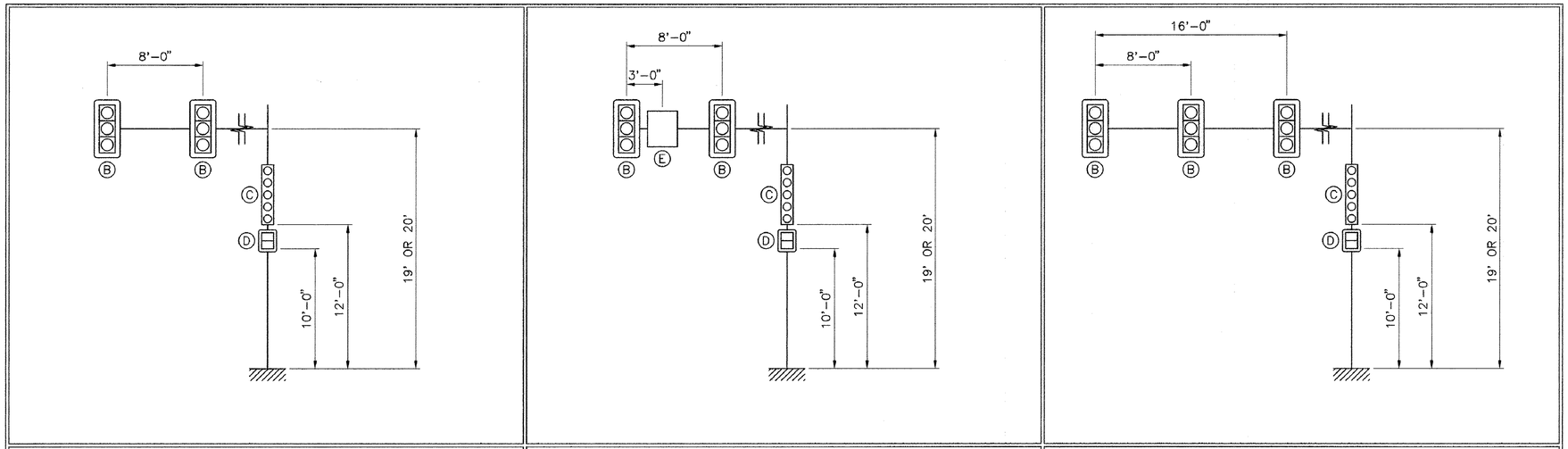
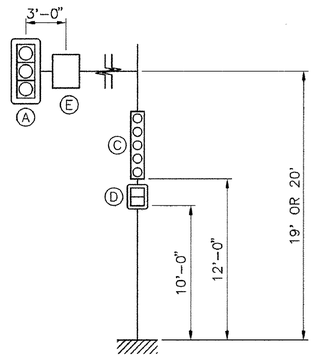


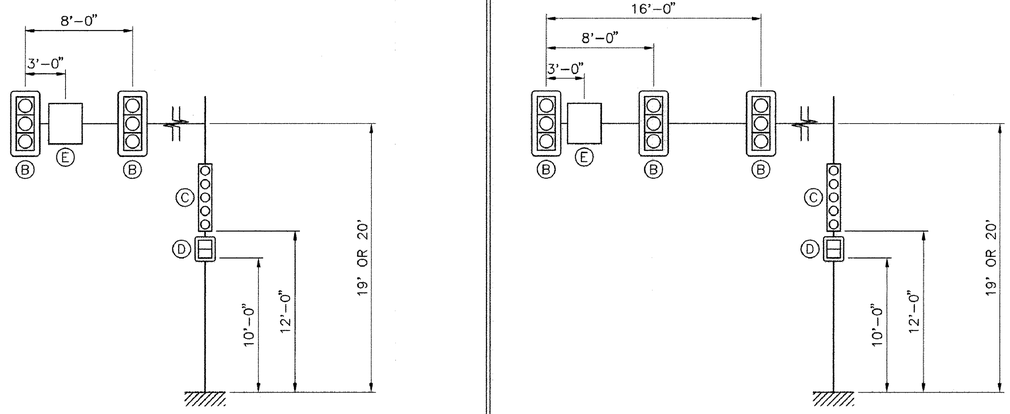
20', 25', 40' & 45' SPANS | 30' SPAN | 35' SPAN

LOAD DEFINITIONS – LIGHT LOADS



15' SPAN

SHORT SPAN LOADING



20' & 25' SPANS | 30', 35', 40' & 45' SPANS

LOAD DEFINITIONS – MEDIUM LOADS

DEVICE	DESCRIPTION	PROJ. AREA (FT^2)	WEIGHT (LBS)
(A)	3 SECTION, 3 WAY SIGNAL	13.50	202
(B)	3 SECTION, 1 WAY SIGNAL	8.67	74
(C)	5 SECTION, 1 WAY SIGNAL	13.33	110
(D)	DUAL PEDESTRIAN SIGNAL	8.00	80
(E)	30" X 36" REGULATORY SIGN	7.50	23

NOTE: ALL SIGNALS HAVE 5.0" BACKPLATES

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MONTH_DD,_YYYY | ISSUED FOR CONSTRUCTION

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STANDARD DRAWINGS

TYPE II MAST ARMS
LIGHT, MEDIUM & SHORT SPAN
LOAD DIAGRAMS

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
10 PARK PLAZA BOSTON, MASS

Frank A. Tramontozzi 2/24/2011
CHIEF ENGINEER

BRIDGE ENGINEER

Paul E. Bruneau
TRAFFIC ENGINEER

SHEET 2 OF 5 SHEETS

MARLBOROUGH
SIMARANO DRIVE
TRAFFIC DETAILS
MAST ARM DETAILS
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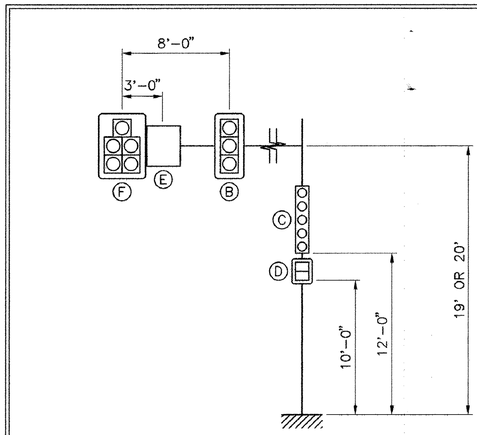
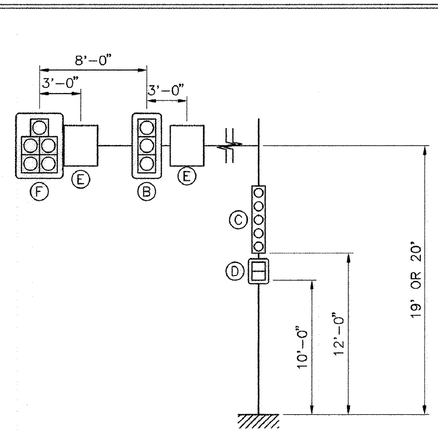
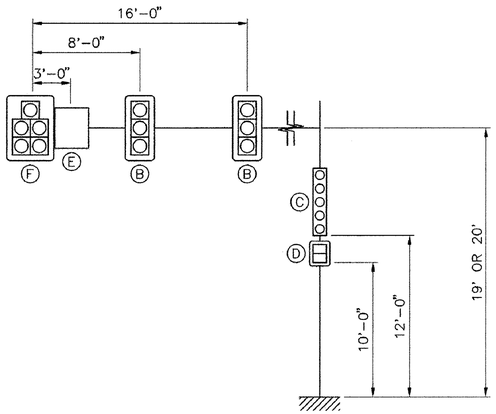


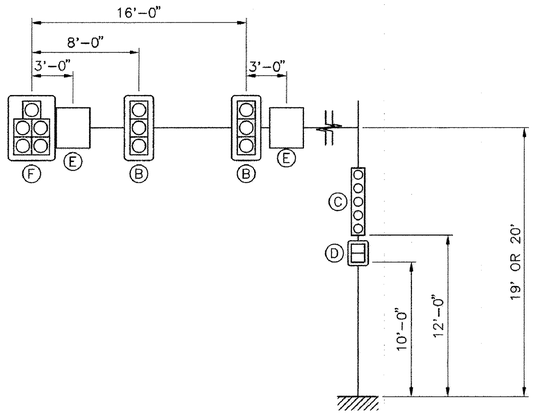
20' SPAN



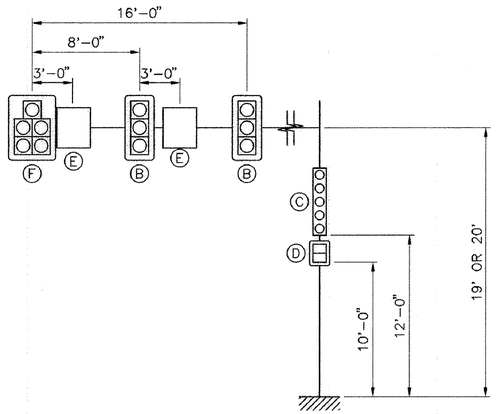
25' SPAN



30' SPAN



35' SPAN



40' & 45' SPANS

LOAD DEFINITIONS – HEAVY LOADS

DEVICE	DESCRIPTION	PROJ. AREA (FT^2)	WEIGHT (LBS)
Ⓐ	3 SECTION, 3 WAY SIGNAL	18.29	202
Ⓑ	3 SECTION, 1 WAY SIGNAL	8.67	74
Ⓒ	5 SECTION, 1 WAY SIGNAL	13.33	110
Ⓓ	DUAL PEDESTRIAN SIGNAL	8.00	80
Ⓔ	30" X 36" REGULATORY SIGN	7.50	23
Ⓕ	5 SECTION, 2 WAY SIGNAL	21.95	215

NOTE: ALL SIGNALS HAVE 5.0" BACKPLATES

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STANDARD DRAWINGS

TYPE II MAST ARMS
HEAVY LOAD DIAGRAMS

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
10 PARK PLAZA BOSTON, MASS

2/24/2011
CHIEF ENGINEER

BRIDGE ENGINEER

TRAFFIC ENGINEER

SHEET 3 OF 5 SHEETS

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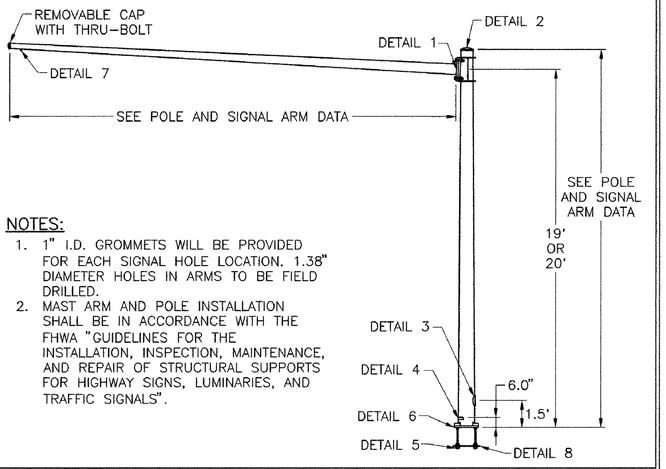
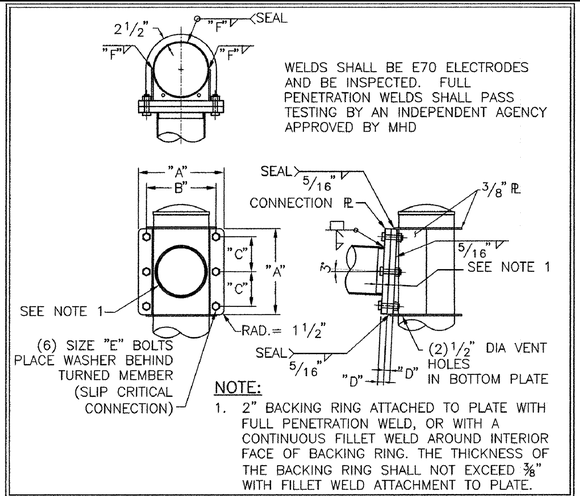


NOTES:

1. 1" I.D. GROMMETS WILL BE PROVIDED FOR EACH SIGNAL HOLE LOCATION. 1.38" DIAMETER HOLES IN ARMS TO BE FIELD DRILLED.
2. MAST ARM AND POLE INSTALLATION SHALL BE IN ACCORDANCE WITH THE FHWA "GUIDELINES FOR THE INSTALLATION, INSPECTION, MAINTENANCE, AND REPAIR OF STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES, AND TRAFFIC SIGNALS".

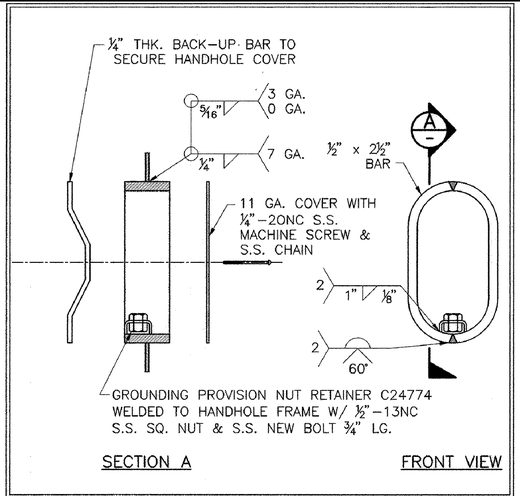
MAST ARM ELEVATION



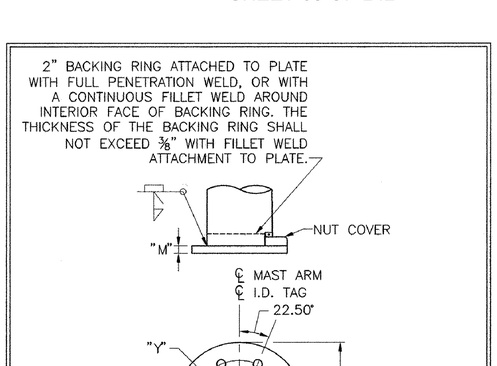
NOTE:

1. 2" BACKING RING ATTACHED TO PLATE WITH FULL PENETRATION WELD, OR WITH A CONTINUOUS FILLET WELD AROUND INTERIOR FACE OF BACKING RING. THE THICKNESS OF THE BACKING RING SHALL NOT EXCEED 3/8" WITH FILLET WELD ATTACHMENT TO PLATE.

DETAIL 1 | SIGNAL ARM ATTACHMENT



DETAIL 3 | 4"x8" HANDHOLE

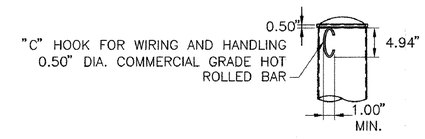


DETAIL 6 | POLE BASE

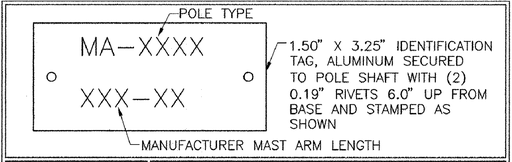
MATERIAL DATA

COMPONENT	DESIGNATION	YIELD (KSI)	COMPONENT	DESIGNATION	YIELD (KSI)
POLE TUBE	ASTM A595 GR. A	55	ARM TUBE	ASTM A595 GR. A	55
POLE BASE PLATE	AASHTO M270	50	ARM CONNECTION PLATE	AASHTO M270	50
ANCHOR BOLTS	AASHTO M314	55	ARM CONNECTING BOLTS	AASHTO M164 **	
GALVANIZING	AASHTO M111 OR M232				

** BOLTS WHICH ACCUMULATE RUST OR DIRT SHALL BE DISCARDED.



DETAIL 2 | POLE TOP



DETAIL 4 | I.D. TAG

POLE AND SIGNAL ARM DATA – LIGHT LOADS

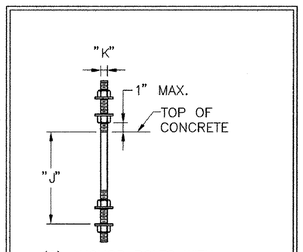
LOCATIONS	SIGNAL ARM TUBE				POLE TUBE				POLE BASE				ANCHOR BOLT		SIGNAL ARM ATTACHMENT DATA					
	SPAN (FT)	FIXED END DIA. (IN)	FREE END DIA. (IN)	WALL THK.	BASE DIA. (IN)	TOP DIA. (IN)	LENGTH (FT)	WALL THK.	PLATE CIRCLE "S" (IN)	BOLT CIRCLE "Y" (IN)	THK. "M" (IN)	HOLE "Z" (IN)	DIA. "K" (IN)	EMBED. LENGTH "J" (IN)	"A" (IN)	"B" (IN)	"C" (IN)	"D" (IN)	"E" (IN)	"F" (IN)
	15.00	9.00	6.90	7 GA.	12.00	9.06	21.00	7 GA.	29.50	24.00	1.50	1.813	1.50	36.00	19.00	15.00	7.50	1.00	1.00	0.188
	20.00	9.00	6.20	7 GA.	12.00	9.06	21.00	7 GA.	29.50	24.00	1.50	1.813	1.50	36.00	19.00	15.00	7.50	1.00	1.00	0.188
	25.00	10.00	6.50	7 GA.	13.00	10.06	21.00	7 GA.	29.50	24.00	1.50	1.813	1.50	36.00	20.00	16.00	8.00	1.00	1.00	0.188
	30.00	12.50	8.30	3 GA.	15.50	12.56	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	23.50	19.00	9.50	1.25	1.25	0.250
	35.00	13.00	8.10	3 GA.	16.00	13.06	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	24.50	20.00	10.00	1.25	1.25	0.250
	40.00	13.00	7.40	3 GA.	16.00	13.06	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	24.50	20.00	10.00	1.25	1.25	0.250
	45.00	13.50	7.20	3 GA.	16.50	13.56	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	27.50	22.00	11.00	1.50	1.50	0.313

POLE AND SIGNAL ARM DATA – MEDIUM LOADS

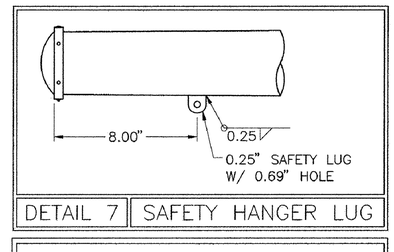
LOCATIONS	SIGNAL ARM TUBE				POLE TUBE				POLE BASE				ANCHOR BOLT		SIGNAL ARM ATTACHMENT DATA					
	SPAN (FT)	FIXED END DIA. (IN)	FREE END DIA. (IN)	WALL THK.	BASE DIA. (IN)	TOP DIA. (IN)	LENGTH (FT)	WALL THK.	PLATE CIRCLE "S" (IN)	BOLT CIRCLE "Y" (IN)	THK. "M" (IN)	HOLE "Z" (IN)	DIA. "K" (IN)	EMBED. LENGTH "J" (IN)	"A" (IN)	"B" (IN)	"C" (IN)	"D" (IN)	"E" (IN)	"F" (IN)
	15.00	9.00	6.90	7 GA.	12.00	9.06	21.00	7 GA.	29.50	24.00	1.50	1.813	1.50	36.00	19.00	15.00	7.50	1.00	1.00	0.188
	20.00	10.00	7.20	3 GA.	13.00	10.06	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	20.00	16.00	8.00	1.00	1.00	0.250
	25.00	11.00	7.50	3 GA.	14.00	11.06	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	23.50	19.00	9.50	1.25	1.25	0.250
	30.00	13.00	8.80	3 GA.	16.00	13.06	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	23.50	19.00	9.50	1.25	1.25	0.250
	35.00	14.00	9.10	3 GA.	17.00	14.06	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	27.50	22.00	11.00	1.50	1.50	0.250
	40.00	15.00	9.40	3 GA.	18.00	15.06	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	27.50	22.00	11.00	1.50	1.50	0.250
	45.00	16.00	9.70	0 GA.	19.00	16.06	21.00	0 GA.	29.50	24.00	1.50	1.813	1.50	36.00	29.50	24.00	12.00	1.75	1.50	0.313

POLE AND SIGNAL ARM DATA – HEAVY LOADS

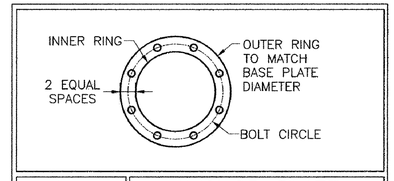
LOCATIONS	SIGNAL ARM TUBE				POLE TUBE				POLE BASE				ANCHOR BOLT		SIGNAL ARM ATTACHMENT DATA					
	SPAN (FT)	FIXED END DIA. (IN)	FREE END DIA. (IN)	WALL THK.	BASE DIA. (IN)	TOP DIA. (IN)	LENGTH (FT)	WALL THK.	PLATE CIRCLE "S" (IN)	BOLT CIRCLE "Y" (IN)	THK. "M" (IN)	HOLE "Z" (IN)	DIA. "K" (IN)	EMBED. LENGTH "J" (IN)	"A" (IN)	"B" (IN)	"C" (IN)	"D" (IN)	"E" (IN)	"F" (IN)
	15.00	9.00	6.90	7 GA.	12.00	9.06	21.00	7 GA.	29.50	24.00	1.50	1.813	1.50	36.00	19.00	15.00	7.50	1.00	1.00	0.188
	20.00	12.50	9.70	3 GA.	15.50	12.56	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	24.00	19.00	9.50	1.25	1.25	0.250
	25.00	14.00	10.50	3 GA.	17.00	14.06	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	27.50	22.00	11.00	1.50	1.50	0.250
	30.00	15.50	11.30	3 GA.	18.50	15.56	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	27.50	22.00	11.00	1.50	1.50	0.250
	35.00	16.50	11.60	0 GA.	19.50	16.56	21.00	0 GA.	34.50	28.00	1.75	2.063	1.75	36.00	29.50	24.00	12.00	1.75	1.50	0.313
	40.00	17.50	11.90	0 GA.	20.50	17.56	21.00	0 GA.	34.50	28.00	1.75	2.063	1.75	36.00	29.50	24.00	12.00	1.75	1.50	0.313
	45.00	18.50	12.20	0 GA.	21.50	18.56	21.00	0 GA.	34.50	28.00	1.75	2.063	1.75	36.00	31.50	26.00	13.00	2.00	1.50	0.313



DETAIL 5 | ANCHOR BOLT



DETAIL 7 | SAFETY HANGER LUG



DETAIL 8 | ANCHOR PLATE

THIS PLAN NOT DESIGNED BY VANASSE HANGEN BRUSTLIN, INC. IT WAS PROVIDED BY THE MASSDOT AND ALL INFORMATION CONTAINED HEREIN IS ASSUMED TO BE CORRECT.

MONTH_DD,_YYYY	ISSUED FOR CONSTRUCTION

Moving Massachusetts Forward. massDOT Highway

STANDARD DRAWINGS

TYPE II MAST ARMS DETAILS

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
10 PARK PLAZA BOSTON, MASS

Frank A. Tramontozzi 2/24/2011
CHIEF ENGINEER

BRIDGE ENGINEER

Neil E. Boudreau
TRAFFIC ENGINEER

PIER FOUNDATIONS FOR 110 MPH WIND SPEED ZONE

LIGHT LOADING CONDITIONS

SOIL TYPE	15' & 20' MAST ARMS			25' & 30' MAST ARMS			35' & 40' MAST ARMS			45' MAST ARMS		
	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS
DRY SAND	3'-6"	6'-0"	18-#8	3'-6"	8'-0"	18-#8	3'-6"	8'-0"	18-#8	3'-6"	9'-0"	18-#8
WET SAND	3'-6"	7'-0"	18-#8	3'-6"	9'-0"	18-#8	3'-6"	9'-0"	18-#8	3'-6"	9'-0"	18-#8
CLAY (MEDIUM STIFF)	3'-6"	11'-0"	18-#8	3'-6"	12'-0"	18-#8	3'-6"	12'-0"	18-#8	3'-6"	12'-0"	18-#8
ALLUVIAL	3'-6"	8'-0"	18-#8	3'-6"	10'-0"	18-#8	3'-6"	10'-0"	18-#8	3'-6"	11'-0"	18-#8

MEDIUM LOADING CONDITIONS

SOIL TYPE	15' & 20' MAST ARMS			25' & 30' MAST ARMS			35' & 40' MAST ARMS			45' MAST ARMS		
	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS
DRY SAND	3'-6"	7'-0"	18-#8	3'-6"	9-0"	18-#8	4'-0"	9-0"	18-#9	4'-6"	8'-0"	18-#10
WET SAND	3'-6"	8'-0"	18-#8	3'-6"	9'-0"	18-#8	4'-0"	10'-0"	18-#9	4'-6"	9'-0"	18-#10
CLAY (MEDIUM STIFF)	3'-6"	11'-0"	18-#8	3'-6"	12'-0"	18-#8	4'-0"	13'-0"	18-#9	4'-6"	14'-0"	18-#10
ALLUVIAL	3'-6"	9'-0"	18-#8	3'-6"	10'-0"	18-#8	4'-0"	11'-0"	18-#9	4'-6"	10'-0"	18-#10

HEAVY LOADING CONDITIONS

SOIL TYPE	15' & 20' MAST ARMS			25' & 30' MAST ARMS			35' & 40' MAST ARMS			45' MAST ARMS		
	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS
DRY SAND	3'-6"	8'-0"	18-#8	4'-0"	9'-0"	18-#9	4'-6"	10'-0"	18-#10	5'-0"	9'-0"	23-#10
WET SAND	3'-6"	8'-0"	18-#8	4'-0"	10'-0"	18-#9	4'-6"	11'-0"	18-#10	5'-0"	10'-0"	23-#10
CLAY (MEDIUM STIFF)	3'-6"	12'-0"	18-#8	4'-0"	14'-0"	18-#9	4'-6"	15'-0"	18-#10	5'-0"	16'-0"	23-#10
ALLUVIAL	3'-6"	10'-0"	18-#8	4'-0"	11'-0"	18-#9	4'-6"	12'-0"	18-#10	5'-0"	12'-0"	23-#10

PIER FOUNDATIONS FOR 130 MPH WIND SPEED ZONE

LIGHT LOADING CONDITIONS

SOIL TYPE	15' & 20' MAST ARMS			25' & 30' MAST ARMS			35' & 40' MAST ARMS			45' MAST ARMS		
	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS
DRY SAND	3'-6"	7'-0"	18-#8	3'-6"	9'-0"	18-#8	3'-6"	10'-0"	18-#8	3'-6"	10'-0"	18-#8
WET SAND	3'-6"	8'-0"	18-#8	3'-6"	10'-0"	18-#8	3'-6"	11'-0"	18-#8	3'-6"	11'-0"	18-#8
CLAY (MEDIUM STIFF)	3'-6"	12'-0"	18-#8	3'-6"	13'-0"	18-#8	3'-6"	13'-0"	18-#8	3'-6"	13'-0"	18-#8
ALLUVIAL	3'-6"	9'-0"	18-#8	3'-6"	12'-0"	18-#8	3'-6"	12'-0"	18-#8	3'-6"	13'-0"	18-#8

MEDIUM LOADING CONDITIONS

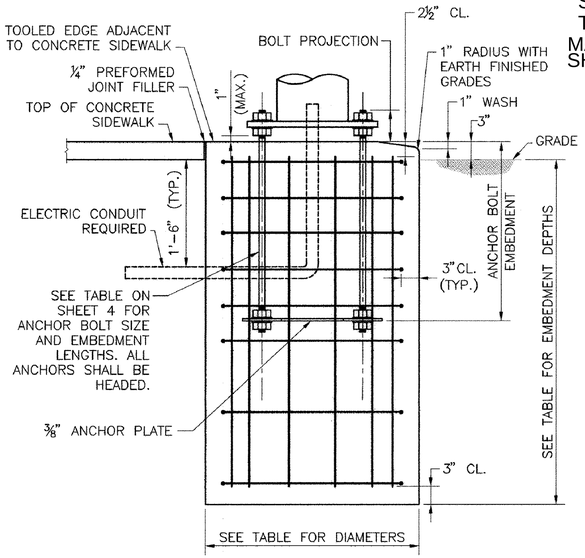
SOIL TYPE	15' & 20' MAST ARMS			25' & 30' MAST ARMS			35' & 40' MAST ARMS			45' MAST ARMS		
	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS
DRY SAND	3'-6"	8'-0"	18-#8	3'-6"	10'-0"	18-#8	4'-0"	11'-0"	18-#9	4'-6"	10'-0"	18-#10
WET SAND	3'-6"	8'-0"	18-#8	3'-6"	11'-0"	18-#8	4'-0"	12'-0"	18-#9	4'-6"	11'-0"	18-#10
CLAY (MEDIUM STIFF)	3'-6"	12'-0"	18-#8	3'-6"	14'-0"	18-#8	4'-0"	15'-0"	18-#9	4'-6"	15'-0"	18-#10
ALLUVIAL	3'-6"	10'-0"	18-#8	3'-6"	13'-0"	18-#8	4'-0"	13'-0"	18-#9	4'-6"	12'-0"	18-#10

HEAVY LOADING CONDITIONS

SOIL TYPE	15' & 20' MAST ARMS			25' & 30' MAST ARMS			35' & 40' MAST ARMS			45' MAST ARMS		
	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS
DRY SAND	3'-6"	9'-0"	18-#8	4'-0"	11'-0"	18-#9	4'-6"	12'-0"	18-#10	5'-0"	11'-0"	23-#10
WET SAND	3'-6"	10'-0"	18-#8	4'-0"	12'-0"	18-#9	4'-6"	13'-0"	18-#10	5'-0"	12'-0"	23-#10
CLAY (MEDIUM STIFF)	3'-6"	14'-0"	18-#8	4'-0"	15'-0"	18-#9	4'-6"	16'-0"	18-#10	5'-0"	17'-0"	23-#10
ALLUVIAL	3'-6"	11'-0"	18-#8	4'-0"	13'-0"	18-#9	4'-6"	15'-0"	18-#10	5'-0"	14'-0"	23-#10

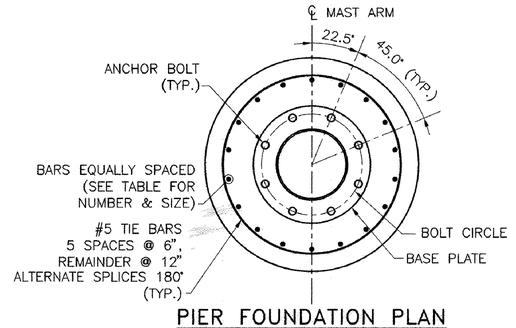
NOTES:

1. FOUNDATIONS SHALL BE 4000 PSI, 1½", 565 CEMENT CONCRETE.
2. REINFORCEMENT SHALL BE ASTM A615 GRADE 60.
3. ANCHOR BOLTS SHALL BE SET BY TEMPLATE.
4. PROVIDE FOR ELECTRICAL CONDUIT.
5. EXCAVATION SHALL BE BY THE AUGER METHOD TO THE NEAT LINES OF THE OUTSIDE DIMENSION OF THE FOUNDATIONS WITHOUT DISTURBING THE SOIL AROUND AND BELOW THE PROPOSED FOUNDATION BOTTOM. ALTERNATE METHODS OF EXCAVATION MAY BE SUBMITTED TO MASSHIGHWAY FOR APPROVAL IF THEY MEET THE REQUIREMENTS LISTED IN NOTES 6, 7, AND 8.
6. THE EARTH WALLS OF THE FOUNDATION SHALL BE ADEQUATELY AND SECURELY PROTECTED AT ALL TIMES AGAINST CAVE-INS, DISPLACEMENT OF THE SURROUNDING EARTH AND FOR THE EXCLUSION OF GROUND WATER. THIS MAY BE DONE BY THE USE OF STEEL CYLINDER LINERS OR CASINGS THAT ARE APPROVED BY MASSHIGHWAY. IF LINERS ARE USED THEY MAY BE RECLAIMED PROVIDED THAT THEY ARE WITHDRAWN AS THE CONCRETE IS BEING PLACED, MAINTAINING A SUFFICIENT HEAD OF CONCRETE WITHIN THE LINER TO PREVENT REDUCTION IN THE FOUNDATION DIAMETER AND TO PREVENT EXTRANEOUS MATERIAL FROM FALLING IN FROM THE SIDES AND MIXING WITH THE CONCRETE.
7. IF THE SOIL IS DISTURBED OR REMOVED BEYOND THE NEAT LINES OF THE OUTSIDE DIMENSION OF THE FOUNDATION, IT SHALL BE REPLACED WITH CONCRETE. ANY ADDITIONAL COST FOR THE CONCRETE SHALL BE PAID FOR BY THE CONTRACTOR.
8. SPECIAL CARE SHOULD BE GIVEN TO AREAS WHERE WET SOIL IS ENCOUNTERED, TO INSURE THAT THE PREAUGERED HOLE DOES NOT COLLAPSE. THIS MAY REQUIRE THE USE OF STEEL CYLINDER LINERS OR CASINGS TO HOLD THE SOIL IN PLACE UNTIL READY FOR CONCRETE PLACEMENT. THE STEEL CYLINDERS OR CASINGS SHALL BE WITHDRAWN AS THE FOUNDATION CONCRETE IS PLACED.
9. DETERMINATION OF EXISTING SOIL CONDITIONS SHALL BE MADE BY THE DESIGN ENGINEER.
10. IF LEDGE OR POOR SOIL IS ENCOUNTERED (i.e. ONE WHICH DOES NOT APPLY TO THE DESIGN TABLES SHOWN ON THIS SHEET), AN ALTERNATIVE DESIGN SHALL BE PROVIDED BY THE DESIGN ENGINEER. DECISIONS MADE IN NOTES 8 AND 9 SHALL BE SUBMITTED TO MASSHIGHWAY FOR APPROVAL. IF UTILITIES OR OTHER UNDERGROUND OBSTRUCTIONS ARE ENCOUNTERED, THE CONTRACTOR SHALL BACKFILL THE AREA TO ITS ORIGINAL CONDITION UNTIL AN ALTERNATE DESIGN HAS BEEN PROVIDED BY THE ENGINEER.



PIER FOUNDATION DETAIL

NO SCALE



PIER FOUNDATION PLAN

NO SCALE

THIS PLAN NOT DESIGNED BY VANASSE HANGEN BRUSTLIN, INC. IT WAS PROVIDED BY THE MASSDOT AND ALL INFORMATION CONTAINED HEREIN IS ASSUMED TO BE CORRECT.

MONTH_DD,_YYYY	ISSUED FOR CONSTRUCTION

Moving Massachusetts Forward. massDOT Highway

STANDARD DRAWINGS

TYPE II MAST ARMS
CORED PIER FOUNDATIONS

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
10 PARK PLAZA BOSTON, MASS

Frank A. Tramontozzi 3/24/2011
CHIEF ENGINEER

BRIDGE ENGINEER — TRAFFIC ENGINEER

SHEET 5 OF 5 SHEETS

MARLBOROUGH
SIMARANO DRIVE
TRAFFIC DETAILS
MAST ARM DETAILS
SHEET 69 OF 142

12477 - MADTL.DWG 3-Jun-2014

TEMPORARY TRAFFIC CONTROL PLAN GENERAL NOTES

1. ALL CONSTRUCTION SIGNING, TEMPORARY TRAFFIC CONTROL DEVICES, AND ROADSIDE ELEMENTS SHALL CONFORM WITH THE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AS AMENDED, THE LATEST REVISIONS OF THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, (AASHTO) ROADSIDE DESIGN GUIDE, AASHTO POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS, AND NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP) REPORT 350 OR THE AASHTO MANUAL FOR ASSESSING SAFETY HARDWIRE (MASH).
2. ALL TEMPORARY PEDESTRIAN PATHWAYS SHALL COMPLY FULLY WITH ALL REQUIREMENTS OF THE MUTCD AND ALL APPLICABLE MASSACHUSETTS ARCHITECTURAL ACCESS BOARD (MAAB) AND AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES (ADAAG) REQUIREMENTS.
3. WORK HOURS SHALL BE 9:30AM TO 3:00PM MONDAY THRU FRIDAY UNLESS OTHERWISE APPROVED BY THE ENGINEER. WORK SHALL NOT AFFECT TRAFFIC PATTERNS DURING PEAK TRAFFIC PERIODS. PEAK TRAFFIC PERIODS ARE DEFINED AS MONDAY THRU FRIDAY 7:00AM–9:00AM AND 3:00PM–6:00PM.
4. ALL DRUMS SHALL BE SET AT 20' ON CENTER MAX. UNLESS OTHERWISE NOTED OR ADJUSTED BY THE ENGINEER.
5. ALL DRUMS SHALL BE APPROXIMATELY PLACED AND MOVED AS NECESSARY TO MAINTAIN ADEQUATE ABUTTER ACCESS AT ALL TIMES. WORK MAY REQUIRE ADDITIONAL SIGNS, DRUMS AND OTHER TRAFFIC CONTROL DEVICES, GRADING AND TEMPORARY PAVEMENT FOR PASSAGE OF PEDESTRIAN, VEHICULAR AND EMERGENCY TRAFFIC THROUGH THE WORK AREAS, BOTH DURING AND AFTER WORKING HOURS, TO MAINTAIN SUCH ACCESS.
6. THE CONTRACTOR SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OF ACCESS.
7. A MINIMUM OF ONE LANE OF TRAFFIC IN EACH DIRECTION ON TWO WAY STREETS SHALL BE MAINTAINED AT ALL TIMES, EXCEPT THAT DURING WORKING HOURS, TRAFFIC MAY BE REDUCED TO ONE LANE UNDER POLICE CONTROL FOR SHORT TIME PERIODS WHEN REQUIRED FOR THE WORK, AS SHOWN UNLESS OTHERWISE APPROVED BY THE ENGINEER.
8. GRADE SEPARATIONS IN EXCESS OF 2" DURING NON–WORKING HOURS WILL REQUIRE DELINEATION BY USE OF DRUMS.
9. EXCAVATION EDGES IN EXCESS OF 4 INCHES DEEP SHALL BE PROTECTED DURING NON–WORKING HOURS BY BACKFILLING WITH A WEDGE OF COMPACTED GRAVEL BORROW AT A 4:1 SLOPE PER THE DETAIL SHOWN. EXCAVATIONS IN EXCESS OF 2 FEET SHOULD BE PROTECTED BY A MASSDOT APPROVED TEMPORARY CONCRETE BARRIER WITH A MINIMUM LEVEL LATERAL OFFSET OF 3 FEET FROM THE EDGE OF EXCAVATION. BARRIER PLACED WITH LESS THAN THE RECOMMENDED LATERAL OFFSET TO THE EDGE OF EXCAVATION SHALL BE ANCHORED/RESTRAINED TO PREVENT LATERAL MOVEMENT WHEN STRUCK BY ERRANT VEHICLES TRAVELING AT THE POSTED SPEED.
10. THE CONTRACTOR SHALL PROVIDE TEMPORARY IMPACT ATTENUATORS TO PROTECT ALL BLUNT–ENDS OF TEMPORARY CONCRETE BARRIER. TEMPORARY IMPACT ATTENUATORS SHALL BE DESIGNED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO THE START OF WORK. ALL TEMPORARY IMPACT ATTENUATORS SHALL BE DESIGNED FOR TEST LEVEL 2 (TL–2) ON ALL ROADWAYS HAVING A POSTED SPEED LESS THAN 45MPH AND TEST LEVEL 3 (TL–3) ON ROADWAYS HAVING A POSTED SPEED IN EXCESS OF 45MPH.
11. 11' MINIMUM LANE WIDTHS SHALL BE MAINTAINED.
12. TRAFFIC CONTROL DEVICES AND SIGNS SHALL BE COVERED OR REMOVED DURING NON–WORKING HOURS WHEN NOT IN USE.
13. ADVISORY SPEED PLATES (W13–1) SHALL BE USED IF APPROPRIATE AND AS DIRECTED BY THE ENGINEER.
14. SIGNS INSTALLED ON PORTABLE STANDS REQUIRE 12 INCH MINIMUM MOUNTING HEIGHT FROM THE ROADWAY SURFACE TO THE BOTTOM OF THE SIGN.
15. SIGNS INSTALLED ON PORTABLE STANDS PLACED AMONG CHANNELIZATION DEVICES REQUIRE A 36 INCH MINIMUM MOUNTING HEIGHT FROM THE ROADWAY SURFACE TO THE BOTTOM OF THE SIGN.
16. SIGNS MOUNTED ON POSTS REQUIRE A MINIMUM 84 INCH MOUNTING HEIGHT FROM THE ROADWAY OR SIDEWALK SURFACE TO THE BOTTOM OF THE SIGN.
17. W20–8 SIGNS SHALL BE REPLACED BY W20–7a SIGNS WHEN FLAGGERS ARE USED IN LIEU OF POLICE OFFICER DETAILS.
18. TEMPORARY MARKINGS SHALL BE WATER–BORNE PAINT.
19. TEMPORARY TRAFFIC CONTROL DEVICES ON TAPERS AND AT ROADWAY/RAMP CLOSURE LOCATIONS SHALL BE REFLECTORIZED DRUMS WITH TYPE C (STEADY BURN) LIGHTS FOR NIGHT–TIME OPERATIONS.
20. REFLECTORIZED CONES SHALL BE A MINIMUM OF 36 INCHES IN HEIGHT.
21. CONES MAY BE USED IN LIEU OF DRUMS OUTSIDE OF TAPER AREAS.
22. W20–8a SIGNS SHALL BE INSTALLED IN ADVANCE (100' MIN) OF AREAS WHERE UTILITY CASTINGS HAVE BEEN RAISED IN ADVANCE OF PAVING OPERATIONS OR AS REQUESTED BY THE ENGINEER.
23. W8–15 SIGNS SHALL BE INSTALLED IN ADVANCE (100' MIN) OF PAVEMENT MILLING AREAS OR AS REQUESTED BY THE ENGINEER.
24. THERE IS NO EXIST DESIGNATED BICYCLE LANE ON THE ROADWAY WITHIN THE PROJECT LIMITS. BICYCLES ARE EXPECTED TO SHARE THE ROAD WITH GENERAL VEHICULAR TRAFFIC.
25. REFLECTORIZED DRUMS SHALL BE USED TO DELINEATE THE ROADWAY EDGE OF WORK ZONES AT ALL TIMES UNLESS OTHERWISE APPROVED BY THE ENGINEER.
26. THE CONTRACTOR SHALL SECURE THE WORK AREA TO PROTECT UNAUTHORIZED ACCESS AT ALL TIMES.

TEMPORARY TRAFFIC CONTROL SIGNS

IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	COLOR			TEXT DIMENSIONS (INCHES)		
	WIDTH	HEIGHT		BACKGROUND	LEGEND	BORDER	LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.
R2–10a	48"	36"	WORK ZONE SPEEDING FINES DOUBLED	ORANGE/WHITE	BLACK	BLACK	SEE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS		
R2–10c	36"	48"	END ROAD WORK / DOUBLE FINES END	ORANGE/WHITE	BLACK	BLACK			
R9–9	30"	18"	SIDEWALK CLOSED	WHITE	BLACK	BLACK			
R9–11aL	48"	24"	SIDEWALK CLOSED ← CROSS HERE	WHITE	BLACK	BLACK			
R9–11aR	48"	24"	SIDEWALK CLOSED → CROSS HERE	WHITE	BLACK	BLACK			
W1–4L	36"	36"		ORANGE	BLACK	BLACK			
W1–4R	36"	36"		ORANGE	BLACK	BLACK			
W5–1	36"	36"	ROAD NARROWS	ORANGE	BLACK	BLACK			
W8–15	36"	36"	GROOVED PAVEMENT	ORANGE	BLACK	BLACK			
W11–2	36"	36"		YELLOW	BLACK	BLACK			
W13–1P	24"	30"	XX MPH	ORANGE	BLACK	BLACK			
W16–7pL	24"	12"		YELLOW	BLACK	BLACK			
W16–9p	24"	12"	AHEAD	YELLOW	BLACK	BLACK			
W20–1c	36"	36"	ROAD WORK AHEAD	ORANGE	BLACK	BLACK			
W20–4	36"	36"	ONE LANE ROAD	ORANGE	BLACK	BLACK			
W20–7a	36"	36"		ORANGE	BLACK	BLACK			
W20–8	36"	36"	POLICE OFFICER AHEAD	ORANGE	BLACK	BLACK			
W20–8a	36"	36"	RAISED CASTINGS AHEAD	ORANGE	BLACK	BLACK			

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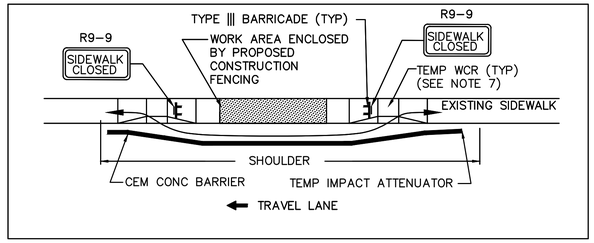
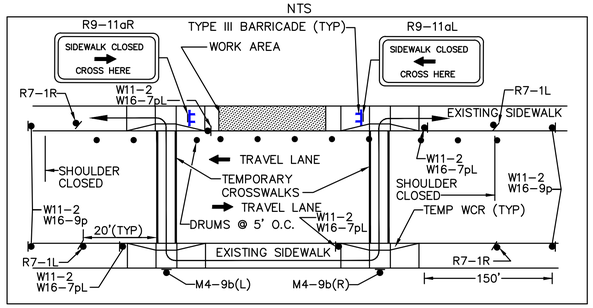
PEDESTRIAN BYPASS

TO BE USED IN CONJUNCTION WITH THE PROPOSED LANE CLOSURE DETAILS AND DURING CONSTRUCTION STAGING AND AS DIRECTED BY THE ENGINEER.



TYPE I

NTS



TYPE II

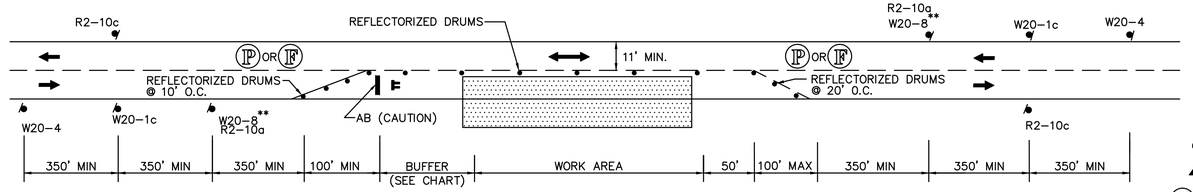
NTS

NOTES:

1. ADDITIONAL ADVANCE WARNING SIGNS MAY BE NECESSARY AS DETERMINED BY THE ENGINEER.
2. CONTROLS FOR PEDESTRIAN TRAFFIC ONLY, ARE SHOWN. VEHICULAR TRAFFIC SHALL BE MAINTAINED AS SHOWN ELSEWHERE.
3. STREET LIGHTING SHOULD BE CONSIDERED WHEN LOCATING CONTROL DEVICES.
4. ←→ INDICATES DIRECTION OF PEDESTRIAN TRAVEL.
5. IF THE WORK ZONE DOES NOT PERMIT PEDESTRIANS TO TRAVEL ADJACENT TO IT AS SHOWN IN PEDESTRIAN BYPASS TYPE I, TEMPORARY CROSSWALKS WITH APPROPRIATE SIGNS SHALL BE INSTALLED TO CROSS PEDESTRIANS TO THE OPPOSITE SIDE OF THE STREET AS SHOWN IN PEDESTRIAN BYPASS TYPE II, AND AS DIRECTED BY THE ENGINEER.
6. PROPOSED TEMPORARY CROSSWALKS SHALL BE 12" WIDE SURFACE APPLIED TAPE OR REFLECTORIZED PAINT AS DIRECTED BY THE ENGINEER.
7. ALL TEMPORARY PEDESTRIAN PATHWAYS SHALL COMPLY FULLY WITH ALL REQUIREMENTS OF THE MUTCD AND ALL APPLICABLE MAAB AND ADAAG REQUIREMENTS.
8. CONTRACTOR SHALL MAINTAIN AS WIDE OF A PEDESTRIAN ACCESS AS POSSIBLE AT ALL TIMES. EXCEPT WHERE NECESSARY, THE CONTRACTOR MAY TEMPORARILY REDUCE PEDESTRIAN PATHWAYS TO 4 FEET IN WIDTH (EXCLUDING CURB) FOR NO MORE THAN 200 LINEAR FEET AT A TIME IN ACCORDANCE WITH ALL STANDARDS.
9. TEMPORARY WHEELCHAIR RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH MASSDOT, MAAB, AND ADAAG REQUIREMENTS.
10. W16-7pR OR W16-7pL SIGNS SHALL BE USED IN COMBINATION WITH W11-2 SIGNS AS DIRECTED BY THE ENGINEER.
11. EXISTING WHEELCHAIR RAMPS (WCR) MAY BE USED IN LIEU OF TEMPORARY WHEELCHAIR RAMPS FOR TEMPORARY DETOURS UNLESS OTHERWISE DRIECTED BY THE ENGINEER.

OPERATIONAL SIGNING

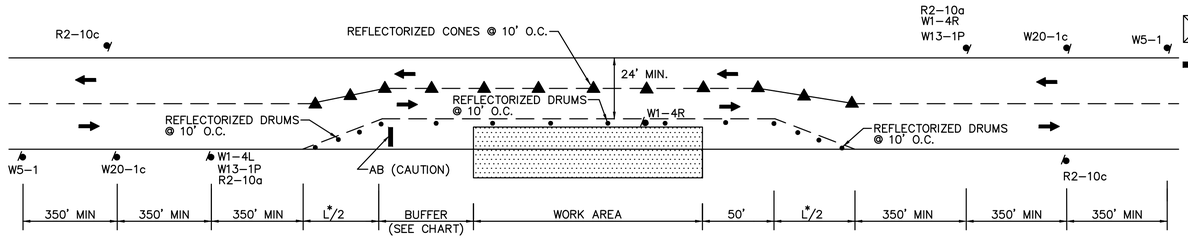
LANE CLOSURES SHOWN ARE FOR TEMPORARY CONSTRUCTION. ALL DRUMS AND SIGNS ARE SHOWN AS THEY SHOULD APPEAR DURING THE WORKING DAY, OR WHILE OPERATING IN THE WORK ZONE.



** SEE NOTE 17 ON SHEET 70

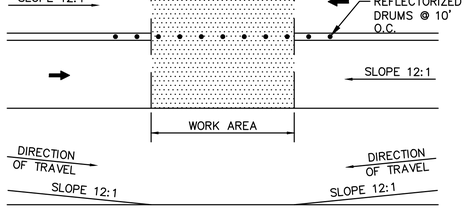
TYPICAL TWO WAY STREET LANE CLOSURE

NOT TO SCALE



TYPICAL TWO WAY STREET LANE SHIFT

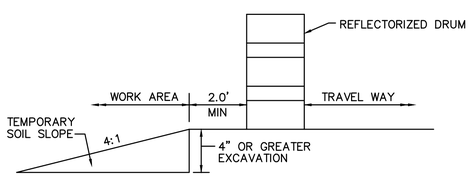
NOT TO SCALE



SQUARE OFF THE FULL WIDTH OF THE ROADWAY AT THE END OF WORK DAY

TEMPORARY PAVEMENT TRANSITION DETAIL

NOT TO SCALE



ROADWAY SLOPE PROTECTION

NOT TO SCALE

BUFFER SPACING

SPEED (MPH)	DISTANCE (FEET)
15	80
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645

FOR POSTED SPEEDS OF 40 MPH OR LESS

$* \quad L = \frac{WS^2}{60}$ L=TAPER LENGTH
W=WIDTH OF ROADWAY TO BE SHIFTED OR REDIRECTED
S=POSTED SPEED LIMIT

FOR POSTED SPEEDS GREATER THAN 40 MPH

$* \quad L = W \times S$ L=TAPER LENGTH
W=WIDTH OF ROADWAY TO BE SHIFTED OR REDIRECTED
S=POSTED SPEED LIMIT

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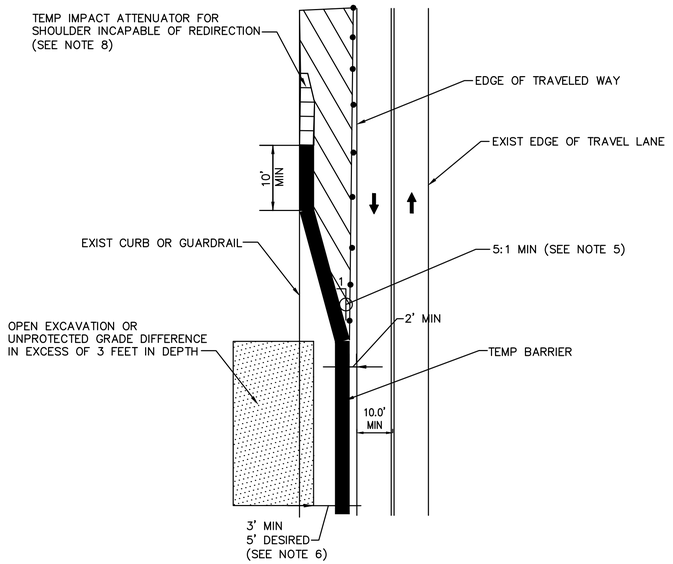
LEGEND

- REFLECTORIZED DRUM
- REFLECTORIZED CONE
- POLICE OFFICER/FLAGGER
- TEMPORARY TRAFFIC CONTROL SIGN
- TEMPORARY IMPACT ATTENUATOR
- MOVEABLE IMPACT ATTENUATOR
- TEMPORARY CONCRETE BARRIER
- TYPE III BARRICADES
- WORK ZONE
- PROPOSED TRAFFIC FLOW
- SPECIAL LIGHTING UNIT (SLU)

NTS NOT TO SCALE



BARRIER ADJACENT TO LIVE TRAVEL LANE DETAIL

NOT TO SCALE

NOTES:

1. ANY EXCAVATION GREATER THAN 3' DEEP ADJACENT TO TRAFFIC SHALL BE PROTECTED BY TEMPORARY CONCRETE BARRIER.
2. ALL BLUNT ENDS OF BARRIER SHALL BE PROTECTED AT ALL TIMES IN ACCORDANCE WITH THE LATEST EDITION OF THE AASHTO ROADSIDE DESIGN GUIDE.
3. TEMPORARY IMPACT ATTENUATORS SHALL BE DESIGNED FOR TEST LEVEL 2 (TL-2) ON ROADWAYS HAVING A POSTED LESS THAN OR EQUAL TO 45 MPH.
4. TEMPORARY IMPACT ATTENUATORS SHALL BE DESIGNED FOR TEST LEVEL 3 (TL-3) ON ROADWAYS HAVING A POSTED SPEED IN EXCESS OF 45 MPH.
5. BARRIER TAPER RATES SHALL BE:
   - 5:1 IF POSTED SPEED IS LESS THAN 40 MPH
   - 9:1 IF POSTED SPEED IS GREATER THAN OR EQUAL TO 40 MPH
   - 11:1 IF POSTED SPEED IS GREATER THAN OR EQUAL TO 50 MPH
   - 13:1 IF POSTED SPEED IS GREATER THAN OR EQUAL TO 60 MPH
6. LEVEL ASPHALT CLEAR SLIDE SPACE FOR BARRIER SHALL BE FREE FROM OBSTRUCTIONS AT ALL TIMES. 3 FEET CLEAR SHALL BE PROVIDED FOR SPEEDS LESS THAN OR EQUAL TO 45 MPH. 5 FEET CLEAR SHALL BE PROVIDED FOR SPEEDS IN EXCESS OF 45 MPH.
7. IF MINIMUM CLEAR SLIDE SPACE CANNOT BE PROVIDED TEMP CONC BARRIER SHALL BE ANCHORED OR RESTRAINED BY A MASSDOT APPROVED METHOD.
8. TEMP IMPACT ATTENUATOR SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
9. THE CONTRACTOR SHALL USE THE TRUCK TURNING TEMPLATE FOR A WB-50 TRUCK WHEN DESIGNING TEMPORARY BARRIER PLACEMENT AT THE INTERSECTION.

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N

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INTERSTATE 495

AMES STREET

HAYES MEMORIAL DRIVE

FOREST STREET

WILLIAMS STREET

MARLBOROUGH
NORTHBOROUGH

CAMPUS DR

VALUE WAY

SIMARANO DRIVE

EXIT 23C

MARLBOROUGH
SOUTHBOROUGH

CEDAR HILL ST

D'ANGELO DRIVE

NORTHBORO ROAD

PROJECT LIMIT

350' 350' 500'
W20-1a R2-10a W20-1b

500'
R2-10c W20-1c

350' 350'
W20-1c R2-10c

350' 350'
R2-10a

350' 350'
R2-10c W20-1c

R2-10a

350' 350'
R2-10a R2-10c W20-1c

350' 350'
R2-10a W20-1c R2-10c

350' 350'
R2-10c W20-1c

350' 350'
R2-10a

350' 350'
R2-10a

350' 350'
R2-10a W20-1c R2-10c

PROJECT LIMIT

R2-10c W20-1c

ADVANCE SIGN SCHEMATIC
NTS
SIGNS TO BE INSTALLED AT THE PROJECT LIMITS AS SHOWN.
ALL ADVANCE SIGNS TO BE IN PLACE FOR THE DURATION OF THE PROJECT.
THE CONTRACTOR SHALL COVER ANY ADVANCE SIGNAGE IF THE SIGNAGE
FROM A DAILY OPERATIONAL SETUP INTERFERES WITH THE ADVANCE SIGNING.

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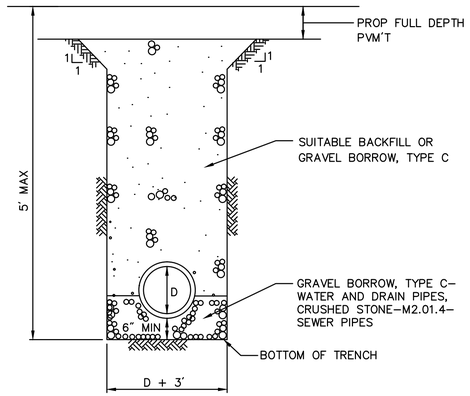
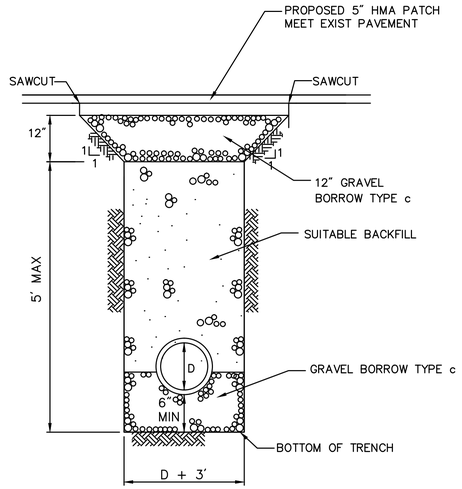


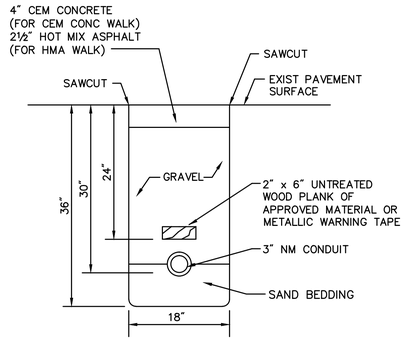
TRENCH DETAIL IN FULL DEPTH PAVEMENT/ RECLAIM

SCALE:
DATE:
DWG:



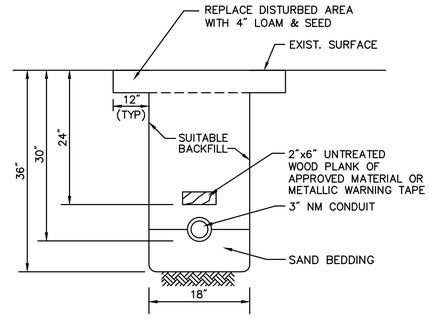
TRENCH DETAIL IN MICRO MILL AND PAVEMENT OVERLAY

SCALE: NOT TO SCALE
DATE: APRIL 2003
DWG: TRENCH–04



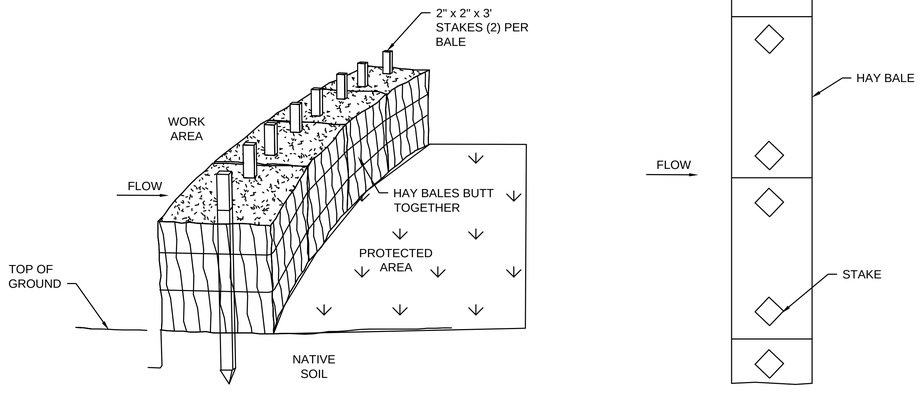
CONDUIT IN SIDEWALK

SCALE: NOT TO SCALE
DATE: APRIL 2003
DWG: TRENCH–03

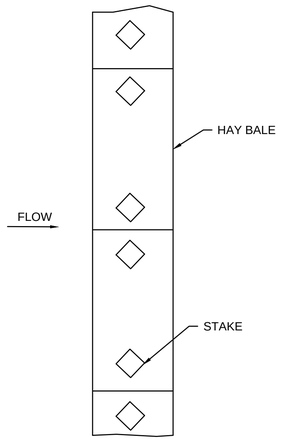


CONDUIT IN GRASS

SCALE: NOT TO SCALE
DATE: APRIL 2003
DWG: TRENCH–02



CROSS SECTION

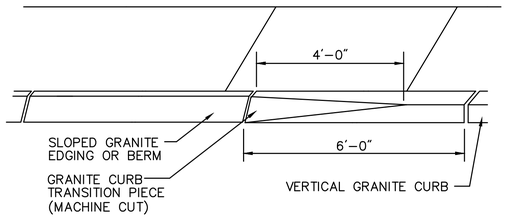


PLAN VIEW

CONSTRUCTION NOTES:
1. INSPECTIONS SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS REQUIRED.

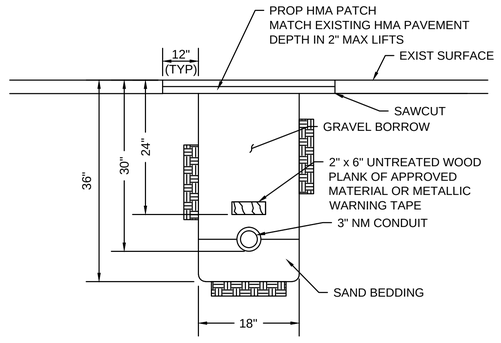
BALES OF HAY FOR EROSION CONTROL

SCALE: N.T.S. DWG: EV-04 DATE: MARCH 2013



SPLAYED END GRANITE CURB

SCALE: NOT TO SCALE
DATE: APRIL 2003
DWG: CURB–07



CONDUIT CROSSING ROADWAY/ DRIVEWAY

SCALE: NOT TO SCALE
DATE: APRIL 2003
DWG: TRENCH–02

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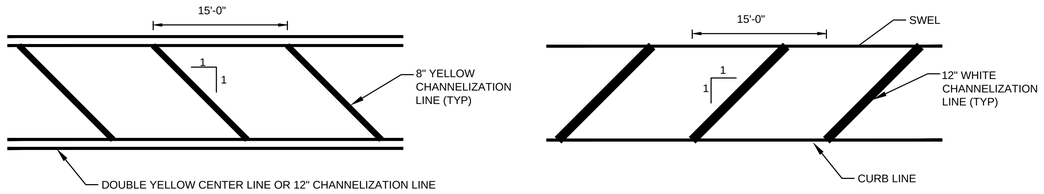
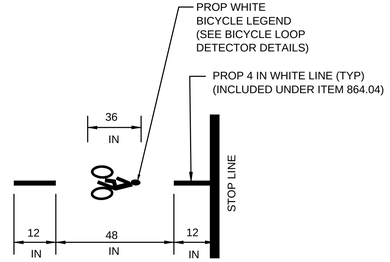


NOTES:

1. ALL 8" AND 12" LINES SHALL BE APPLIED IN ONE APPLICATION, NO COMBINATION OF LINES (e.g. TWO - 6" LINES) WILL BE ACCEPTED.

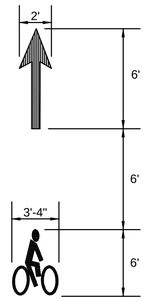
CHANNELIZED MARKINGS DETAIL

SCALE: NTS



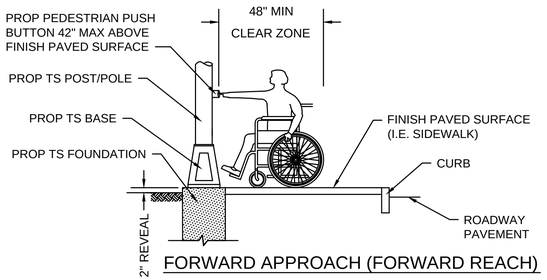
BICYCLE LEGEND DETAIL

SCALE: NTS

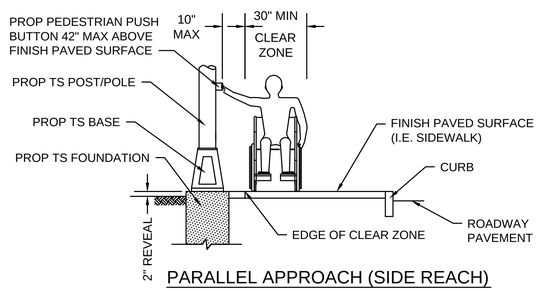


NOTES:
1. REFER TO FIGURE 9C-6 IN THE MUTCD FOR MORE DETAIL.
2. MARKINGS SHALL BE REFLECTORIZED WHITE PAINT.

	BIKE LANE PAVEMENT MARKINGS
	SCALE: NOT TO SCALE
	DATE:
	DWG:



FORWARD APPROACH (FORWARD REACH)



PARALLEL APPROACH (SIDE REACH)

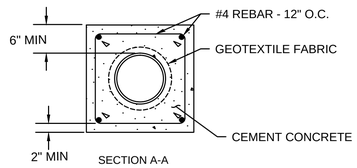
NOTE:
A CLEAR GROUND SPACE SHALL CONSIST OF A STABLE AND FIRM AREA, COMPLYING WITH 521 CMR 6.5 (FORWARD REACH) OR 521 CMR 6.6 (SIDE REACH) AND SHALL BE PROVIDED AT EACH OF THE PEDESTRIAN PUSH BUTTONS.

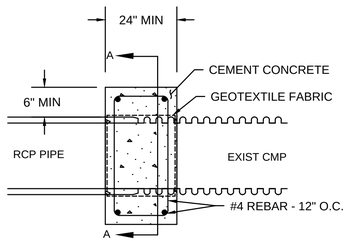
a) WHERE A FORWARD APPROACH IS PROVIDED, PEDESTRIAN PUSH BUTTONS SHALL ABUT AND BE CENTERED ON THE CLEAR GROUND SPACE.

b) WHERE A PARALLEL APPROACH IS PROVIDED, PEDESTRIAN PUSH BUTTONS SHALL BE WITHIN TEN INCHES (10") HORIZONTALLY OF AND CENTERED ON THE CLEAR GROUND SPACE.

PEDESTRIAN PUSH BUTTON CLEAR ZONE

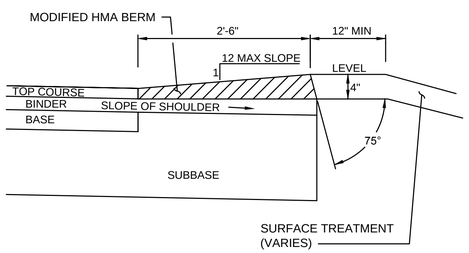
SCALE: N.T.S. DWG: PM-10 DATE: APRIL 2013





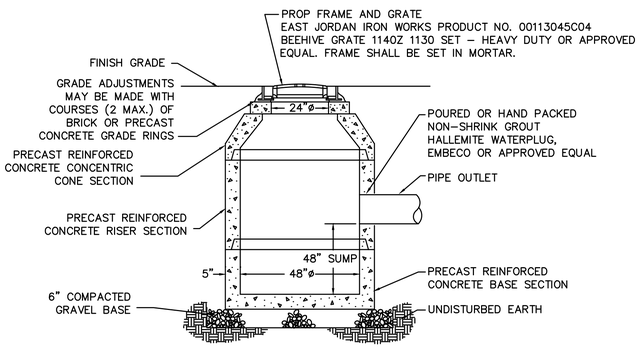
CONNECTION OF EXIST CMP PIPE TO RCP PIPE

SCALE: NTS



MODIFIED HMA BERM

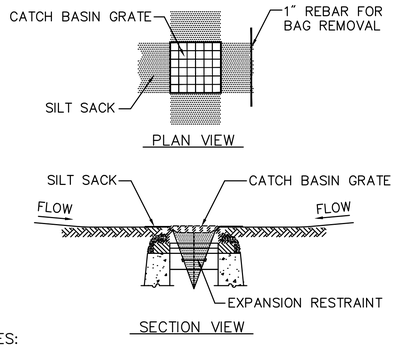
SCALE: NTS



PRECAST CONCRETE DRAINAGE INLET

NTS

12477 - DET.DWG Plotted on 4-Jun-2014 2:55 PM

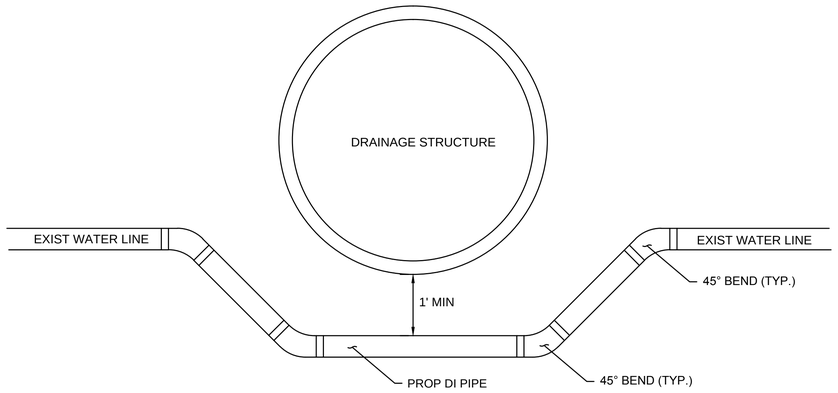


NOTES:

1. INSTALL INLET SILT SACK IN EXISTING CATCH BASINS, BEFORE COMMENCING WORK, AND IN NEW CATCH BASINS, GUTTER INLETS, AND ALL CURB INLETS IMMEDIATELY AFTER INSTALLATION OF STRUCTURE. MAINTAIN UNTIL BINDER COURSE PAVING IS COMPLETE OR A PERMANENT STAND OF GRASS HAS BEEN ESTABLISHED.
2. GRATE TO BE PLACED OVER INLET PROTECTION SACK.
3. INLET SILT SACK SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS AND CLEANING OR REPLACEMENT SHALL BE PERFORMED PROMPTLY AS NEEDED.

INLET SILT SACK IN CATCH BASIN

SCALE: NOT TO SCALE
DATE: APRIL 2003
DWG: EV–03

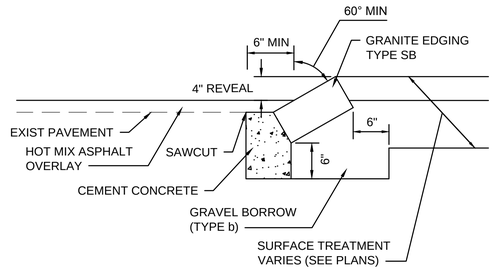


NOTES:

1. NEW DUCTILE IRON PIPE & FITTINGS SHALL BE OF THE SAME SIZE OF THE EXISTING WATER LINE.
2. THIS DETAIL SHALL ONLY BE USED PER THE DIRECTION OF THE ENGINEER.

WATERLINE RELOCATION AT DRAINAGE STRUCTURES

SCALE: NTS DWG: DET DATE: MAY 2014

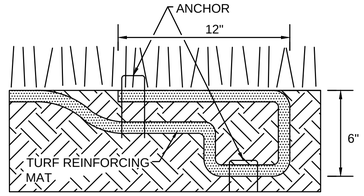


NOTES:

1. CONCRETE SHALL BE IN PRICE BID FOR GRANITE EDGING
2. ANY DESIGNATED CEMENT CONCRETE THAT IS ACCEPTABLE UNDER SECTION M4 OF THE STANDARD SPECIFICATIONS MAY BE USED. ALL TEST REQUIREMENTS ARE WAIVED. HOT MIX ASPHALT SHALL NOT BE USED AS A SUBSTITUTE.

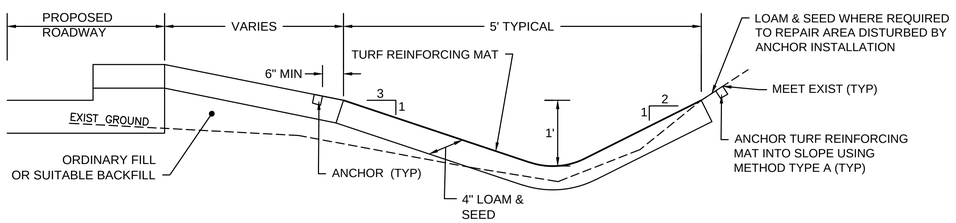
GRANITE EDGING IN EXISTING PAVEMENT - WITH OVERLAY

SCALE: N.T.S. DWG: CURB-08 DATE: FEB. 2013



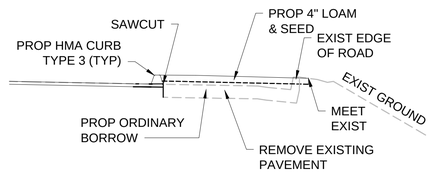
ANCHOR METHOD A

N.T.S.



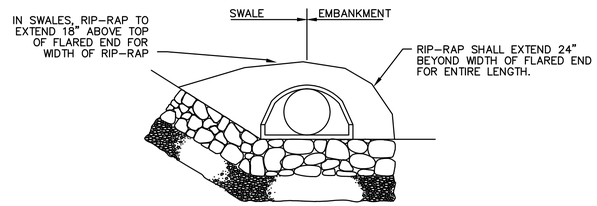
DRAINAGE DITCH WITH GEOTEXTILE FABRIC

SCALE: NOT TO SCALE
DATE: FEB – 14
DWG: DET

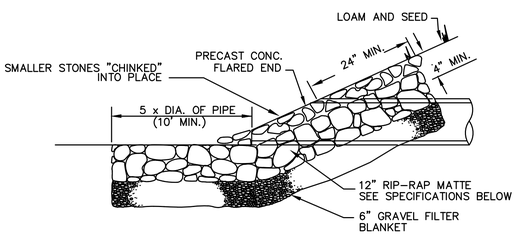


REMOVAL OF EXISTING ROADWAY IN ROAD NARROWING AREAS

SCALE: NOT TO SCALE
DATE: FEB – 14
DWG: DET



ELEVATION



PROFILE

RIP–RAP SPECIFICATIONS

1. THE RIP–RAP SHALL BE COMPRISED OF DURABLE STONE WHICH MEETS THE FOLLOWING GRADATION REQUIREMENTS:

STONE SIZE	% OF TOTAL WEIGHT SMALLER THAN GIVEN SIZE
125 LB.	100%
50 LB.	0%

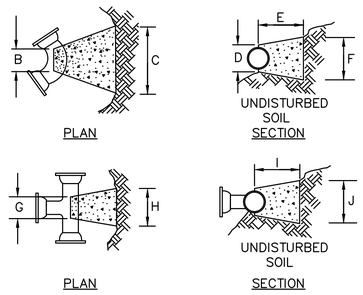
2. THE RIP–RAP SHALL BE UNDERLAYED WITH A FILTER BLANKET CONSISTING OF CLEAN, COARSE GRAVEL WITH NO STONES OVER 3" AND FEWER THAN 10% PASSING A #200 SIEVE.
3. THE FILTER BLANKET NEED NOT BE COMPACTED, BUT SHALL BE GRADED TO A UNIFORM SURFACE WITH A MINIMUM THICKNESS OF 6".

FLARED END W/RIP–RAP DETAIL

NTS

12477 - DET.DWG Plotted on 3-Jun-2014 3:53 PM

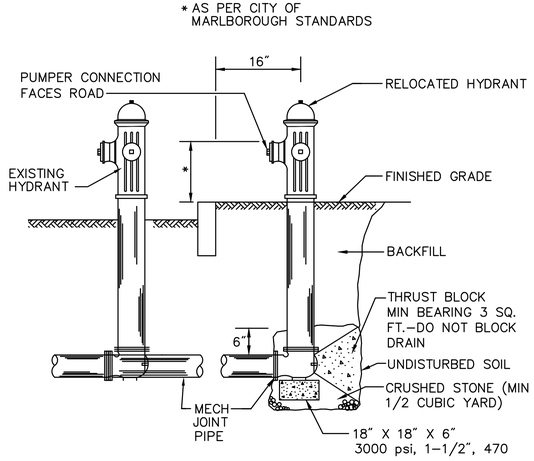
BENDS	B	C	D	E	F	BENDS	B	C	D	E	F
6" 11-1/4°	8"	15"	12"	24"	12"	6" 45°	8"	30"	12"	24"	14"
6" 22-1/2°	"	19"	"	"	13"	6" 90°	"	30"	"	"	27"
8" 11-1/4°	"	20"	"	"	12"	8" 45°	"	30"	"	"	24"
8" 22-1/2°	"	22"	"	"	17"	8" 90°	"	38"	"	"	36"
12" 11-1/4°	"	30"	"	"	15"	12" 45°	"	40"	"	"	40"
12" 22-1/2°	"	35"	"	"	25"	12" 90°	"	60"	"	"	52"
TEES	G	H	I	J		TEES	G	H	I	J	
6"x 6"x 6"	12"	24"	24"	18"		12"x12"x6"	12"	24"	24"	12"	
8"x 8"x 6"	"	"	"	"		12"x12"x8"	"	"	"	24"	
8"x 8"x 8"	"	"	"	24"		12"x12"x12"	"	36"	"	36"	



NOTES:
1. PROVIDE BLOCKS FOR TAPPING SLEEVES, DEAD ENDS, GATE VALVES AND VERTICAL BENDS, SAME SIZE AS REQUIRED FOR TEES.
2. PROVIDE ANCHOR RODS AT VERTICAL BENDS AND GATE VALVES
3. CONCRETE SHALL NOT BE PLACED AGAINST PIPE BEYOND FITTING.

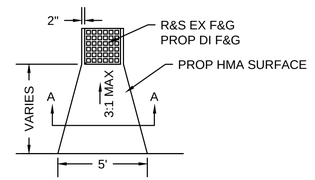
CONCRETE THRUST BLOCK

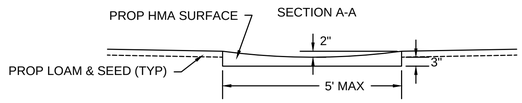
SCALE: NOT TO SCALE
DATE: APRIL 2003
DWG: WS-02



HYDRANT RELOCATION DETAIL

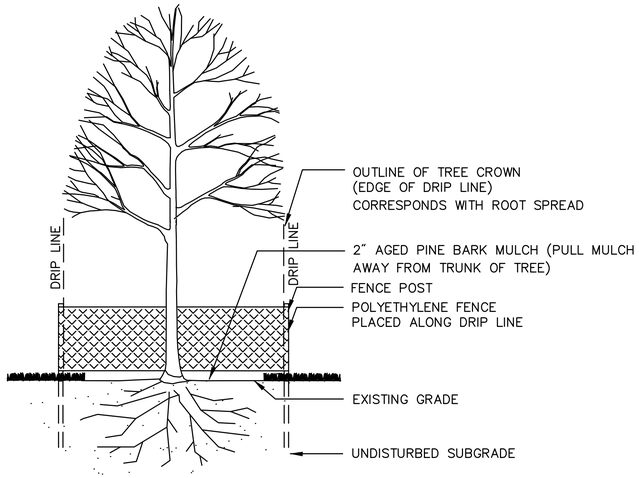
SCALE: NOT TO SCALE
DATE: APRIL 2003
DWG: WS-03





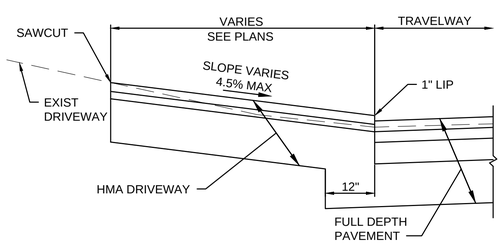
HMA PAVED SURFACE AT DROP INLETS

SCALE: NTS DWG: DET DATE: MAY 2014



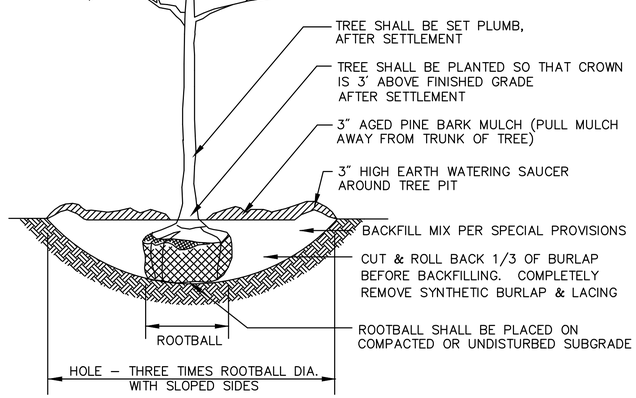
INDIVIDUAL TREE PROTECTION

SCALE: NOT TO SCALE
DATE: MAY 2001
DWG:



DRIVEWAY SECTION WITHOUT SIDEWALK - STA 29+32 & 51+80 LT

SCALE: NOT TO SCALE
DATE:
DWG:

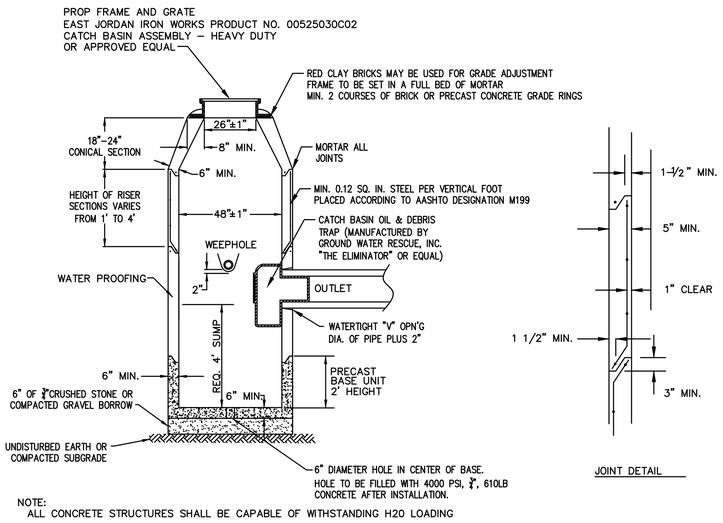


NOTE: WATERING SAUCER SHALL BE FLOODED TWICE DURING THE FIRST 24 HOURS AFTER PLANTING

TREE PLANTING

SCALE: NOT TO SCALE
DATE: APRIL 2003

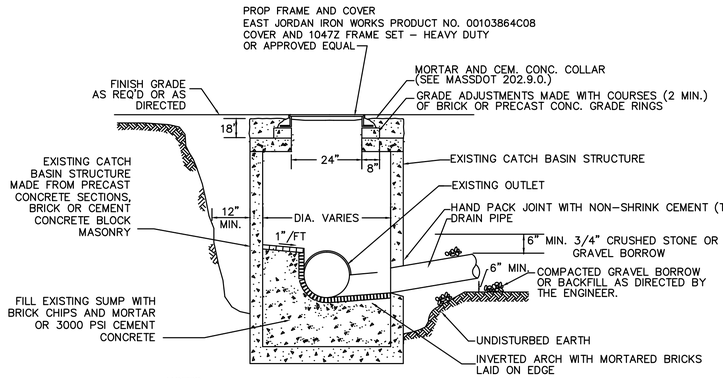
12477 - DET.DWG Plotted on 4-Jun-2014 2:29 PM



NOTE:
ALL CONCRETE STRUCTURES SHALL BE CAPABLE OF WITHSTANDING H20 LOADING

PRECAST CONCRETE CATCH BASIN WITH HOOD & FRAME AND GRATE DETAIL

SCALE: N.T.S. DWG: MASTER DETAILS DATE: DEC 2011

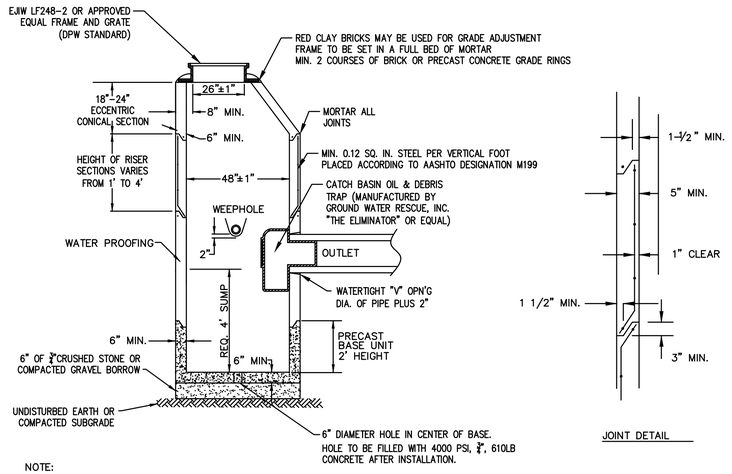


NOTES

1. DRAIN PIPE FOR LATERAL CONNECTIONS TO CATCH BASINS SHALL BE INSTALLED AND TEMPORARILY PLUGGED AS REQUIRED OR DIRECTED.
2. SEE GENERAL PLANS FOR PIPE SIZE, LINE AND GRADE.
3. BACKFILL MATERIAL SHALL CONSIST OF SUITABLE EXCAVATED MATERIAL.
4. CATCH BASIN SUMP SHALL BE CLEANED PRIOR TO CONSTRUCTING PROPOSED INVERT. INVERT CONSTRUCTION SHALL NOT BEGIN UNTIL THE SUMP IS INSPECTED AND APPROVED BY THE ENGINEER.

EXISTING CATCH BASIN CHANGE IN TYPE TO MANHOLE

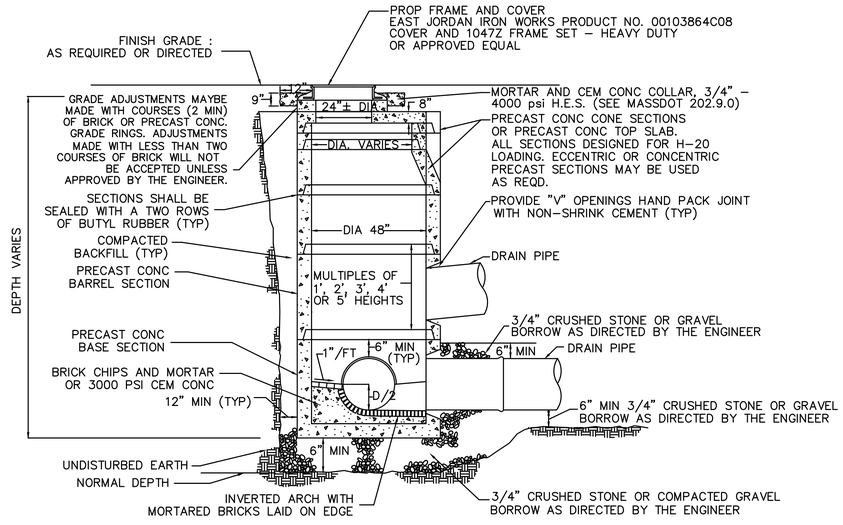
SCALE: NTS DWG: MASTER DETAILS DATE: DEC 2011



NOTE:
ALL CONCRETE STRUCTURES SHALL BE CAPABLE OF WITHSTANDING H20 LOADING

PRECAST CONCRETE CATCH BASIN WITH ECCENTRIC CONE SECTION, HOOD, AND FRAME AND GRATE

SCALE: N.T.S. DWG: MASTER DETAILS DATE: DEC 2011



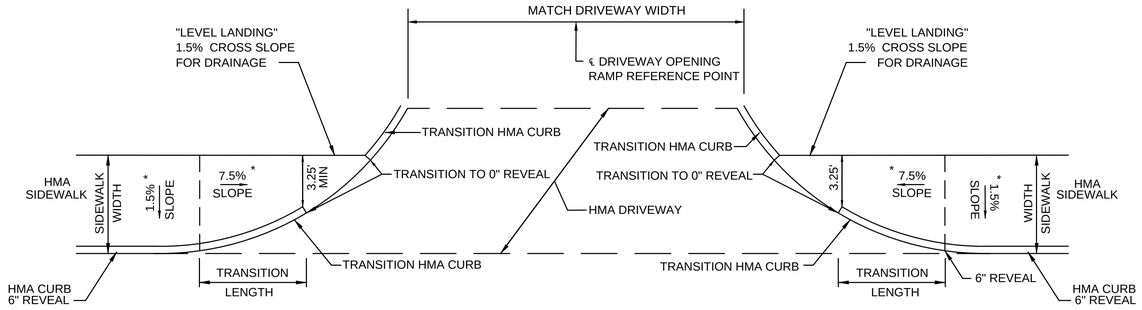
NOTES

1. MANHOLE SHALL BE PRECAST CEMENT CONCRETE MANUFACTURED IN ACCORDANCE WITH ASTM C–478 DESIGNED FOR H–20 LOADING. MANHOLES SHALL BE 48" DIA. UNLESS OTHERWISE INDICATED ON GENERAL PLANS.
2. SEE GENERAL PLANS FOR PIPE SIZE, LINE AND GRADE.
3. BACKFILL MATERIAL SHALL CONSIST OF SUITABLE EXCAVATED MATERIAL AND/OR GRAVEL BORROW AS DIRECTED BY THE ENGINEER.

PRECAST CONCRETE DRAIN MANHOLE

SCALE: N.T.S. DWG: MASTER DETAILS DATE: DEC 2011

12477 - DET.DWG Plotted on 3-Jun-2014 3:53 PM



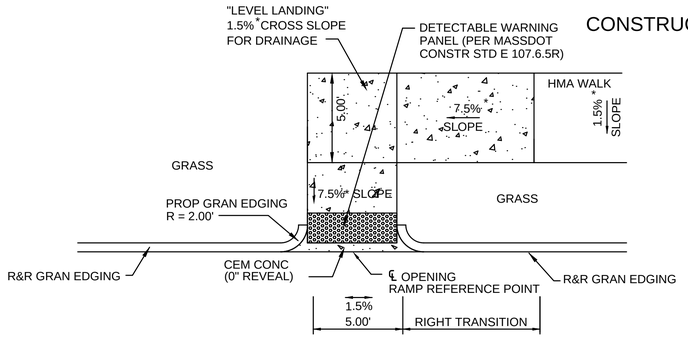
* TOLERANCE FOR CONSTRUCTION ±0.5%

SIDEWALK AT DRIVEWAY NO GRASS STRIP

SCALE: NOT TO SCALE
DATE:
DWG:

TRANSITION CURB FOR DRIVEWAYS WITH SIDEWALK						
STATION	ROADWAY GUTTER	SIDEWALK WIDTH	LEFT SIDE		RIGHT SIDE	
			REVEAL	TRANSITION	REVEAL	TRANSITION
54+32.22 LT	−5.20%	5.50′	6″	6.5′	6″	15.0′
71+04.20 LT	−2.80%	5.50′	6″	6.5′	6″	11.0′

NOTE: NEGATIVE (−) ROADWAY GUTTER MAX DENOTES A LOW SIDE TRANSITION.



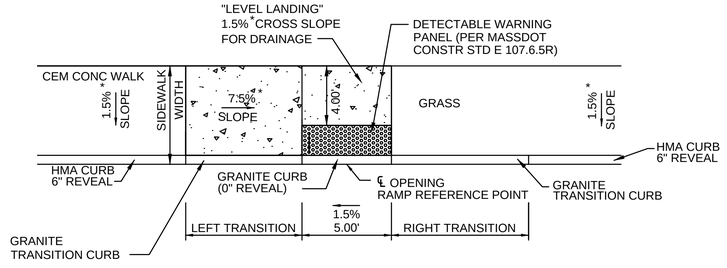
TOLERANCE FOR CONSTRUCTION ±0.5%

WHEEL CHAIR RAMP − ONE WING WITH GRASS STRIP

SCALE: NOT TO SCALE
DATE:
DWG:

WHEELCHAIR RAMP DATA											
NO.	LOCATION (REF. POINT)	SIDEWALK WIDTH	RAMP OPENING WIDTH	LEFT SIDE				RIGHT SIDE			
				ROADWAY GUTTER	REVEAL	TRANS	OPENING ELEV	ROADWAY GUTTER	REVEAL	TRANS	OPENING ELEV
17	10+29.00 24.00′ LT	5.0′	5.0′	−5.70%	6″	−−	388.14	5.70%	6″	15.0′	388.22

NOTE: NEGATIVE (−) ROADWAY GUTTER MAX DENOTES A LOW SIDE TRANSITION.



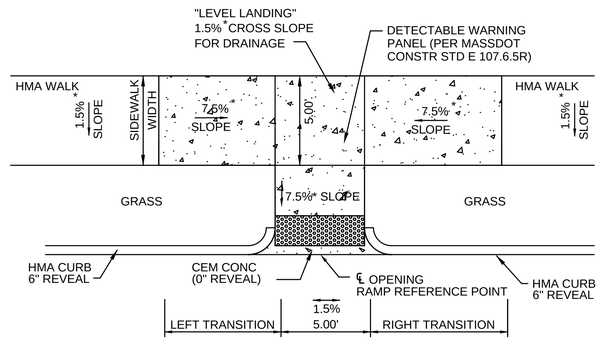
* TOLERANCE FOR CONSTRUCTION ±0.5%

WHEEL CHAIR RAMP−ONE WING SIDEWALK LESS THAN 6.5 FT

SCALE: NOT TO SCALE
DATE:
DWG:

WHEELCHAIR RAMP DATA											
NO.	LOCATION (REF. POINT)	SIDEWALK WIDTH	RAMP OPENING WIDTH	LEFT SIDE				RIGHT SIDE			
				ROADWAY GUTTER	REVEAL	TRANS	OPENING ELEV	ROADWAY GUTTER	REVEAL	TRANS	OPENING ELEV
10	29+94.62 16.08′ RT	7.0′±	5.0′	2.60%	6′	6.5′	454.93	−2.60	6″	6.5′	454.85
11	51+05.12 27.00 LT	5.5′	5.0′	5.20%	6″	15.0′	372.61	−5.20%	6″	6.5′	372.53
12	51+06.20 27.01′ RT	5.5′	5.0′	−5.20%	6″	6.5′	369.84	5.20%	6″	15.0′	369.92
15	57+51.50 33.00′ RT	7.2′	5.0′	−4.47%	6″	6.5′	338.69	4.47%	6″	15.0′	338.61
16	66+71.25 33.00′ RT	5.5′	5.0′	1.55%	6″	6.5′	321.29	−1.55%	6″	6.5′	321.37

NOTE: NEGATIVE (−) ROADWAY GUTTER MAX DENOTES A LOW SIDE TRANSITION.



TOLERANCE FOR CONSTRUCTION ±0.5%

WHEEL CHAIR RAMP WITH GRASS STRIP

SCALE: NOT TO SCALE
DATE:
DWG:

WHEELCHAIR RAMP DATA											
NO.	LOCATION (REF. POINT)	SIDEWALK WIDTH	RAMP OPENING WIDTH	LEFT SIDE				RIGHT SIDE			
				ROADWAY GUTTER	REVEAL	TRANS	OPENING ELEV	ROADWAY GUTTER	REVEAL	TRANS	OPENING ELEV
9	29+94.95 16.00′ LT	5.0′±	5.0′	−2.60%	6″	6.5′	454.87	2.60%	6″	11.0′	454.95

NOTE: NEGATIVE (−) ROADWAY GUTTER MAX DENOTES A LOW SIDE TRANSITION.

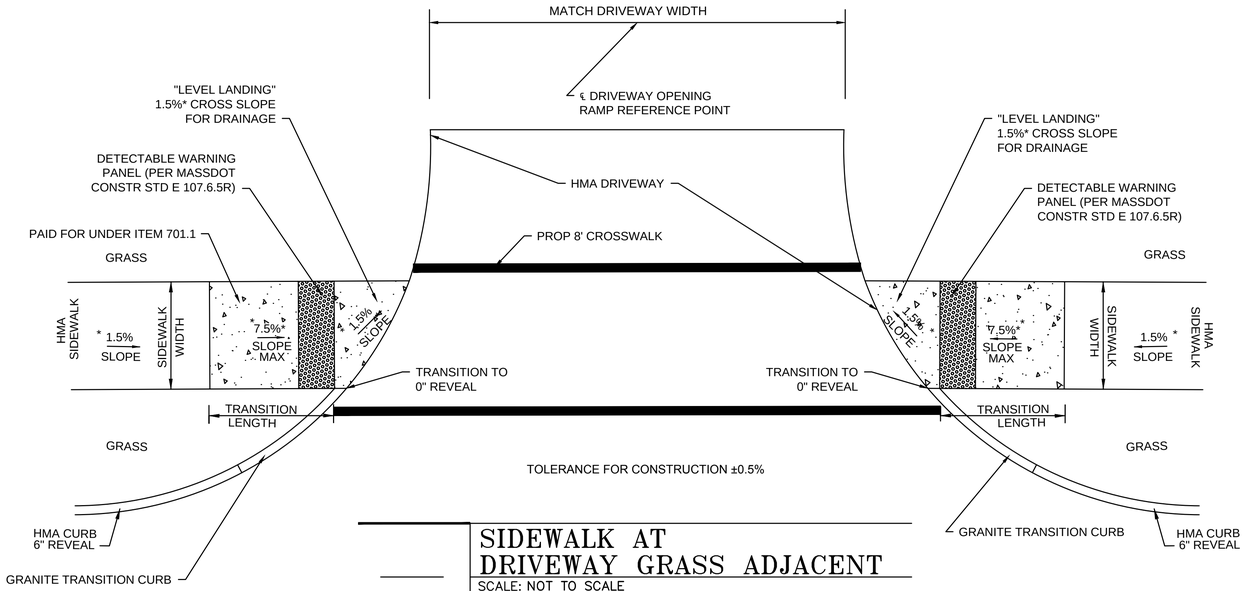
LEGEND

LIMITS OF CEMENT CONCRETE WHEELCHAIR RAMP

LIMITS OF DETECTABLE WARNING PANEL (SEE SPECIFICATIONS FOR COLOR)

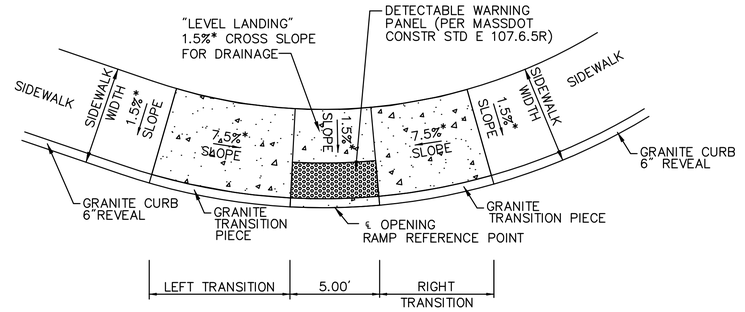
SEE ALIGNMENT PLANS FOR LOCATIONS

12477 - DET.DWG Plotted on 4-Jun-2014 2:31 PM



SIDEWALK AT DRIVEWAY GRASS ADJACENT

SCALE: NOT TO SCALE
DATE:
DWG:



NTS

TOLERANCE FOR CONSTRUCTION ±0.5%

WHEEL CHAIR RAMP – 2 WINGS – CURVED – SIDEWALK LESS THAN 6.5'

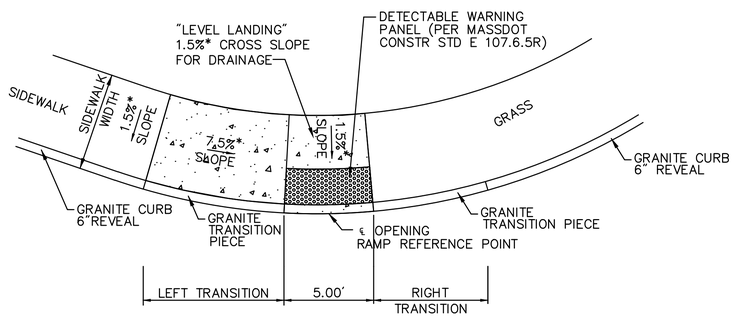
SCALE: NOT TO SCALE
DATE:
DWG:

TRANSITION CURB FOR DRIVEWAYS WITH SIDEWALK						
STATION	ROADWAY GUTTER	SIDEWALK WIDTH	LEFT SIDE		RIGHT SIDE	
			REVEAL	TRANSITION	REVEAL	TRANSITION
23+86.94 LT	3.20%	5.00'	6"	6.5'	6"	14.0'
37+65.58 LT	−6.16%	5.00'	6"	15.0'	6"	6.5'

NOTE: NEGATIVE (−) ROADWAY GUTTER MAX DENOTES A LOW SIDE TRANSITION.

WHEELCHAIR RAMP DATA											
NO.	LOCATION (REF. POINT)	SIDEWALK WIDTH	RAMP OPENING WIDTH	LEFT SIDE				RIGHT SIDE			
				ROADWAY GUTTER	REVEAL	TRANS	OPENING ELEV	ROADWAY GUTTER	REVEAL	TRANS	OPENING ELEV
1	14+98.92 19.25' LT	7.5'±	5.0'	−6.03	6"	6.5'	411.65	3.10%	6"	14.0'	411.73
3	102+35.55 29.96' RT	6.0'±	5.0'	3.00%	6"	11.0'	412.37	−4.10%	6"	6.5'	412.30
4	16+09.37 29.17' LT	6.0'±	5.0'	4.10%	6"	11.0'	410.04	−2.00%	6"	6.5'	409.96
7	101+36.11 26.69' RT	6.0'±	5.0'	1.90%	6"	9.0'	409.89	−2.19%	6"	6.5'	409.82
14	77+99.20 60.62' RT	6.0'±	5.0'	−1.30%	6"	6.5'	295.00	1.30%	6"	9.0'	295.08

NOTE: NEGATIVE (−) ROADWAY GUTTER MAX DENOTES A LOW SIDE TRANSITION.



TOLERANCE FOR CONSTRUCTION ±0.5%

WHEEL CHAIR RAMP – 1 WING – CURVED–SIDEWALK LESS THAN 6.5'

SCALE: NOT TO SCALE
DATE:
DWG:

WHEELCHAIR RAMP DATA											
NO.	LOCATION (REF. POINT)	SIDEWALK WIDTH	RAMP OPENING WIDTH	LEFT SIDE				RIGHT SIDE			
				ROADWAY GUTTER	REVEAL	TRANS	OPENING ELEV	ROADWAY GUTTER	REVEAL	TRANS	OPENING ELEV
2	102+45.14 36.50' LT	7.5'±	5.0'	−8.10%	6"	6.5'	413.32	8.10%	6"	6.5'	413.40
5	14+97.14 28.45' RT	6.0'±	5.0'	1.32%	6"	9.0	410.88	−1.32%	6"	6.5'	410.95
6	101+40.55 32.28' LT	6.0'±	5.0'	−1.59%	6"	6.5'	409.93	1.32%	6"	9.0'	409.97
8	16+14.55 32.29' RT	6.0'±	5.0'	0.51%	6"	6.5'	410.95	−0.51%	6"	6.5'	410.93
13	77+54.01 58.37' RT	5.5'±	5.0'	−1.13%	6"	6.5'	295.16	1.13%	6"	9.0'	295.08

NOTE: NEGATIVE (−) ROADWAY GUTTER MAX DENOTES A LOW SIDE TRANSITION.

LEGEND

LIMITS OF CEMENT CONCRETE WHEELCHAIR RAMP

LIMITS OF DETECTABLE WARNING PANEL (SEE SPECIFICATIONS FOR COLOR)

SEE ALIGNMENT PLANS FOR LOCATIONS

MARLBOROUGH
SIMARANO DRIVE
EXISTING BASE PLANS
SHEET 80 OF 142

12477-BASE.DWG Plotted on 4-Jun-2014 3:13 PM

N

AMES STREET

LIMIT OF WORK
STA 10+20.00
N 2946364.6768
E 632728.2624

CB
RIM=383.85'

CB
RIM=386.49'
I=382.4'

INV 12" HDPE
EL=387.84'

INV 12" HDPE
EL=389.71'

UPL #23 W/2 RISERS

RIP RAP

FES 15"
EL=393.81'

UPL #22

DMH
RIM=385.12'
I=381.6' 12"RCP A
I=381.5' 12"RCP B

GRAN. CURB

GRAN. EDGE

EDGE PAVEMENT

SWL

WG

DYL

B"Gas

GRAN. CURB

METAL GUARD RAIL

CB
RIM=384.75'
I=380.3' 12"RCP

MHD

SMH
RIM=390.06'
BC=380.4'

20"CON

12"DEC

BENCHMARK
GRAN. BOUND
w/DRILL HOLE
HIGH POINT ON BOUND
ELEV.=387.08'

11

S30°05'30"E
209.50'

12

PC +09.50

13

R=1077.00'
L=322.52'

14

15

PT +32.03

N/F
MARLBOROUGH / NORTHBOROUGH
LAND REALTY TRUST
89/80
LC BOOK 1228/149

N/F
MARLBOROUGH / NORTHBOROUGH
LAND REALTY TRUST
89/99
LC BOOK 1228/149

N/F
MARLBOROUGH / NORTHBOROUGH
LAND REALTY TRUST
100/24
LC BOOK 1228/149

N/F
MARLBOROUGH / NORTHBOROUGH
LAND REALTY TRUST
100/24
LC BOOK 1228/149

N/F
MARLBOROUGH / NORTHBOROUGH
LAND REALTY TRUST
LC BOOK

UPL #35 W/ELEC. METER/LIGHTLIGH

N/F
BND REALTY LLC
100/21
BOOK 43590, PAGE 510

N/F
NORMANDAY NICKERSON
ROAD LLC
100/11
BOOK 48642, PAGE 432

SMH
RIM=403.38'
BC=389.8' 6"PVC

GUY

UPL #25

BIT. CURB

18"DEC

15"DEC

EDGE PAVEMENT

GRAN. EDGE BIT. CURB

EDGE LINE

RIM=411.63'
C.N.S. A
I=400.6' 8"VC B
C.N.S. C
GRAVEL=397.3

EHH

SIGN

UPL w/LIGHT

UPL #36
CONC. PAD

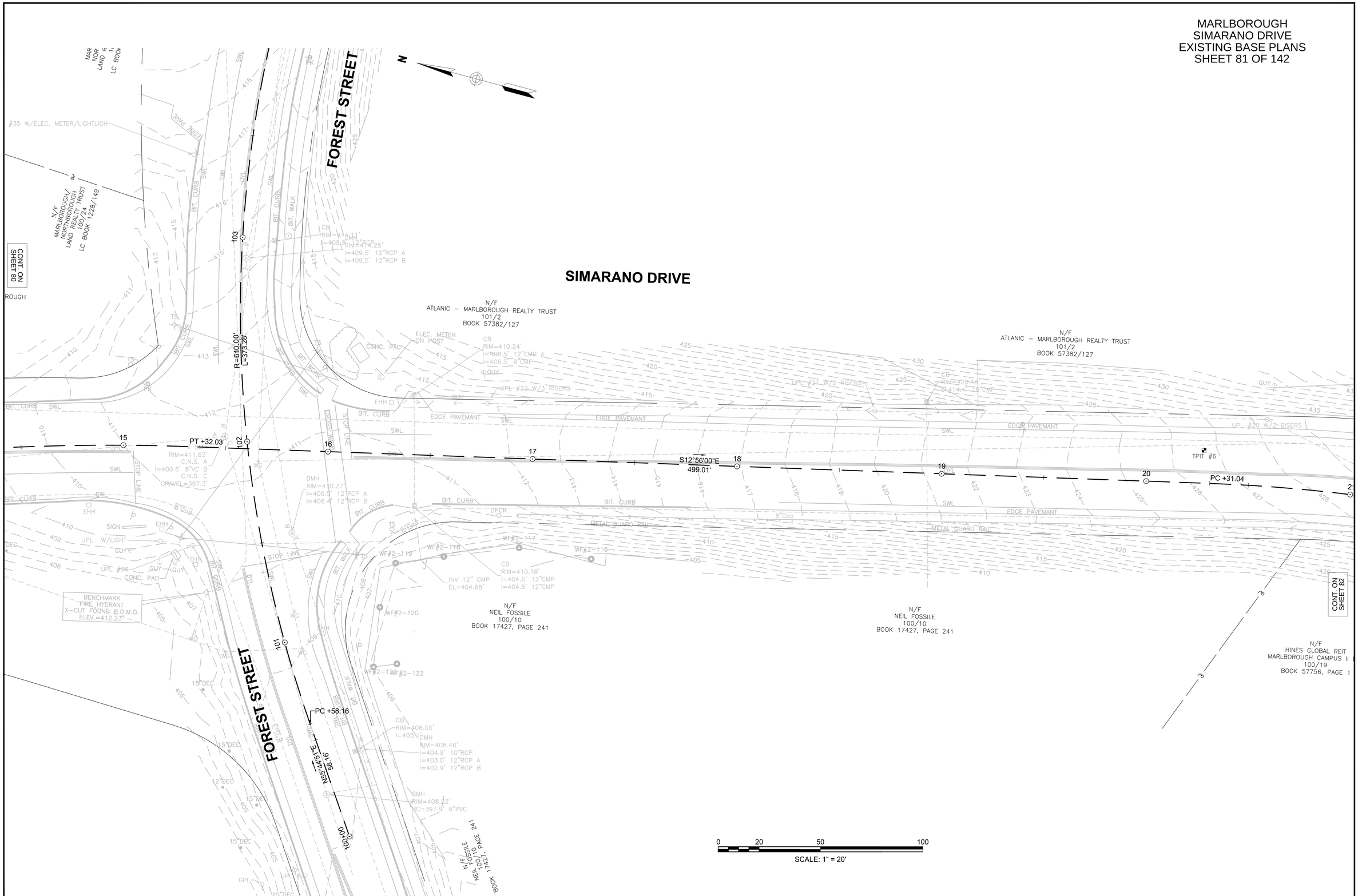
BENCHMARK
FIRE HYDRANT
X-CUT FOUND, B.O.M.O.
ELEV.=412.23'

FOREST STREET

CONT. ON
SHEET 81

0 20 50 100
SCALE: 1" = 20'

MARLBOROUGH
SIMARANO DRIVE
EXISTING BASE PLANS
SHEET 81 OF 142



12477 -BASE.DWG Plotted on 4-Jun-2014 3:13 PM

MARLBOROUGH
SIMARANO DRIVE
EXISTING BASE PLANS
SHEET 82 OF 142

12477-BASE.DWG Plotted on 4-Jun-2014 3:13 PM

N

SIMARANO DRIVE

CONT. ON SHEET 81

N/F
ATLANIC – MARLBOROUGH REALTY TRUST
101/2
BOOK 57382/127

BENCHMARK
FIRE HYDRANT
X-CUT FOUND B.O.M.O.
ELEV.=436.87'

CB
RIM=435.33'
I=429.5' 12"CMP_A"
I=428.1' 18"CMP

RIP RAP

CB
RIM=437.68'
I=434.6' 8"CMP_A
I=434.3' 12"CMP

EDGE PAVEMENT
SWL
DYL
WG
METAL GUARD RAIL
UPL #20 W/2 RISERS
UPL #19
UPL #18
UPL #17
GUY
TPIT #6
8"Gas
PK

R=800.00'
L=231.33'
S3°38'03"W
183.91'
PC +31.04
PT +62.37
PC +46.28

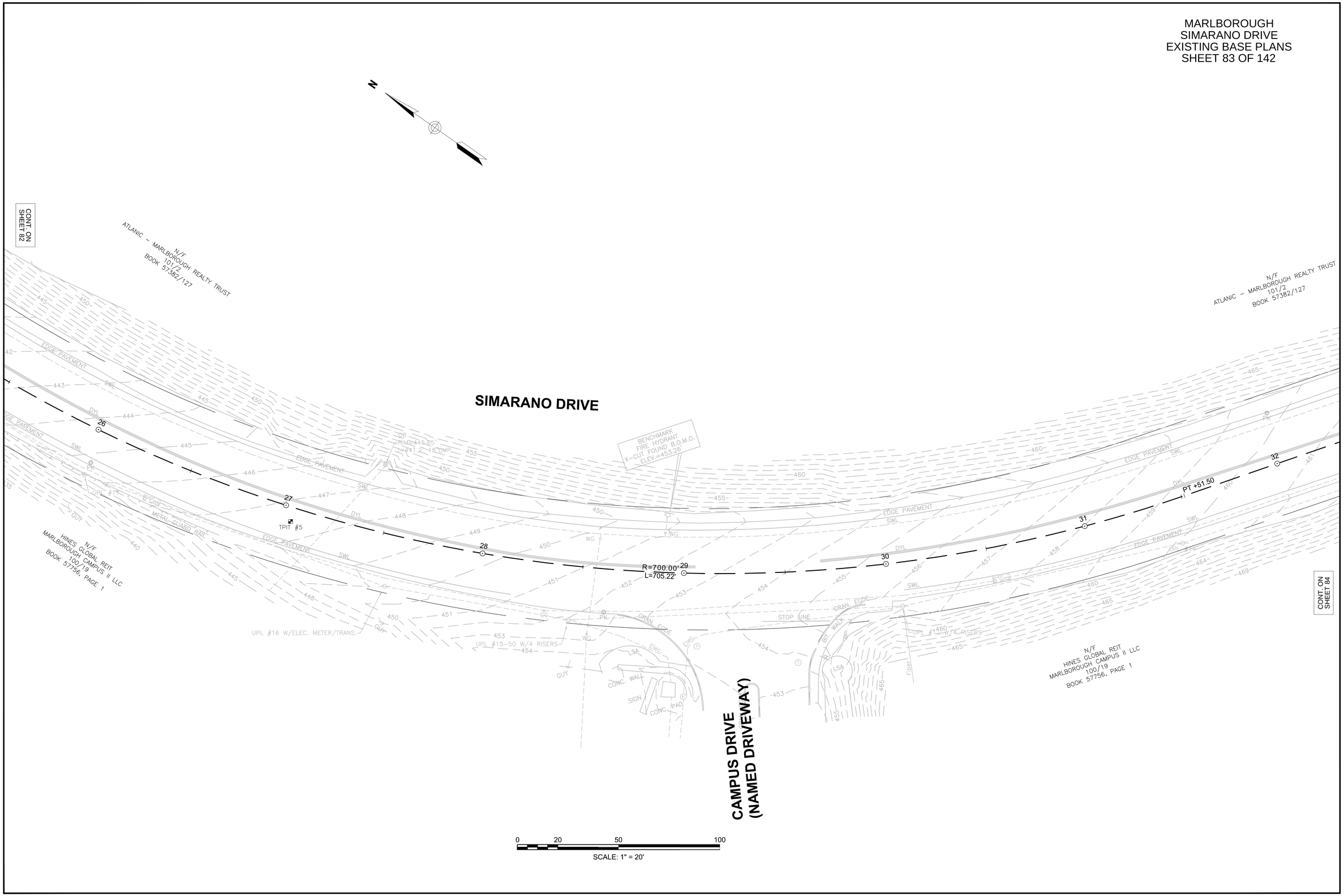
20 21 22 23 24 25 26

N/F
HINES GLOBAL REIT
MARLBOROUGH CAMPUS II LLC
100/19
BOOK 57756, PAGE 1

CONT. ON SHEET 83

0 20 50 100
SCALE: 1" = 20'

MARLBOROUGH
SIMARANO DRIVE
EXISTING BASE PLANS
SHEET 83 OF 142



12477 -BASE.DWG Plotted on 4-Jun-2014 3:13 PM

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

SEE SHEET 51

WATER SUPPLY ALTERATIONS

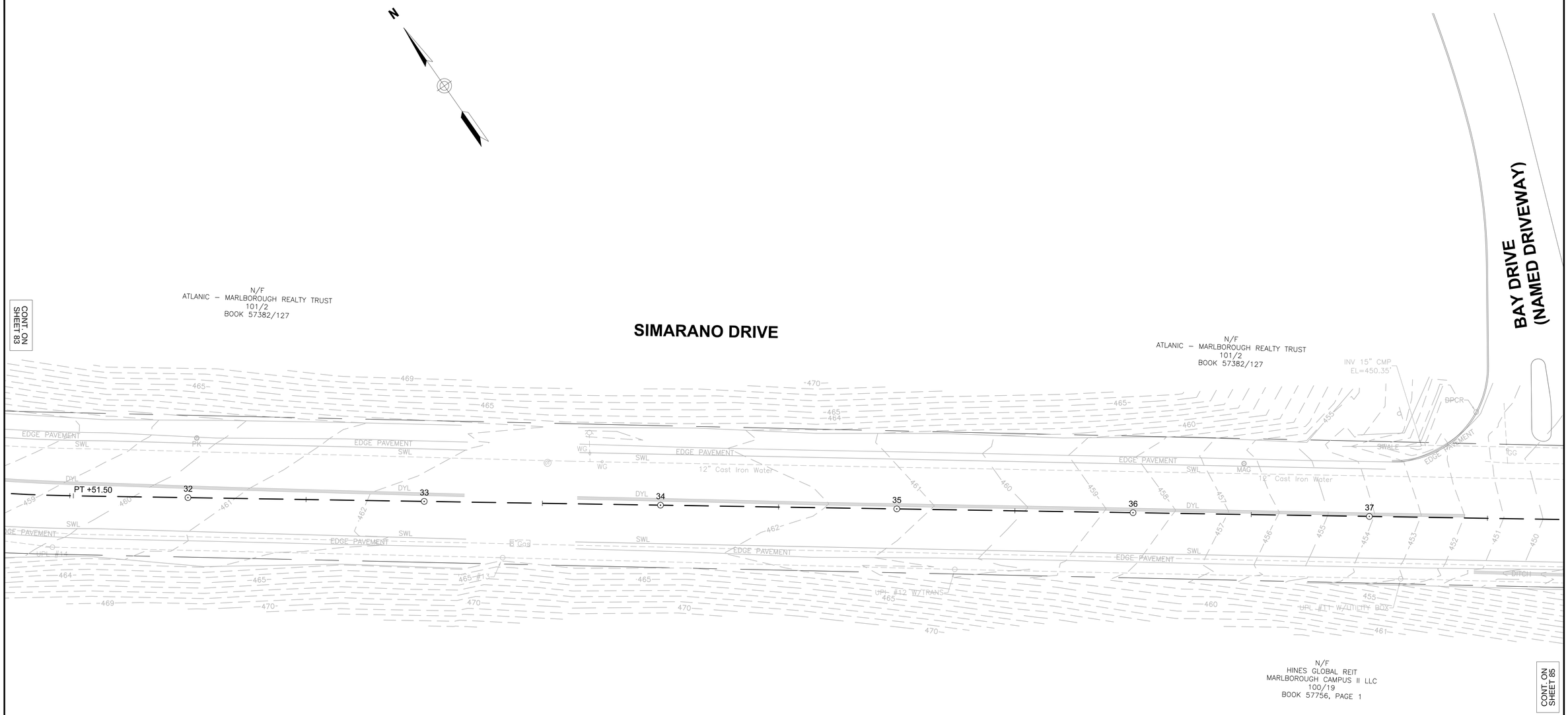
SEE BELOW

DRAINAGE DETAILS

SEE BELOW

MARLBOROUGH
SIMARANO DRIVE
EXISTING BASE PLANS
SHEET 84 OF 142

12477-BASE.DWG Plotted on 4-Jun-2014 3:13 PM



0 20 50 100

SCALE: 1" = 20'

MARLBOROUGH
SIMARANO DRIVE
EXISTING BASE PLANS
SHEET 85 OF 142

12477 -BASE.DWG Plotted on 4-Jun-2014 3:14 PM

MARLBOROUGH
SIMARANO DRIVE
EXISTING BASE PLANS
SHEET 86 OF 142

12477-BASE.DWG Plotted on 4-Jun-2014 3:14 PM

CONT. ON SHEET 85

CONT. ON SHEET 87

REALTY TRUST
127

SIMARANO DRIVE

N/F
ATLANIC – MARLBOROUGH REALTY TRUST
101/2
BOOK 57382/127

N/F
257 SIMARANO LLC
112/4
BOOK 50633, PAGE 448

N/F
257 SIMARANO LLC
112/4
BOOK 50633, PAGE 448

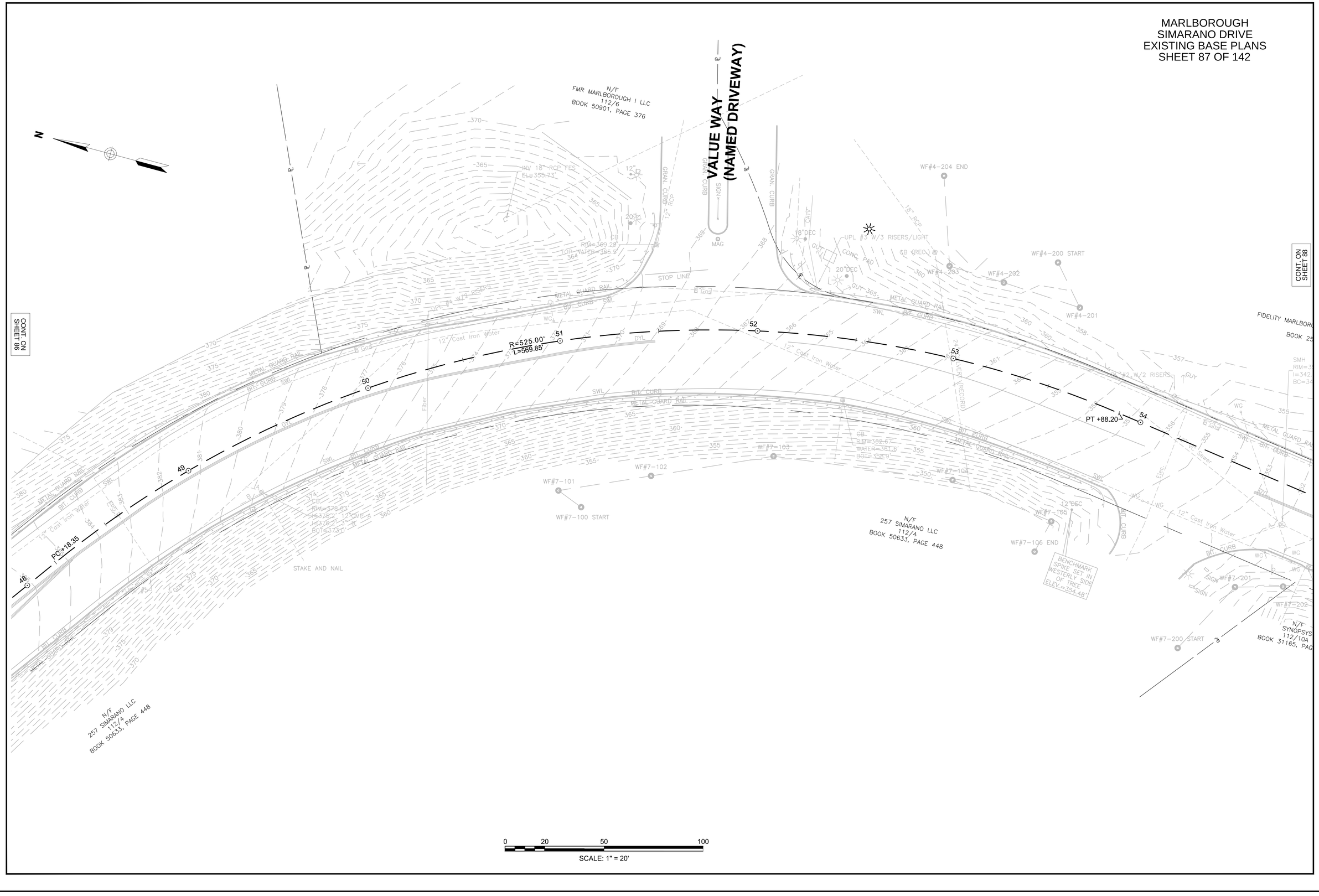
BENCHMARK
UTILITY POLE #6
SPIKE FOUND
ELEV.=393.80'

PC +18.35

0 20 50 100
SCALE: 1" = 20'

MARLBOROUGH
SIMARANO DRIVE
EXISTING BASE PLANS
SHEET 87 OF 142

12477-BASE.DWG Plotted on 4-Jun-2014 3:14 PM



MARLBOROUGH
SIMARANO DRIVE
EXISTING BASE PLANS
SHEET 88 OF 142

12477-BASE.DWG Plotted on 4-Jun-2014 3:14 PM

N

SIMARANO DRIVE

CONT. ON SHEET 87

N/F
FIDELITY MARLBOROUGH LIMITED PARTNERSHIP
112/6A
BOOK 25065, PAGE 350

SMH
RIM=351.81'
I=342.8' 6" A
BC=342.5'

SMH
RIM=347.86'
I=342.0' 12"ABESTOS A
I=339.6' 12"VC B
I=339.4' 12"VC C

CB
RIM=346.12'
I=340.9' 12"RCP

UPL #2 W/2 RISERS

GUY

WG

METAL GUARD RAIL

SWL BIT. CURB

54
PT. +88.20

55

56

57

58

59

60

S8°06'06"W
911.63'

LIMIT OF WORK
STA 57+60.41
N 2942545.4528
E 634857.2587

N/F
FIDELITY MARLBOROUGH LIMITED PARTNERSHIP
112/6A
BOOK 25065, PAGE 350

UPL #12

CHAIN LINK FENCE

Tel

BIT. CURB

SWL

DYL

12" VC Sewer

16" Cast Iron Water

Elec.

Fiber

A B C D

WG

12" Cast Iron Water

BIT. CURB

STAKE AND NAIL

WF#7-201

WF#7-202

WF#7-203

WF#7-204

WF#7-205

WF#7-206

WF#7-207

WF#7-208

WF#7-209

SIGN

12"DEG

WF#7-105

#7-106 END

BENCHMARK
SPIKE SET IN
WESTERLY SIDE
OF TREE
ELEV.=354.48'

WF#7-200 START

N/F
SYNOPSYS
112/10A
BOOK 31165, PAGE 132

CB
RIM=350.19'
I=347.4' 12"CMP
BOT=344.7'

N/F
SYNOPSYS
112/10A
BOOK 31165, PAGE 132

DITCH

MH5
MHD UPL.5

BENCHMARK
FIRE HYDRANT
B.O.M.O.
ELEV.=339.54'

UPL #10-5 W/3
CB
RIM=328.98'
TOP WATER=324.6'

DMH
RIM=330.43'
I=327.3' 8"PVC
I=326.6'

GPL

CB
RIM=332.11'
I=325.3' 12"RCP

UPL #11

ZO

GRAN. CURB

SMH
RIM=334.94'
BC=324.4'

N/F
337 SIMARANO LLC
116/10
BOOK 46129, PAGE 479

CONT. ON SHEET 89

0 20 50 100
SCALE: 1" = 20'

MARLBOROUGH
SIMARANO DRIVE
EXISTING BASE PLANS
SHEET 89 OF 142

12477-BASE.DWG Plotted on 4-Jun-2014 3:14 PM

I-495 EXIT 23C

SIMARANO DRIVE

N

CB
RIM=326.94'
TOP WATER=323.1'

DMH
RIM=328.40'
I=316.5' 36"RCP A
I=316.4' 36"RCP B

CB
RIM=327.70'
WATER=323.3'
I=325.1' 12"RCP

CB
RIM=324.74'

DMH
RIM=328.21'
I=324.7' 8"PVC
I=323.6' 12"RCP

UPL #10-5 W/3 TRANS.
CB
RIM=328.98'
TOP WATER=324.6'

DMH
RIM=330.43'
I=327.3' 8"PVC
I=325.6'

CB
RIM=330.04'
I=327.8' 8"PVC

CB
RIM=327.66'
I=324.8' 8"PVC

SMH
RIM=324.14'
BC=313.1'

CB
RIM=325.06'
TOP WATER=320.6'

UPL #8 W/2 RISERS/LIGHT

UPL #9

UPL #11

WF#8-204

WF#8-205

WF#8-206

N/F
BP CRANE MEADOW LLC
116/2
BOOK 32163, PAGE 598

CONT. ON SHEET 90

60 61 62 63 PC +99.83 64 65 PT

R=1500.00'
L=283.73'

WF#7-208 WF#7-209 WF#7-210 WF#7-211 END WF#7-400 START WF#7-401 WF#7-402 WF#7-403 WF#7-404 WF#7-405 WF#7-406

CB
RIM=330.17'
I=326.1' 12"CMP
BOT=324.2'

SMH
RIM=329.10'
I=318.1' 8"PVC A
BC=318.0'

CB
RIM=327.55'
I=323.3' 12"CMP
BOT=321.5'

CB
RIM=324.91'
I=319.7' 12"RCP
I=319.6' 12"CMP

SMH
RIM=324.89'
BC=313.4'

SMH
RIM=323.19'
I=303.4' 6"PVC
BC=311.8'

N/F
337 SIMARANO LLC
116/10
BOOK 46129, PAGE 479

N/F
337 SIMARANO LLC
116/10
BOOK 46129, PAGE 479

CONT. ON SHEET 88

BENCHMARK
CHISEL SQ. NE.
CONC. HEADWALL
ELEV.=326.94'

0 20 50 100
SCALE: 1" = 20'

MARLBOROUGH
SIMARANO DRIVE
EXISTING BASE PLANS
SHEET 90 OF 142

12477-BASE.DWG Plotted on 4-Jun-2014 3:14 PM

SIMARANO DRIVE

CONT ON SHEET 89

LIMIT OF WORK
STA 66+62.80
N 2941661.0200
E 634689.2874

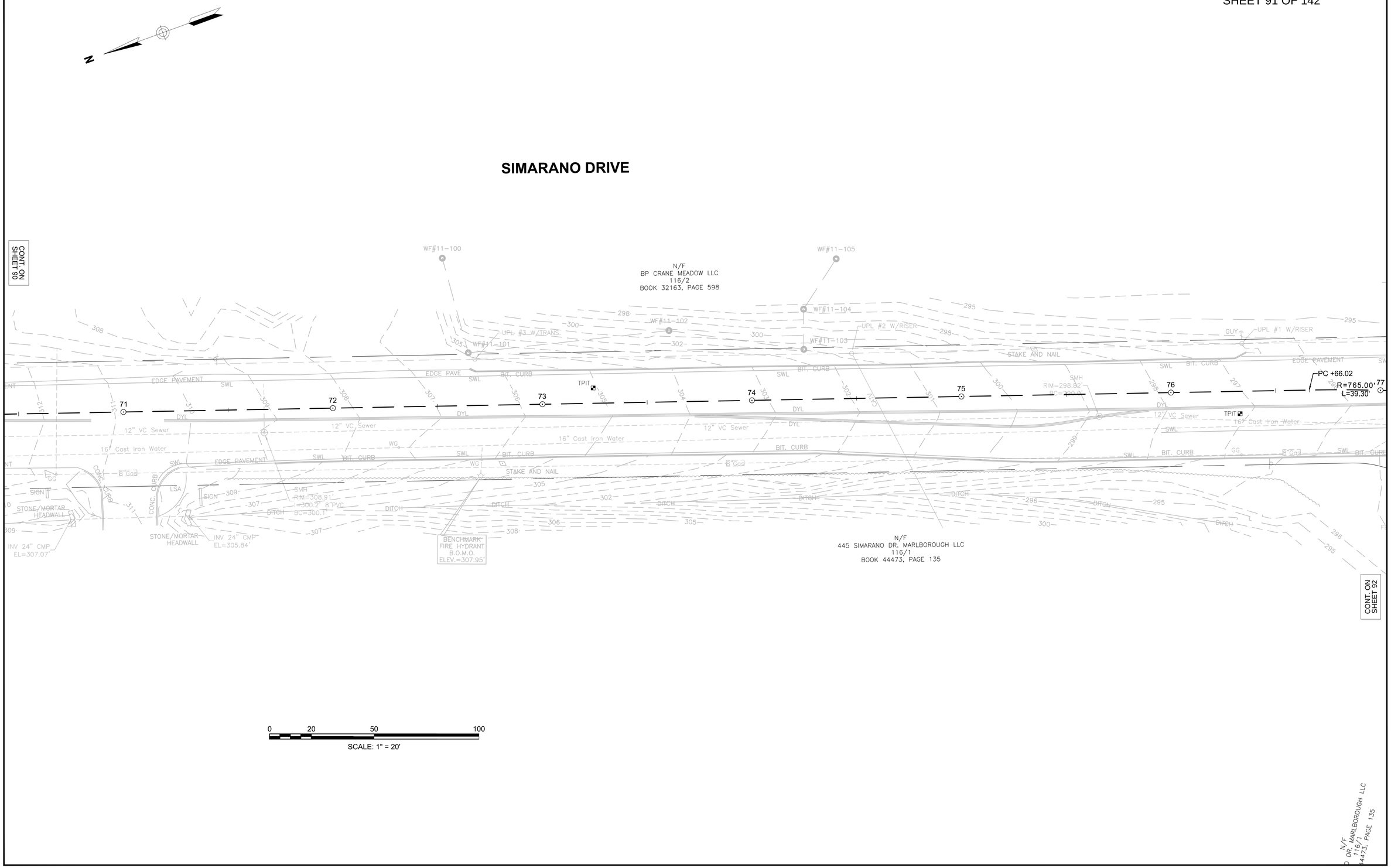
N/F
BP CRANE MEADOW LLC
116/2
BOOK 32163, PAGE 598

W/2 RISERS/LIGHT
STAKE AND NAIL
BIT. CURB
SWL
Elec.
PT +83.56
65
66
67
68
69
70
71
S18°56'21"W
1082.47'
DYL
12" VC Sewer
16" Cast Iron Water
BIT. CURB
METAL GUARD RAIL
WF#7-401
WF#7-400 START
324.89'
313.4'
SMH
RIM=323.19'
I=303.4' 6"PVC
BC=311.8'
WF#7-304
WF#7-305 END
WF#7-303
CB
RIM=320.27'
I=315.9' 12"RCP
I=315.6' 12"CMP
WF#7-302
BENCHMARK
FIRE HYDRANT
B.O.M.O.
ELEV.=321.00'
N/F
337 SIMARANO LLC
116/10
BOOK 46129, PAGE 479
WF#7-301
WF#7-300
N/F
445 SIMARANO DR. MARLBOROUGH LLC
116/1
BOOK 44473, PAGE 135
UPL #7 W/2 RISERS
UPL #6 W/2 RISERS
UPL #5 W/ELEC. METER
GUY
CB
RIM=320.07'
I=316.1' 12"RCP
SMH
RIM=319.84'
I=308.4' 8"
BC=308.3'
TMH (Record)
EDGE PAVEMENT
WG
B Gas
STAKE AND NAIL
SIGN
DITCH
STONE/MORTAR HEADWALL
INV 24" CMP
EL=307.07'
CONC CURB
LSA

CONT. ON SHEET 91

0 20 50 100
SCALE: 1" = 20'

MARLBOROUGH
SIMARANO DRIVE
EXISTING BASE PLANS
SHEET 91 OF 142



12477 -BASE.DWG Plotted on 4-Jun-2014 3:14 PM

MARLBOROUGH
SIMARANO DRIVE
EXISTING BASE PLANS
SHEET 92 OF 142

12477-BASE.DWG Plotted on 4-Jun-2014 3:14 PM

CONT. ON SHEET 91

CEDAR HILL STREET

D'ANGELO DRIVE

CSX RAILROAD

N/F
BP CRANE MEZ
116/2
BOOK 32163, F

N/F
TMX PROPERTY LLC
116/9
BOOK 56676, PAGE 242

N/F
TMX PROPERTY LLC
116/9
BOOK 56676, PAGE 242

N/F
CCHS LLC
118/2
BOOK 41530, PAGE 158

N/F
SURBURBAN PROPANE LP
116/6
BOOK 34656, PAGE 382

N/F
SURBURBAN PROPANE LP
116/6
BOOK 34656, PAGE 382

N/F
MIP REALTY TRUST
116/8
BOOK 15705, PAGE 199

N/F
MARLBOROUGH LLC
BOOK 135

LIMIT OF WORK
STA 78+66.00
N 2940526.1704
E 634290.1049

BENCHMARK
GRAN. BOUND
w/DRILL HOLE
HIGH POINT ON BOUND
ELEV.=296.02'

PC +66.02
R=765.00'
L=39.30'
PT +05.32

PT +30.89
R=200.00'
L=5.77'
PC +25.12

S21°52'57"W
155.28'

PC +60.60
R=765.00'
L=96.82'
PT +57.43

S14°37'51"W
155.38'

S59°19'52"E
248.42'

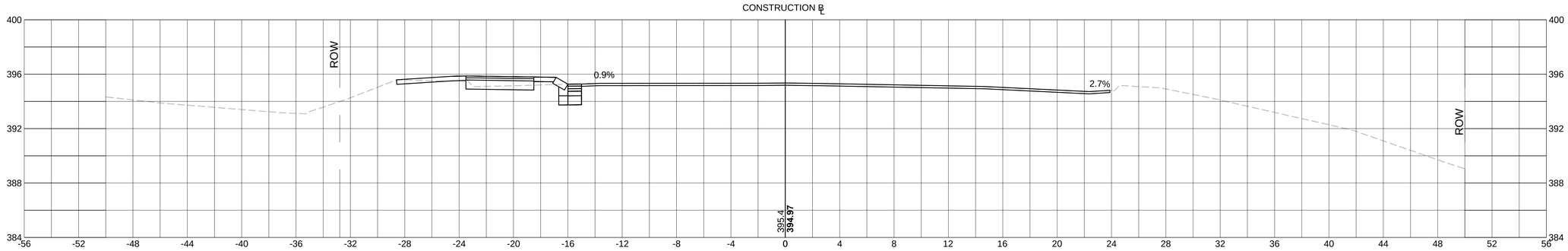
S60°59'01"E
225.12'

0 20 50 100
SCALE: 1" = 20'

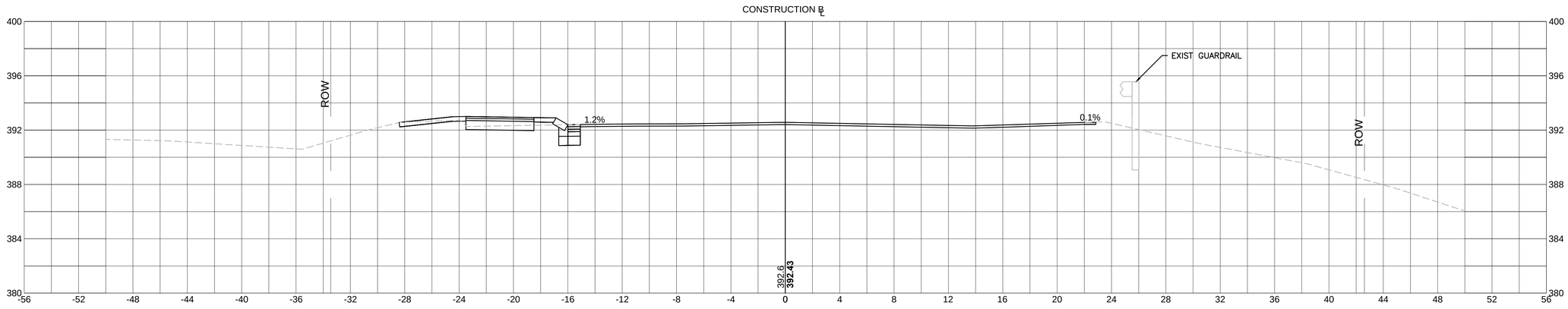
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 93 OF 142

12477 - XSEC.DWG 3-Jun-2014

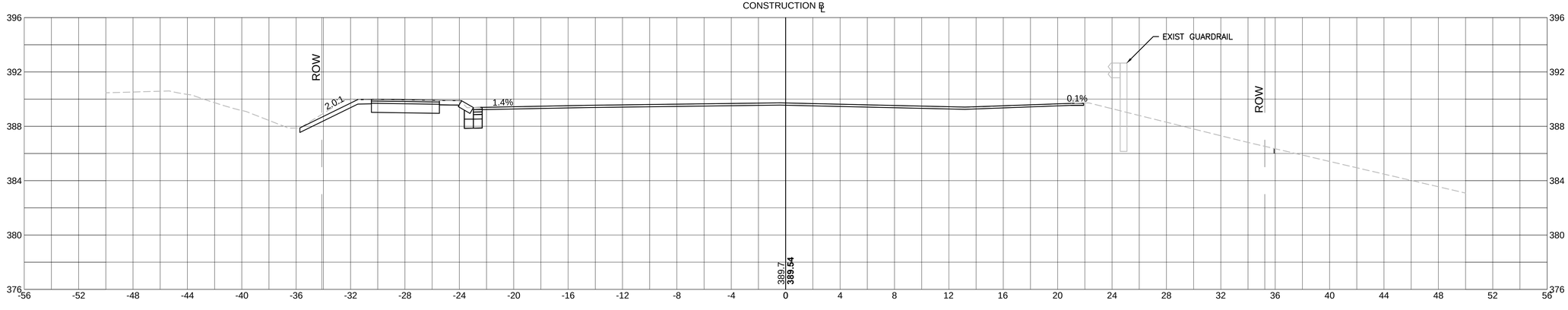
11+50



11+00



10+50

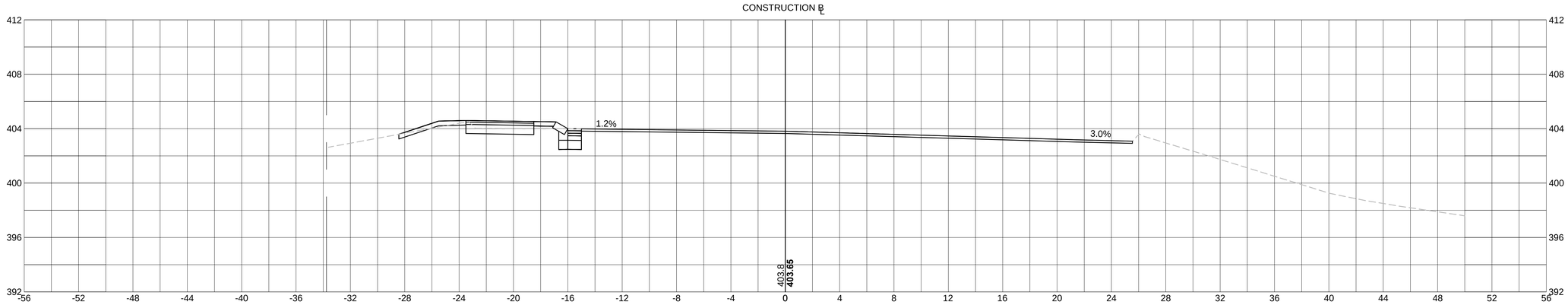


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

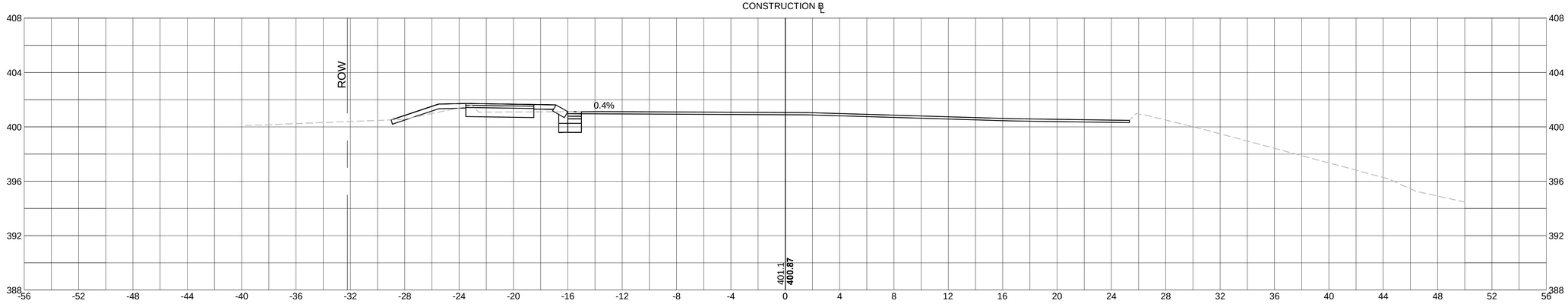
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 94 OF 142

12477 - XSEC.DWG 4-Jun-2014

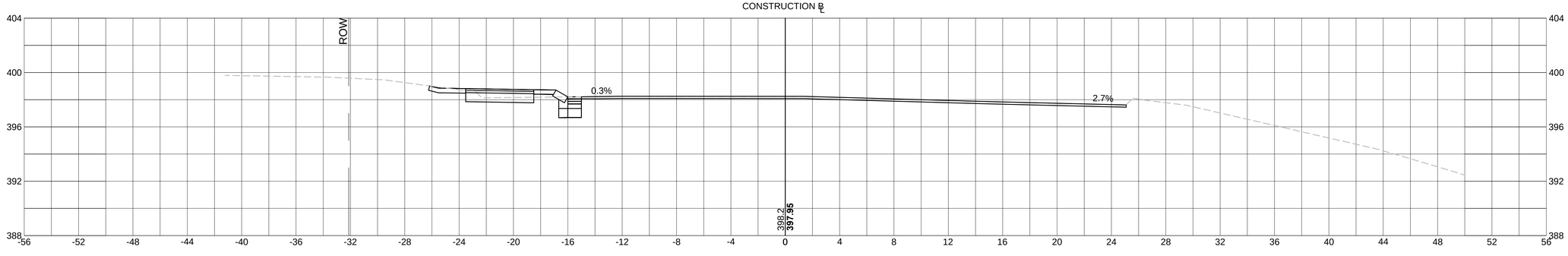
13+00



12+50



12+00

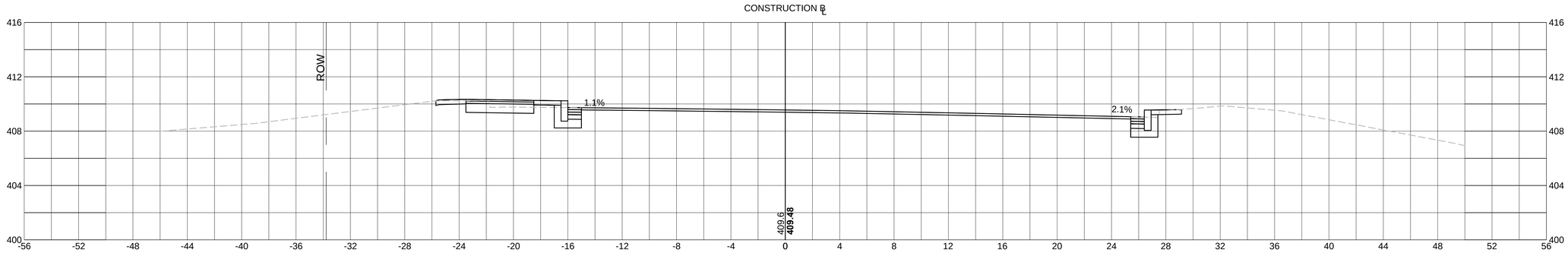


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

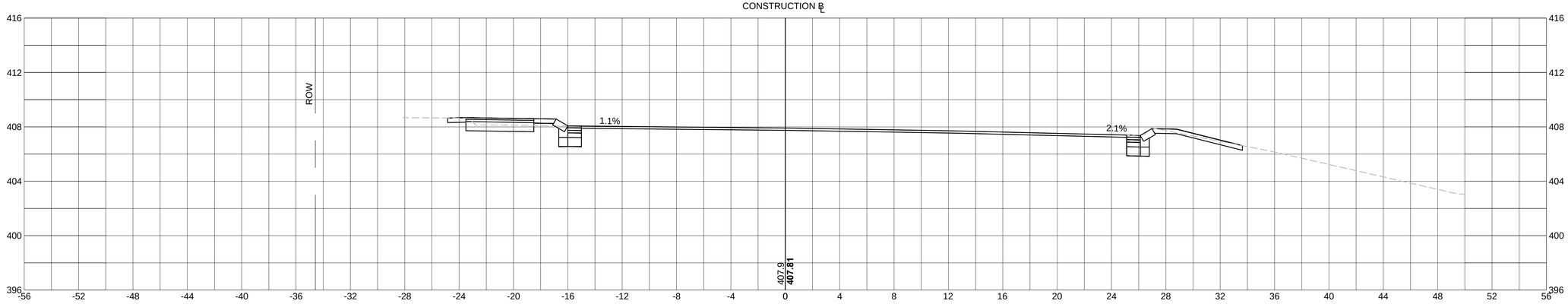
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 95 OF 142

12477 - XSEC.DWG 3-Jun-2014

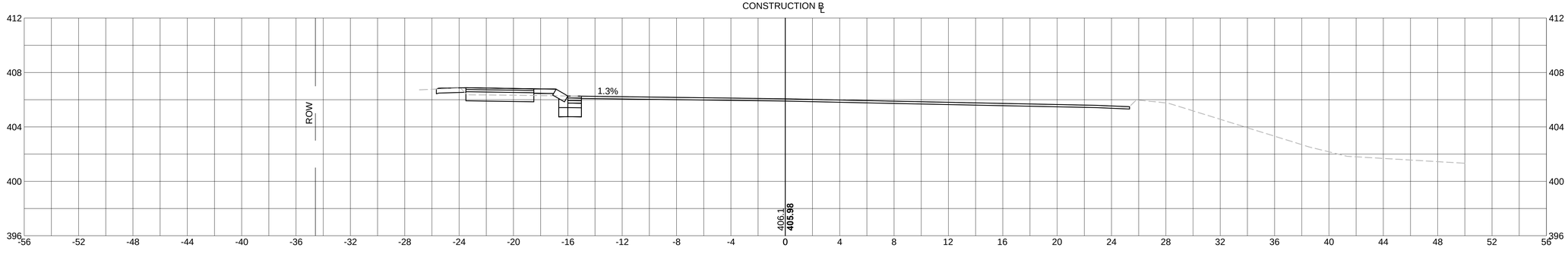
14+50



14+00



13+50



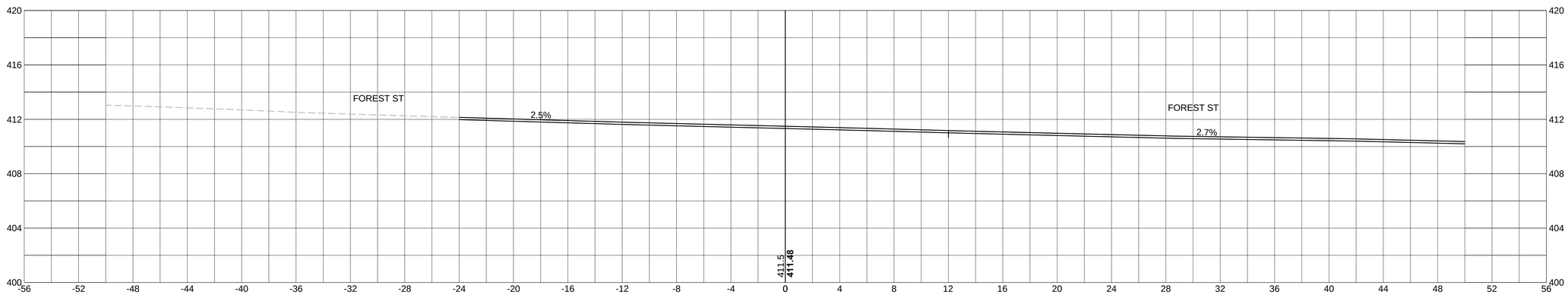
HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 96 OF 142

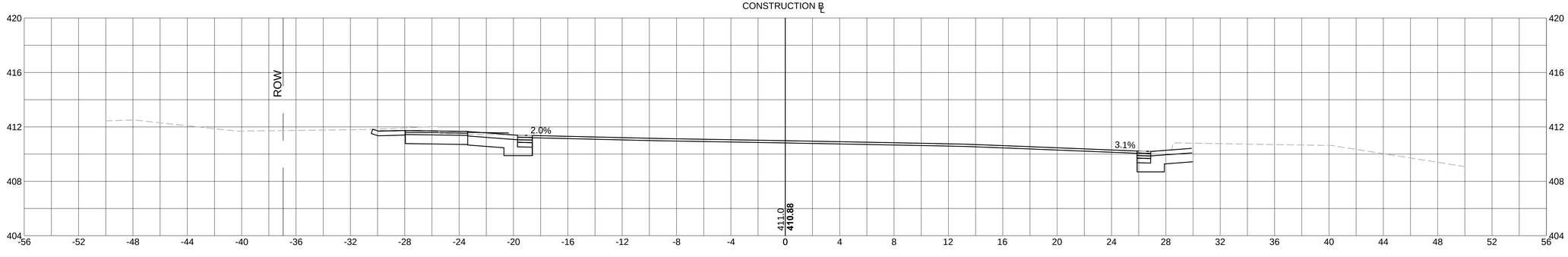
12477 - XSEC.DWG 4-Jun-2014

16+00

15+50



15+00

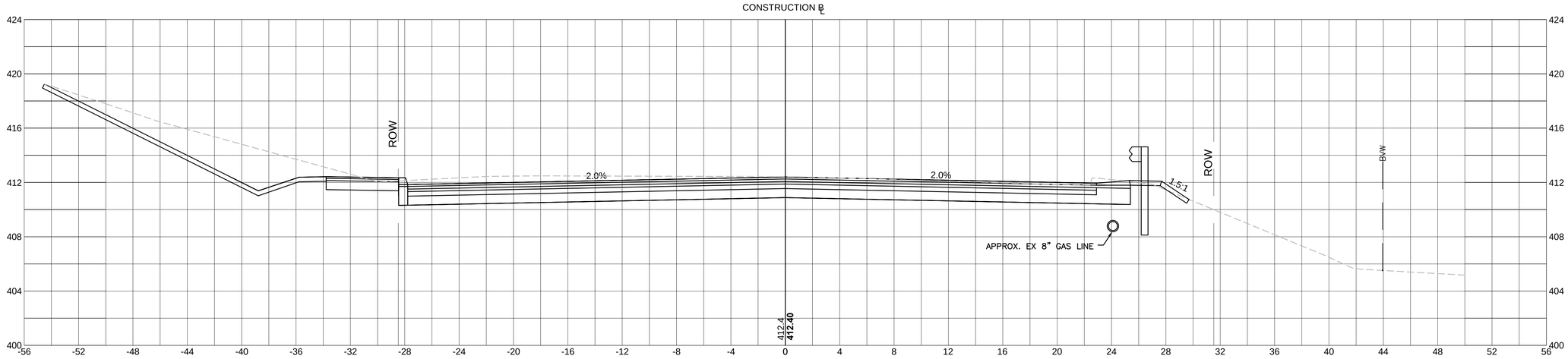


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

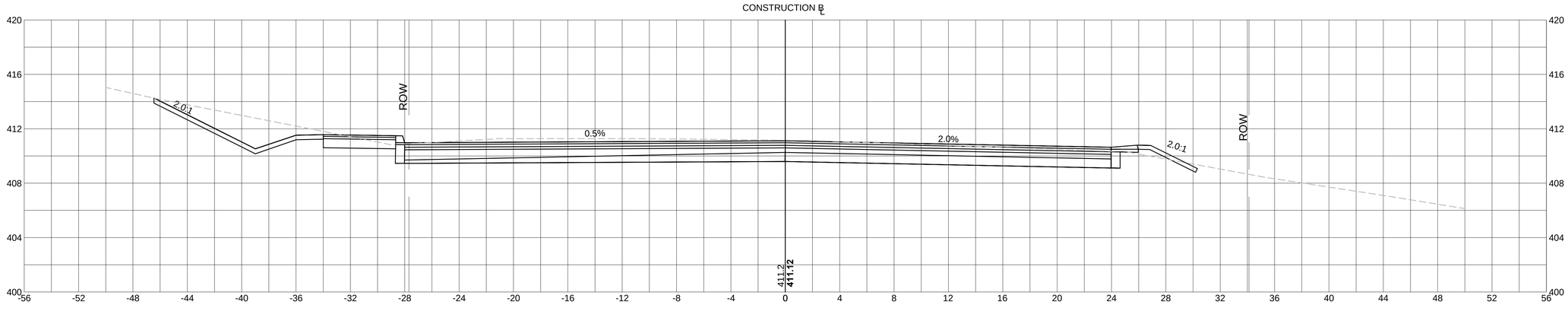
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 97 OF 142

12477 - XSEC.DWG 3-Jun-2014

17+00



16+50

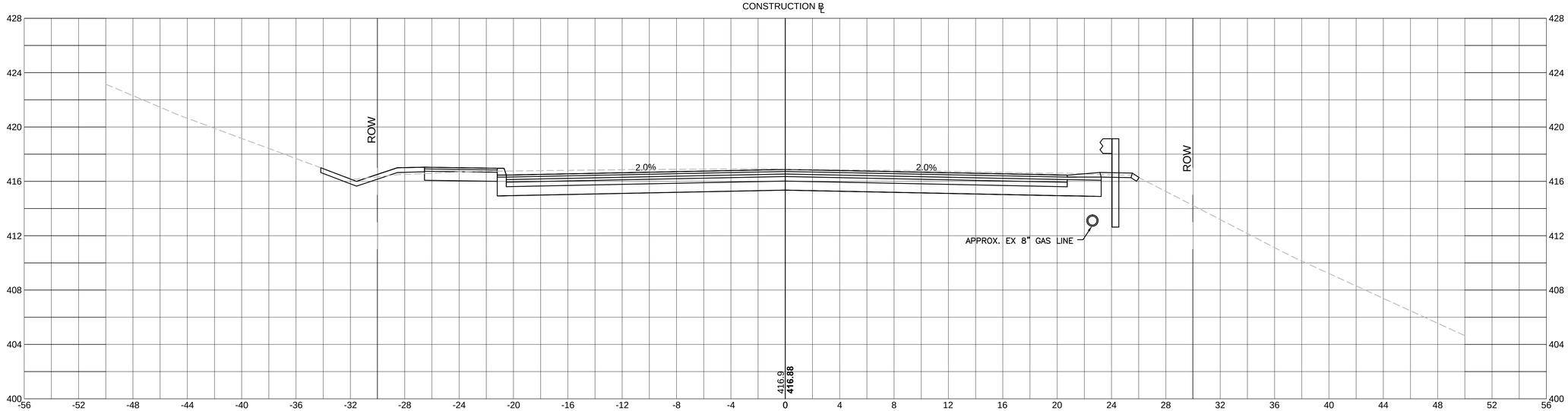


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

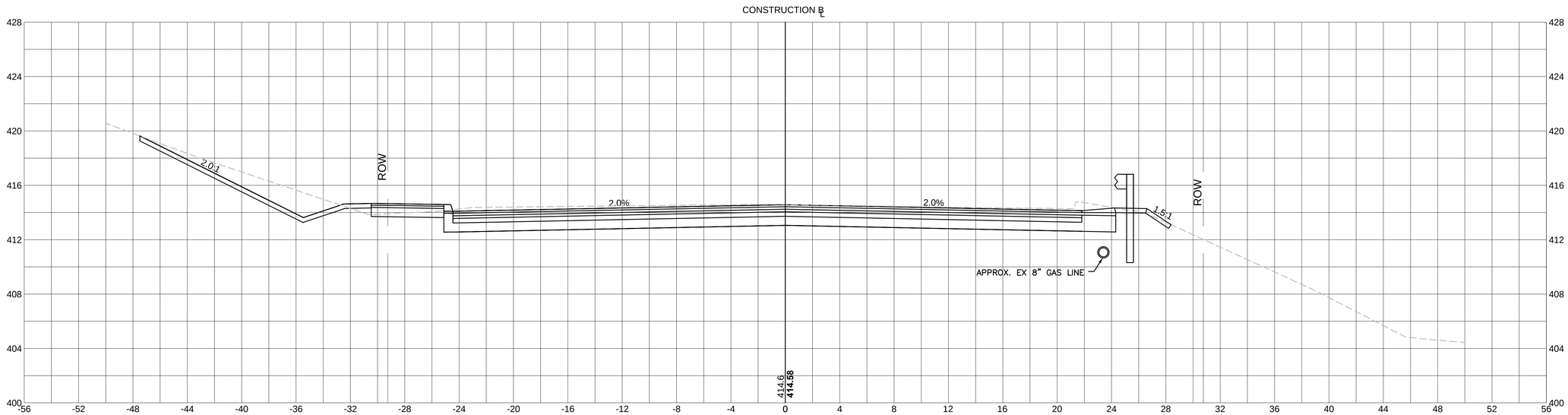
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 98 OF 142

12477 - XSEC.DWG 3-Jun-2014

18+00



17+50

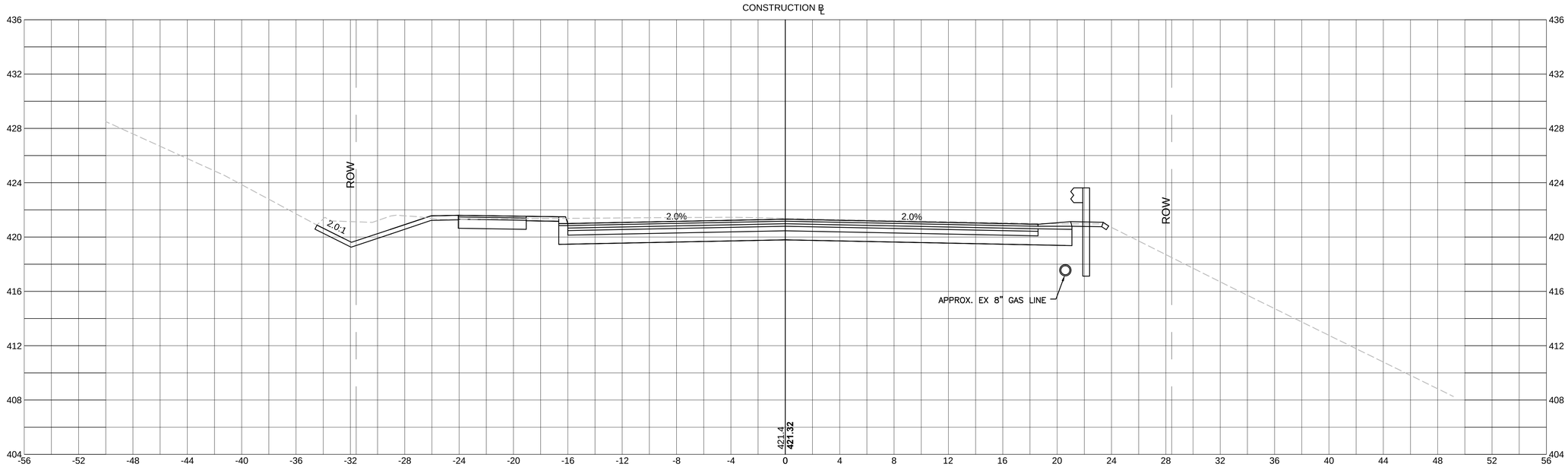


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

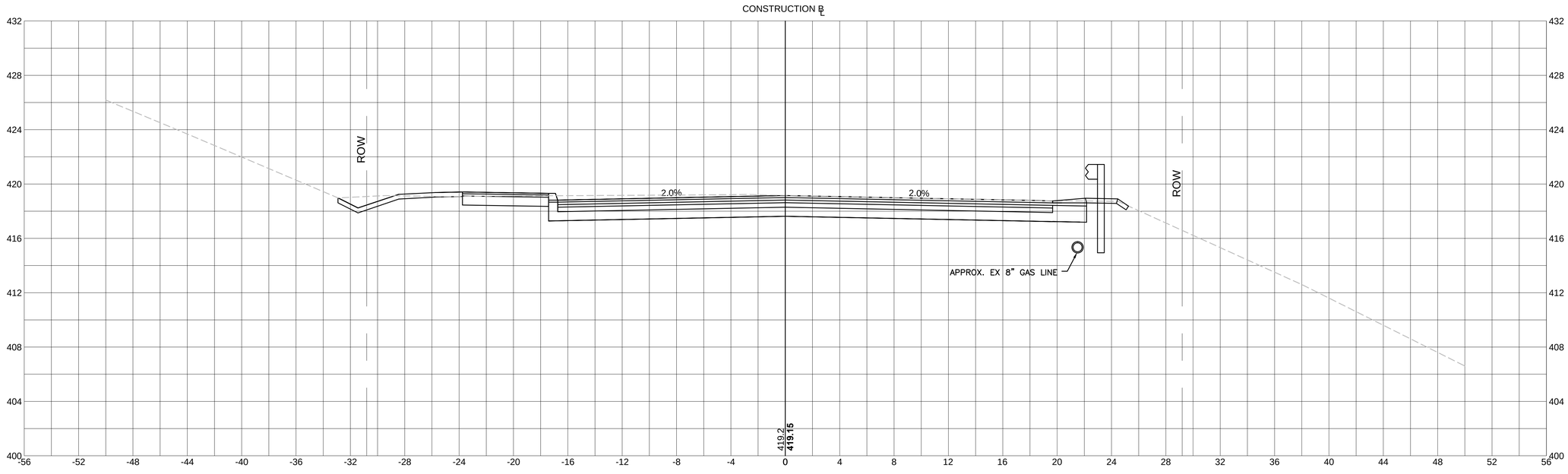
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 99 OF 142

12477 - XSEC.DWG 3-Jun-2014

19+00



18+50

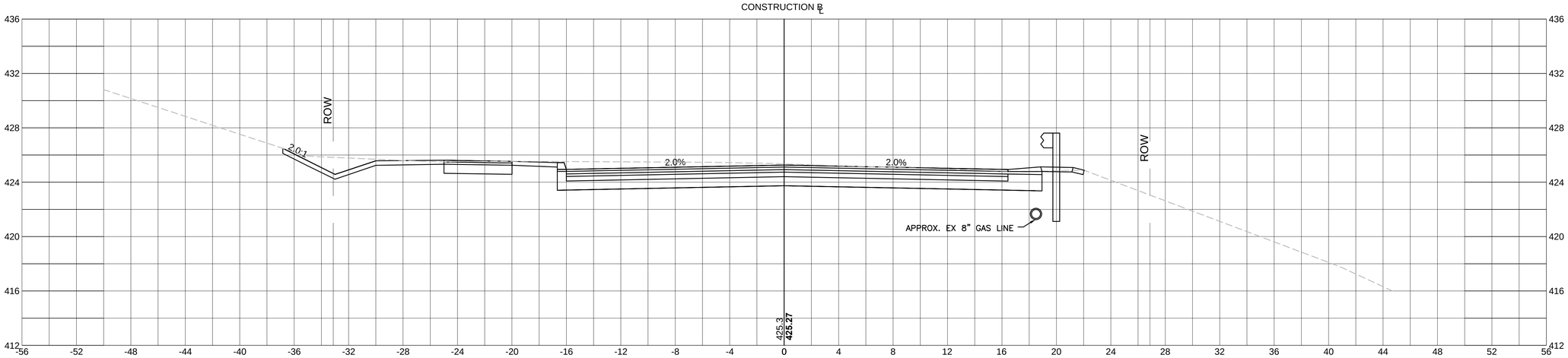


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

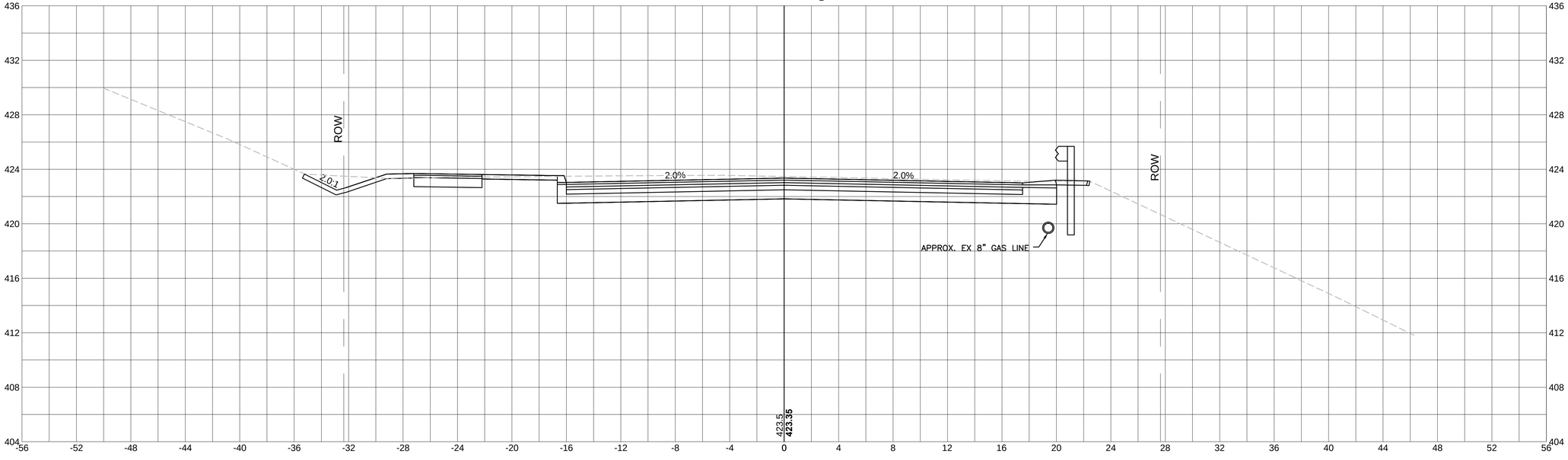
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 100 OF 142

12477 - XSEC.DWG 3-Jun-2014

20+00



19+50

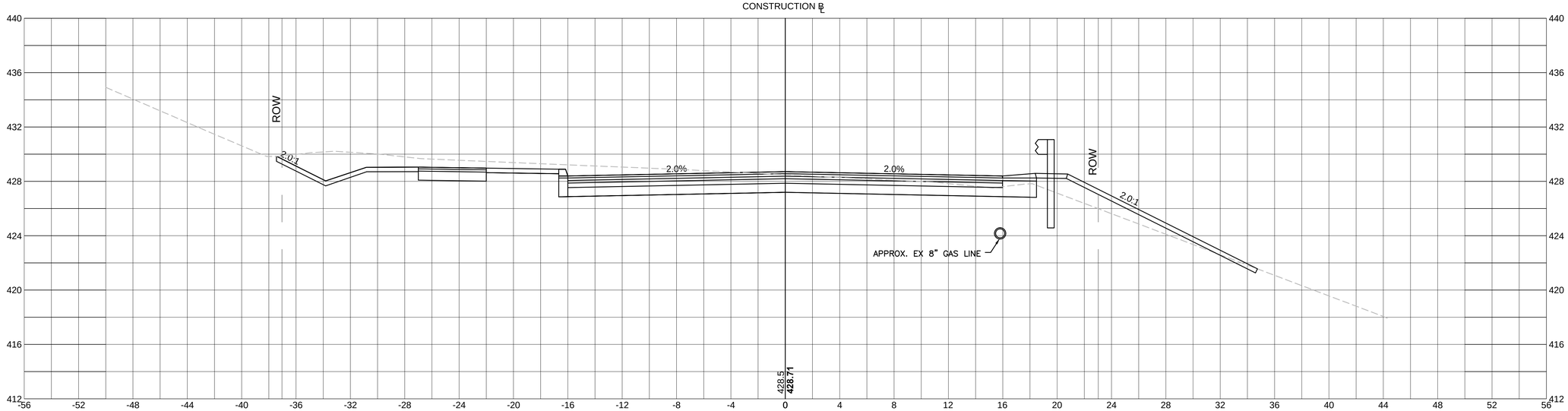


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

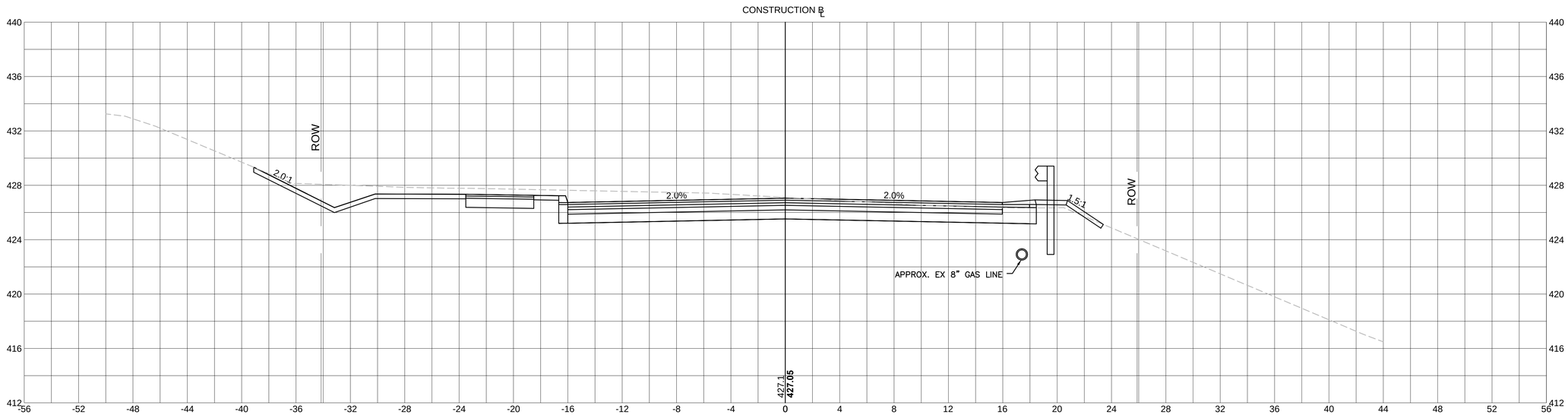
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 101 OF 142

12477 - XSEC.DWG 3-Jun-2014

21+00



20+50

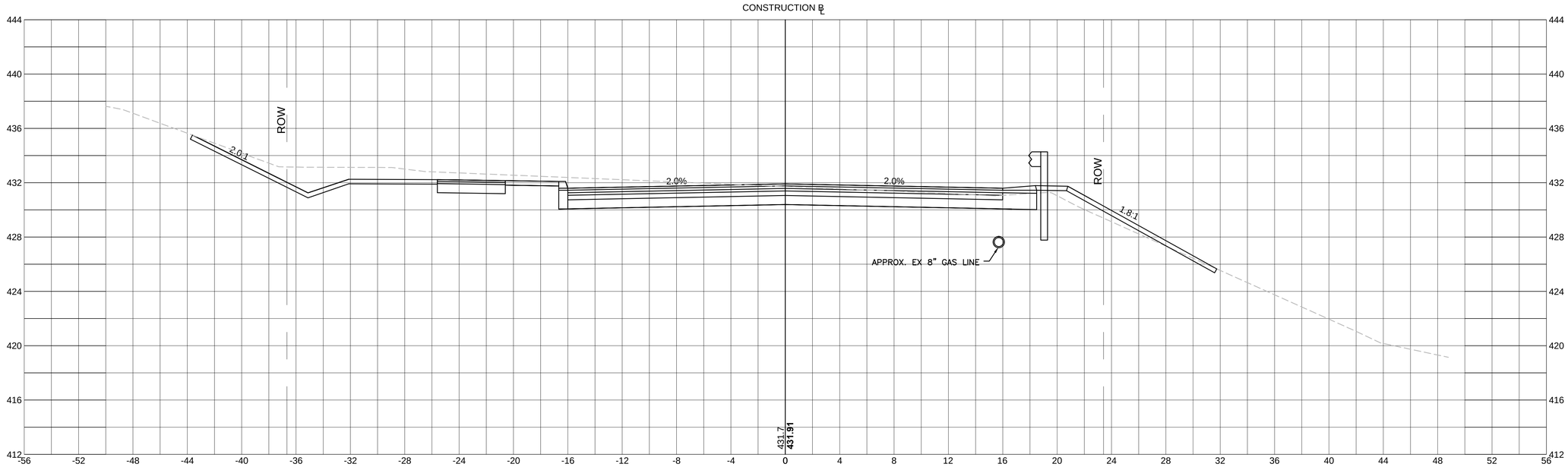


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

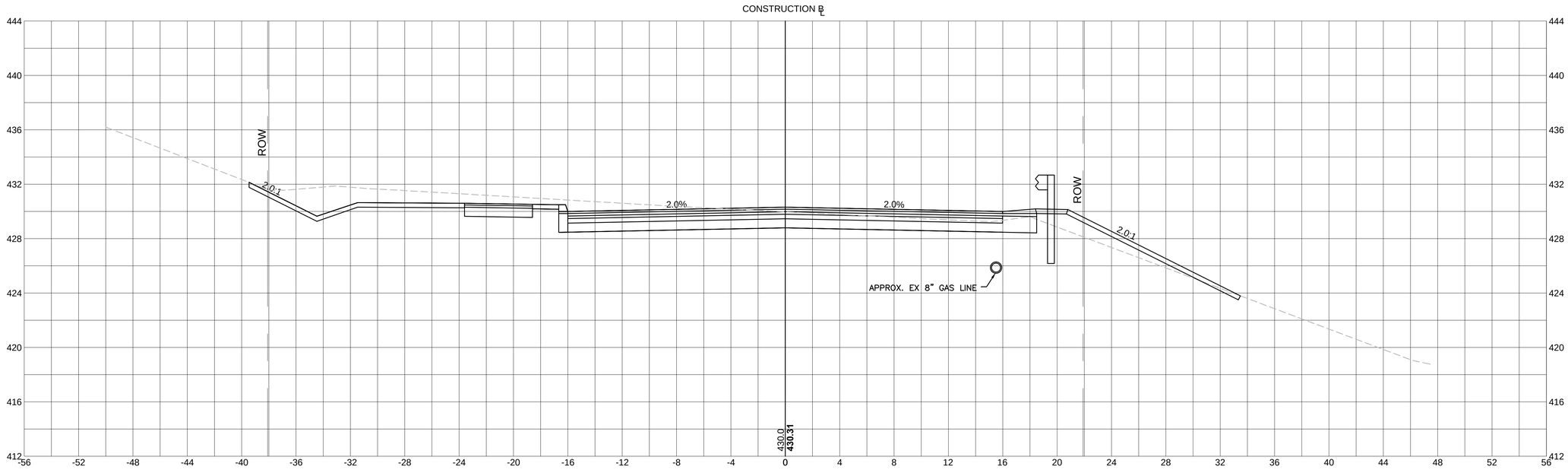
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 102 OF 142

12477 - XSEC.DWG 3-Jun-2014

22+00



21+50

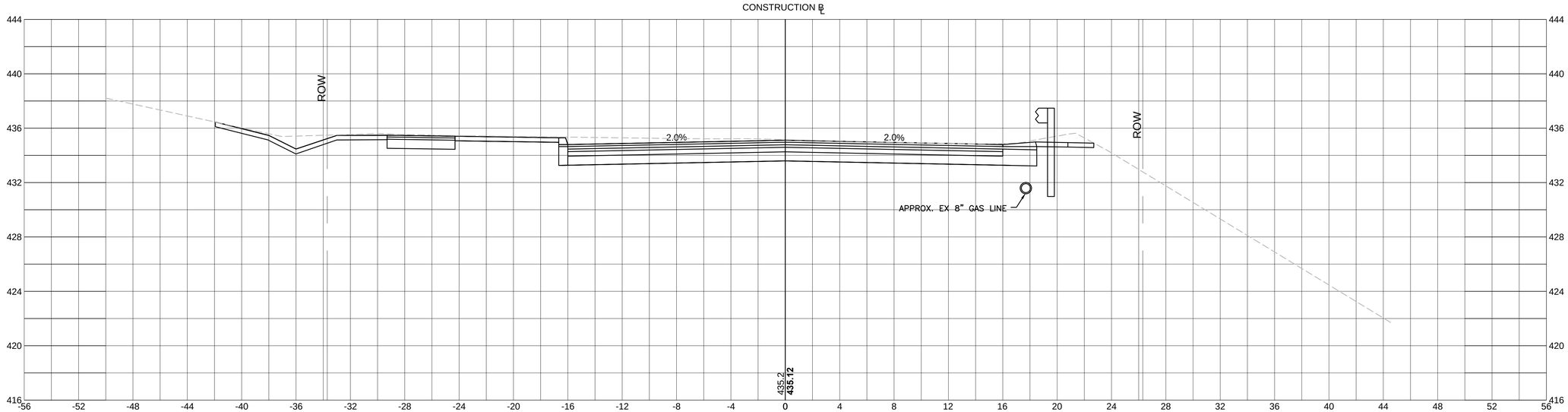


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

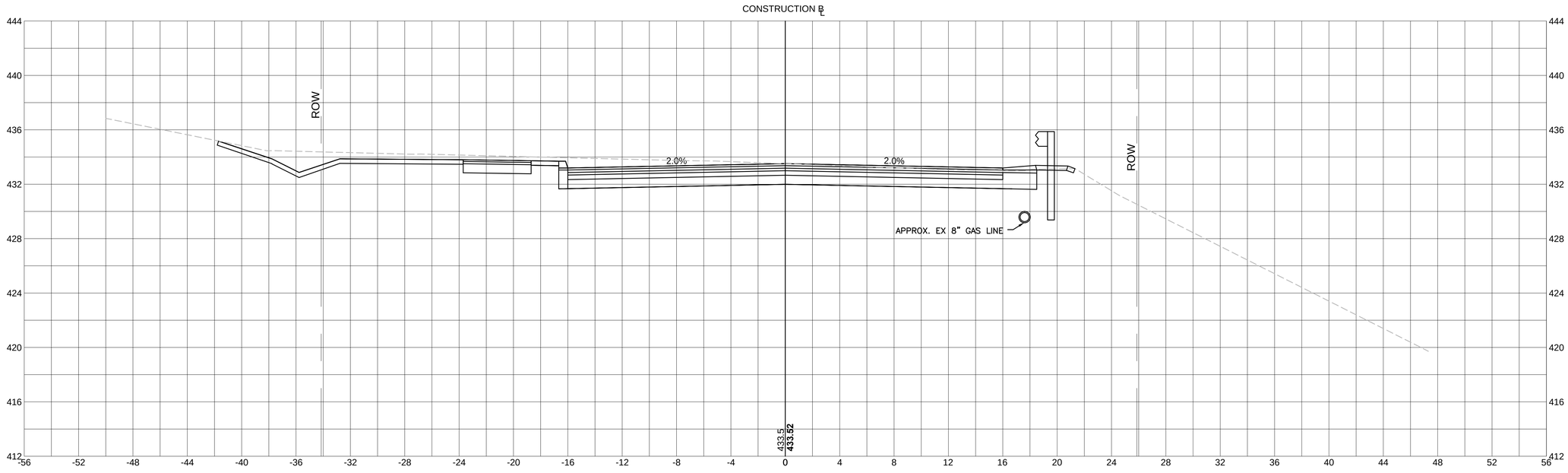
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 103 OF 142

12477 - XSEC.DWG 3-Jun-2014

23+00



22+50

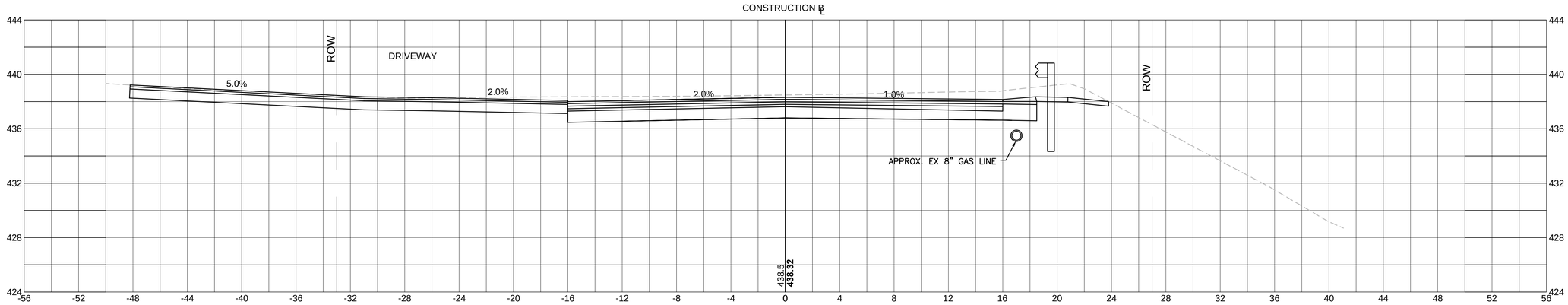


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 104 OF 142

12477 - XSEC.DWG 3-Jun-2014

24+00



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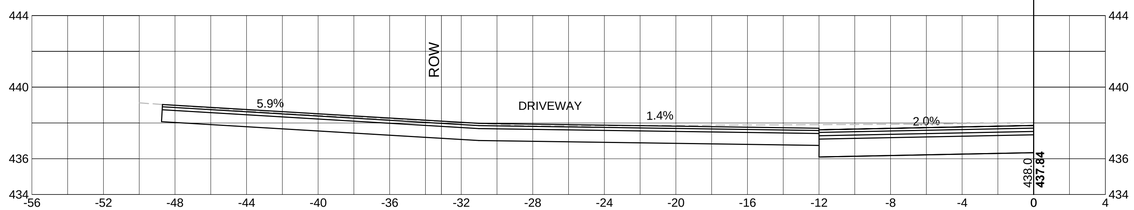
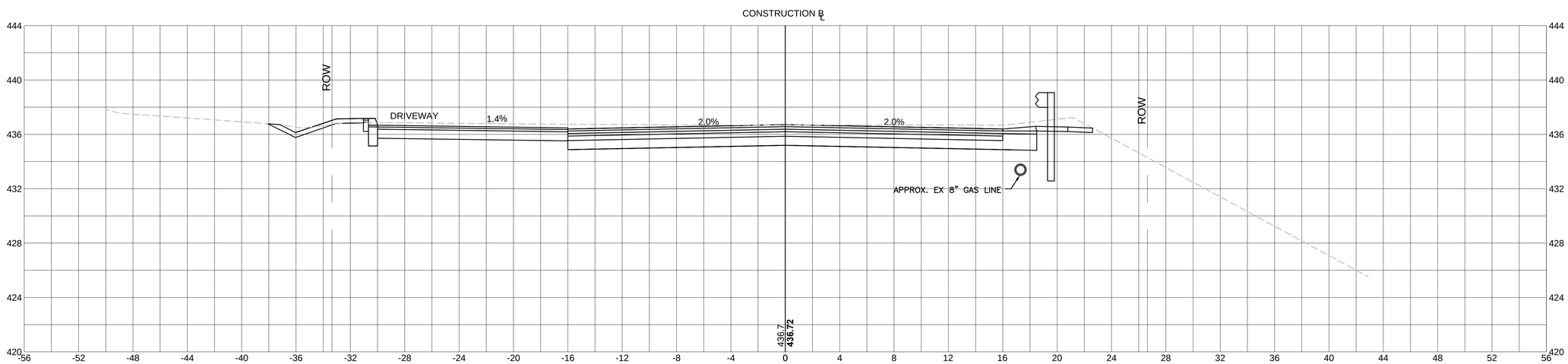


23+50

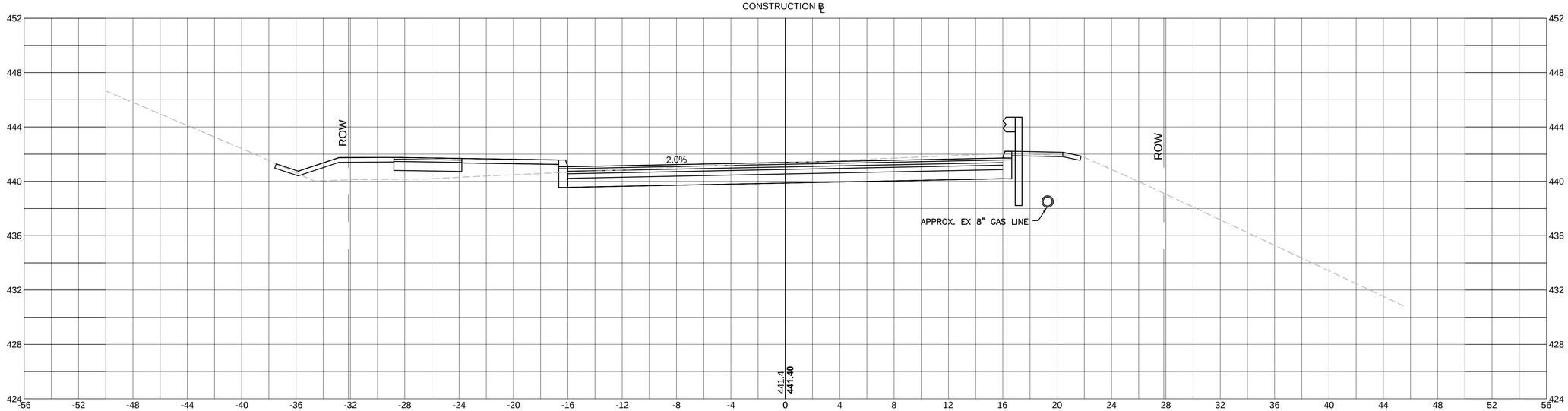


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

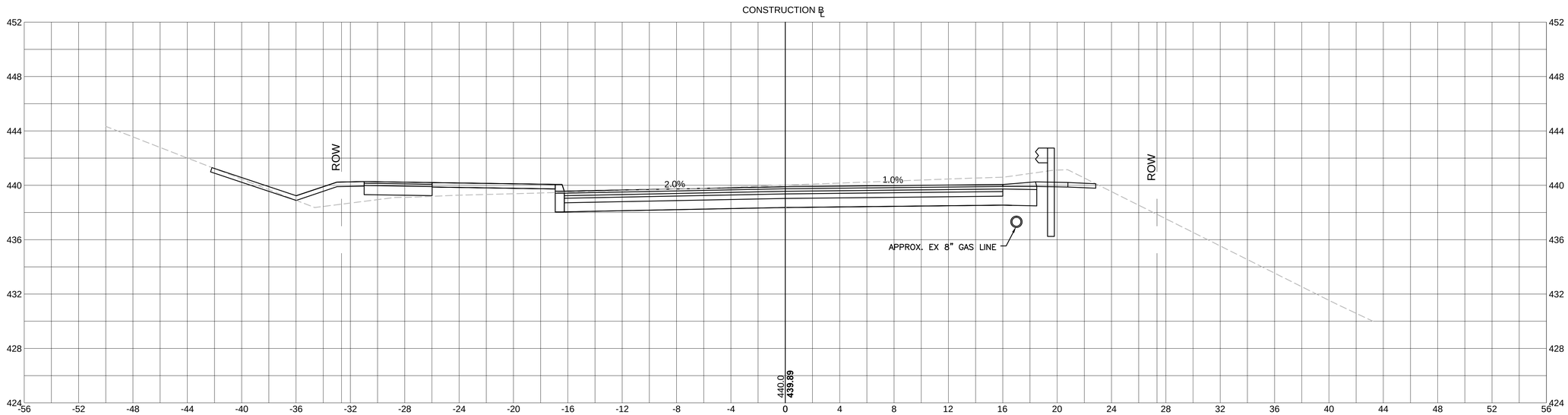
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 105 OF 142

12477 - XSEC.DWG 3-Jun-2014

25+00



24+50



HORIZONTAL
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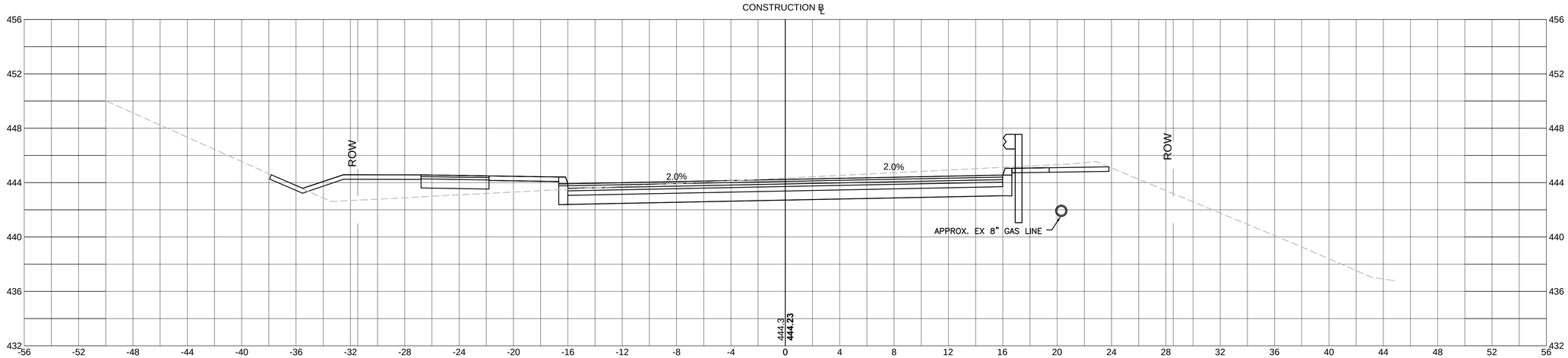
4 0 4 8
VERTICAL
SCALE IN FEET

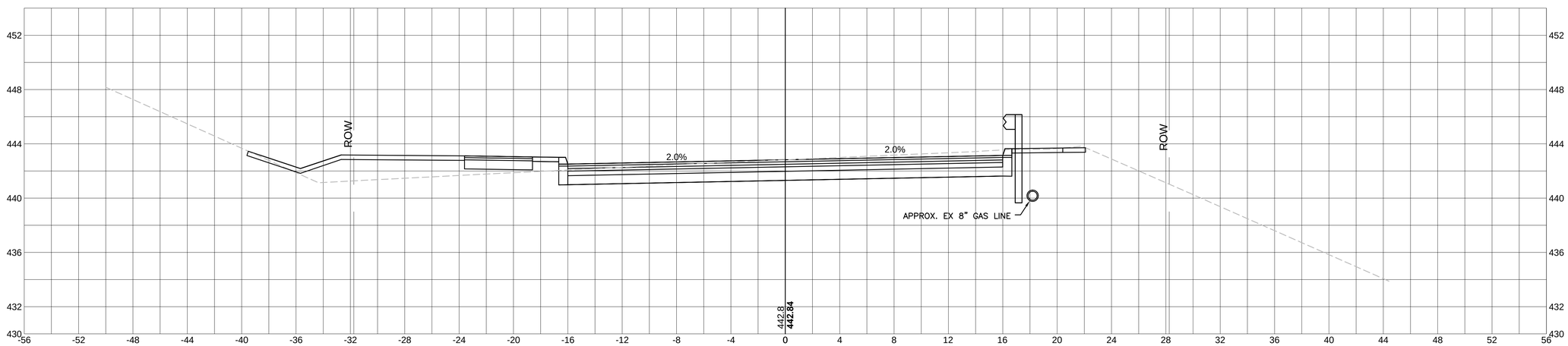
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 106 OF 142

12477 - XSEC.DWG 4-Jun-2014

26+00



25+50



HORIZONTAL
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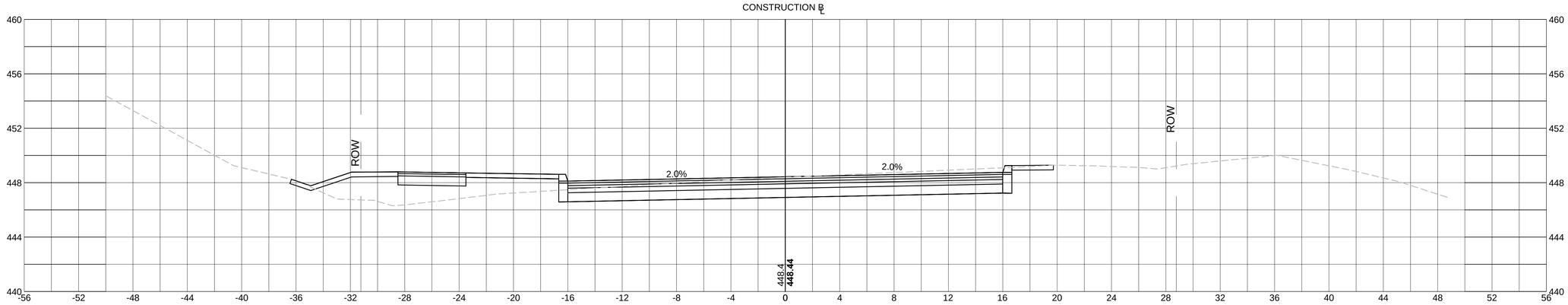
4 0 4 8
VERTICAL
SCALE IN FEET

MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 107 OF 142

12477 - XSEC.DWG 4-Jun-2014

27+50



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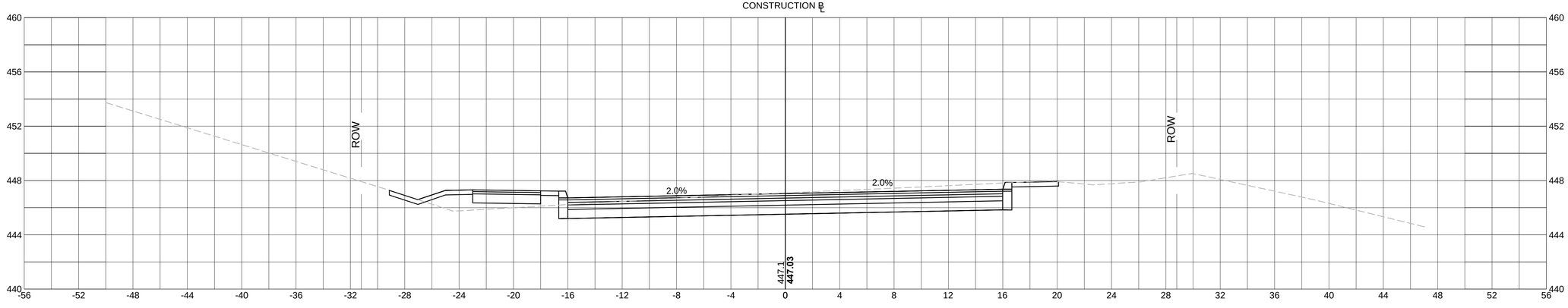

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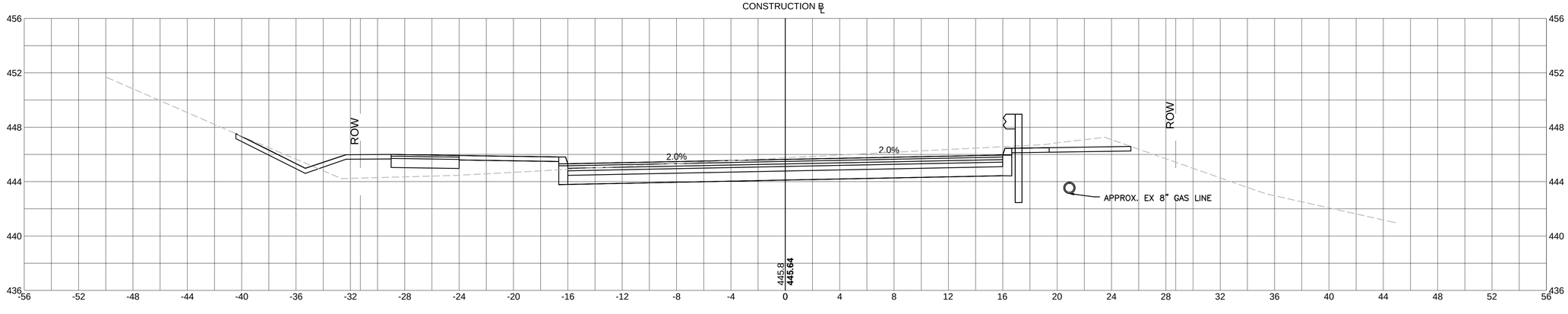

HORIZONTAL
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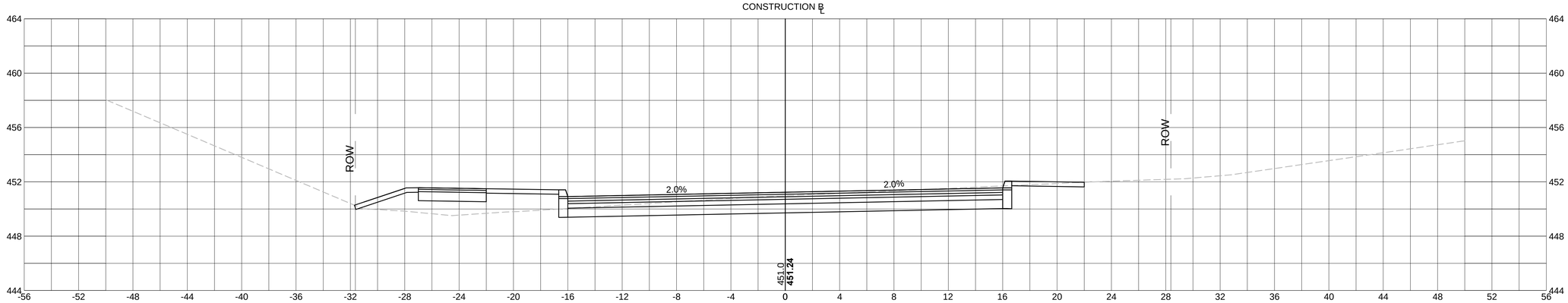
4 0 4 8
VERTICAL
SCALE IN FEET

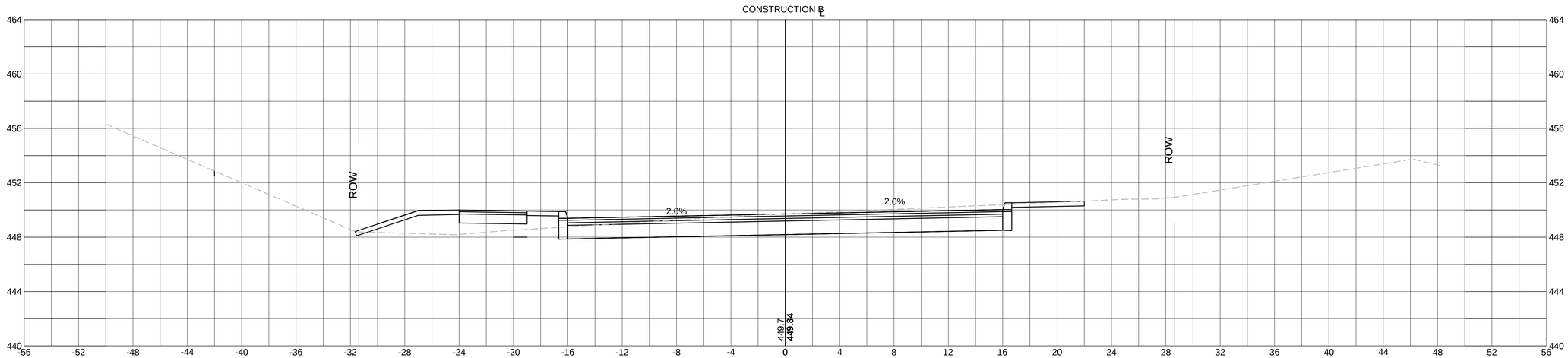
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 108 OF 142

12477 - XSEC.DWG 4-Jun-2014

28+50



28+00

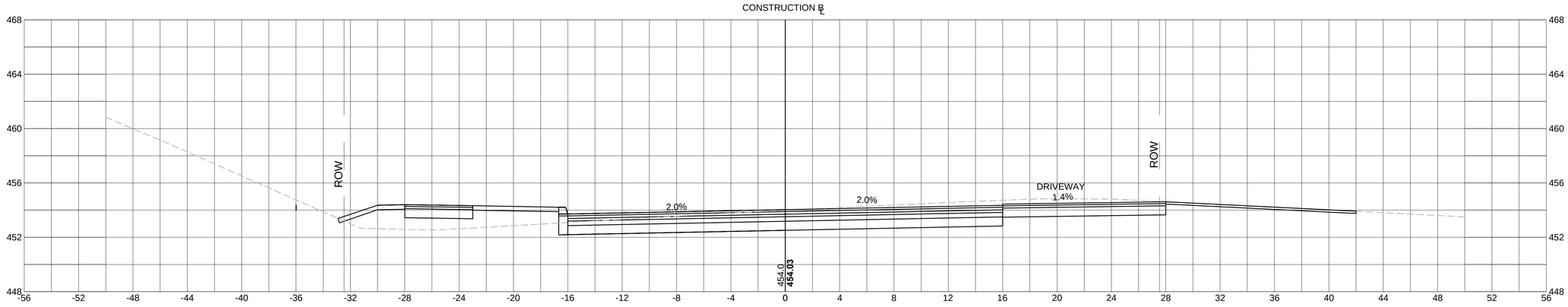


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 109 OF 142

12477 - XSEC.DWG 4-Jun-2014

29+50



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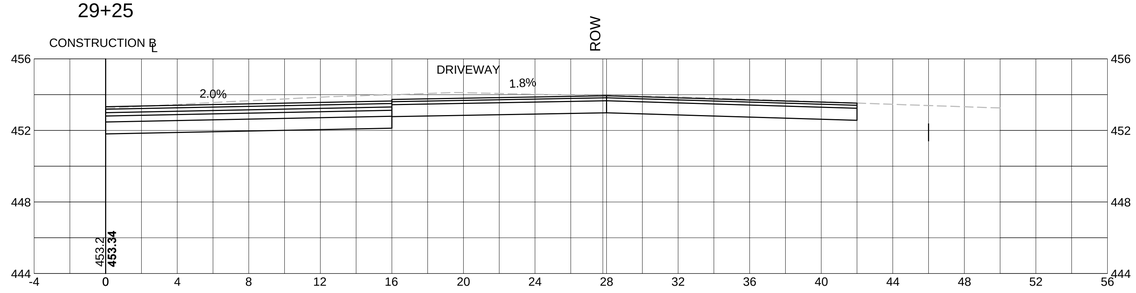

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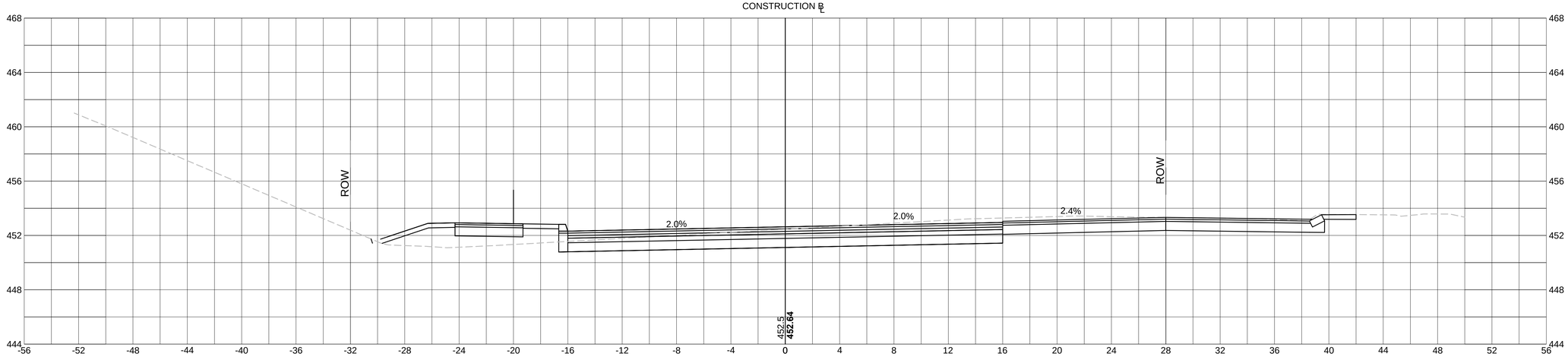

HORIZONTAL
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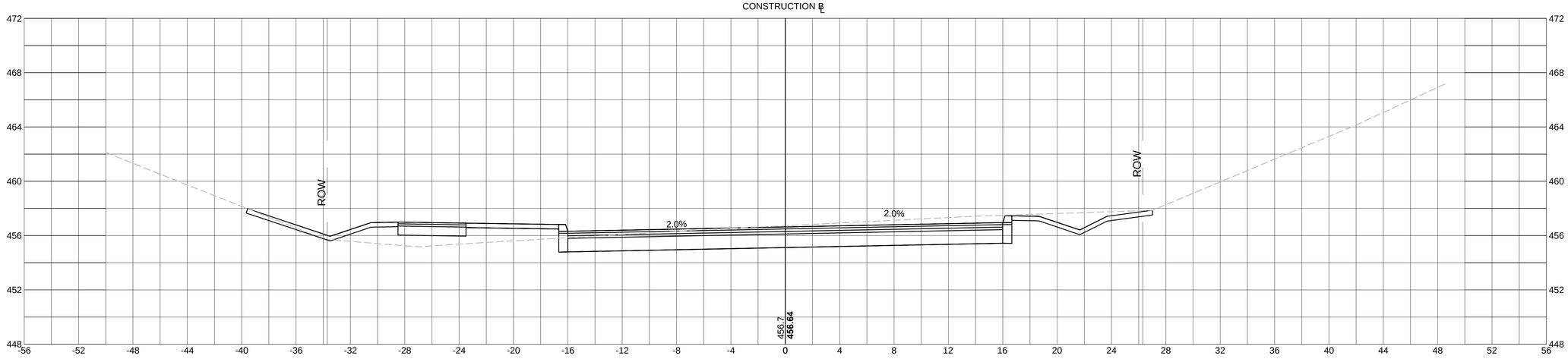
4 0 4 8
VERTICAL
SCALE IN FEET

MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 110 OF 142

12477 - XSEC.DWG 3-Jun-2014

30+50



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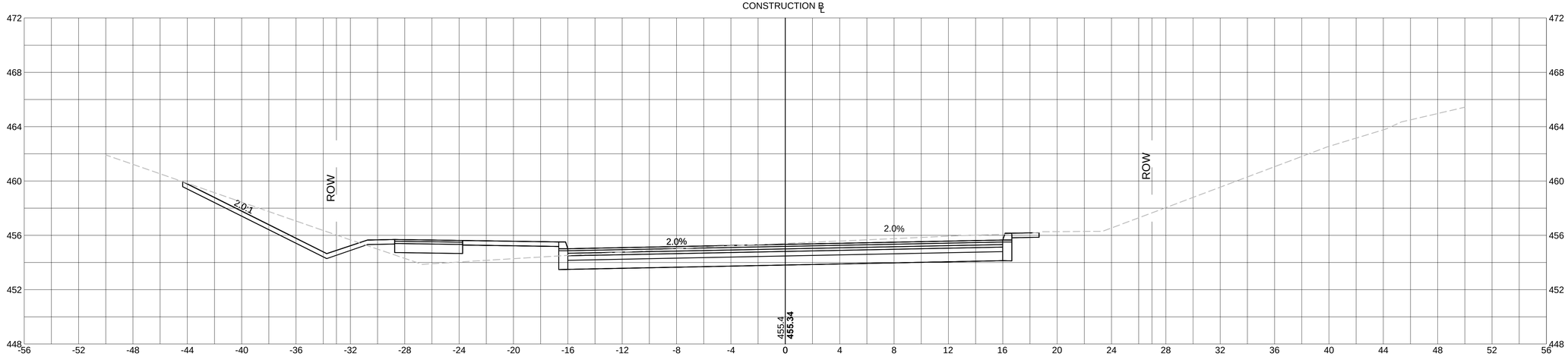

HORIZONTAL
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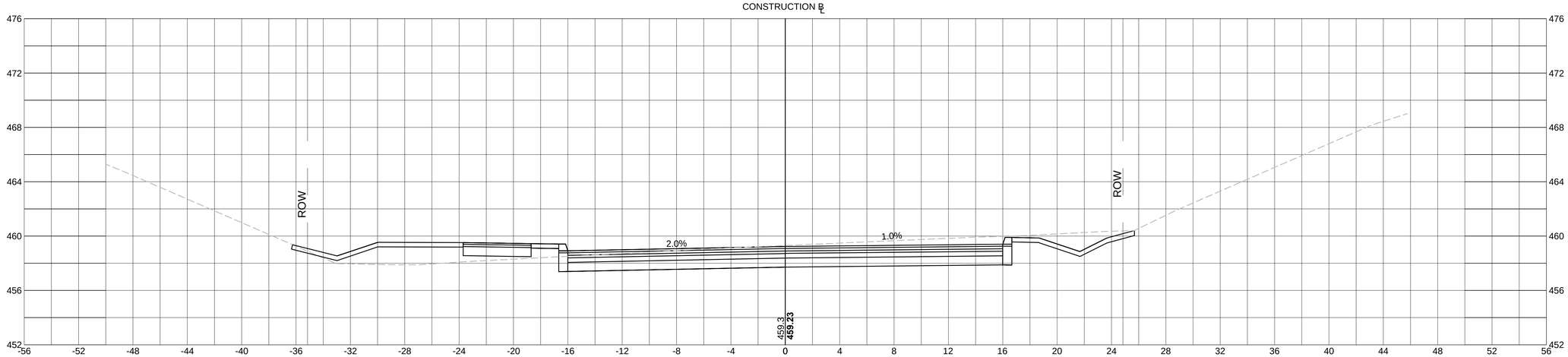
4 0 4 8
VERTICAL
SCALE IN FEET

MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 111 OF 142

12477 - XSEC.DWG 3-Jun-2014

31+50



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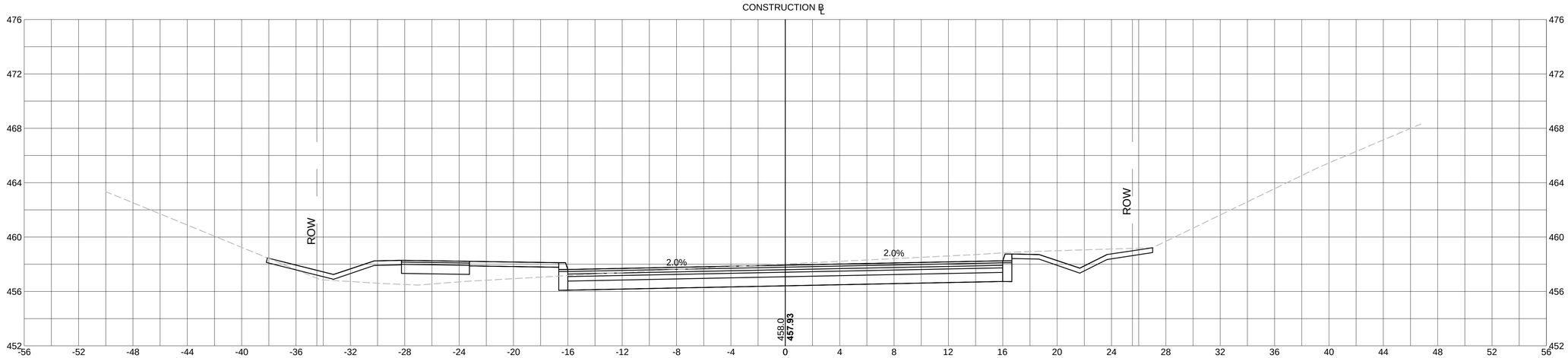

HORIZONTAL
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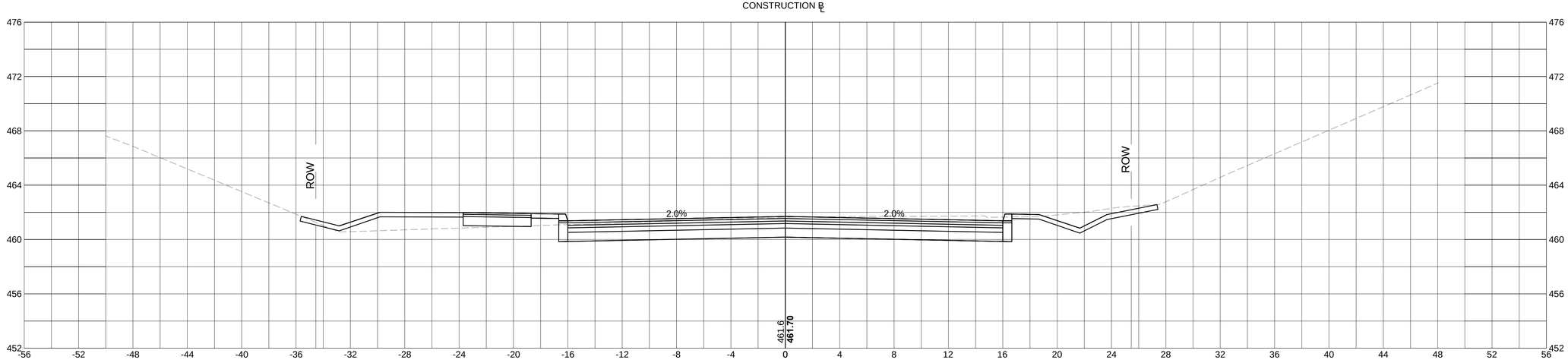
4 0 4 8
VERTICAL
SCALE IN FEET

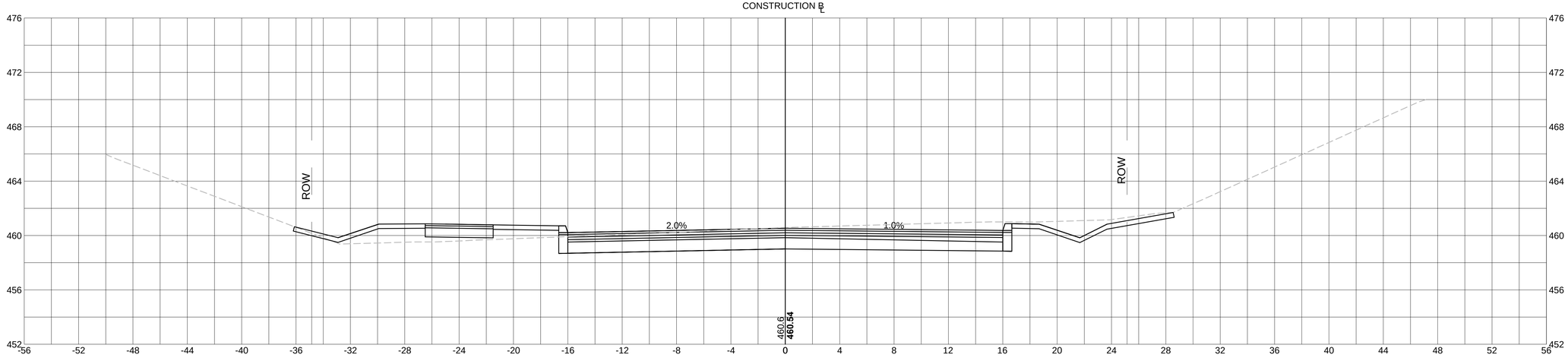
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 112 OF 142

12477 - XSEC.DWG 3-Jun-2014

32+50



32+00



HORIZONTAL
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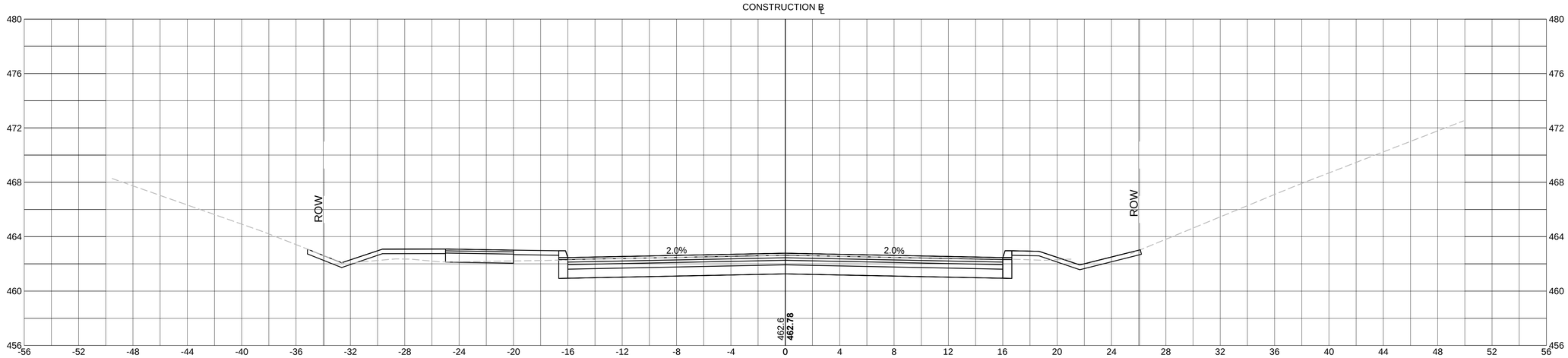
4 0 4 8
VERTICAL
SCALE IN FEET

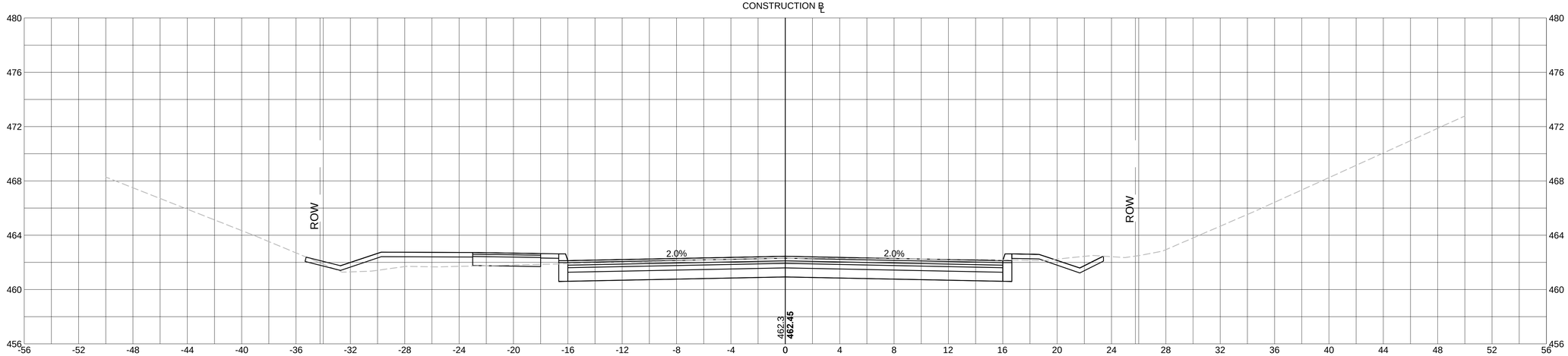
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 113 OF 142

12477 - XSEC.DWG 3-Jun-2014

33+50



33+00



HORIZONTAL
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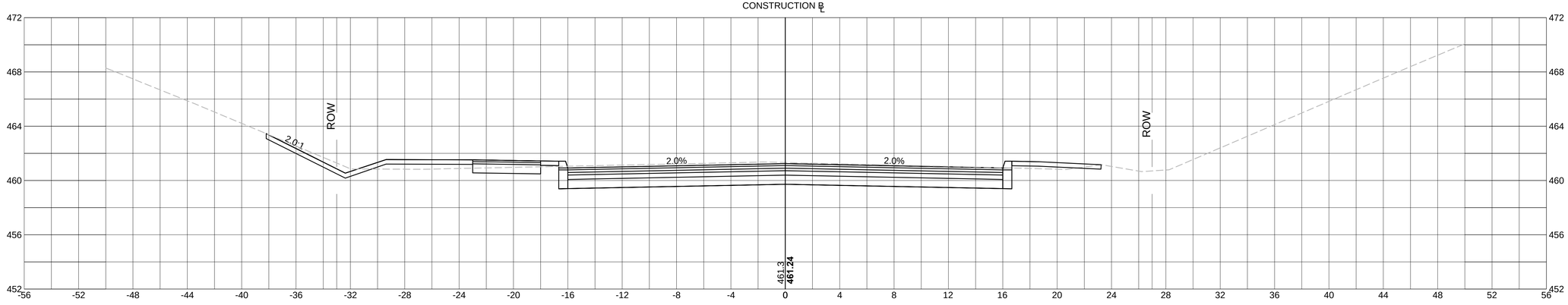
4 0 4 8
VERTICAL
SCALE IN FEET

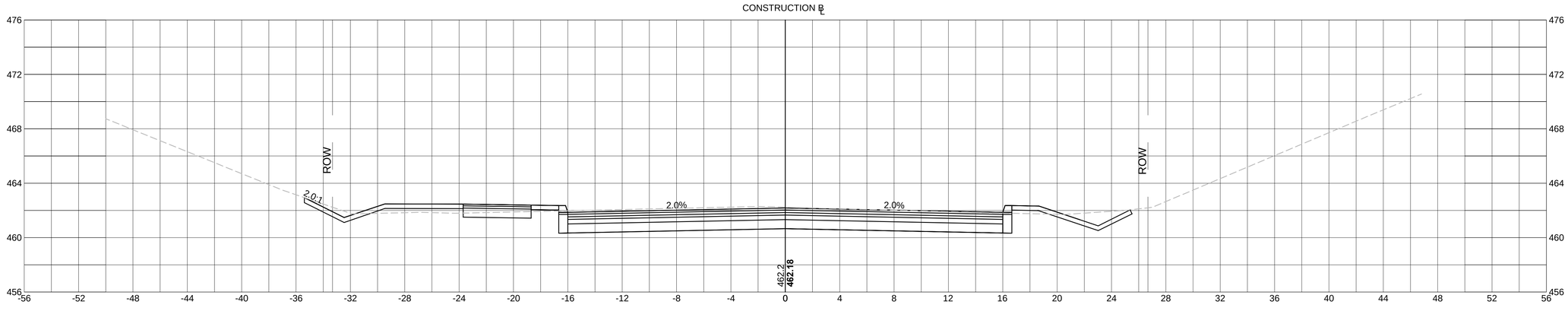
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 114 OF 142

12477 - XSEC.DWG 3-Jun-2014

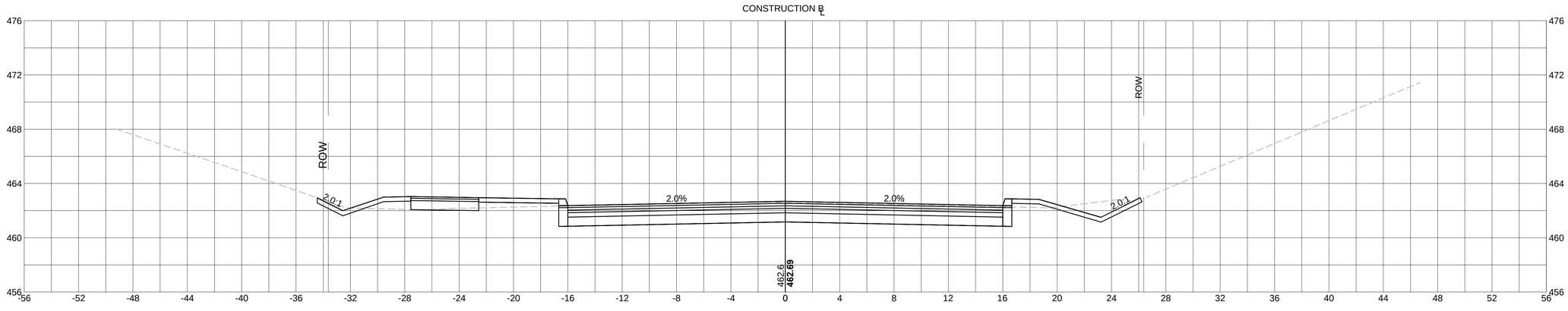
35+00



34+50



34+00



HORIZONTAL
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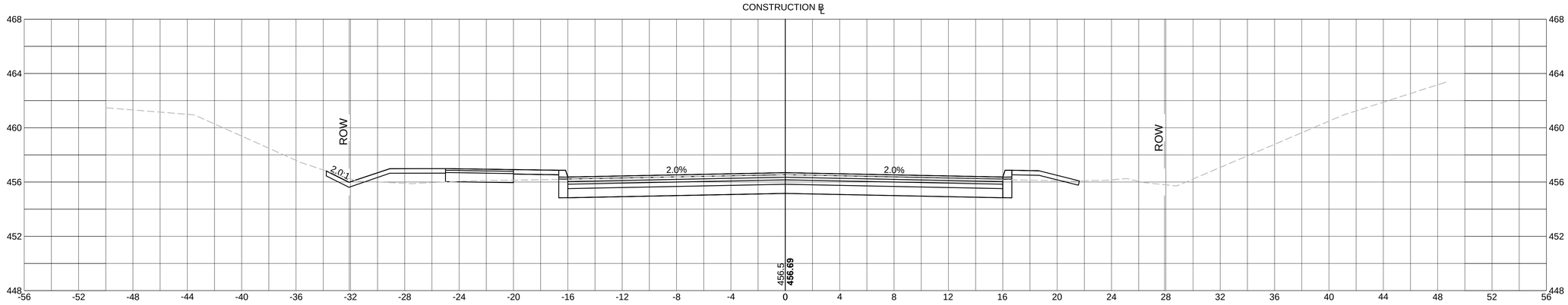
4 0 4 8
VERTICAL
SCALE IN FEET

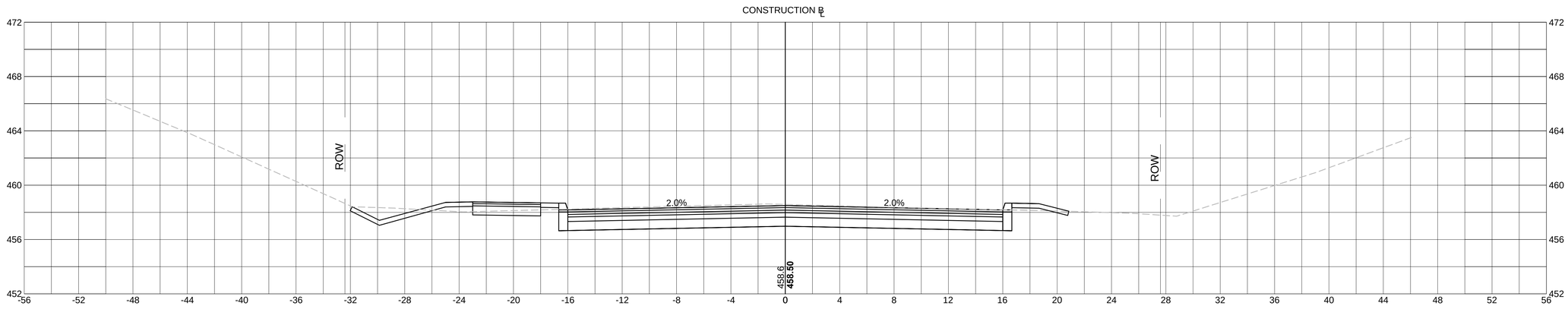
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 115 OF 142

12477 - XSEC.DWG 3-Jun-2014

36+50



36+00



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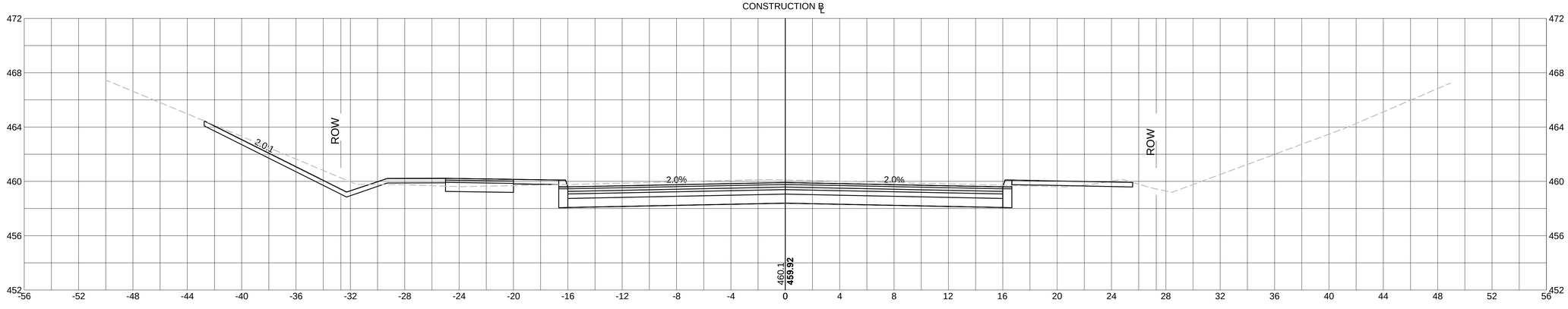

HORIZONTAL
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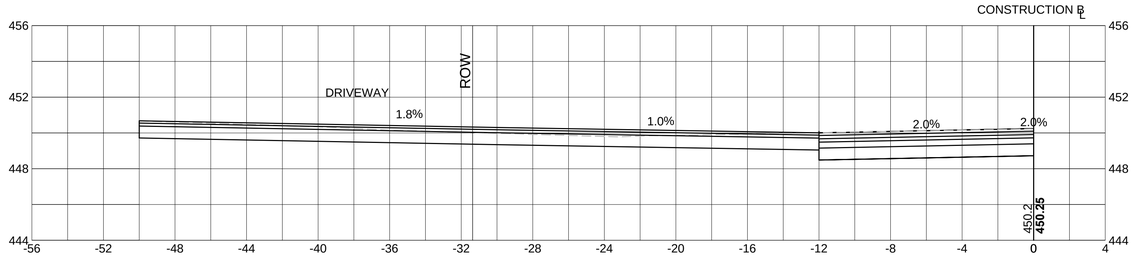
4 0 4 8
VERTICAL
SCALE IN FEET

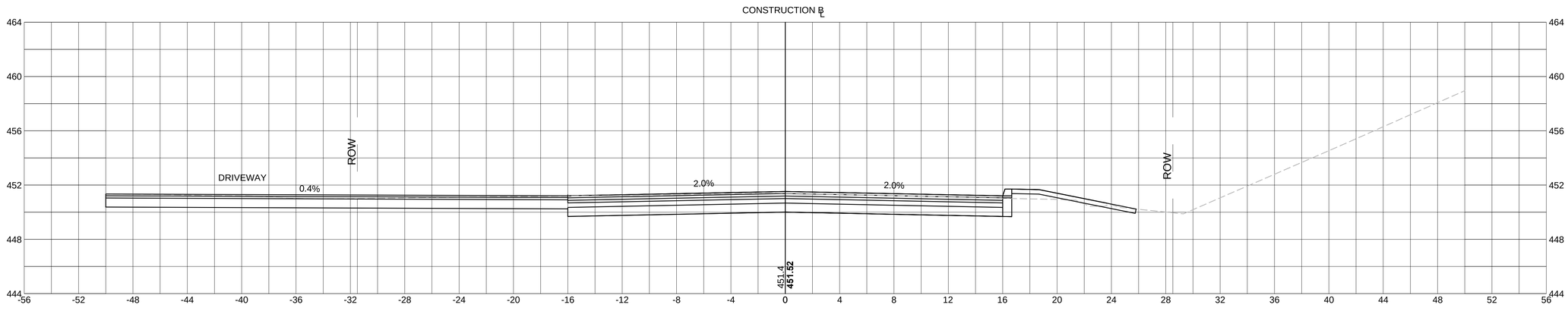
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 116 OF 142

12477 - XSEC.DWG 4-Jun-2014

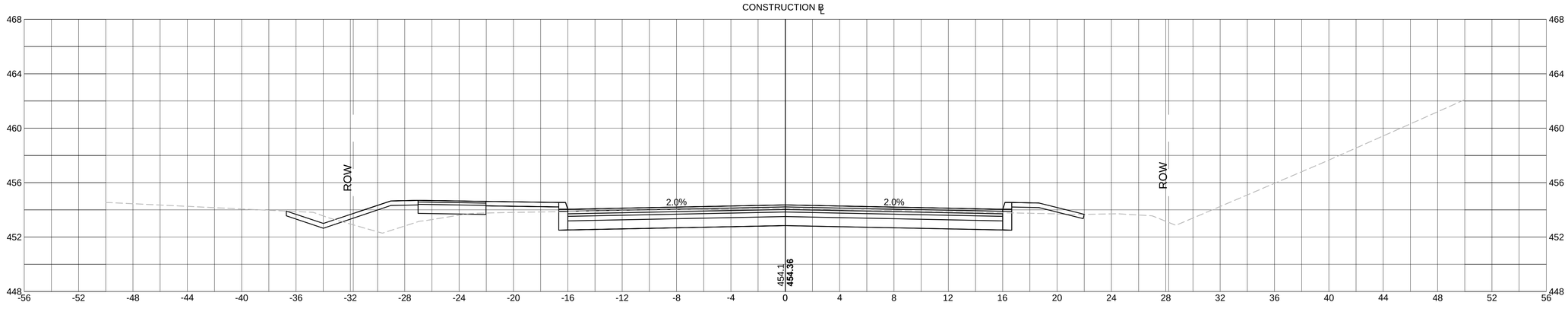
37+70



37+50



37+00

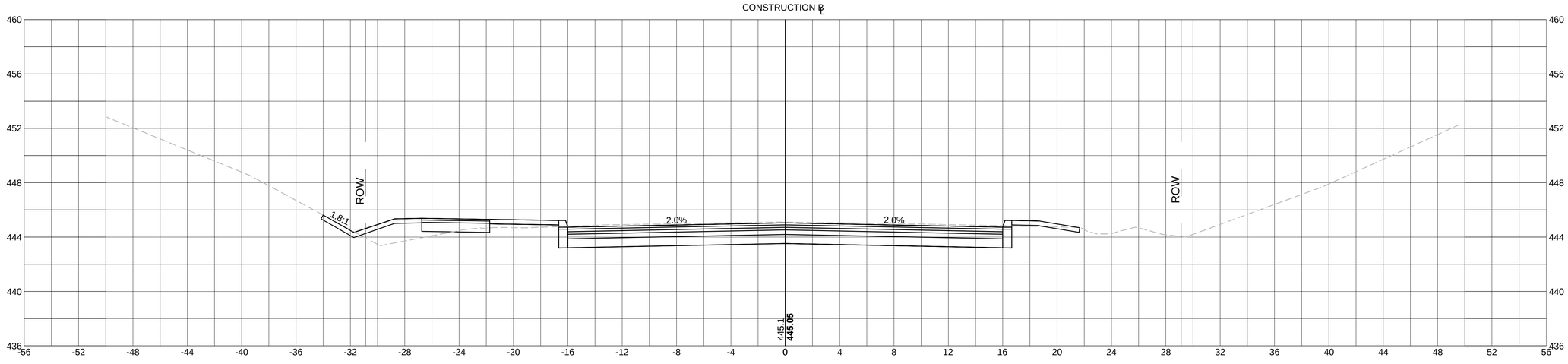


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

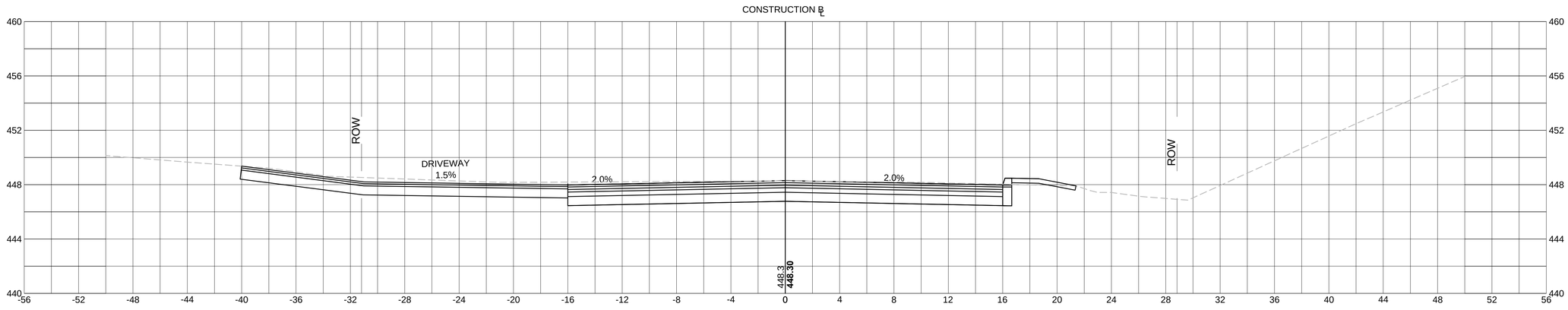
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 117 OF 142

12477 - XSEC.DWG 4-Jun-2014

38+50



38+00

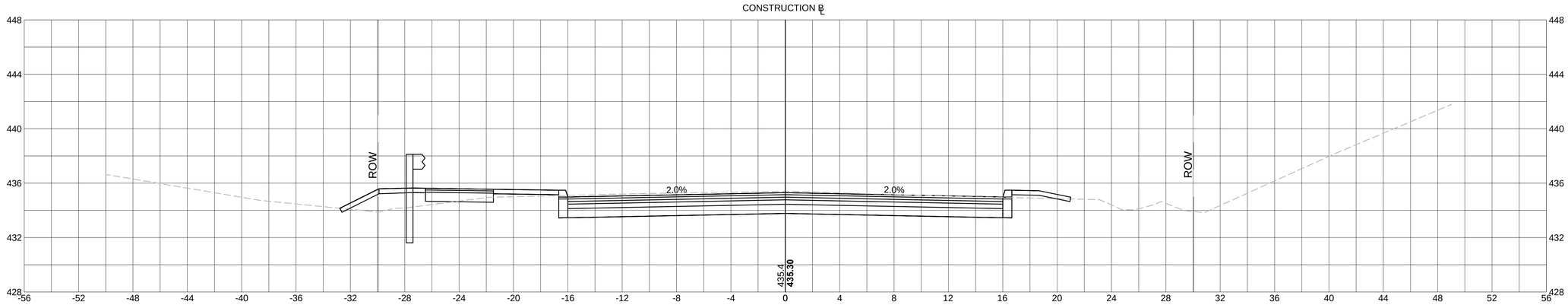


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

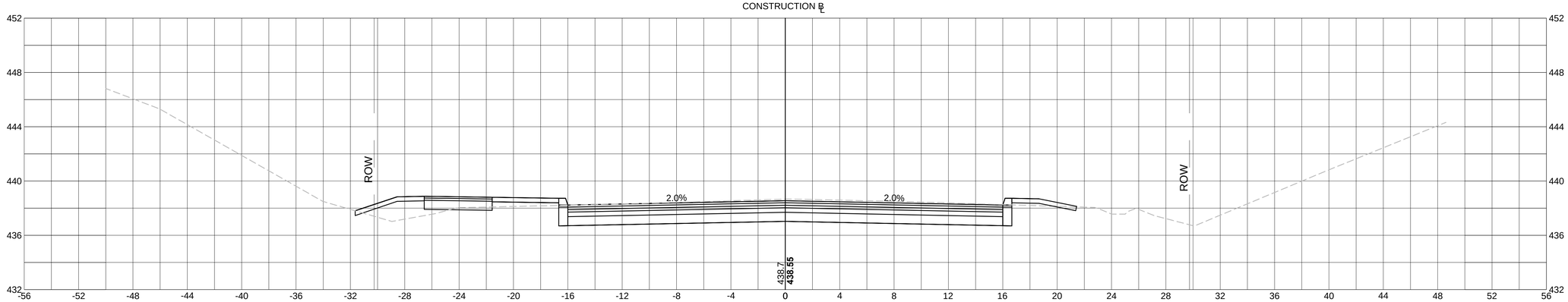
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 118 OF 142

12477 - XSEC.DWG 3-Jun-2014

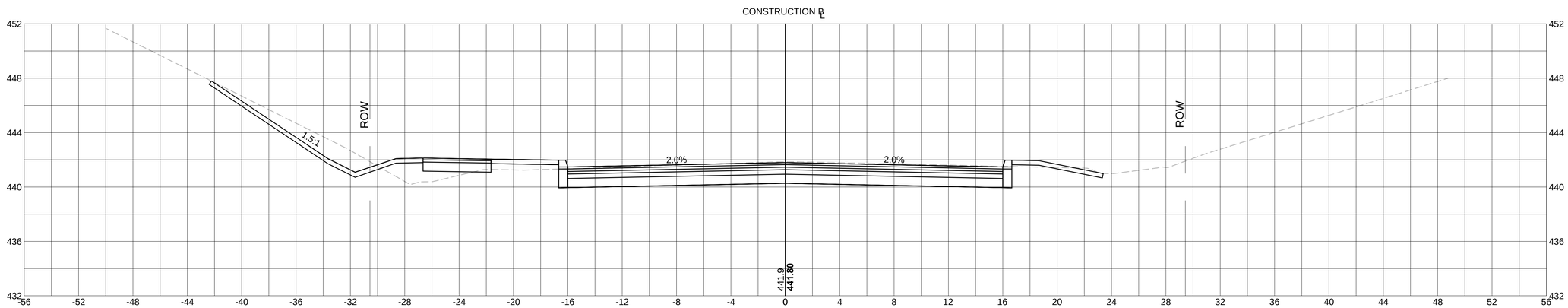
40+00



39+50



39+00

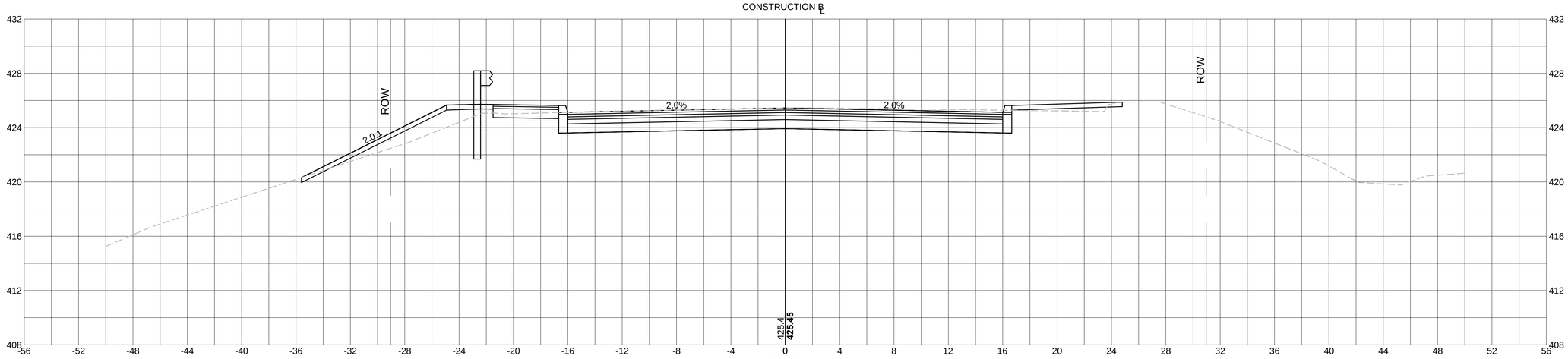


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

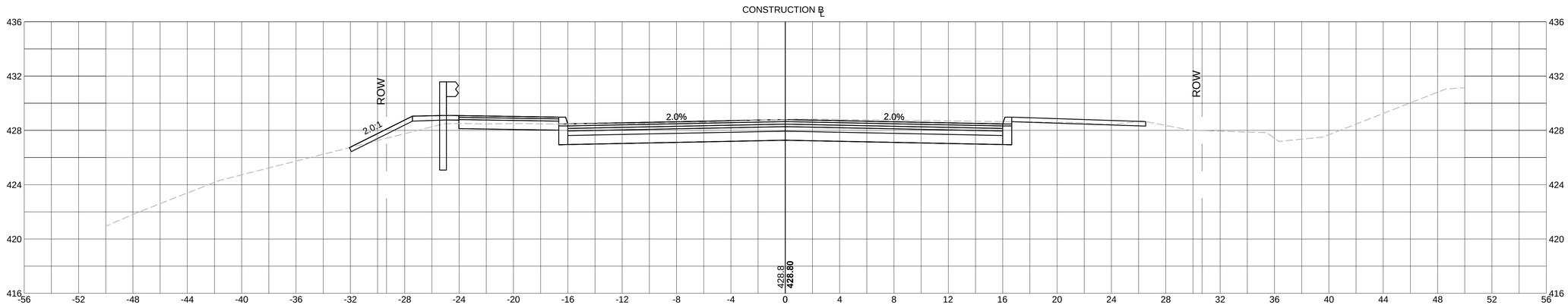
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 119 OF 142

12477 - XSEC.DWG 4-Jun-2014

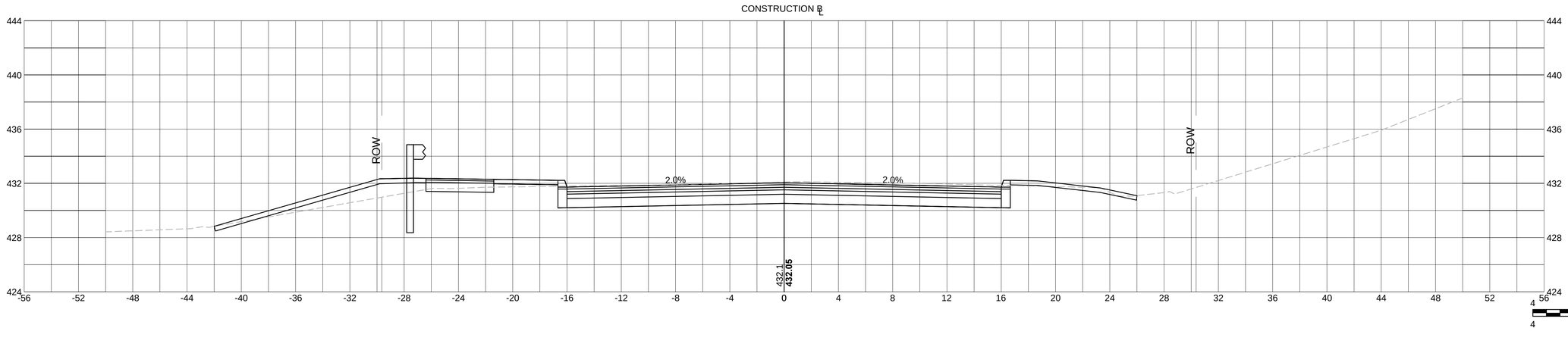
41+50



41+00



40+50

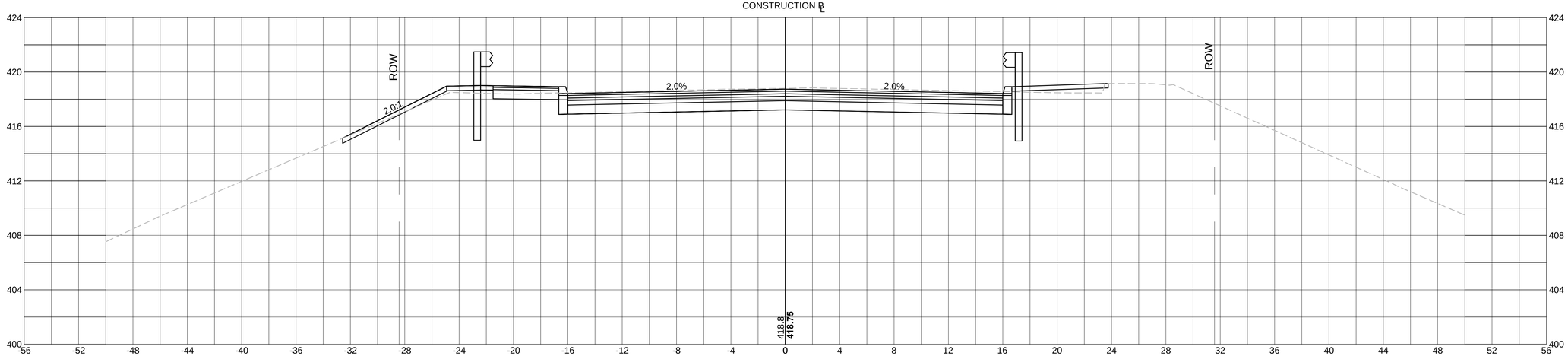


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

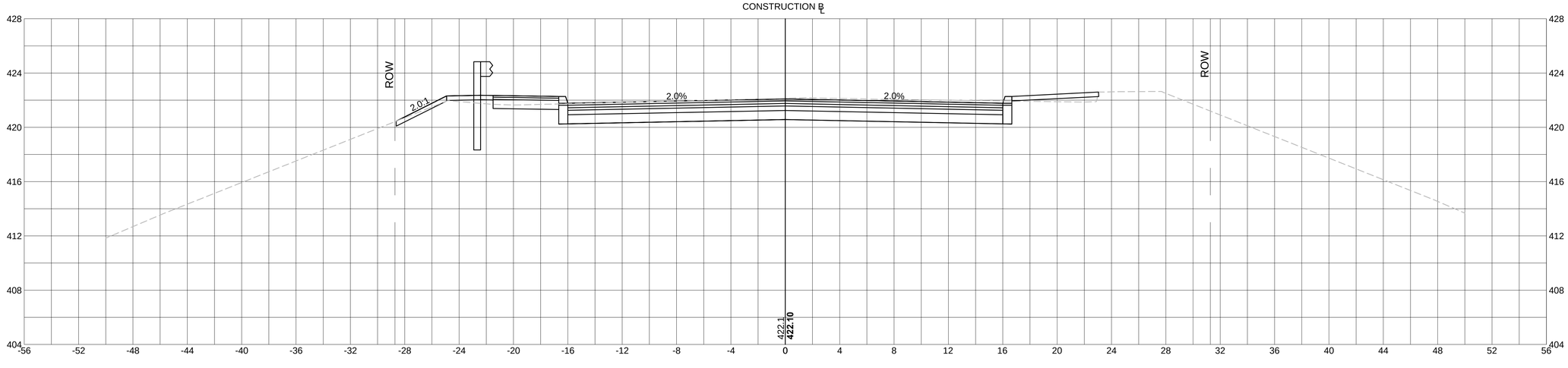
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 120 OF 142

12477 - XSEC.DWG 3-Jun-2014

42+50



42+00

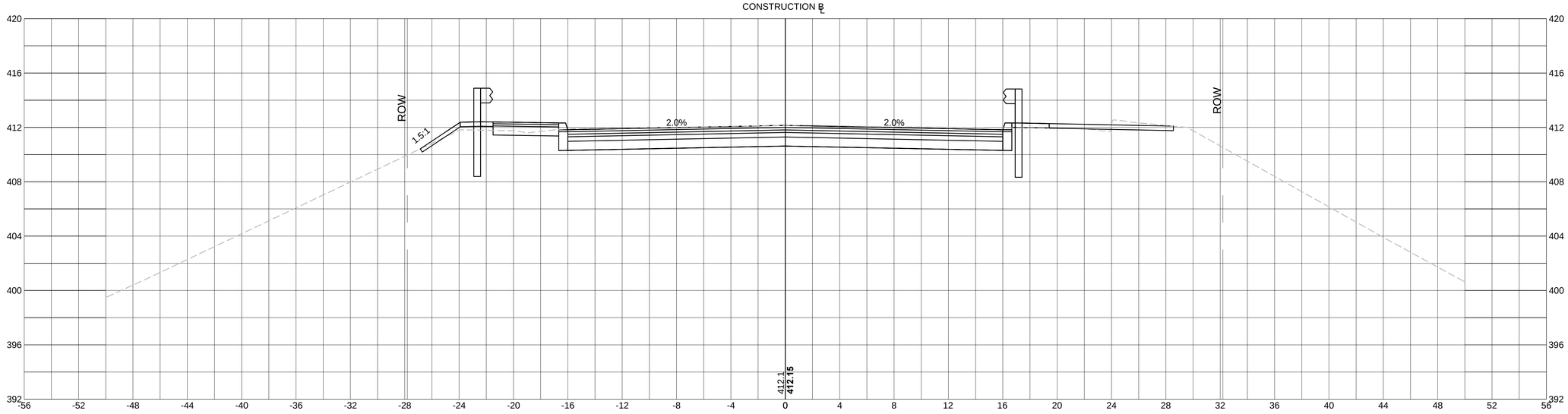


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

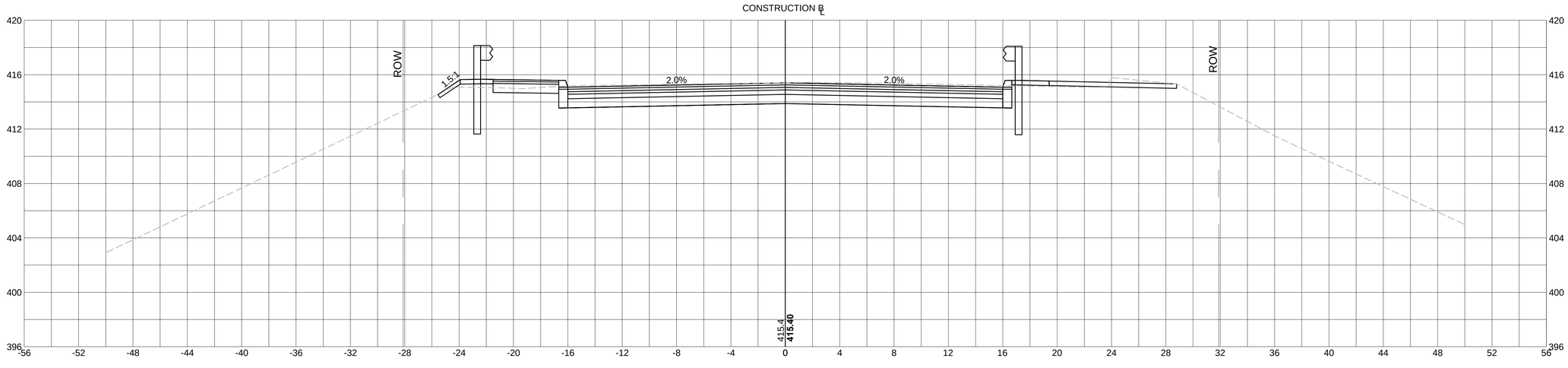
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 121 OF 142

12477 - XSEC.DWG 3-Jun-2014

43+50



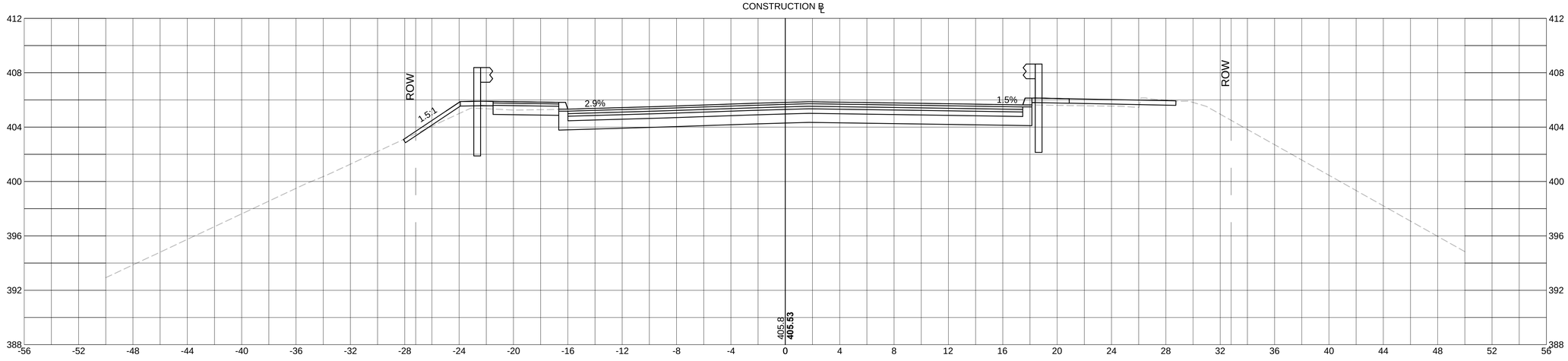
43+00



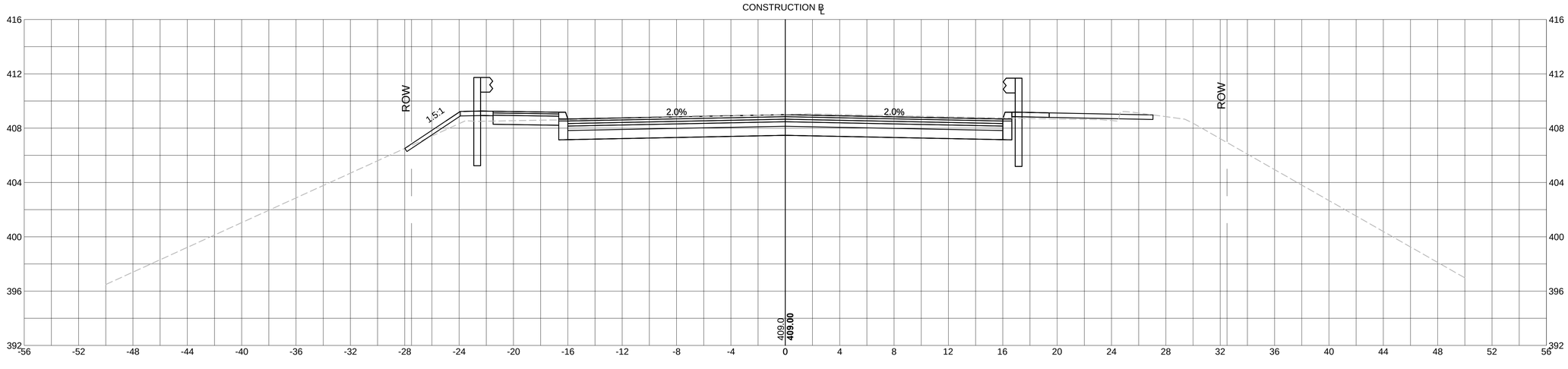
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 122 OF 142

12477 - XSEC.DWG 3-Jun-2014

44+50



44+00

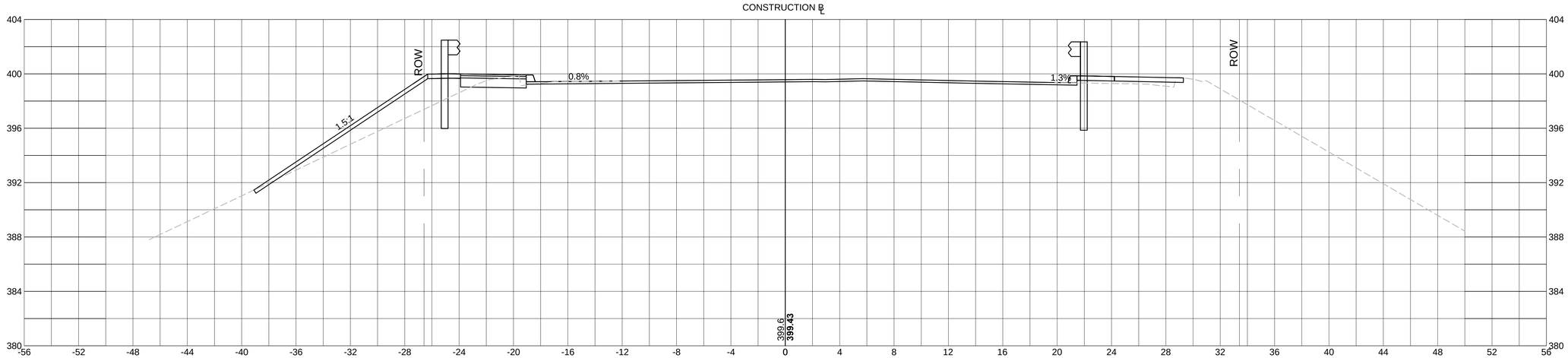


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

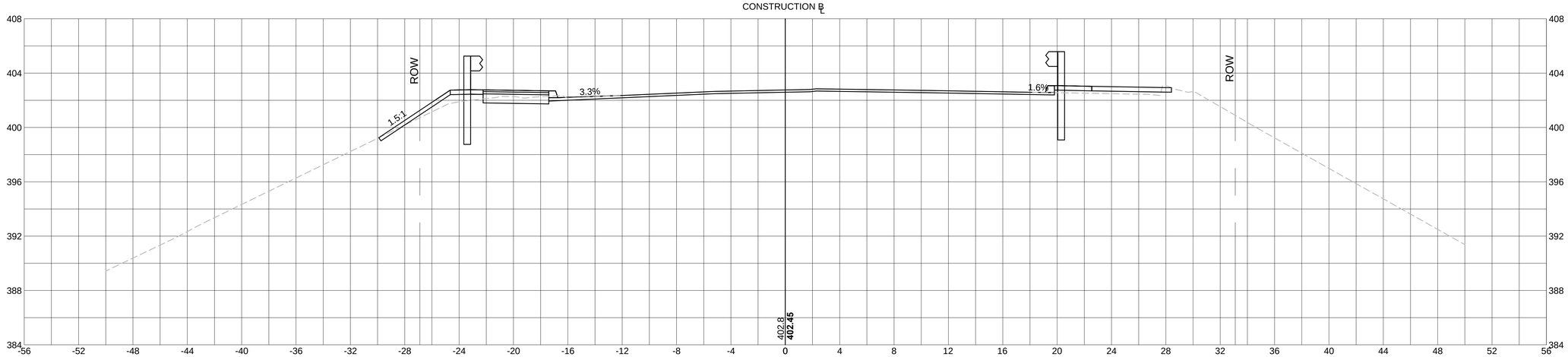
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 123 OF 142

12477 - XSEC.DWG 3-Jun-2014

45+50



45+00

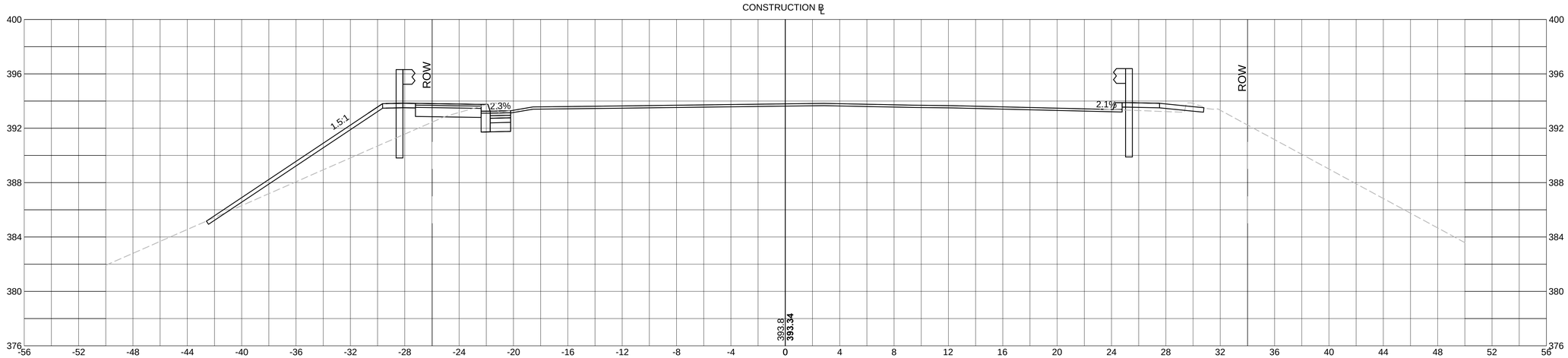


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

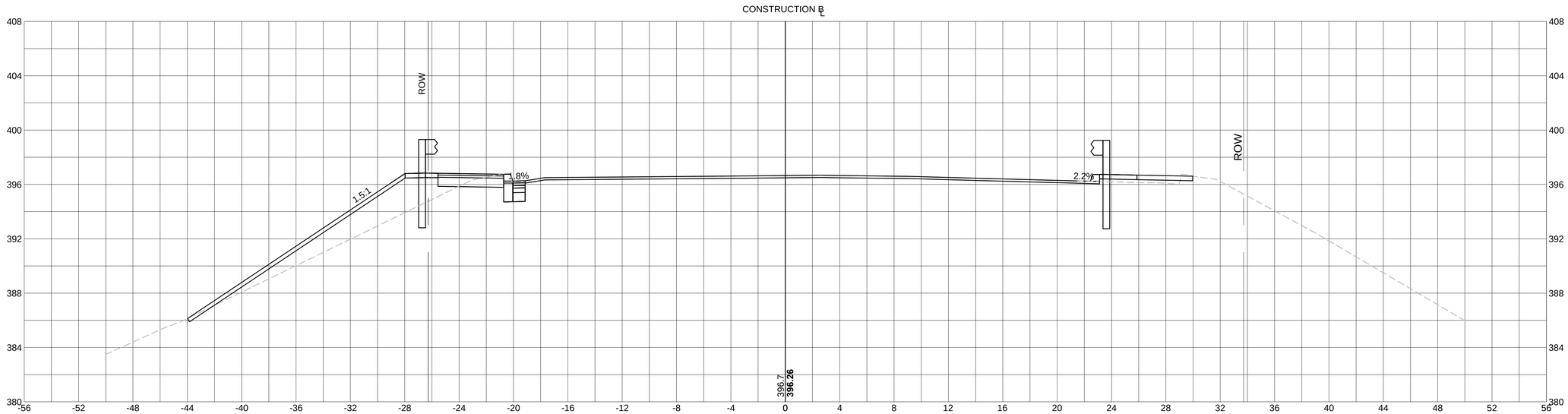
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 124 OF 142

12477 - XSEC.DWG 3-Jun-2014

46+50



46+00

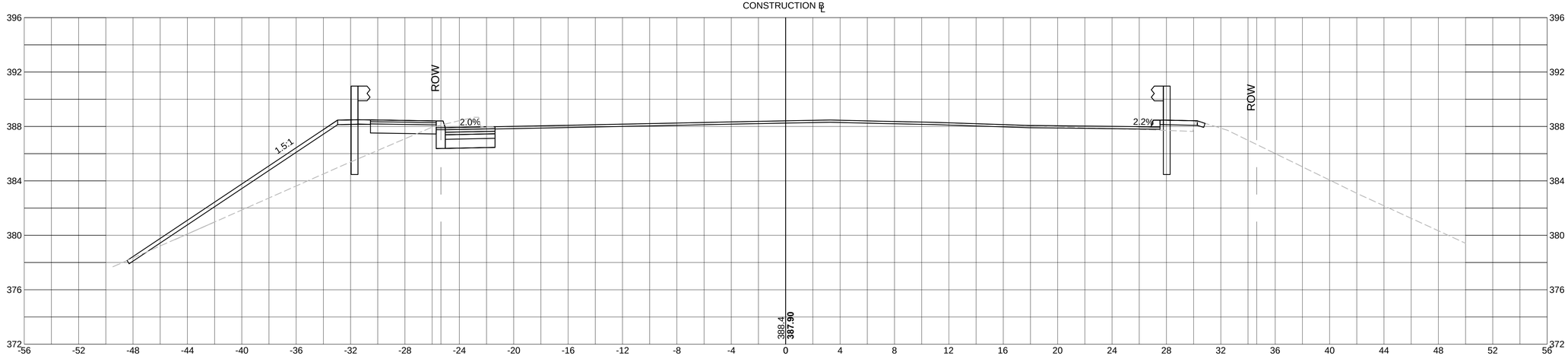


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

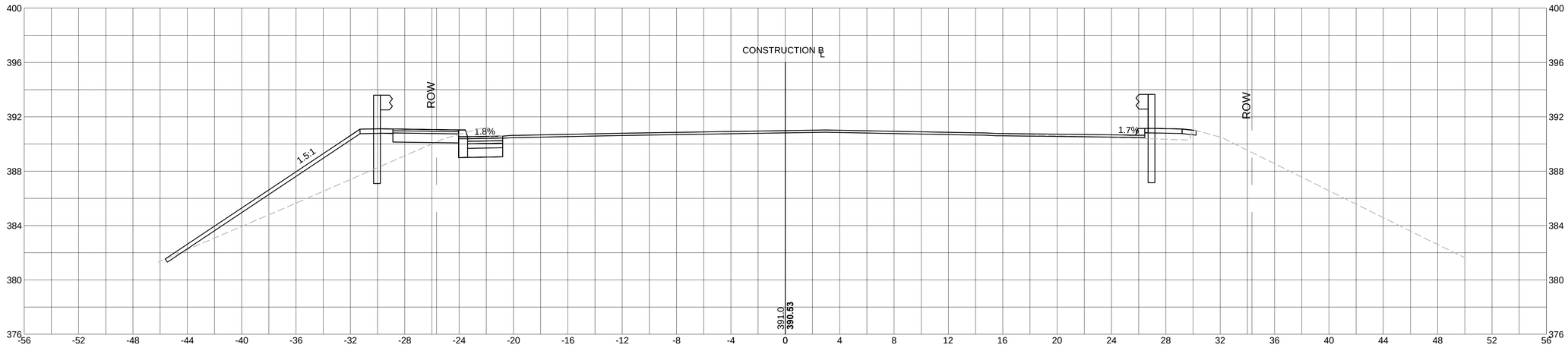
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 125 OF 142

12477 - XSEC.DWG 3-Jun-2014

47+50



47+00

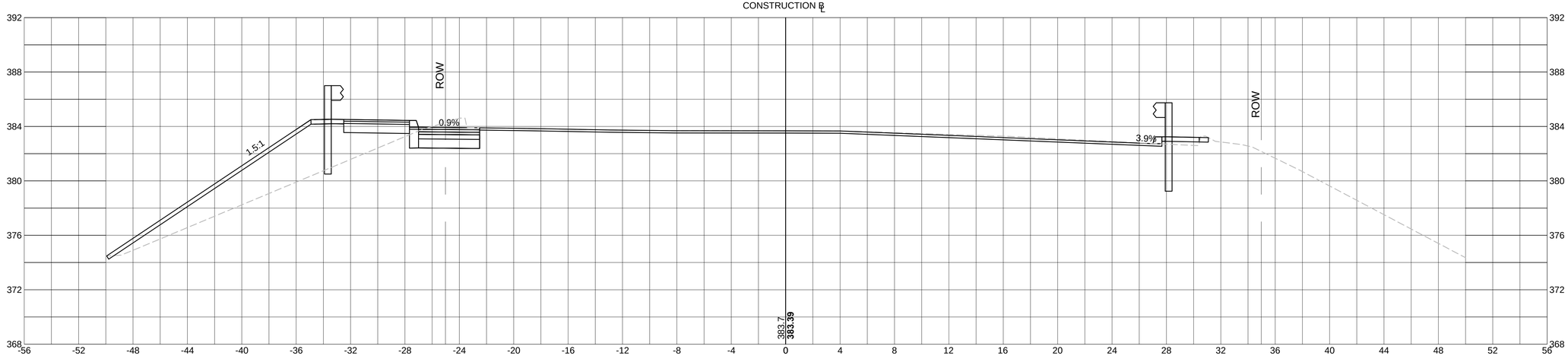


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

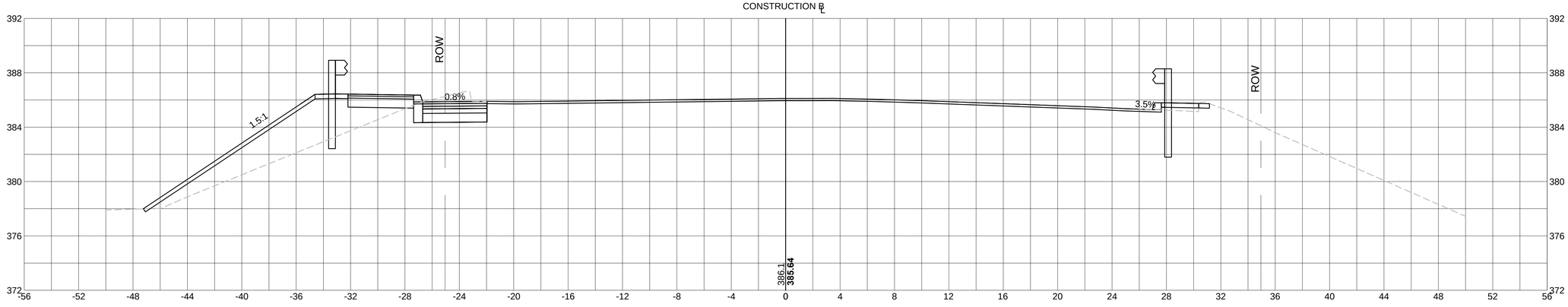
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 126 OF 142

12477 - XSEC.DWG 3-Jun-2014

48+50



48+00

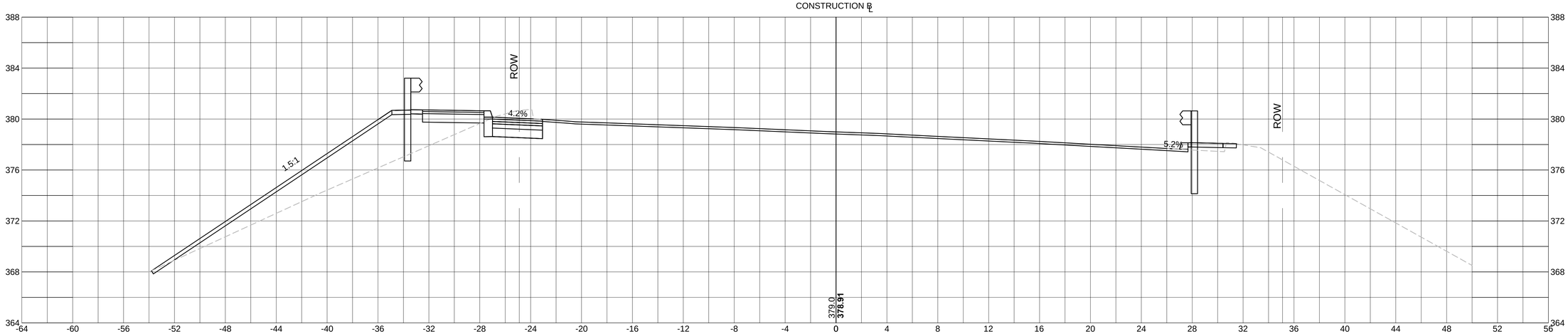


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

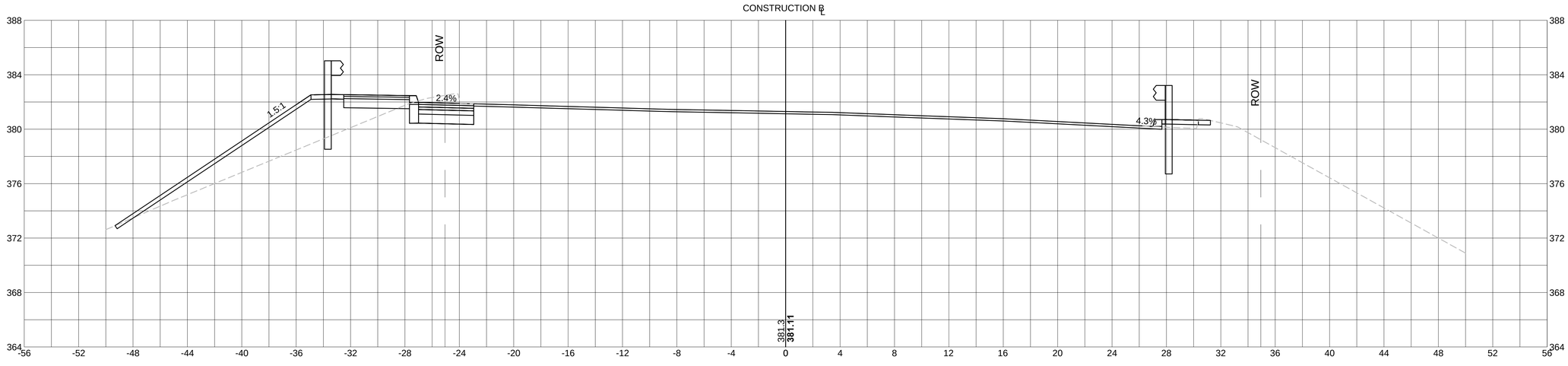
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 127 OF 142

12477 - XSEC.DWG 3-Jun-2014

49+50



49+00

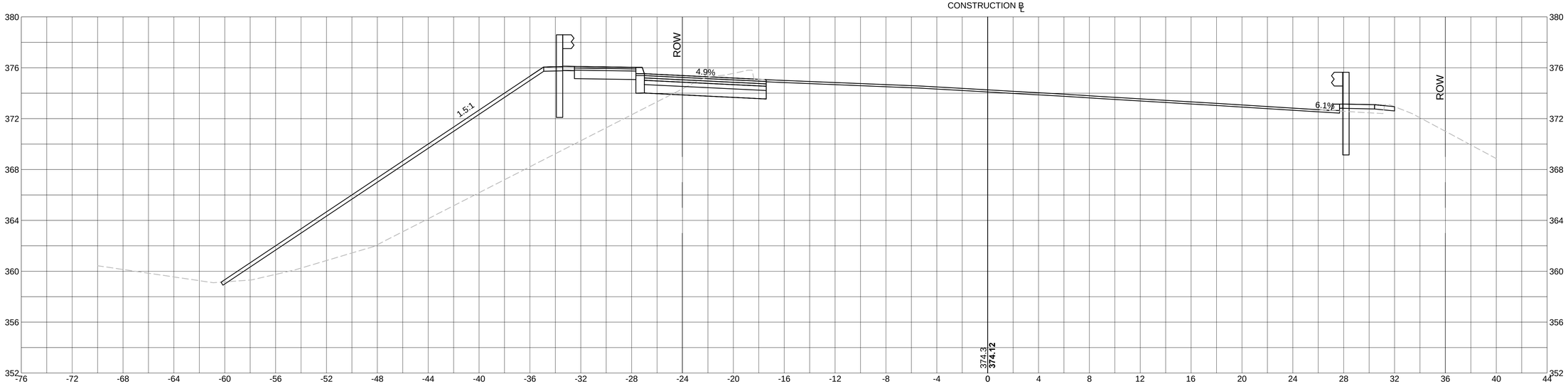


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

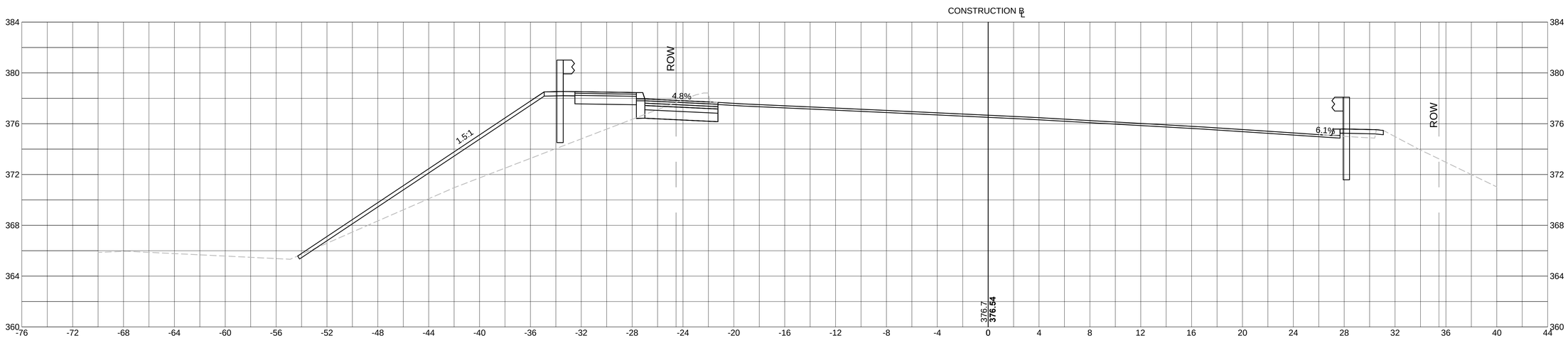
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 128 OF 142

12477 - XSEC.DWG 3-Jun-2014

50+50



50+00

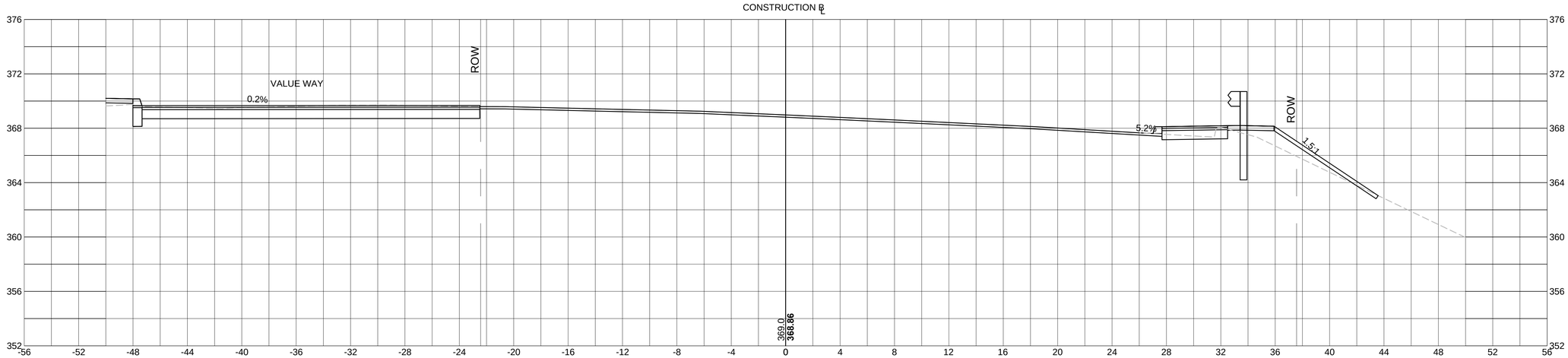


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

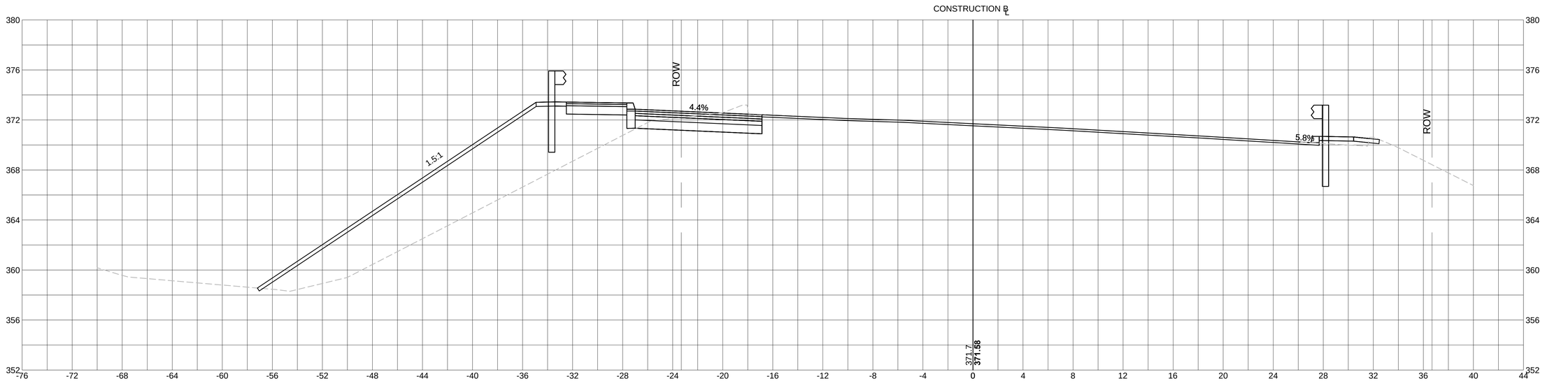
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 129 OF 142

12477 - XSEC.DWG 3-Jun-2014

51+50



51+00

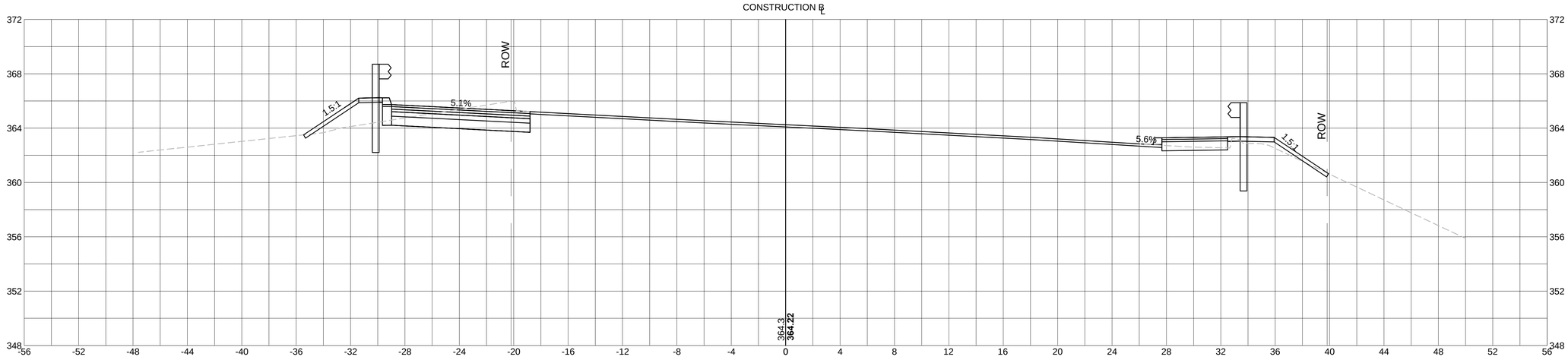


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

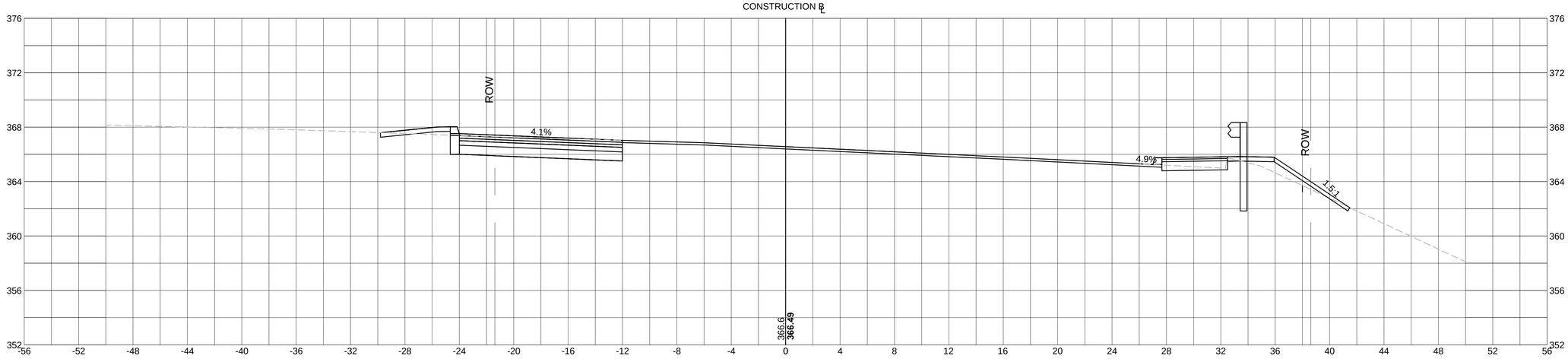
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 130 OF 142

12477 - XSEC.DWG 3-Jun-2014

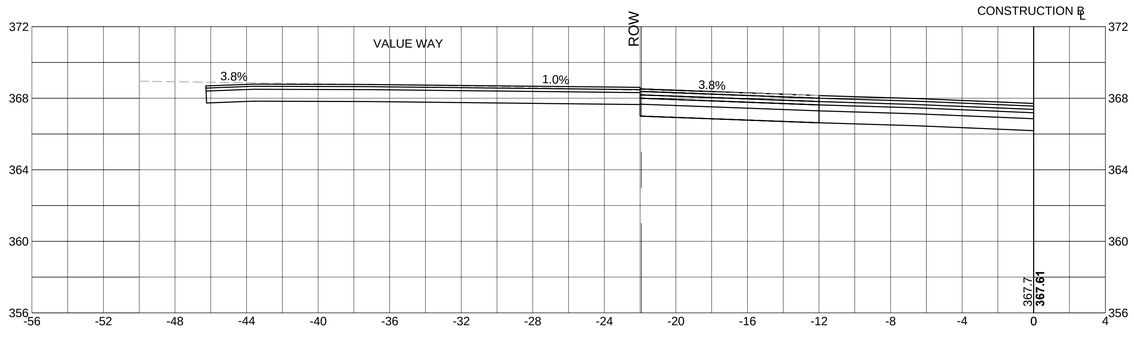
52+50



52+00



51+75



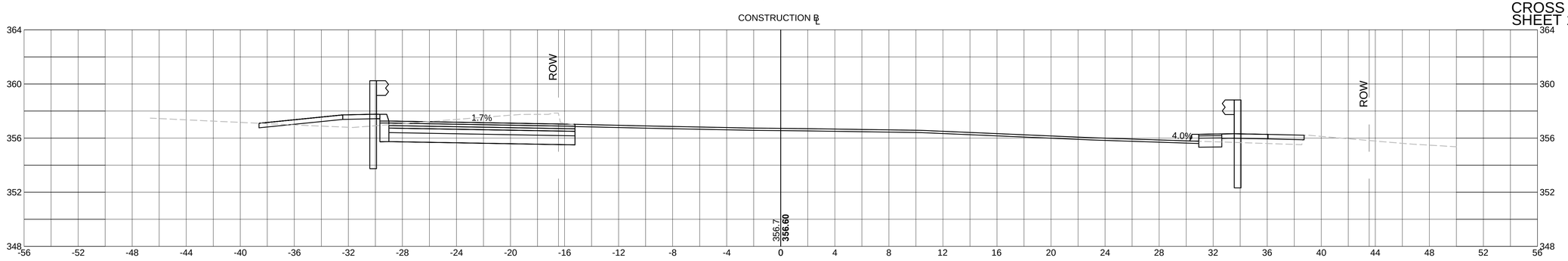
HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 131 OF 142

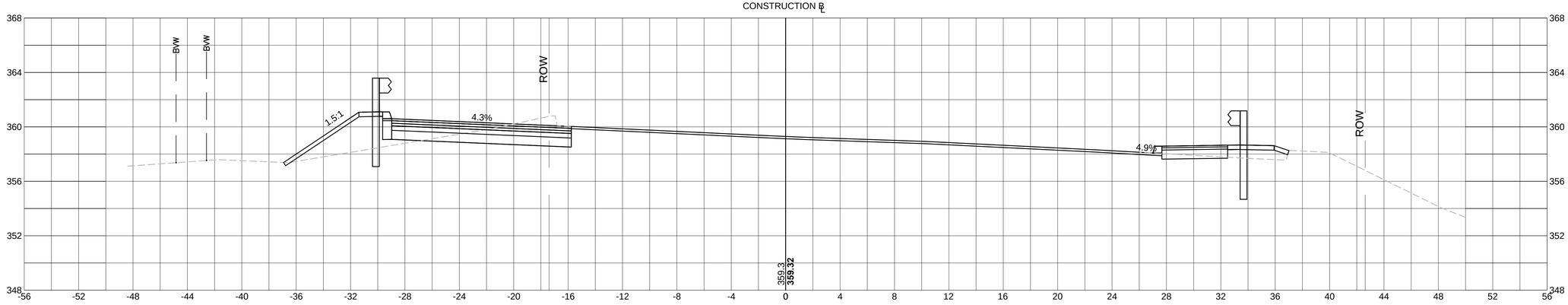
3-Jun-2014

12477 - XSEC.DWG

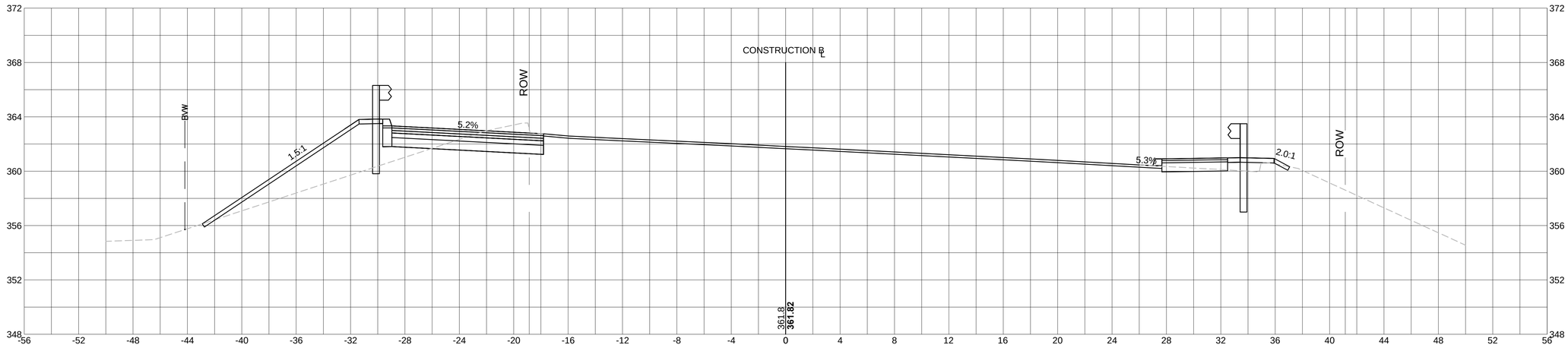
54+00



53+50



53+00

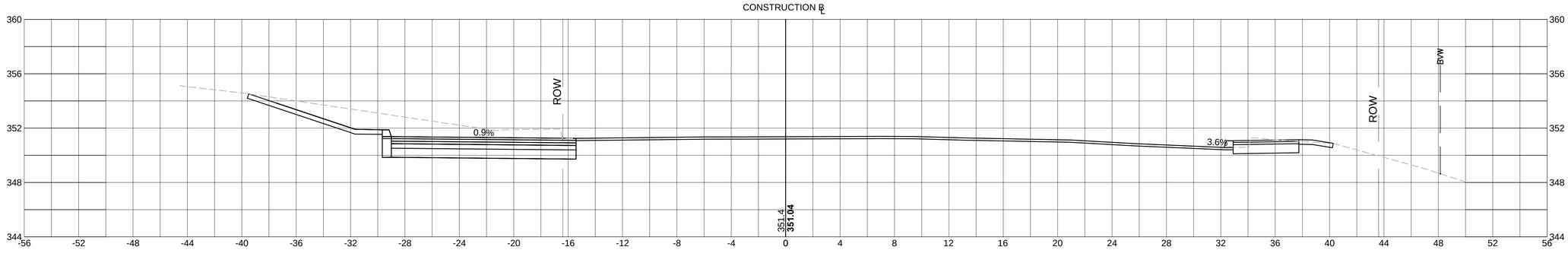


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

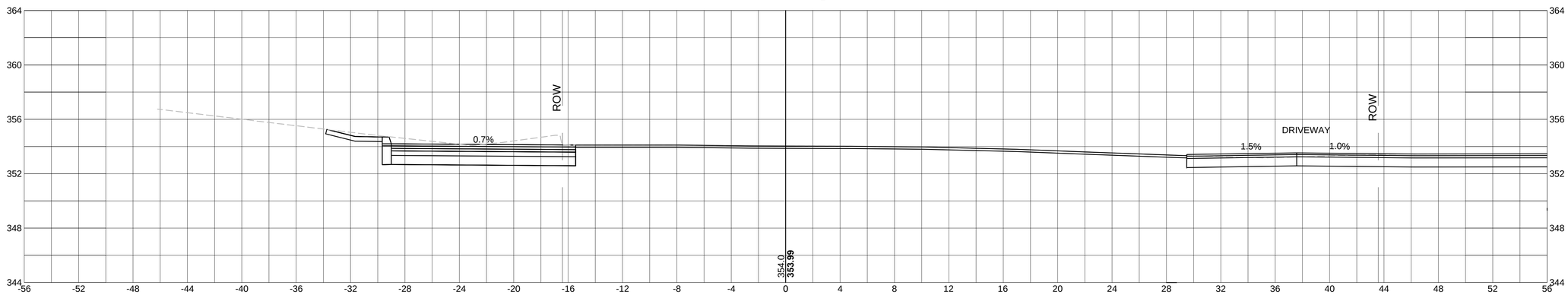
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 132 OF 142

12477 - XSEC.DWG 3-Jun-2014

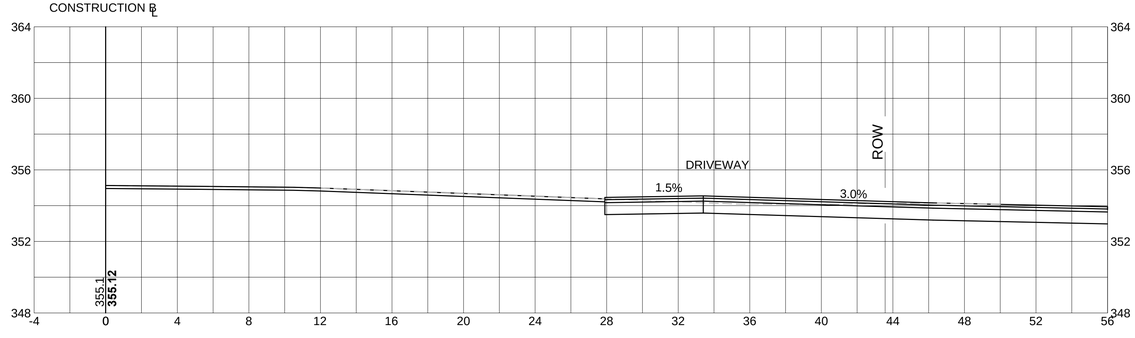
55+00

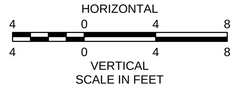


54+50



54+30

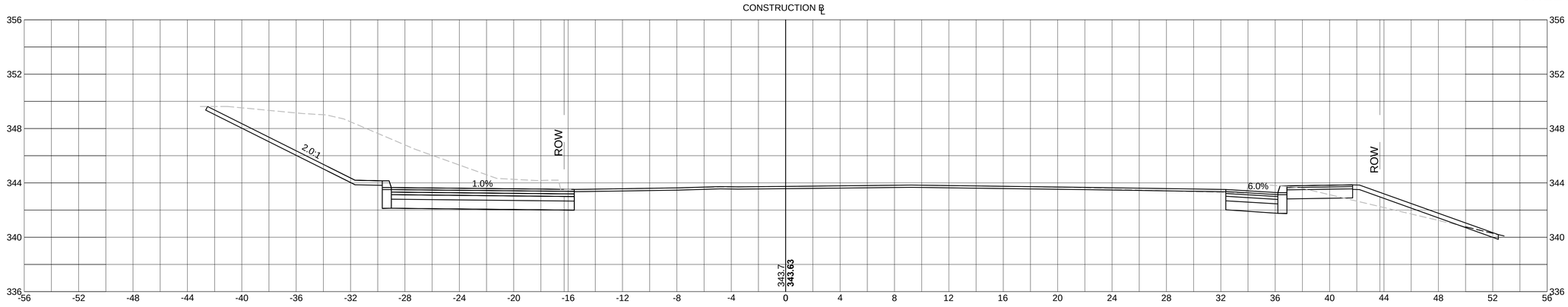




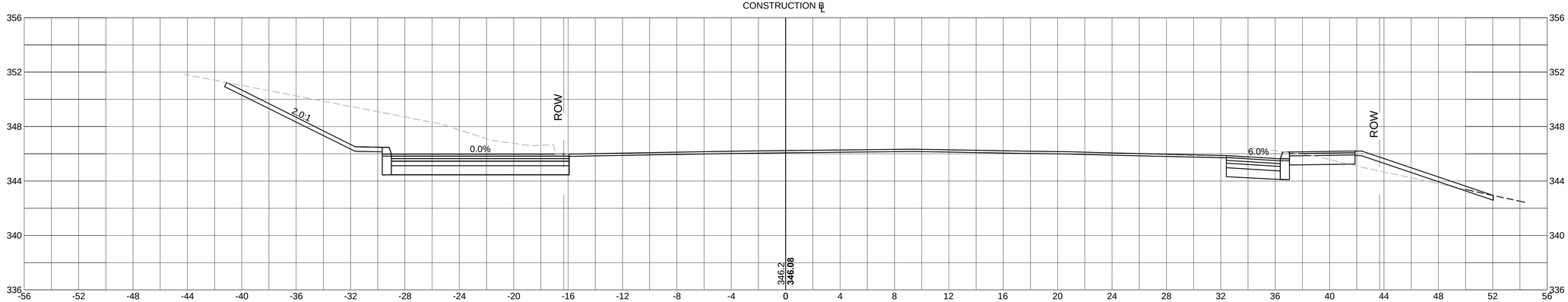
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 133 OF 142

12477 - XSEC.DWG 3-Jun-2014

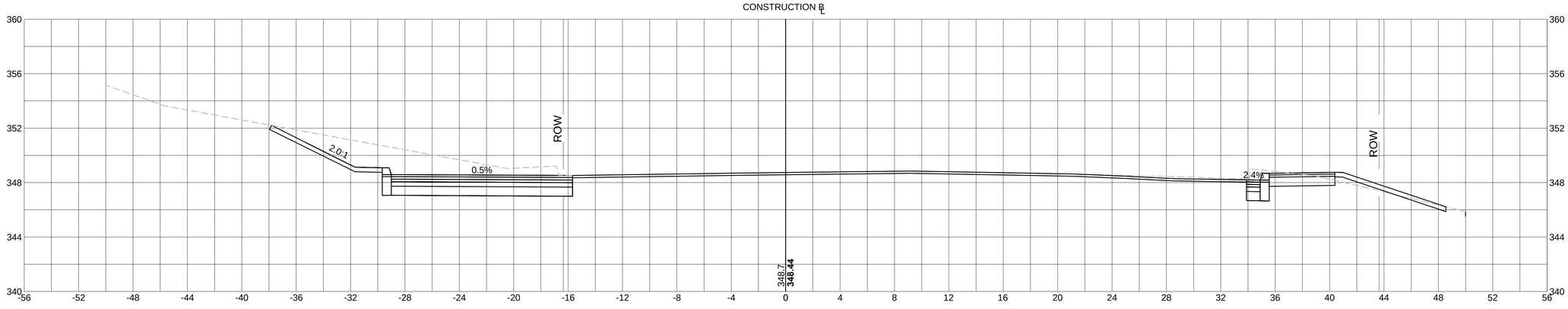
56+50



56+00



55+50



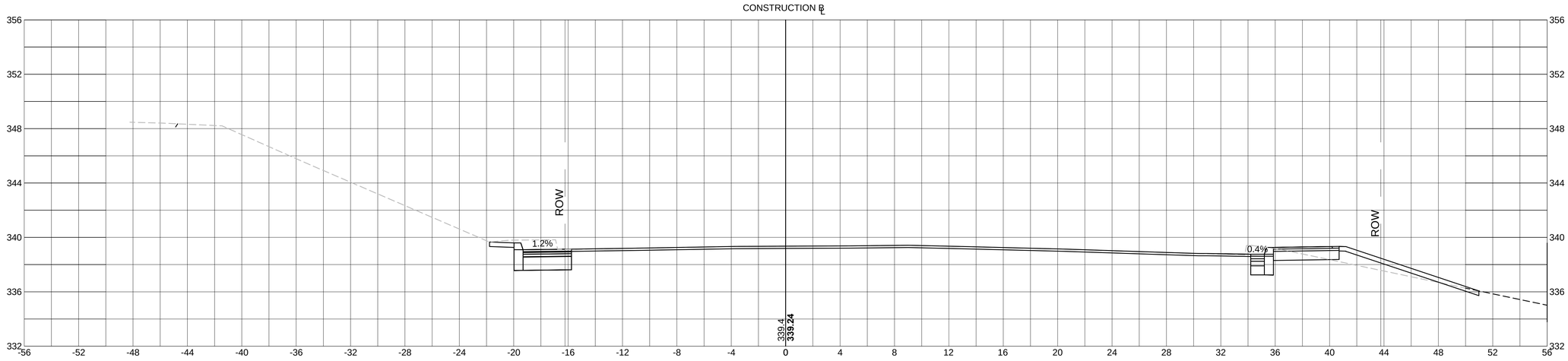
HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 134 OF 142

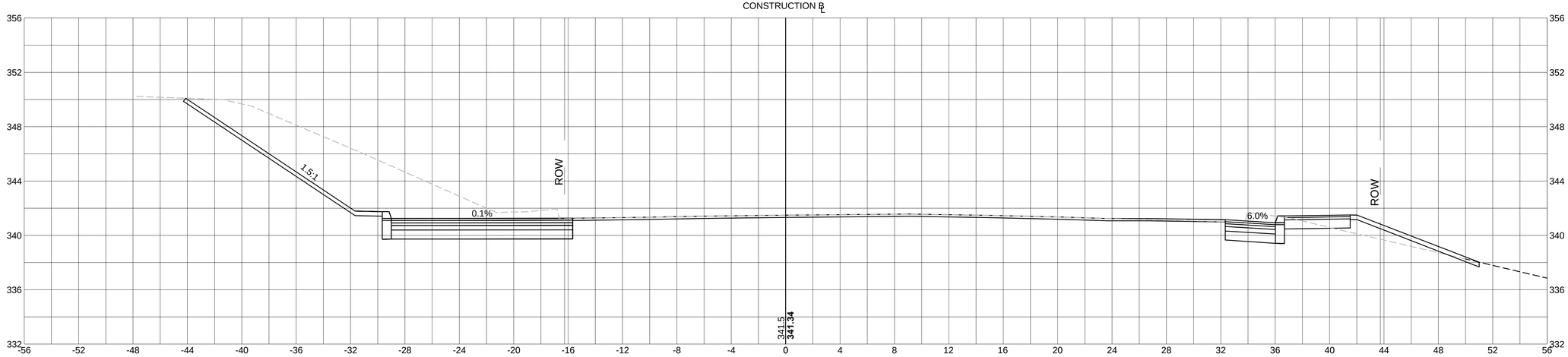
12477 - XSEC.DWG 3-Jun-2014

NO WORK IS TO BE PERFORMED BETWEEN STATE HIGHWAY LAYOUT STA 57+60.41 TO 66+62.80.
CROSS SECTIONS ARE NOT SHOWN FOR THIS AREA.

57+50



57+00

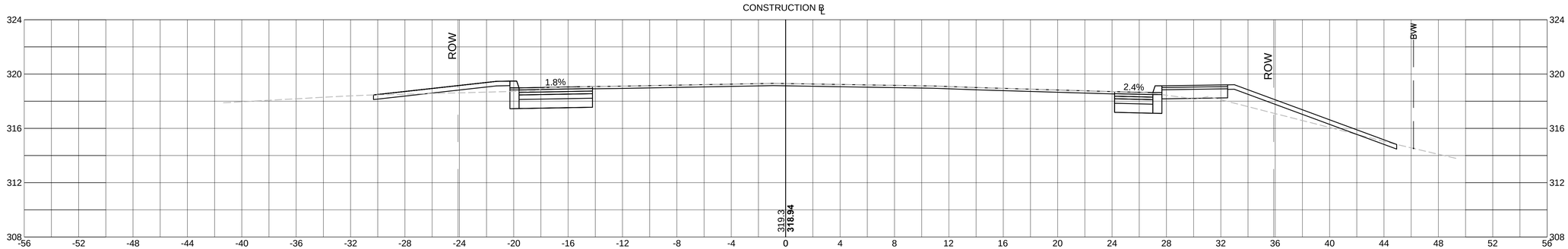


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

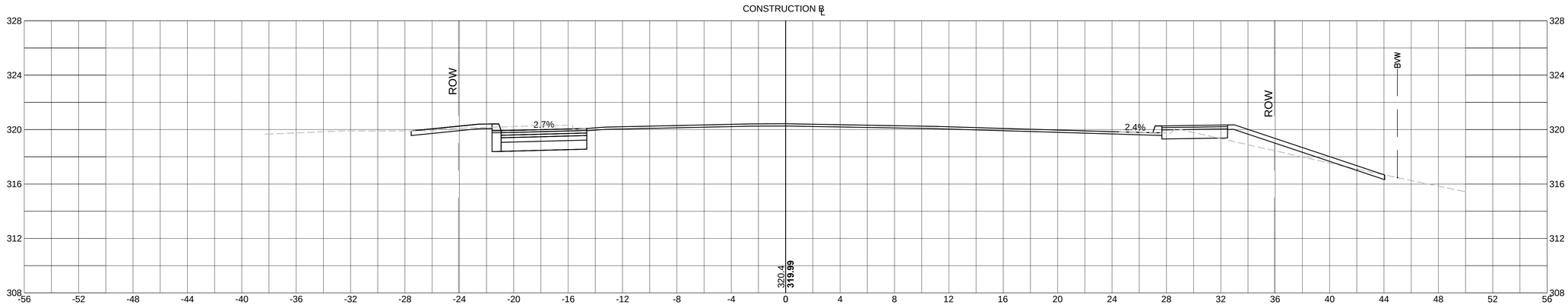
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 135 OF 142

12477 - XSEC.DWG 3-Jun-2014

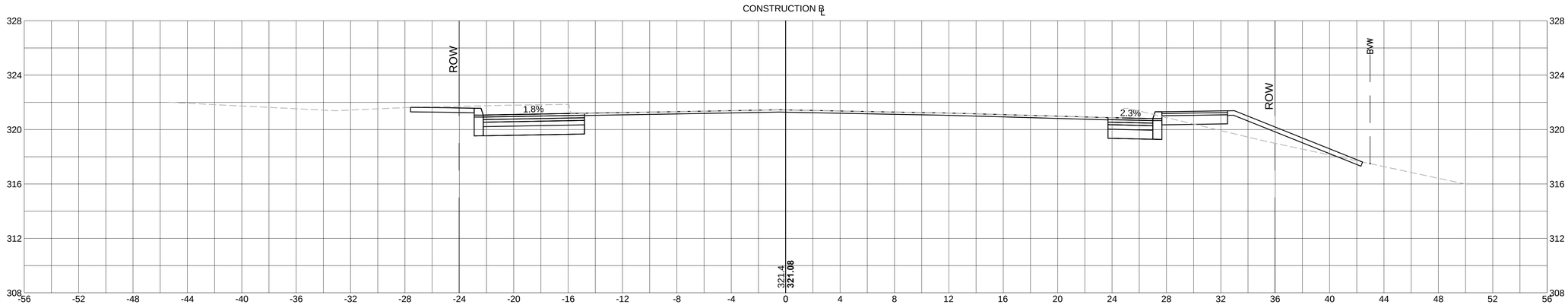
68+00



67+50



67+00

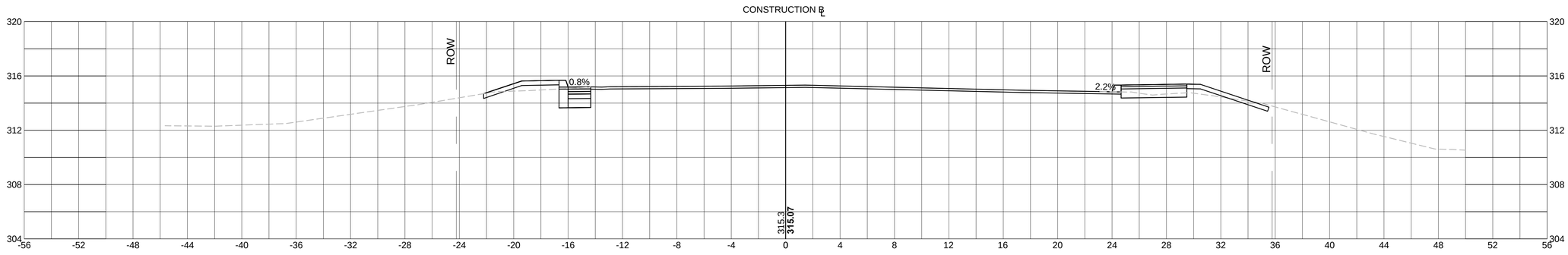


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

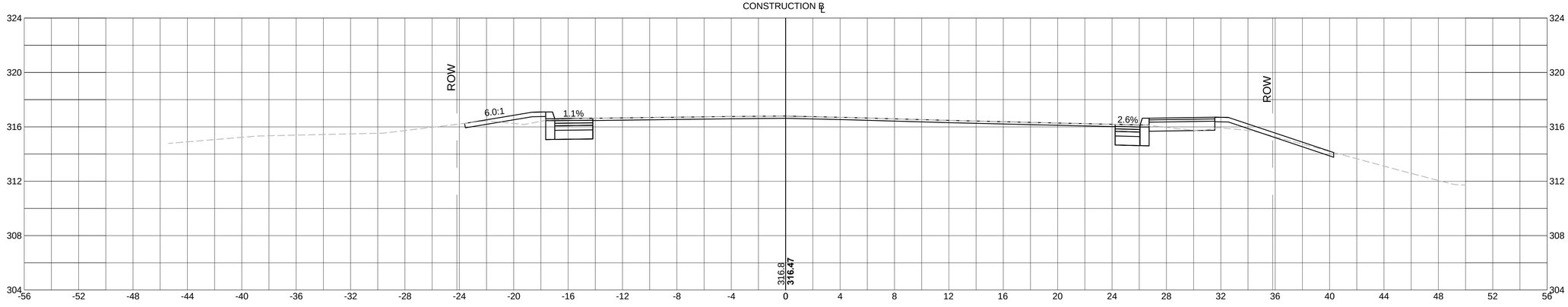
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 136 OF 142

12477 - XSEC.DWG 3-Jun-2014

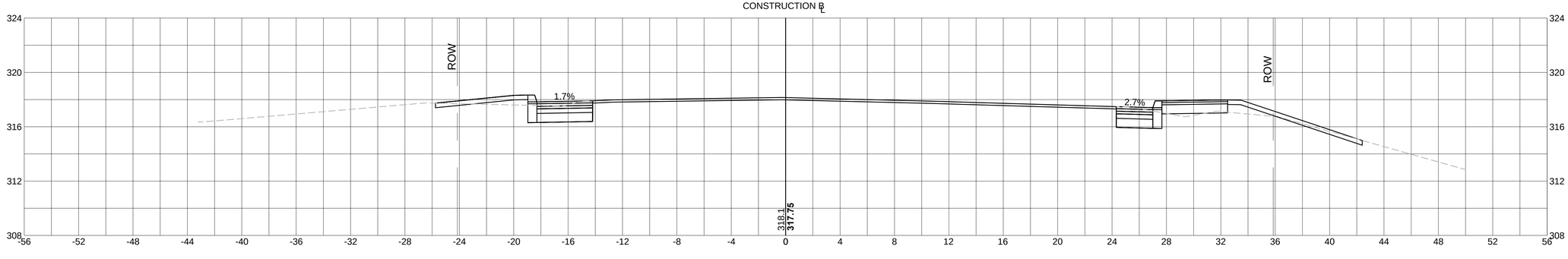
69+50



69+00



68+50

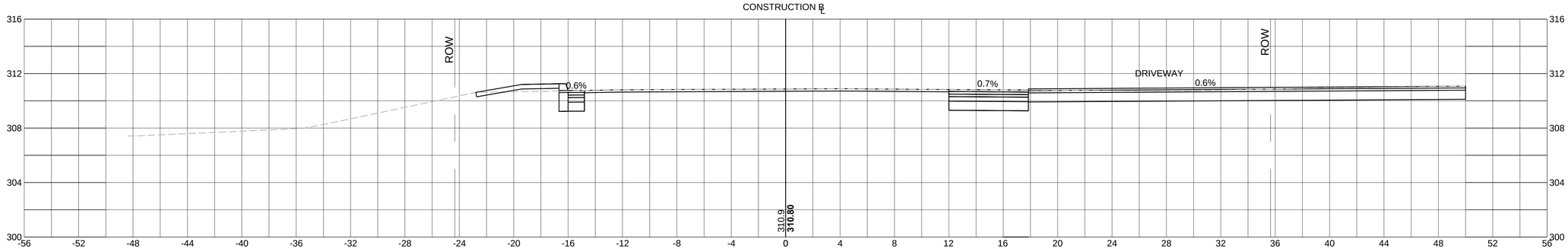


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

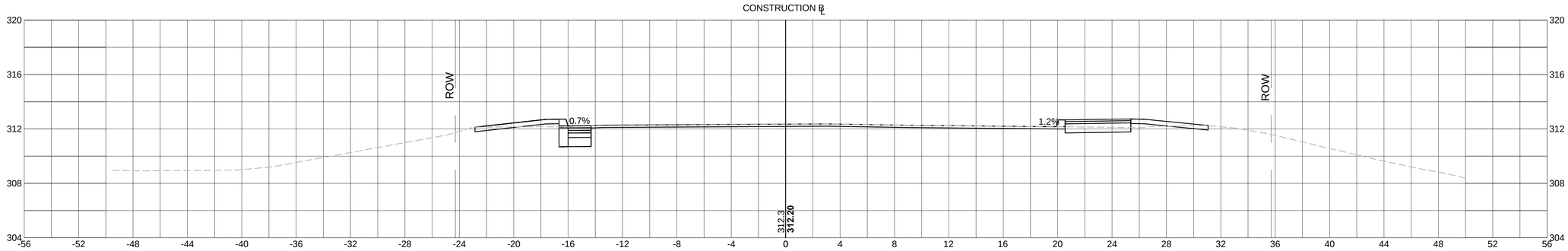
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 137 OF 142

12477 - XSEC.DWG 3-Jun-2014

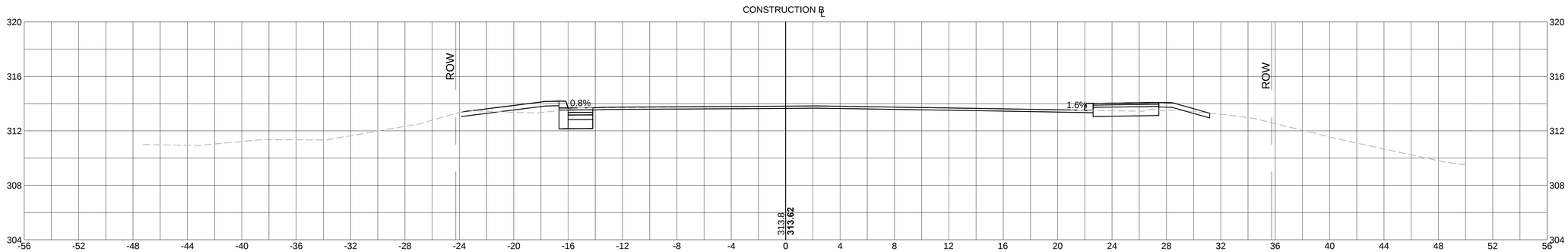
71+00



70+50



70+00

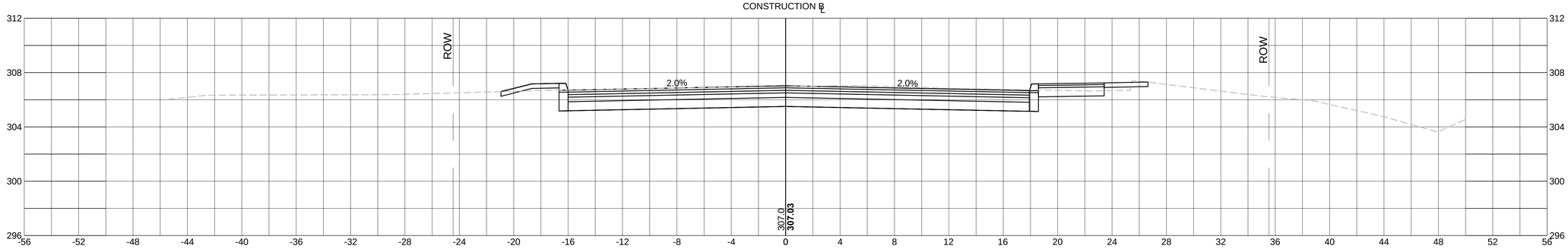


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

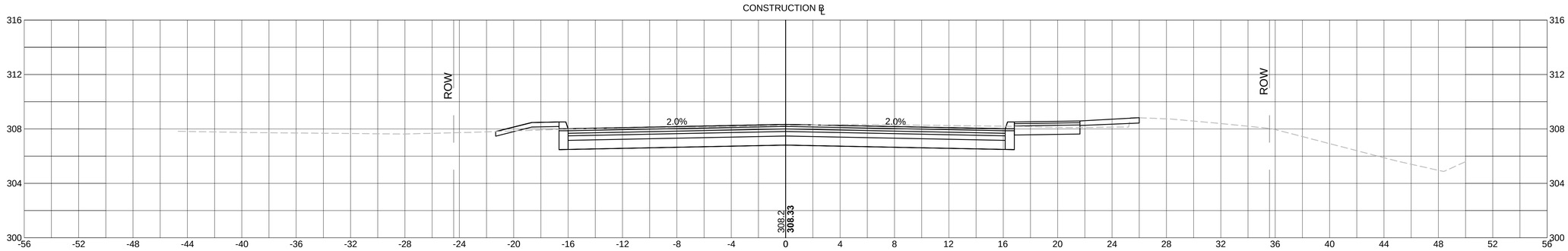
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 138 OF 142

12477 - XSEC.DWG 3-Jun-2014

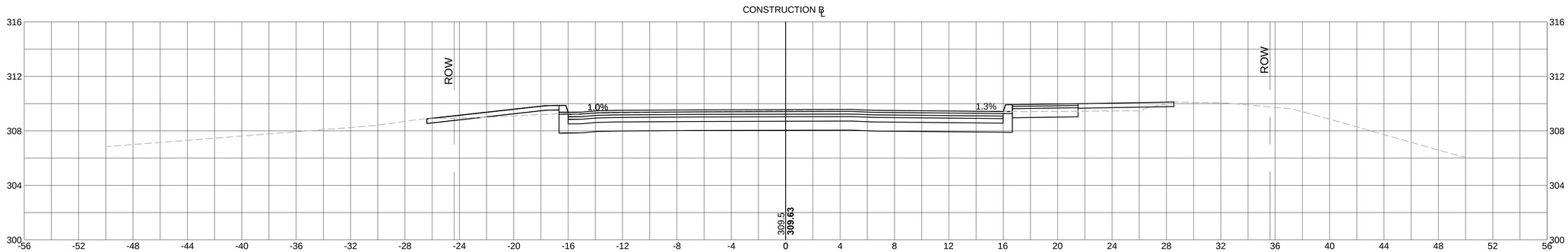
72+50



72+00



71+50

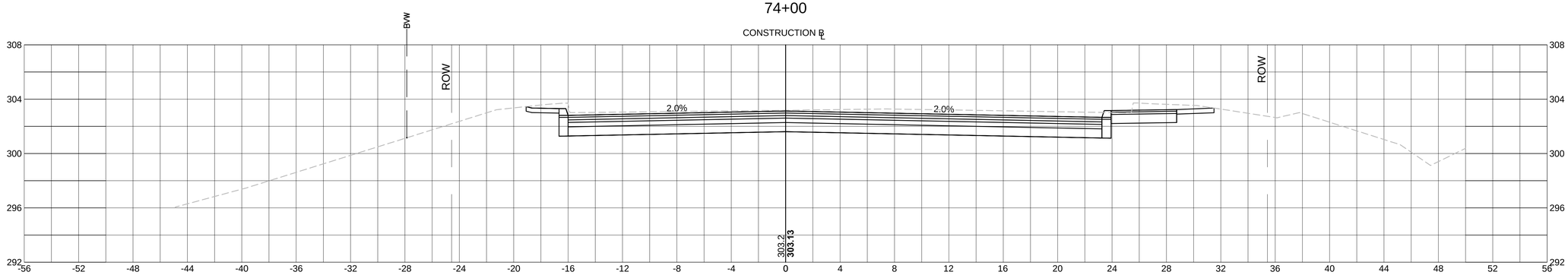


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

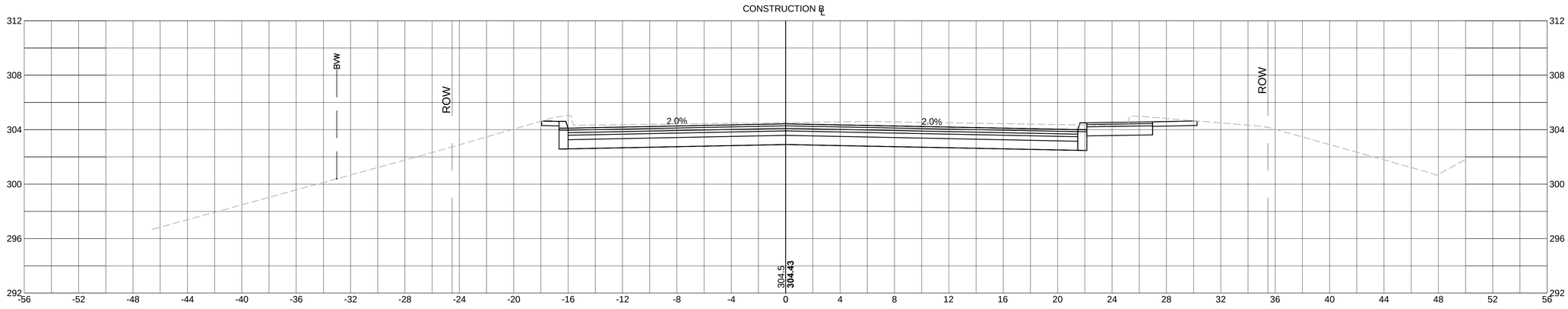
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 139 OF 142

12477 - XSEC.DWG 3-Jun-2014

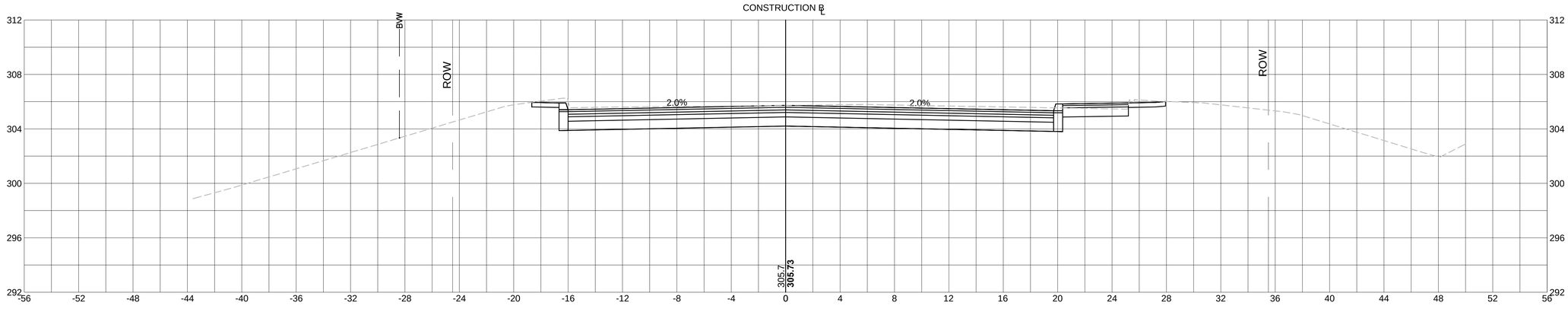
74+00



73+50



73+00

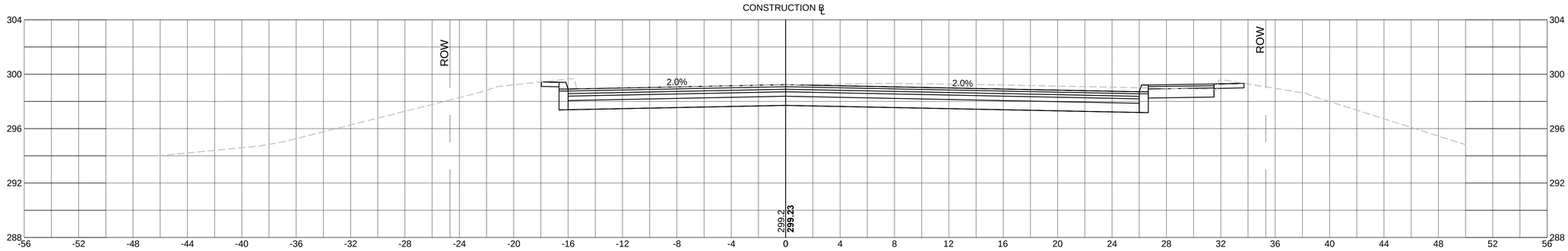


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

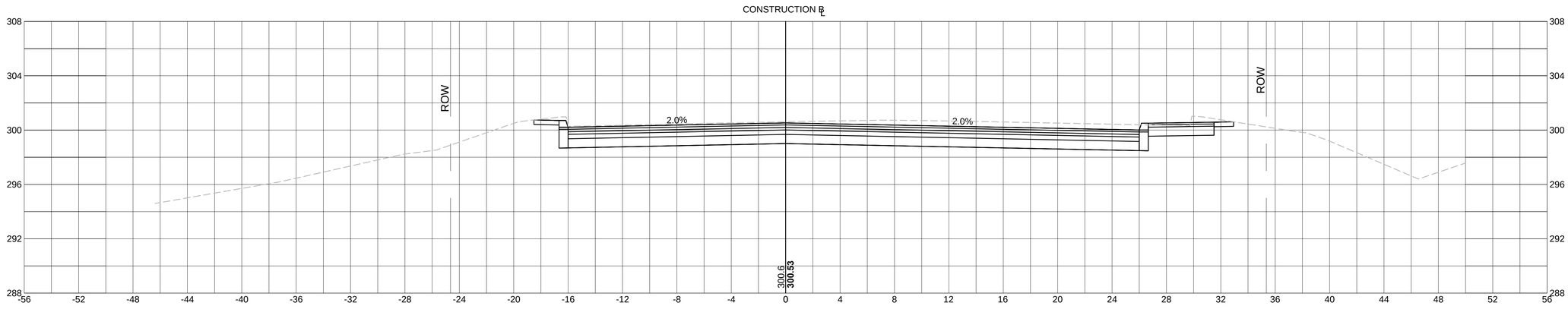
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 140 OF 142

12477 - XSEC.DWG 3-Jun-2014

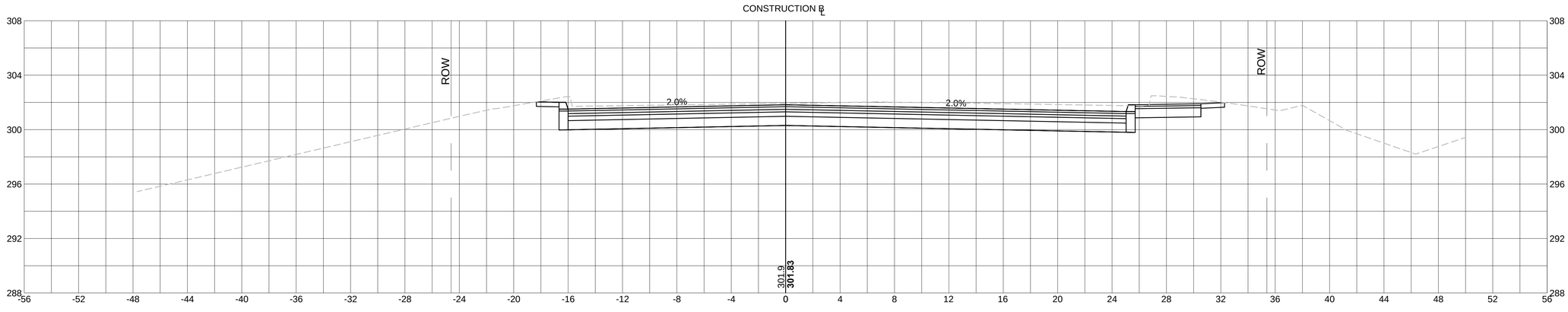
75+50



75+00



74+50

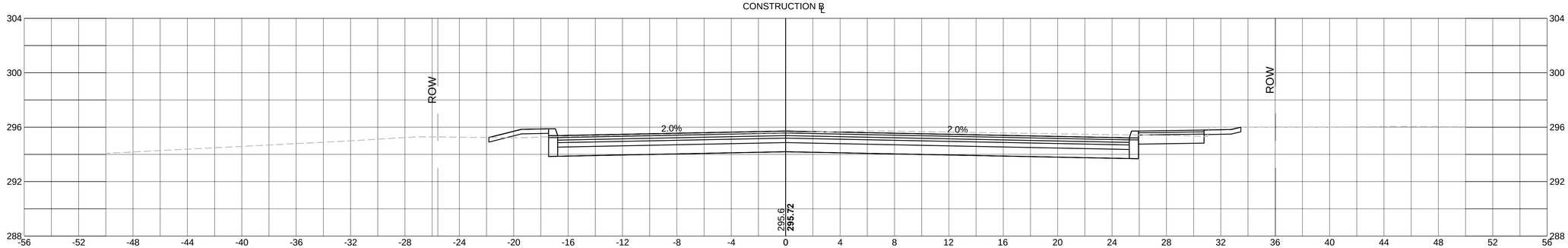


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

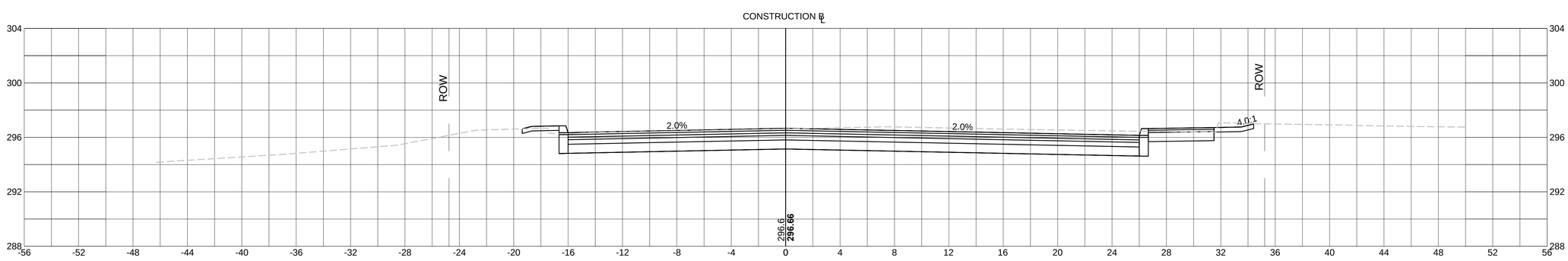
MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 141 OF 142

12477 - XSEC.DWG 3-Jun-2014

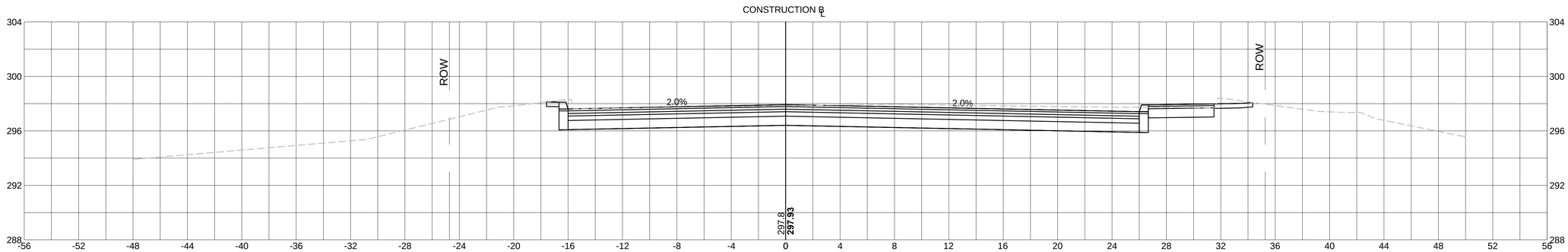
77+00



76+50



76+00

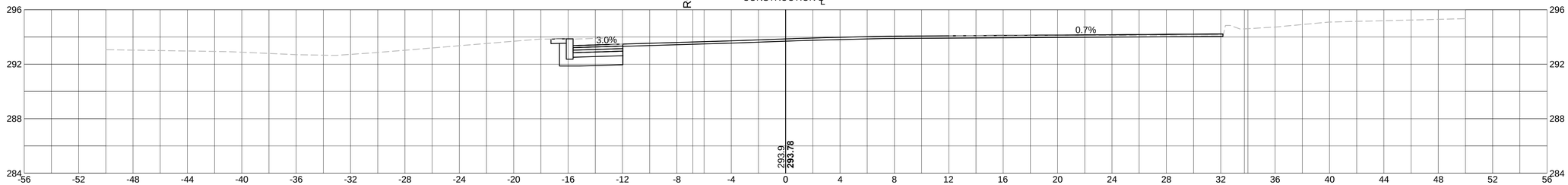


HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

MARLBOROUGH
SIMARANO DRIVE
CROSS SECTIONS
SHEET 142 OF 142

12477 - XSEC.DWG 4-Jun-2014

78+50



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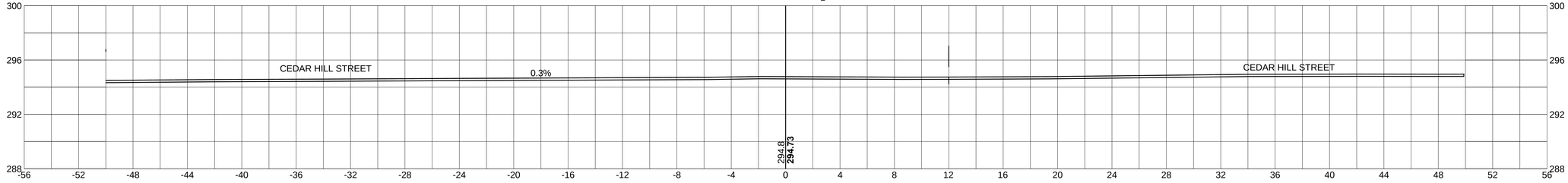
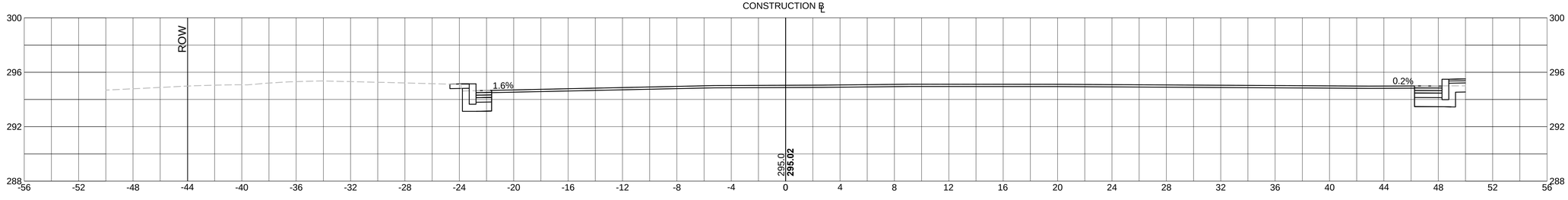


77+50



HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET