

# TRANSPORTATION AND WATER DISTRIBUTION IMPROVEMENT PROJECT

WESTFORD  
MAIN STREET  
TITLE SHEET & INDEX  
SHEET 1 OF 63

PLAN AND PROFILE OF  
MAIN STREET

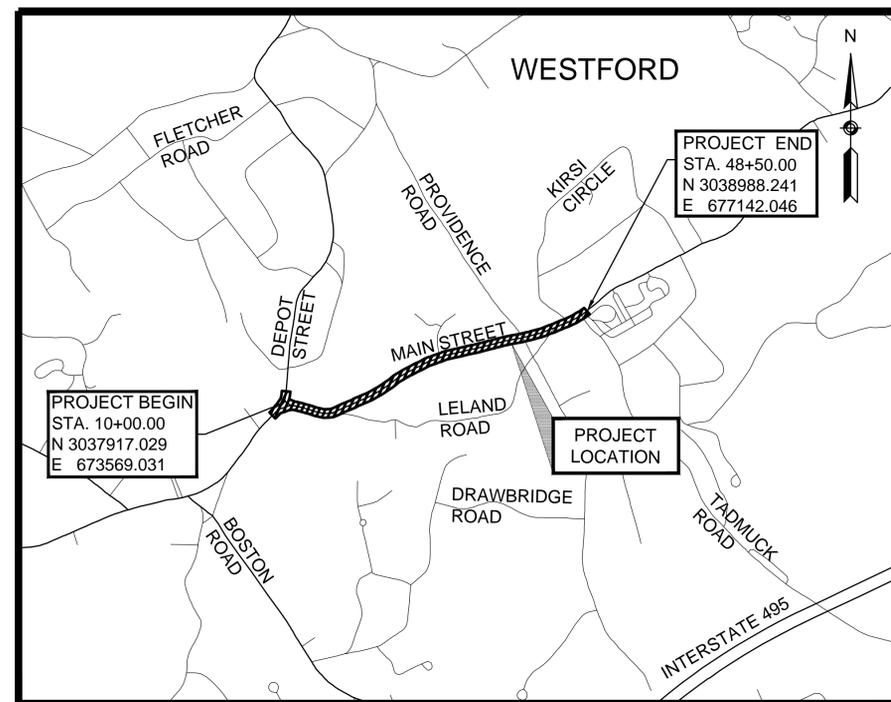
IN THE TOWN OF  
WESTFORD  
MIDDLESEX COUNTY

THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES DATED 1988, AS AMENDED, THE SUPPLEMENTAL SPECIFICATIONS DATED JULY 1, 2015, THE 2014 CONSTRUCTION STANDARD DETAILS, THE 1996 CONSTRUCTION AND TRAFFIC STANDARD DETAILS, (AS RELATES TO THE PAVEMENT MARKINGS DETAILS ONLY), THE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS WITH MASSACHUSETTS AMENDMENTS AND THE STANDARD MUNICIPAL TRAFFIC CODE, THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING, AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, WILL GOVERN.

## INDEX

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## PS&E SUBMISSION



DESIGN DESIGNATION (MAIN STREET)	
DESIGN SPEED	30 MPH
ADT (2015)	4,000 VPD
ADT (2025)	4,420 VPD
K	9.7%
D	51.0%
T (PEAK HOUR)	3.1%
T (AVERAGE DAY)	1.7%
DHV	430 VPH
DDHV	219 VPH
FUNCTIONAL CLASSIFICATION	URBAN MINOR ARTERIAL

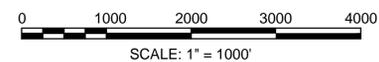
**TOWN MANAGER**  
JODI ROSS

**TOWN ENGINEER**  
PAUL STARRATT, P.E.

**HIGHWAY SUPERINTENDENT**  
RICHARD "CHIP" BARRETT

**WATER SUPERINTENDENT**  
STEPHEN CRONIN

**WATER COMMISSIONERS**  
ELIZABETH A. DENLY, CHAIR  
HUGH C. MAGUIRE, VICE CHAIR  
TITUS PALMER, SECRETARY  
CHAUNCEY CHU, ALTERNATE



LENGTH OF PROJECT = 3,850 FEET = 0.729 MILES

DATE	DESCRIPTION	REV #
3/30/2016	FINAL PS&E SUBMISSION	1
12/18/2015	75% SUBMISSION	-



TEC, Inc.  
65 Glenn Street | 169 Ocean Blvd  
Lawrence, MA 01843 | Hampton, NH 03842

DESIGNED BY	CHECKED BY	DATE
SJM	SJM	12/18/2015
DRAWN BY	APPROVED BY	PROJECT NO.
PFE	MCM	T0577

RECEIVED MARCH 31, 2016

GENERAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		JERSEY BARRIER
		CATCH BASIN
		CATCH BASIN CURB INLET
		FLAG POLE
		GAS PUMP
		MAIL BOX
		POST SQUARE
		POST CIRCULAR
		WELL
		ELECTRIC HANDHOLE
		FENCE GATE POST
		GAS GATE
		BORING HOLE
		MONITORING WELL
		TEST PIT
		HYDRANT
		LIGHT POLE
		COUNTY BOUND
		GPS POINT
		CABLE MANHOLE (CMH)
		DRAINAGE MANHOLE (DMH)
		ELECTRIC MANHOLE (EMH)
		GAS MANHOLE (GMH)
		MISC MANHOLE
		SEWER MANHOLE (SMH)
		TELEPHONE MANHOLE (TMH)
		WATER MANHOLE (WMH)
		MASSACHUSETTS HIGHWAY BOUND
		MONUMENT
		STONE BOUND
		TOWN OR CITY BOUND
		TRAVERSE OR TRIANGULATION STATION
		TROLLEY POLE OR GUY POLE
		TRANSMISSION POLE
		UTILITY POLE W/ FIREBOX
		UTILITY POLE WITH DOUBLE LIGHT
		UTILITY POLE W / 1 LIGHT
		UTILITY POLE
		BUSH
		TREE
		STUMP
		SWAMP / MARSH
		WATER GATE
		PARKING METER
		OVERHEAD CABLE/WIRE
		CURBING
		CONTOURS (ON-THE-GROUND SURVEY DATA)
		CONTOURS (PHOTOGRAMMETRIC DATA)
		UNDERGROUND DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND ELECTRIC DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND GAS MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND SEWER MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND TELEPHONE DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND WATER MAIN (DOUBLE LINE 24 INCH AND OVER)
		BALANCED STONE WALL
		GUARD RAIL - STEEL POSTS
		GUARD RAIL - WOOD POSTS
		CHAIN LINK OR METAL FENCE
		WOOD FENCE
		COMPOST FILTER TUBE
		TREE LINE
		SAWCUT LINE
		TOP OR BOTTOM OF SLOPE
		LIMIT OF EDGE OF PAVEMENT OR COLD PLANE AND OVERLAY
		BANK OF RIVER OR STREAM
		BORDER OF WETLAND
		100 FT WETLAND BUFFER
		200 FT RIVERFRONT BUFFER
		STATE HIGHWAY LAYOUT
		TOWN OR CITY LAYOUT
		COUNTY LAYOUT
		RAILROAD SIDELINE
		TOWN OR CITY BOUNDARY LINE
		PROPERTY LINE OR APPROXIMATE PROPERTY LINE
		EASEMENT

PAVEMENT MARKINGS SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		PAVEMENT ARROW - WHITE
		LEGEND "ONLY" - WHITE
		STOP LINE
		CROSSWALK
		SOLID WHITE LINE
		SOLID YELLOW LINE
		BROKEN WHITE LINE
		BROKEN YELLOW LINE
		DOTTED WHITE LINE
		DOTTED YELLOW LINE
		DOTTED WHITE LINE EXTENSION
		DOTTED YELLOW LINE EXTENSION
		DOUBLE WHITE LINE
		DOUBLE YELLOW LINE

ABBREVIATIONS

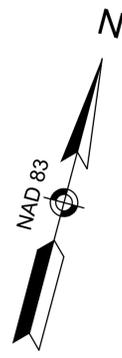
GENERAL	DESCRIPTION
AADT	ANNUAL AVERAGE DAILY TRAFFIC
ABAN	ABANDON
ADJ	ADJUST
APPROX.	APPROXIMATE
A.C.	ASPHALT CONCRETE
ACCM PIPE	ASPHALT COATED CORRUGATED METAL PIPE
BIT.	BITUMINOUS
BC	BOTTOM OF CURB
BD.	BOUND
BL	BASELINE
BLDG	BUILDING
BM	BENCHMARK
BO	BY OTHERS
BOS	BOTTOM OF SLOPE
BR.	BRIDGE
CB	CATCH BASIN
CBCI	CATCH BASIN WITH CURB INLET
CC	CEMENT CONCRETE
CCM	CEMENT CONCRETE MASONRY
CEM	CEMENT
CGMA	COLUMBIA GAS OF MASSACHUSETTS
CI	CURB INLET
CIP	CAST IRON PIPE
CIT	CHANGE IN TYPE
CLF	CHAIN LINK FENCE
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CSP	CORRUGATED STEEL PIPE
CO.	COUNTY
CONC	CONCRETE
CONT	CONTINUOUS
CONST	CONSTRUCTION
CR GR	CROWN GRADE
DHV	DESIGN HOURLY VOLUME
DI	DROP INLET
DI	DUCTILE IRON
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DW	STEADY DON'T WALK - PORTLAND ORANGE
DWY	DRIVEWAY
ELEV (or EL.)	ELEVATION
EMB	EMBANKMENT
EOP	EDGE OF PAVEMENT
EXIST (or EX)	EXISTING
EXC	EXCAVATION
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
FDN.	FOUNDATION
FLDSTN	FIELDSTONE
GAR	GARAGE
GD	GROUND
GG	GAS GATE
GI	GUTTER INLET
GIP	GALVANIZED IRON PIPE
GRAN	GRANITE
GRAV	GRAVEL
GRD	GUARD
HDW	HEADWALL
HMA	HOT MIX ASPHALT
HOR	HORIZONTAL
HYD	HYDRANT
INV	INVERT
JCT	JUNCTION
L	LENGTH OF CURVE
LB	LEACH BASIN
LP	LIGHT POLE
LT	LEFT
LSA	LANDSCAPED AREA
MAX	MAXIMUM
MB	MAILBOX
MH	MANHOLE
MHB	MASSACHUSETTS HIGHWAY BOUND
MIN	MINIMUM
NGRID	NATIONAL GRID
NIC	NOT IN CONTRACT
NO.	NUMBER
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PGL	PROFILE GRADE LINE
PI	POINT OF INTERSECTION
POC	POINT ON CURVE
POT	POINT ON TANGENT
PRC	POINT OF REVERSE CURVATURE
PROJ	PROJECT
PROP	PROPOSED
PSB	PLANTABLE SOIL BORROW

ABBREVIATIONS (cont.)

GENERAL	DESCRIPTION
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENCY
PVMT	PAVEMENT
PWW	PAVED WATER WAY
R	RADIUS OF CURVATURE
R&D	REMOVE AND DISPOSE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDWY	ROADWAY
REM	REMOVE
REMOD	REMODEL
RET	RETAIN
RET WALL	RETAINING WALL
ROW	RIGHT OF WAY
RR	RAILROAD
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
RT	RIGHT
SB	STONE BOUND
SHLD	SHOULDER
SMH	SEWER MANHOLE
ST	STREET
STA	STATION
SSD	STOPPING SIGHT DISTANCE
SHLO	STATE HIGHWAY LAYOUT LINE
SW	SIDEWALK
T	TANGENT DISTANCE OF CURVE/TRUCK %
TAN	TANGENT
TEMP	TEMPORARY
TC	TOP OF CURB
TOS	TOP OF SLOPE
TYP	TYPICAL
UP	UTILITY POLE
VAR	VARIES
VERT	VERTICAL
VC	VERTICAL CURVE
WCR	WHEEL CHAIR RAMP
WG	WATER GATE
WIP	WROUGHT IRON PIPE
WM	WATER METER/WATER MAIN
WSO	WATER SHUTOFF
X-SECT	CROSS SECTION

WESTFORD  
MAIN STREET  
LEGEND & ABBREVIATIONS  
SHEET 2 OF 63





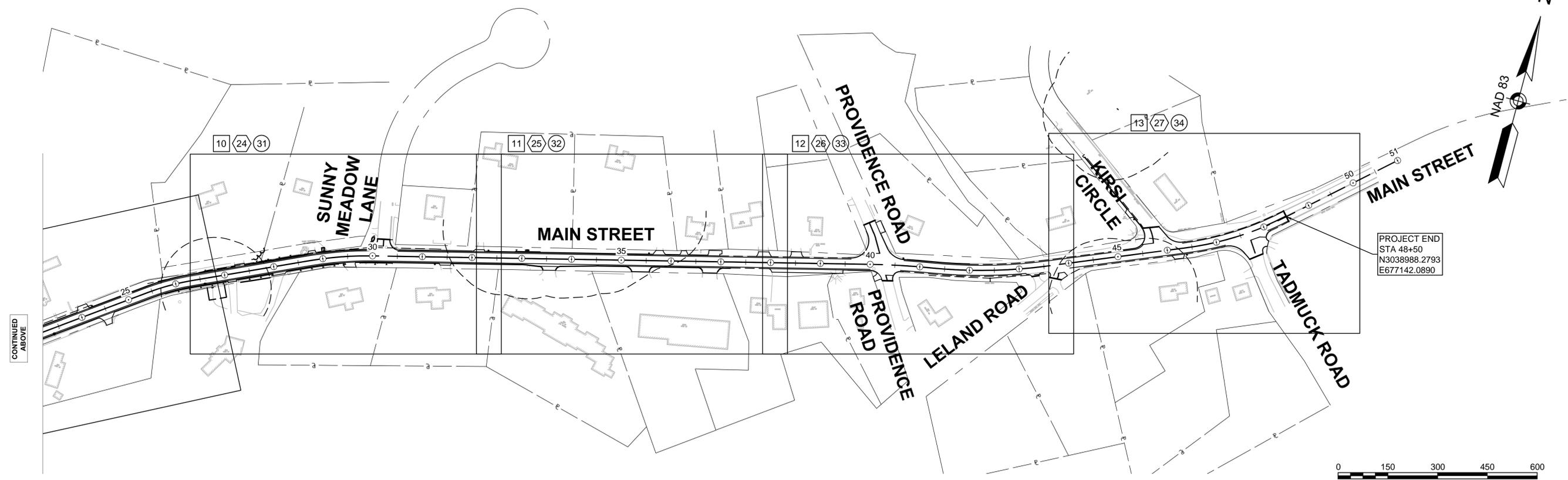
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 STA 10+00  
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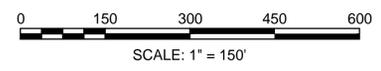
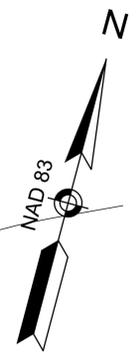
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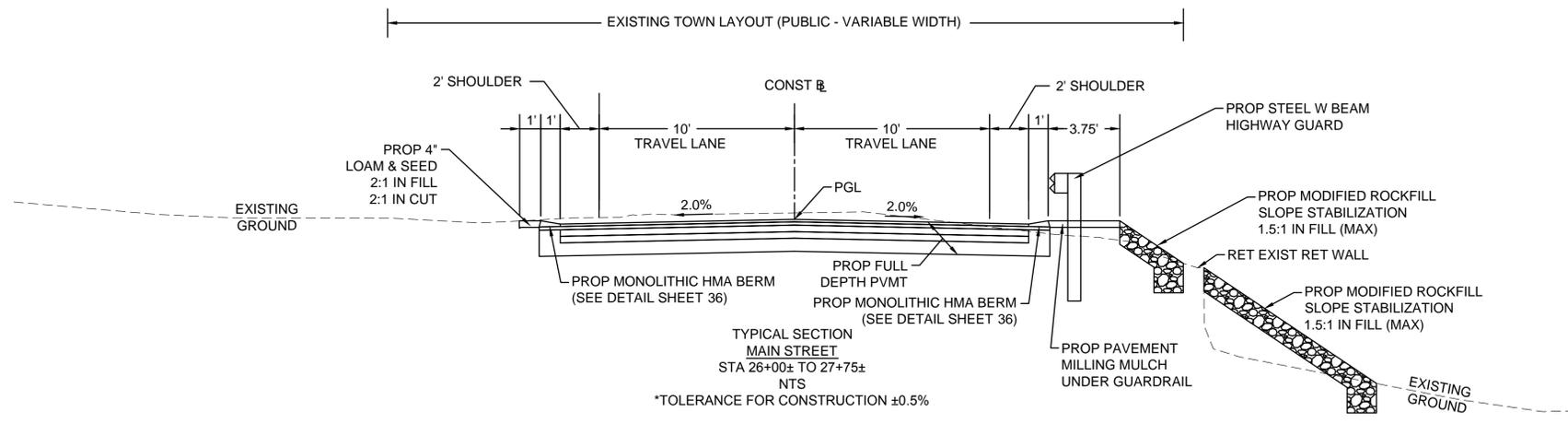
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- X DRAINAGE & UTILITY PLANS
- X TRAFFIC SIGN & PAVEMENT MARKING PLANS



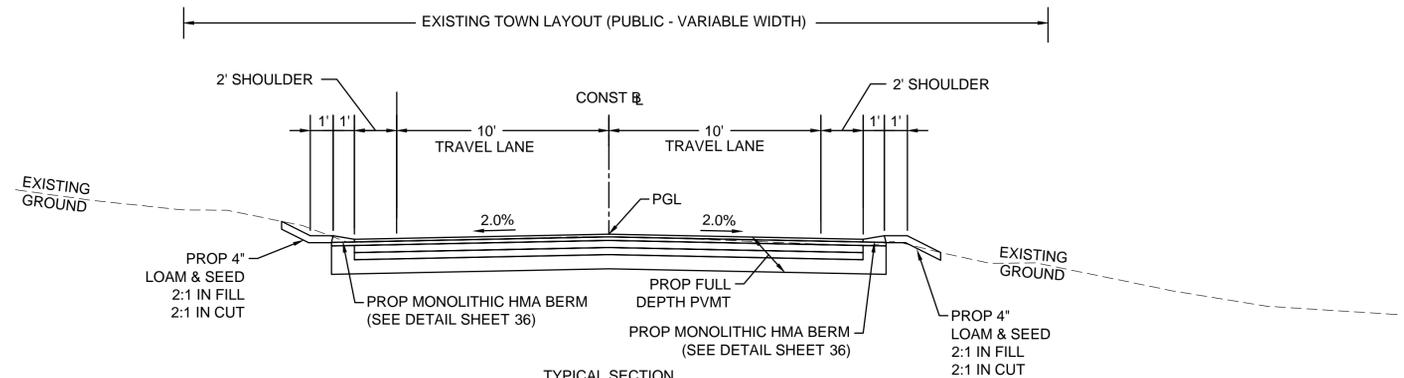
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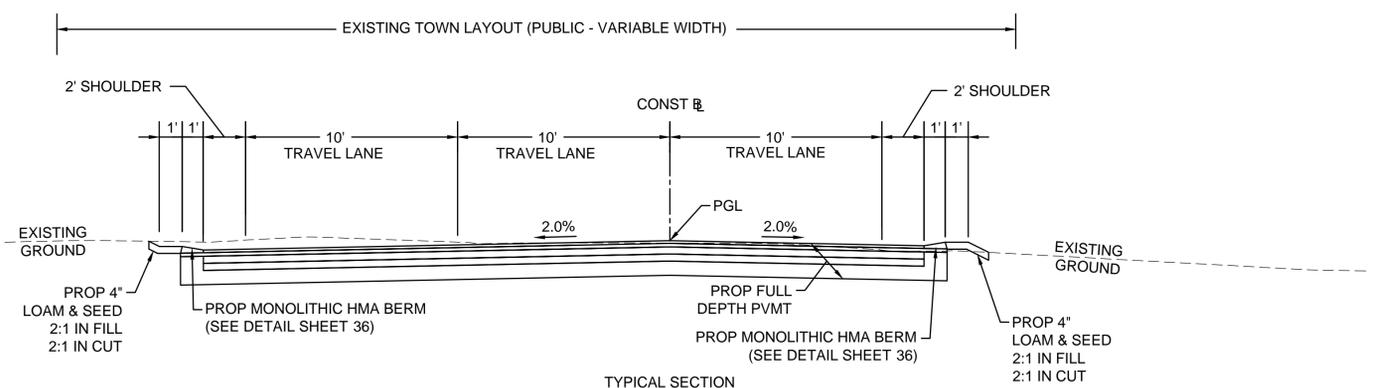




TYPICAL SECTION  
MAIN STREET  
STA 26+00± TO 27+75±  
NTS  
\*TOLERANCE FOR CONSTRUCTION ±0.5%



TYPICAL SECTION  
MAIN STREET  
STA 14+50± TO 26+00±  
STA 30+00± TO 37+00±  
NTS  
\*TOLERANCE FOR CONSTRUCTION ±0.5%



TYPICAL SECTION  
MAIN STREET  
STA 11+00± TO 14+50±  
NTS  
\*TOLERANCE FOR CONSTRUCTION ±0.5%

**PAVEMENT NOTES**

**PROPOSED FULL DEPTH PAVEMENT**

SURFACE: 1½" HMA SURFACE COURSE OVER  
1¾" HMA INTERMEDIATE COURSE OVER  
BASE: 3½" HMA BASE COURSE OVER  
SUBBASE: 4" DENSE GRADED CRUSHED STONE OVER  
8" GRAVEL BORROW, TYPE b (COMPACTED) (SEE PAVEMENT NOTE 2 BELOW)

**PROPOSED FULL DEPTH PAVEMENT LESS THAN 4 FEET WIDE**

SURFACE: 1½" HMA SURFACE COURSE OVER  
1¾" HMA INTERMEDIATE COURSE OVER  
BASE: 6" HIGH EARLY STRENGTH CEMENT CONCRETE BASE COURSE OVER  
SUBBASE: 12" GRAVEL BORROW, TYPE b (COMPACTED) (SEE PAVEMENT NOTE 2 BELOW)

**PROPOSED HMA OVERLAY**

SURFACE: 1½" HMA SURFACE COURSE OVER  
VARIABLE HMA LEVELING COURSE AS REQUIRED TO MAINTAIN 2% MIN CROSS SLOPE

**PROPOSED PERMANENT UTILITY TRENCH PATCH**

SURFACE: HMA OVERLAY OVER  
VARIABLE DEPTH (MATCH EXIST TOP COURSE THICKNESS) HMA INTERMEDIATE  
COURSE OVER  
BASE: VARIABLE DEPTH (MATCH EXIST BINDER / BASE COURSE THICKNESS) HMA BASE  
COURSE OVER  
SUBBASE: 12" GRAVEL BORROW, TYPE b (COMPACTED) (SEE PAVEMENT NOTE 2 BELOW)

**PROPOSED HMA DRIVEWAY (TO MATCH EXISTING)**

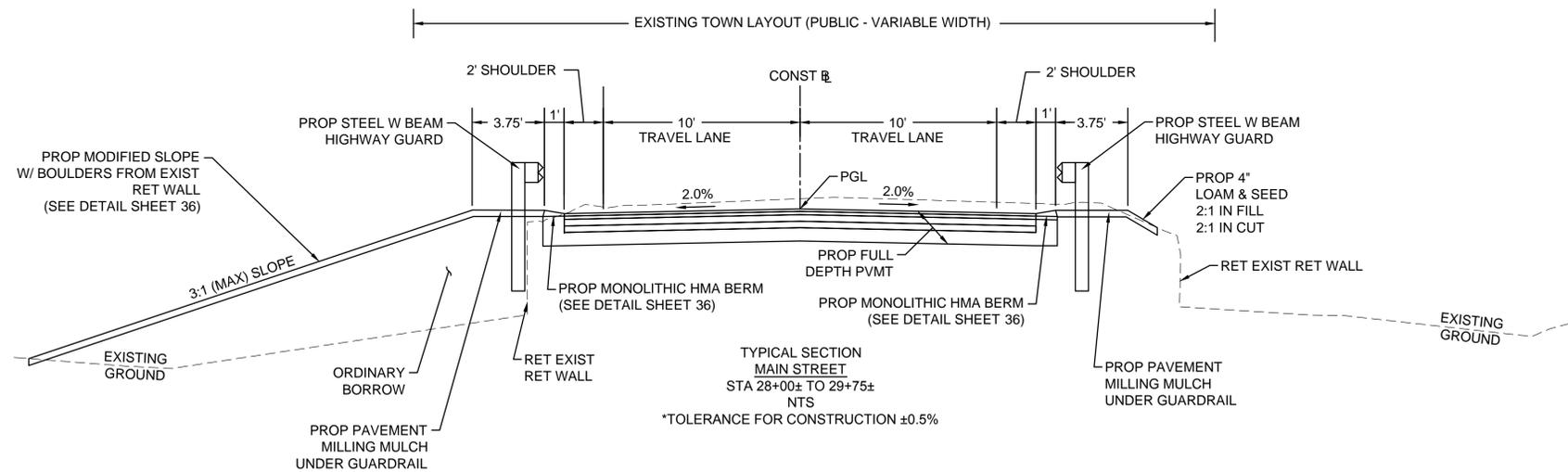
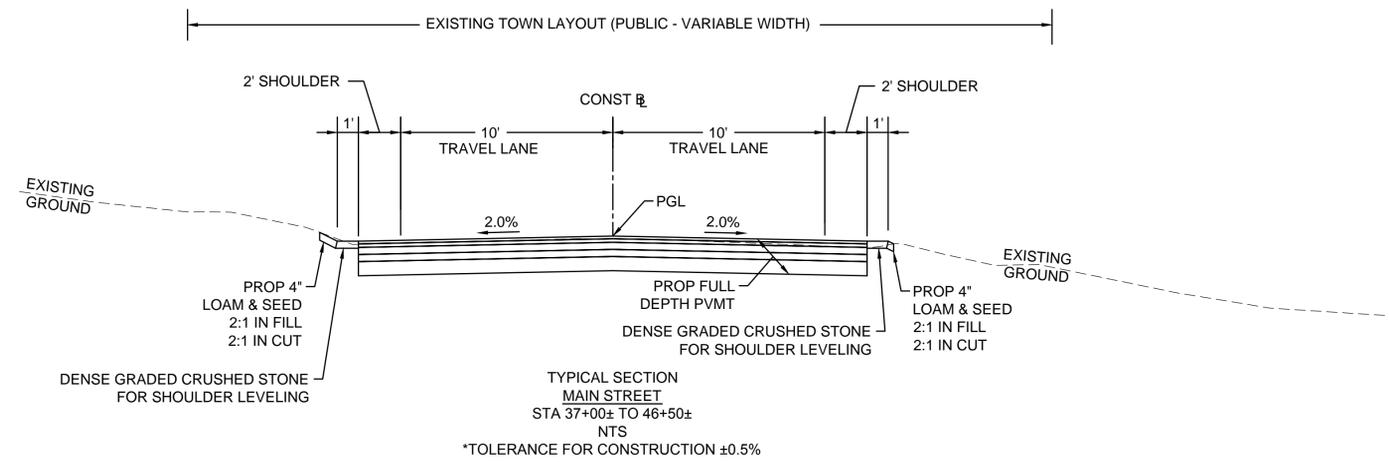
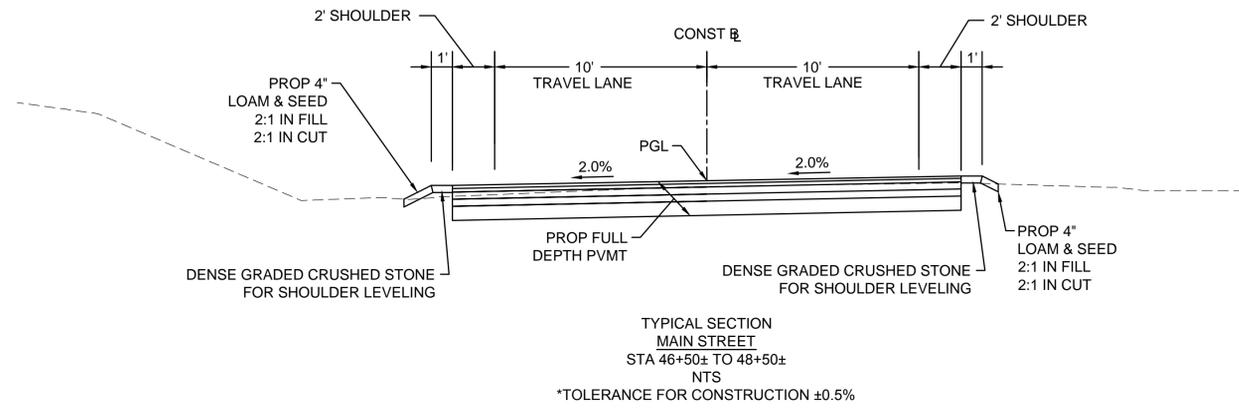
SURFACE: 1½" HMA SURFACE COURSE OVER  
2" HMA INTERMEDIATE COURSE OVER  
BASE: 8" GRAVEL BORROW, TYPE b (COMPACTED) (SEE PAVEMENT NOTE 2 BELOW)

**PROPOSED HMA WALK (TO MATCH EXISTING)**

SURFACE: 1½" HMA SURFACE COURSE OVER  
2" HMA INTERMEDIATE COURSE OVER  
BASE: 8" GRAVEL BORROW, TYPE b (COMPACTED) (SEE PAVEMENT NOTE 2 BELOW)

**GENERAL PAVEMENT NOTES:**

1. ASPHALT EMULSION FOR TACK COAT SHALL BE APPLIED BETWEEN ALL ASPHALT SURFACES AND SAWCUT JOINTS BEFORE PAVING. HMA JOINT SEALANT SHALL BE APPLIED TO ALL COLD JOINTS (LONGITUDINAL AND TRANSVERSE) BEFORE PAVING SURFACE COURSE. ASPHALT EMULSION FOR TACK COAT SHALL BE APPLIED AT A RATE OF 0.05 GAL/SY, EXCEPT OVER MILLED AND CEMENT CONCRETE SURFACES, WHERE THE APPLICATION RATE SHALL BE 0.07 GAL/SY. ALL SURFACES SHALL BE CLEAN OF ALL ORGANICS, DEBRIS, AND SAND PRIOR TO PAVING.
2. ALL GRAVEL BORROW MEETING SPECIFICATION SHALL BE RETAINED IN PLACE, COMPACTED, AND LEVELED WITH DENSE GRADED CRUSHED STONE AS REQUIRED. CONTRACTOR SHALL PROVIDE TEST RESULT SUBMITTALS TO THE ENGINEER FOR APPROVAL.



HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

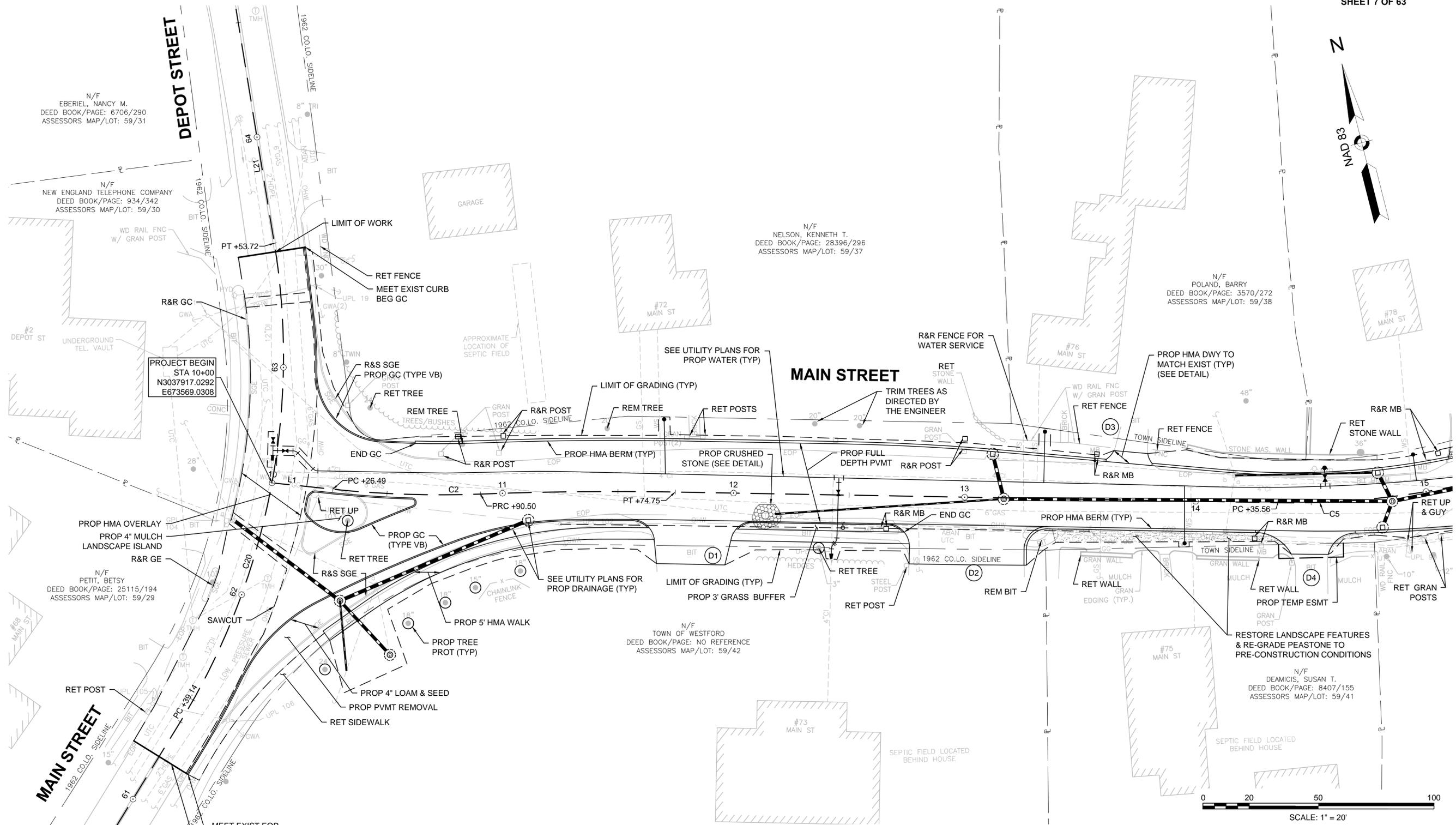
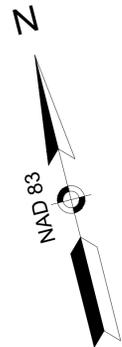
WATER SUPPLY ALTERATIONS

SEE UTILITY PLANS

DRAINAGE DETAILS

SEE UTILITY PLANS

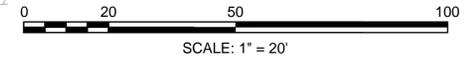
WESTFORD  
MAIN STREET  
CONSTRUCTION PLANS - 1  
SHEET 7 OF 63



MAIN STREET CONSTRUCTION BASELINE DATA							
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING EASTING
L1	10+00.00	3037917.029	673569.031		S89°52'33"E 26.49'	10+26.49	3037907.914 673593.907
C2	10+26.49	3037907.914	673593.907	R = 450.00 Δ = 8°08'59" L = 64.01' T = 32.06'		10+90.50	3037890.233 673655.368
C5	14+35.56	3037802.101	673988.942	R = 350.00 Δ = 36°23'49" L = 222.34' T = 115.06'		16+57.89	3037813.566 674207.259
C6	16+57.89	3037813.566	674207.259	R = 2250.00 Δ = 7°32'48" L = 296.36' T = 148.39'		19+54.25	3037938.616 674475.702

DEPOT STREET CONSTRUCTION BASELINE DATA							
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING EASTING
L19	60+00.00	3037730.040	673405.635		N45°49'33"E 139.14'	61+39.14	3037826.996 673505.427
C20	61+39.14	3037826.996	673505.427	R = 300.00 Δ = 40°58'54" L = 214.58' T = 112.11'		63+53.72	3038016.829 673595.303
L21	63+53.72	3038016.829	673595.303		N4°50'40"E 157.80'	65+11.52	3038174.070 673608.629

CONTINUED ON  
SHEET NO. 8



HIGHWAY GUARD DETAILS

TRAFFIC SIGNAL CONDUIT

WATER SUPPLY ALTERATIONS

DRAINAGE DETAILS

WESTFORD  
MAIN STREET  
CONSTRUCTION PLANS - 2  
SHEET 8 OF 63

NONE

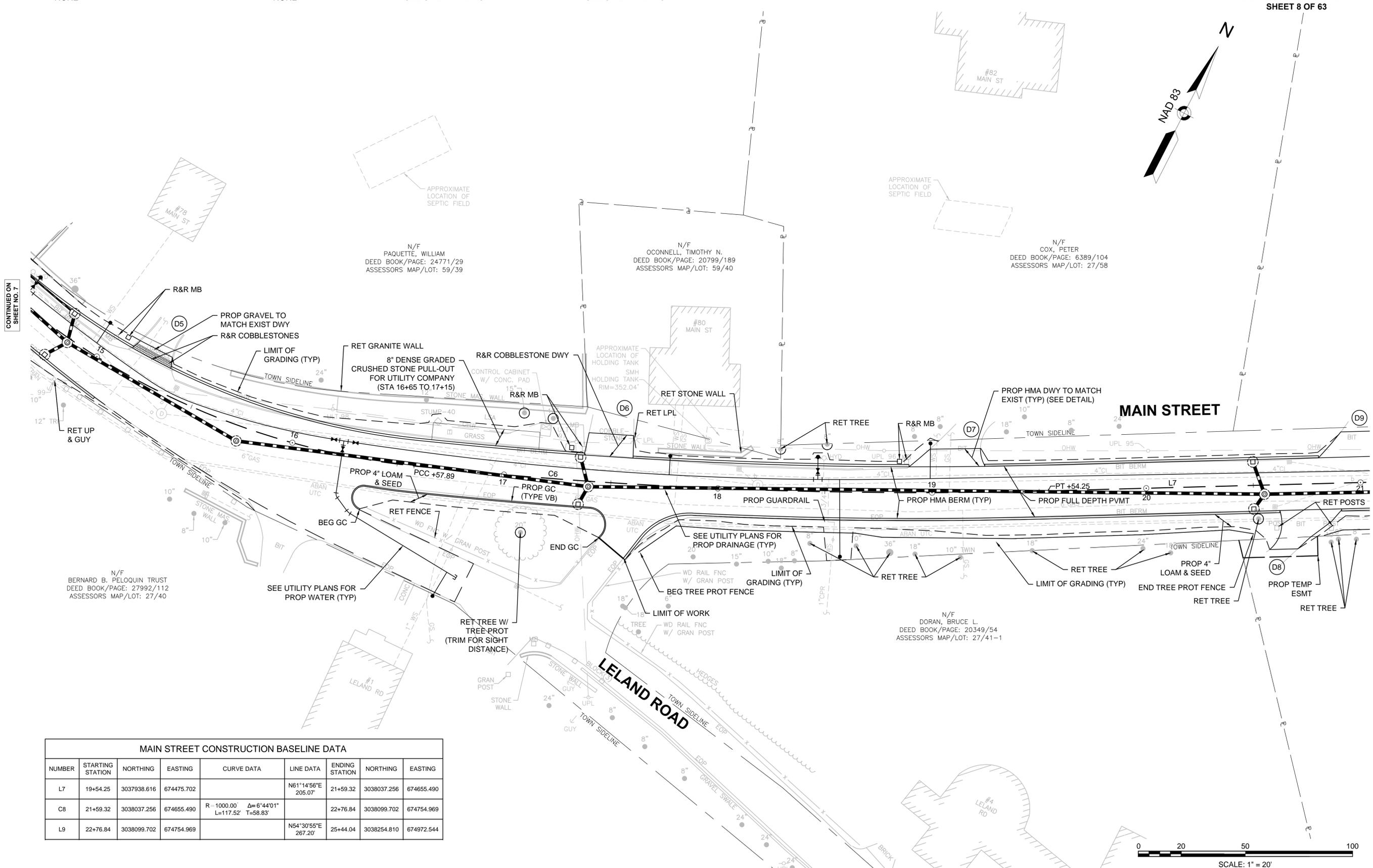
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SEE UTILITY PLANS

SEE UTILITY PLANS

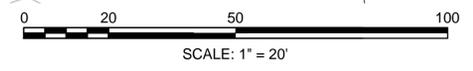
CONTINUED ON  
SHEET NO. 7

CONTINUED ON  
SHEET NO. 9



MAIN STREET CONSTRUCTION BASELINE DATA

NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L7	19+54.25	3037938.616	674475.702		N61°14'56"E 205.07'	21+59.32	3038037.256	674655.490
C8	21+59.32	3038037.256	674655.490	R = 1000.00' Δ = 6°44'01" L = 117.52' T = 58.83'		22+76.84	3038099.702	674754.969
L9	22+76.84	3038099.702	674754.969		N54°30'55"E 267.20'	25+44.04	3038254.810	674972.544



**HIGHWAY GUARD DETAILS**

STA 25+75± RT TANGENT END TREATMENT  
 STA 26+12.5 RT TO STA 27+00 RT STEEL W  
 BEAM HIGHWAY GUARD WEATHERING STEEL  
 WITH ZINC INSERTS  
 STA 27+00± RT TERMINAL END SECTION

**TRAFFIC SIGNAL CONDUIT**

NONE

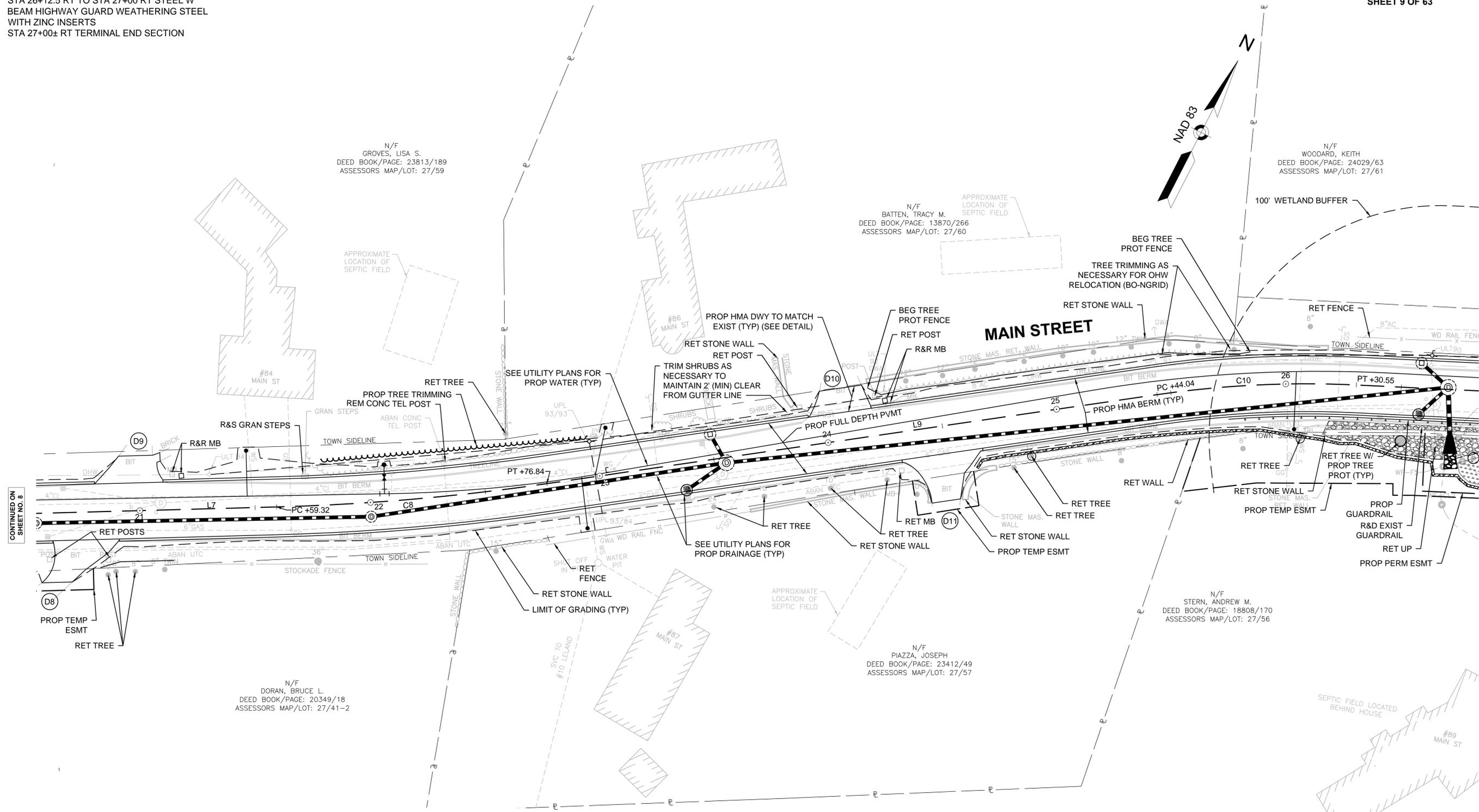
**WATER SUPPLY ALTERATIONS**

SEE UTILITY PLANS

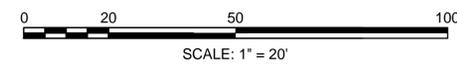
**DRAINAGE DETAILS**

SEE UTILITY PLANS

**WESTFORD  
 MAIN STREET  
 CONSTRUCTION PLANS - 3  
 SHEET 9 OF 63**



MAIN STREET CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L9	22+76.84	3038099.702	674754.969		N54°30'55"E 267.20'	25+44.04	3038254.810	674972.544
C10	25+44.04	3038254.810	674972.544	R = 450.00' Δ = 11°00'53" L = 86.51' T = 43.39'		26+30.55	3038297.969	675047.366
L11	26+30.55	3038297.969	675047.366		N65°31'48"E 241.93'	28+72.48	3038398.180	675267.564
C12	28+72.48	3038398.180	675267.564	R = 700.00' Δ = 10°32'12" L = 128.73' T = 64.55'		30+01.21	3038440.458	675388.960
L13	30+01.21	3038440.458	675388.960		N76°04'00"E 998.74'	39+99.95	3038680.948	676358.310



CONTINUED ON SHEET NO. 8

CONTINUED ON SHEET NO. 10

**HIGHWAY GUARD DETAILS**

STA 25+75± RT TANGENT END TREATMENT  
 STA 26+12.5 RT TO STA 27+00 RT STEEL W BEAM  
 HIGHWAY GUARD WEATHERING STEEL  
 WITH ZINC INSERTS  
 STA 27+00± RT TERMINAL END SECTION

STA 27+25± RT TANGENT END TREATMENT  
 STA 27+62.5 RT TO STA 27+90 RT STEEL W BEAM  
 HIGHWAY GUARD WEATHERING STEEL  
 WITH ZINC INSERTS  
 STA 27+90± RT TERMINAL END SECTION

STA 28+25± RT TANGENT END TREATMENT  
 STA 28+62.5 RT TO STA 29+30 RT STEEL W BEAM  
 HIGHWAY GUARD WEATHERING STEEL  
 WITH ZINC INSERTS  
 STA 29+30± RT TERMINAL END SECTION

STA 29+75± RT TERMINAL END SECTION  
 STA 29+75 RT TO STA 30+40 RT STEEL W BEAM  
 HIGHWAY GUARD WEATHERING STEEL  
 WITH ZINC INSERTS  
 STA 30+40± RT TERMINAL END SECTION

STA 27+60± LT TERMINAL END SECTION  
 STA 27+60 LT TO STA 28+65 LT STEEL W BEAM  
 HIGHWAY GUARD WEATHERING STEEL  
 WITH ZINC INSERTS  
 STA 28+65± LT TERMINAL END SECTION

**TRAFFIC SIGNAL CONDUIT**

NONE

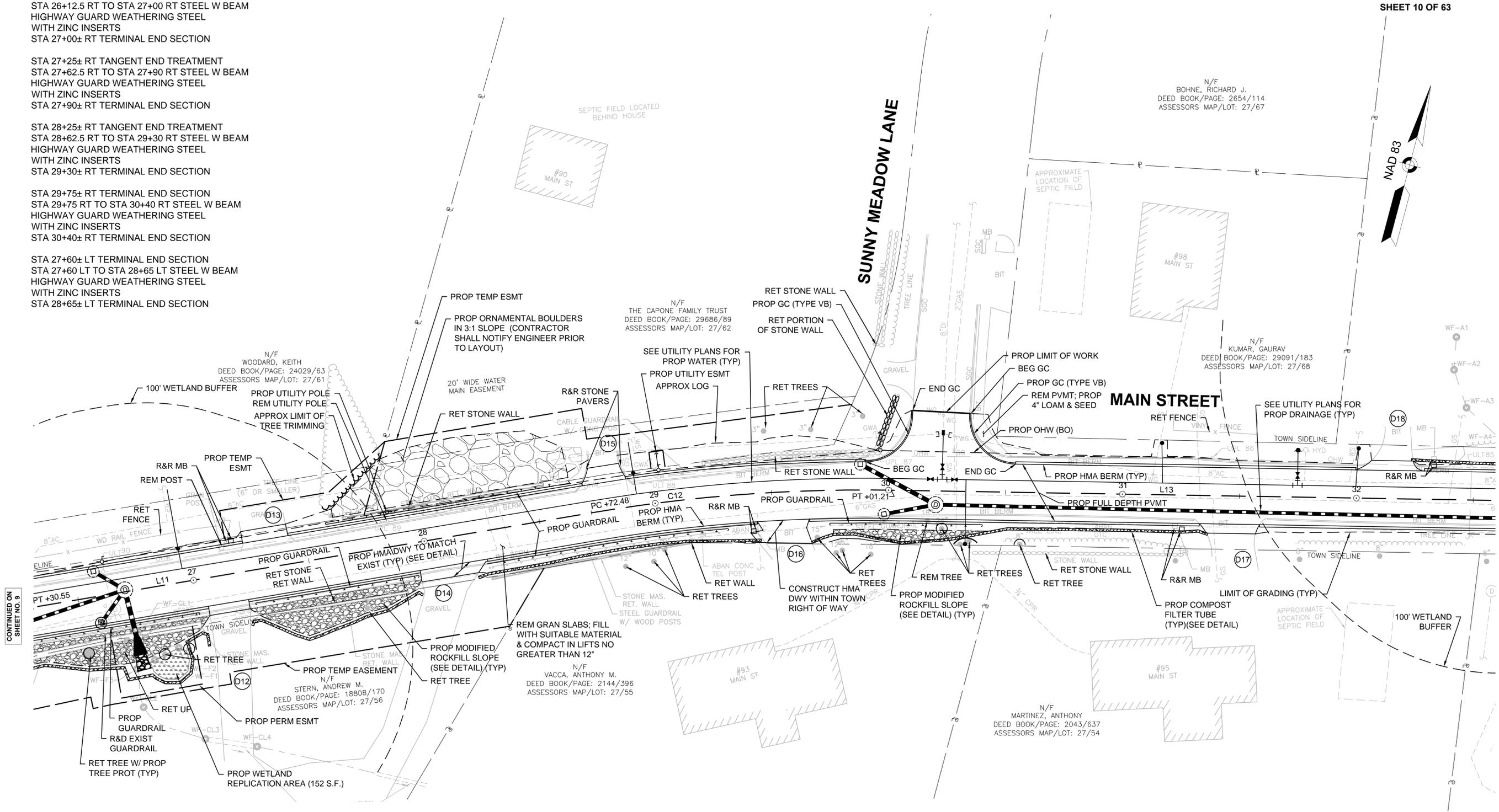
**WATER SUPPLY ALTERATIONS**

SEE UTILITY PLANS

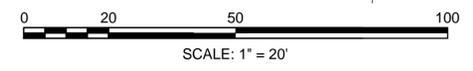
**DRAINAGE DETAILS**

SEE UTILITY PLANS

**WESTFORD  
 MAIN STREET  
 CONSTRUCTION PLANS - 4  
 SHEET 10 OF 63**



MAIN STREET CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L13	30+01.21	3038440.458	675388.960		N76°04'00"E 998.74'	39+99.95	3038680.948	676358.310
C14	39+99.95	3038680.948	676358.310	R=1500.00' Δ=4°44'17" L=124.04' T=62.06'		41+23.99	3038705.807	676479.798
C15	41+23.99	3038705.807	676479.798	R=1000.00' Δ=13°09'19" L=229.61' T=115.31'		43+53.59	3038768.083	676700.272



CONTINUED ON SHEET NO. 9

CONTINUED ON SHEET NO. 11

HIGHWAY GUARD DETAILS

STA 32+87± LT TERMINAL END SECTION  
 STA 32+87 LT TO STA 33+37 LT STEEL W BEAM  
 HIGHWAY GUARD WEATHERING STEEL  
 WITH ZINC INSERTS  
 STA 33+37± LT TERMINAL END SECTION

TRAFFIC SIGNAL CONDUIT

NONE

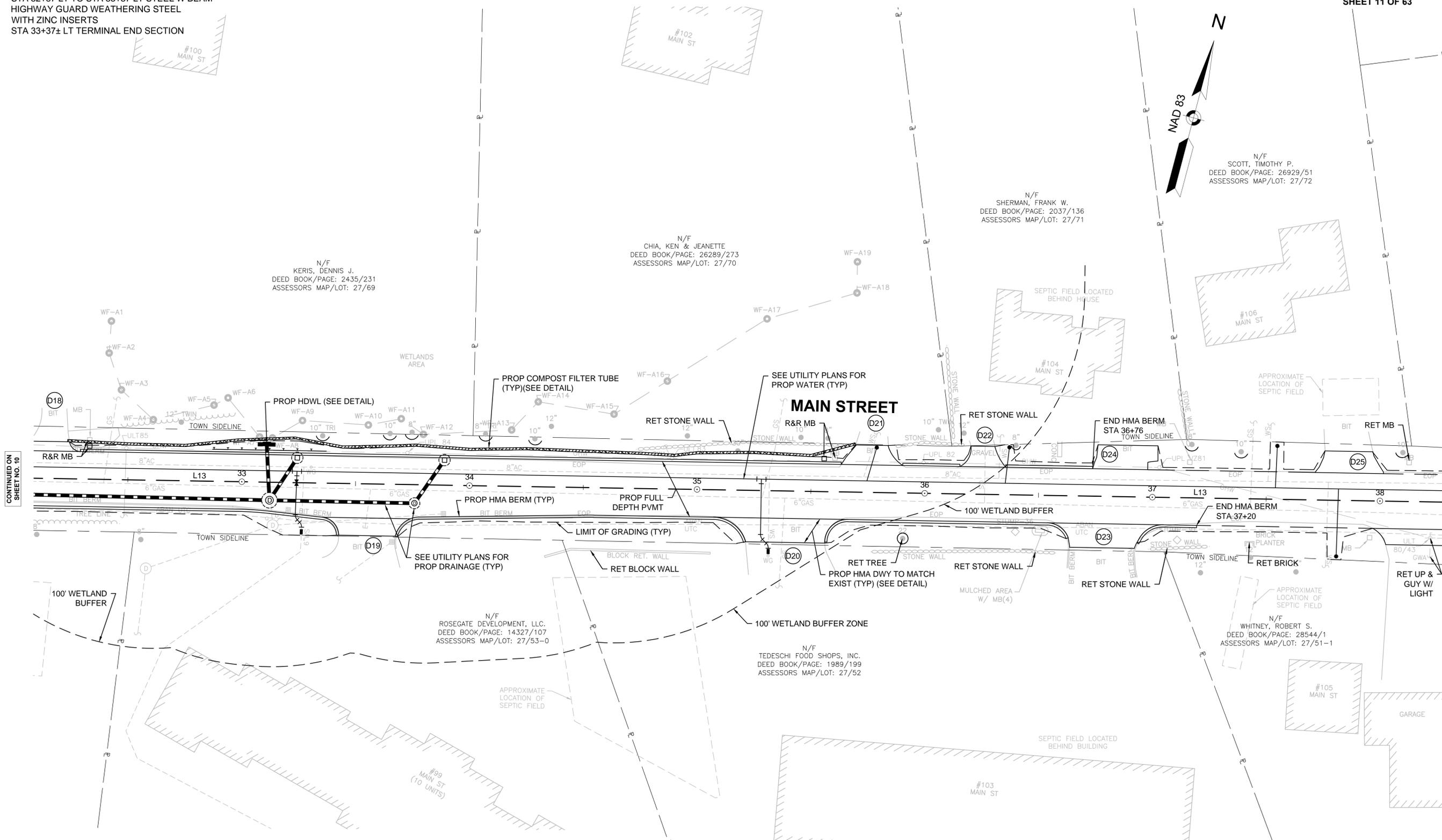
WATER SUPPLY ALTERATIONS

SEE UTILITY PLANS

DRAINAGE DETAILS

SEE UTILITY PLANS

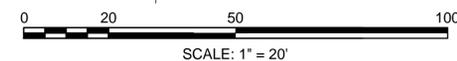
WESTFORD  
 MAIN STREET  
 CONSTRUCTION PLANS - 5  
 SHEET 11 OF 63



CONTINUED ON SHEET NO. 10

CONTINUED ON SHEET NO. 12

MAIN STREET CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C15	41+23.99	3038705.807	676479.798	R = 1000.00' Δ = 13°09'19" L = 229.61' T = 115.31'		43+53.59	3038768.083	676700.272



HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

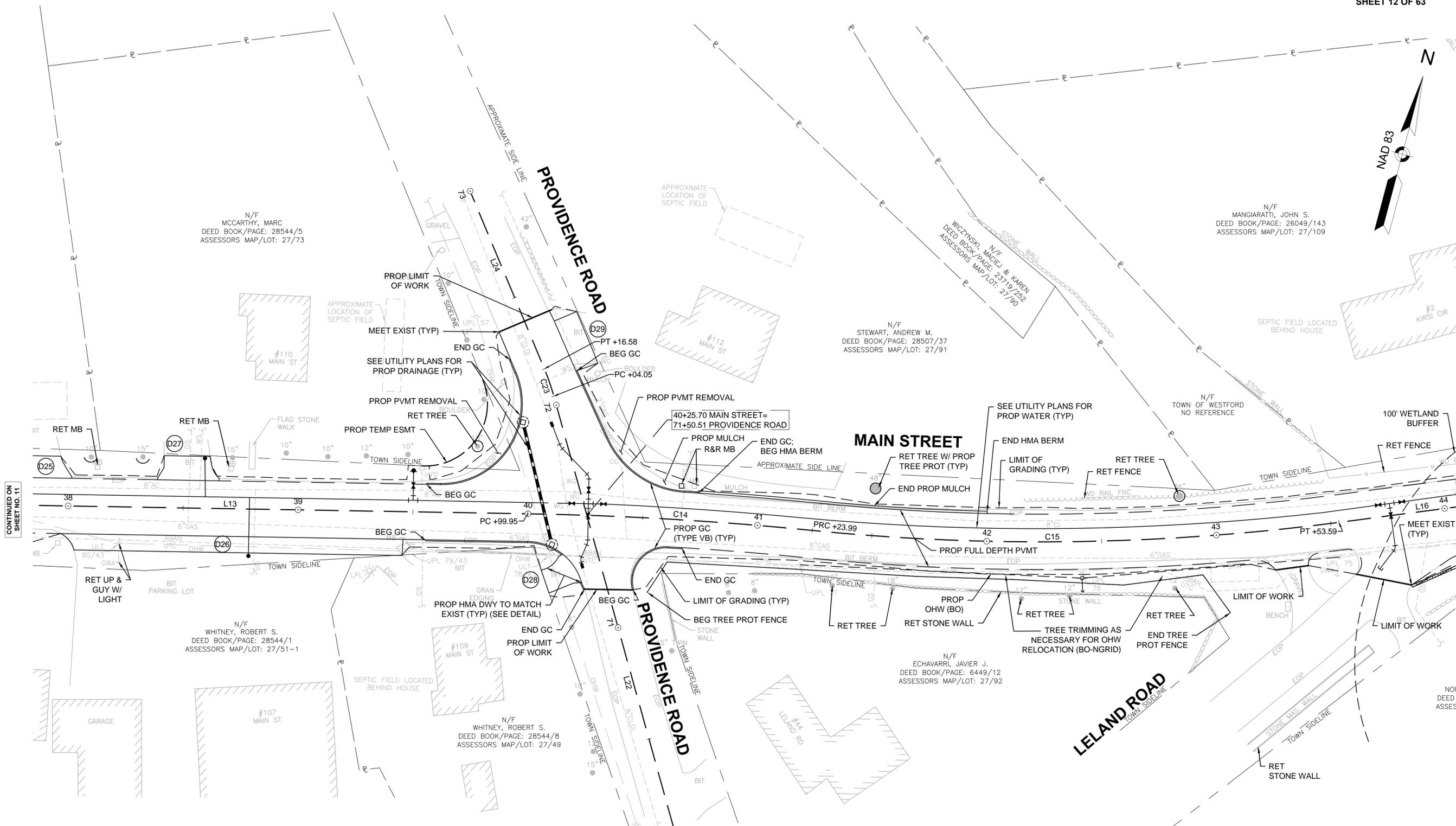
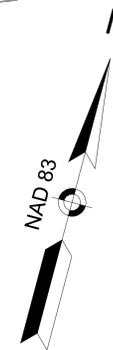
WATER SUPPLY ALTERATIONS

SEE UTILITY PLANS

DRAINAGE DETAILS

SEE UTILITY PLANS

WESTFORD  
MAIN STREET  
CONSTRUCTION PLANS - 6  
SHEET 12 OF 63



CONTINUED ON  
SHEET NO. 11

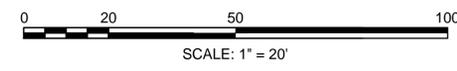
CONTINUED ON  
SHEET NO. 13

MAIN STREET CONSTRUCTION BASELINE DATA

NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C15	41+23.99	3038705.807	676479.798	R = 1000.00' Δ = 13°09'19" L = 229.61' T = 115.31'		43+53.59	3038768.083	676700.272
L16	43+53.59	3038768.083	676700.272		N67°38'57"E 284.31'	46+37.90	3038876.198	676963.219
C17	46+37.90	3038876.198	676963.219	R = 625.00' Δ = 19°13'34" L = 209.72' T = 105.86'		48+47.62	3038986.702	677140.311
L18	48+47.62	3038986.702	677140.311		N48°25'24"E 252.38'	51+00.00	3039154.185	677329.106

PROVIDENCE ROAD CONSTRUCTION BASELINE DATA

NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L22	70+00.00	3038557.232	676459.705		N30°29'06"W 204.05'	72+04.05	3038733.075	676356.188
C23	72+04.05	3038733.075	676356.188	R = 100.00' Δ = 7°10'45" L = 12.53' T = 6.27'		72+16.58	3038743.447	676349.172
L24	72+16.58	3038743.447	676349.172		N37°39'51"W 83.42'	73+00.00	3038809.482	676298.200



HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

SEE UTILITY PLANS

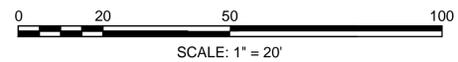
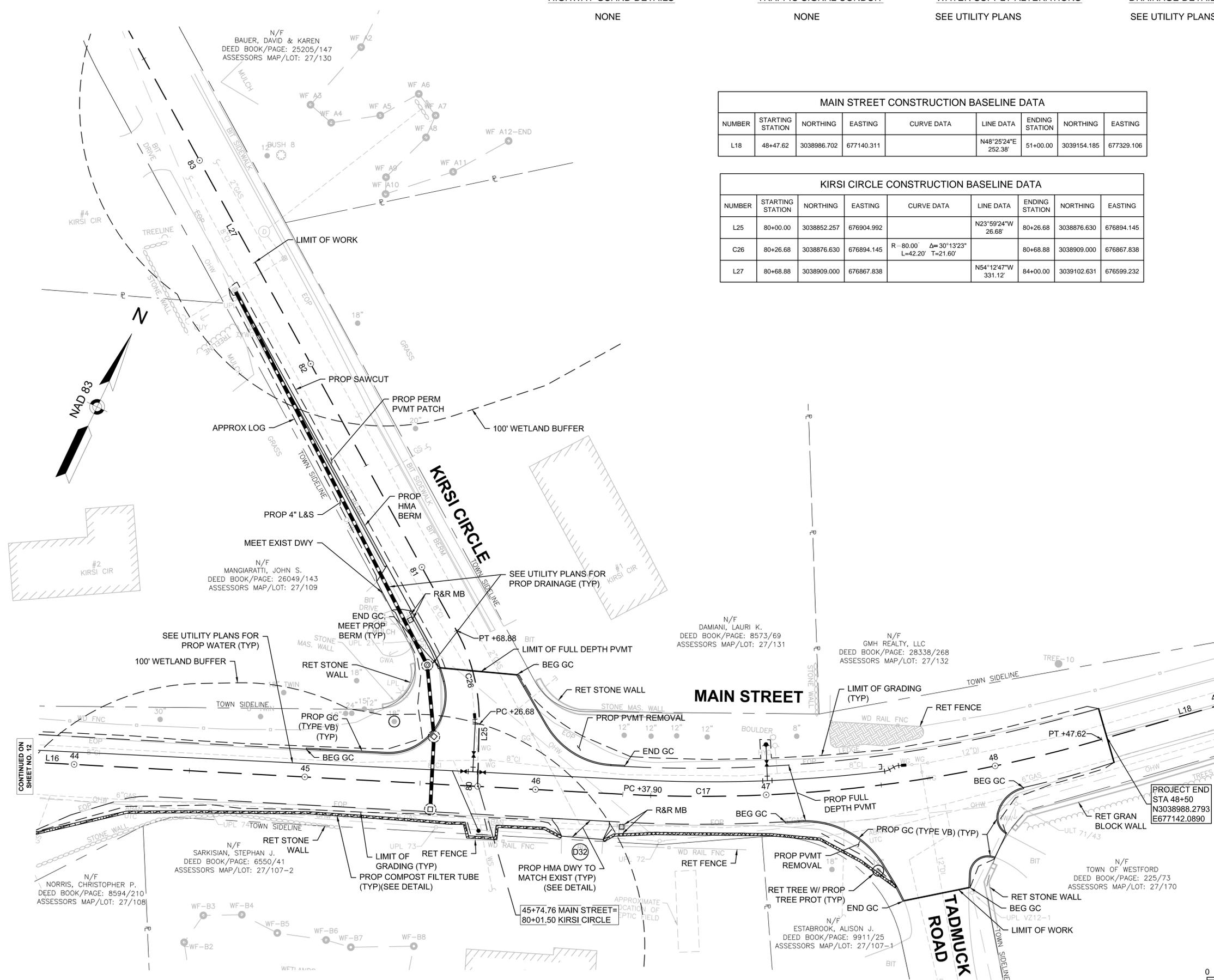
DRAINAGE DETAILS

SEE UTILITY PLANS

WESTFORD  
MAIN STREET  
CONSTRUCTION PLANS - 7  
SHEET 13 OF 63

MAIN STREET CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L18	48+47.62	3038986.702	677140.311		N48°25'24"E 252.38'	51+00.00	3039154.185	677329.106

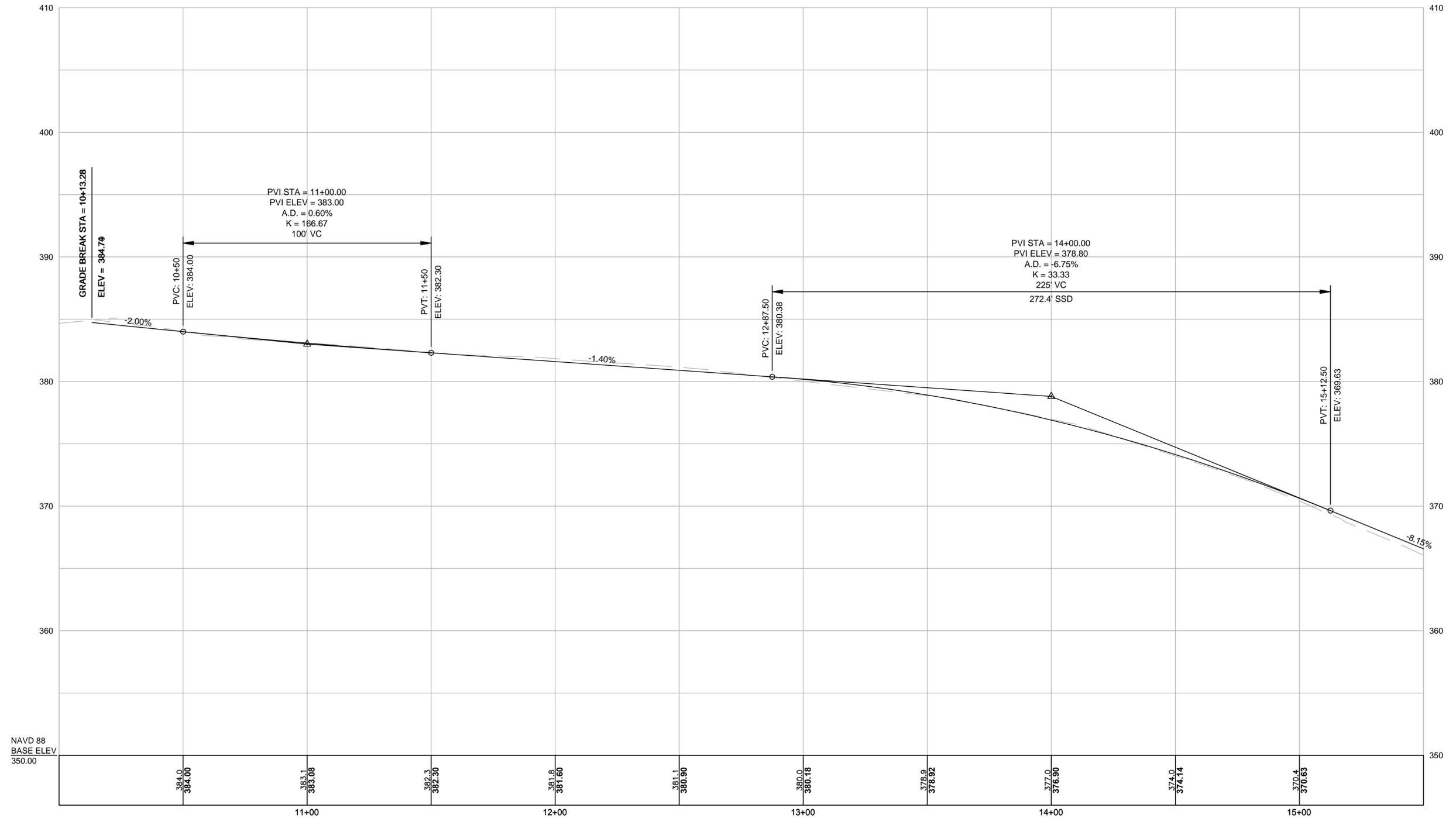
KIRSI CIRCLE CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L25	80+00.00	3038852.257	676904.992		N23°59'24"W 26.68'	80+26.68	3038876.630	676894.145
C26	80+26.68	3038876.630	676894.145	R=80.00' Δ=30°13'23" L=42.20' T=21.60'		80+68.88	3038909.000	676867.838
L27	80+68.88	3038909.000	676867.838		N54°12'47"W 331.12'	84+00.00	3039102.631	676599.232



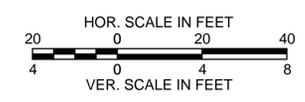
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SHEET NO. 12

T05771009\JHD6\CONSTRUCTION\PLANS\DWG  
Plotted on: 3/31/2016 10:54:AM

MAIN STREET



NAVD 88  
 BASE ELEV  
 350.00

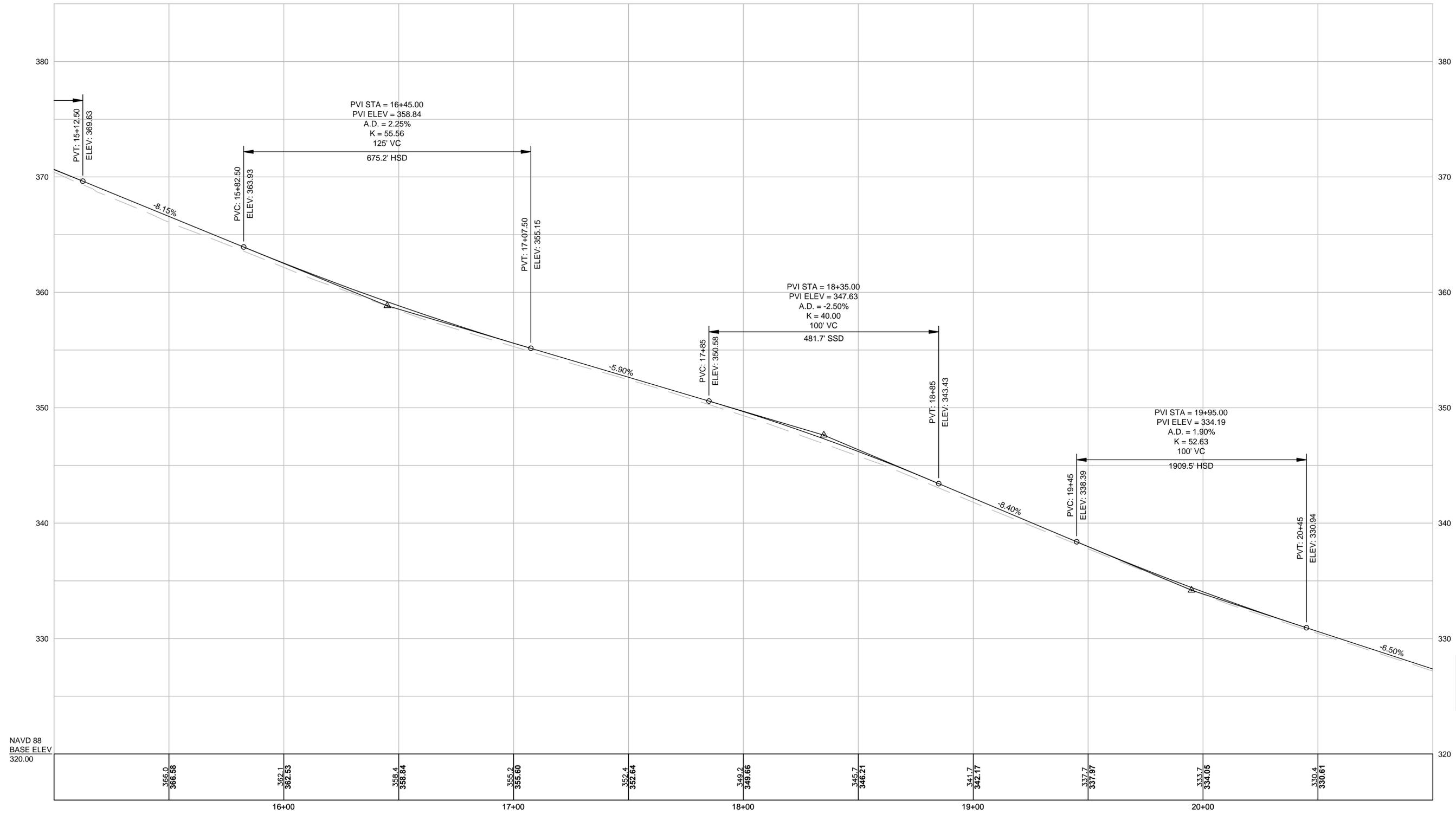


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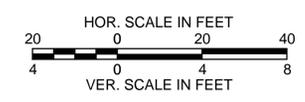
MAIN STREET

CONTINUED ON  
SHEET NO. 14

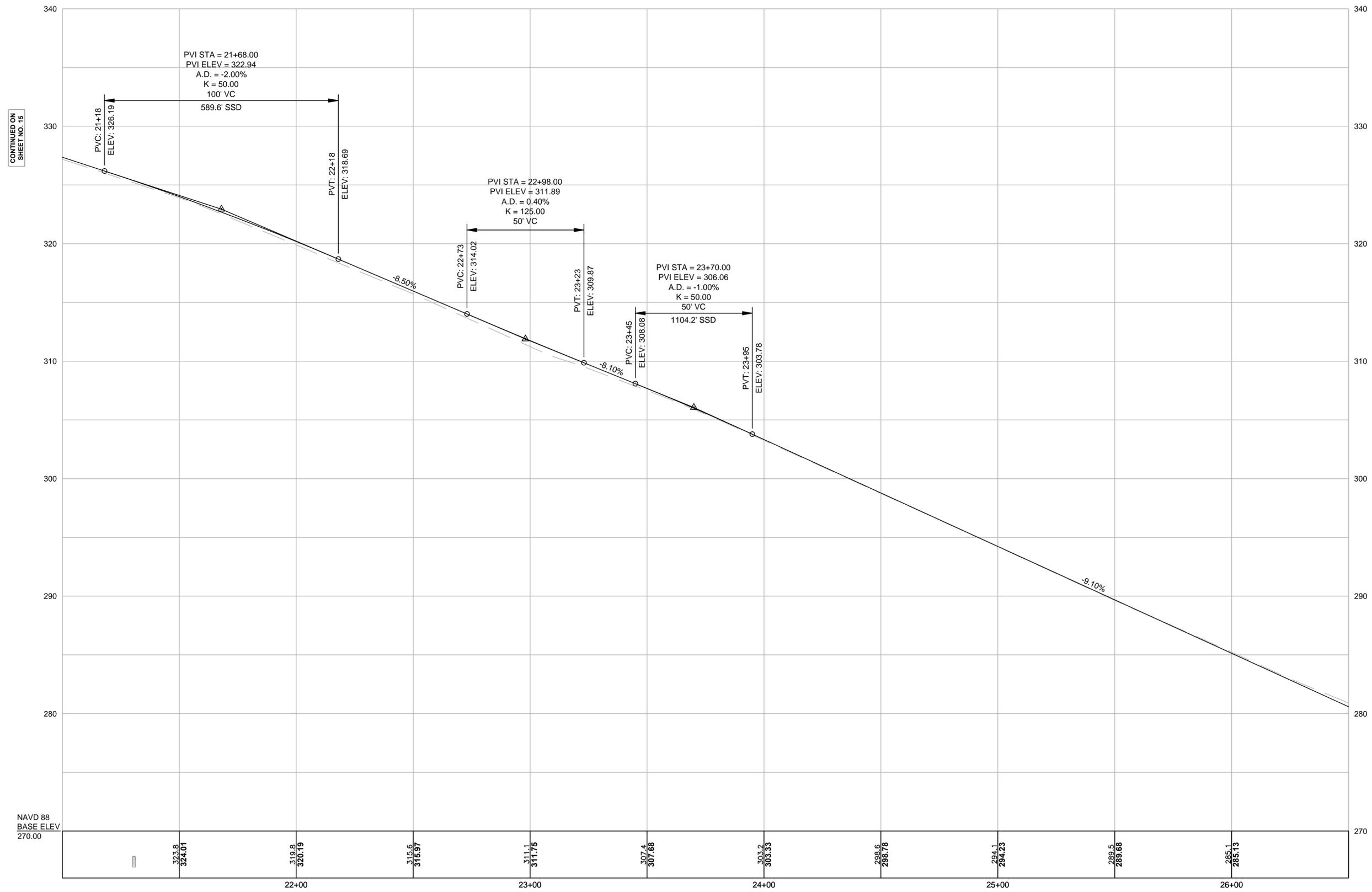
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NAVD 88  
BASE ELEV  
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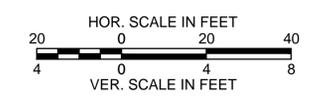
# MAIN STREET



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SHEET NO. 15

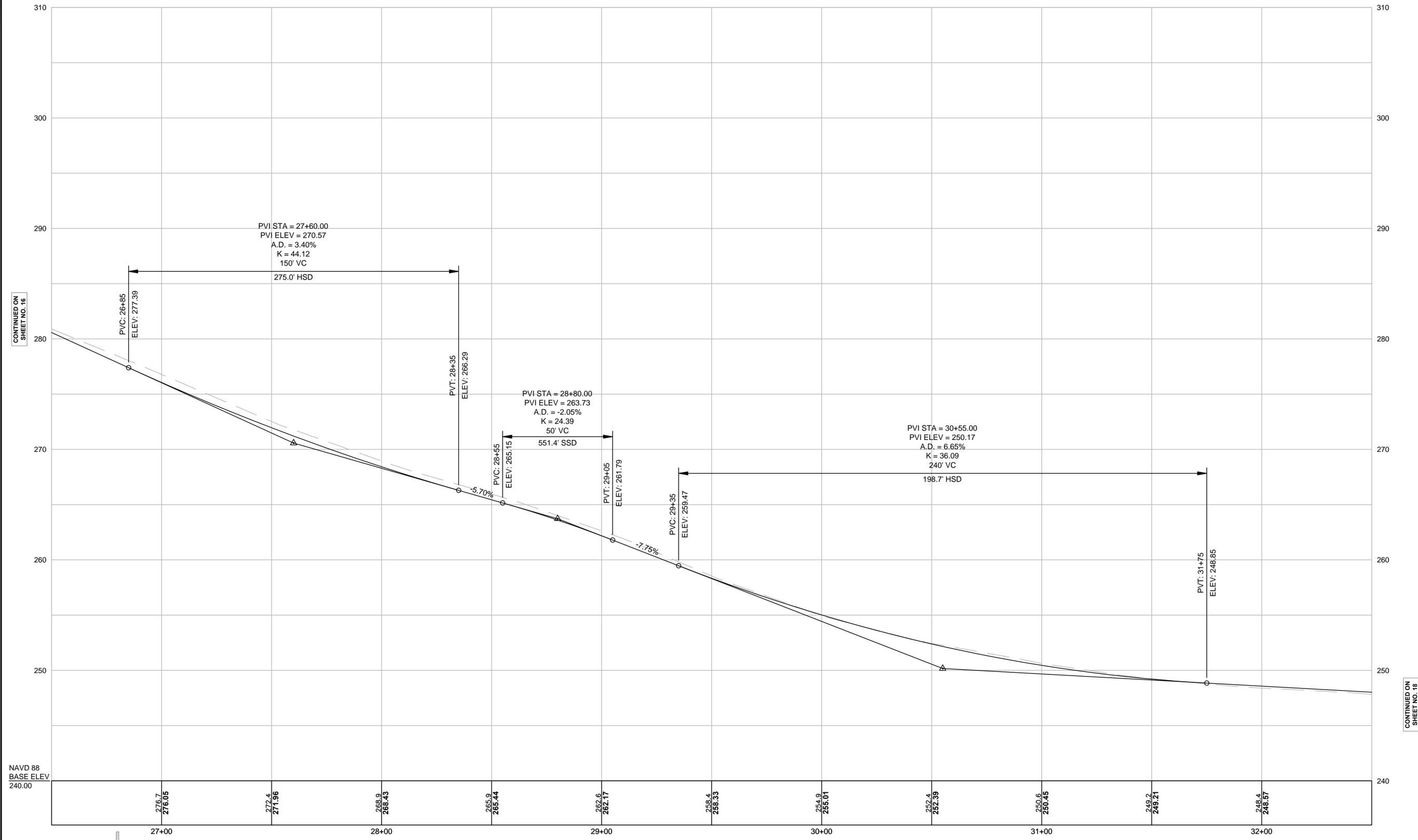
CONTINUED ON  
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NAVD 88  
BASE ELEV  
270.00



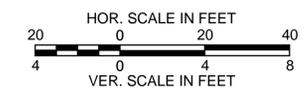
# MAIN STREET

WESTFORD  
MAIN STREET  
PROFILES - 4  
SHEET 17 OF 63



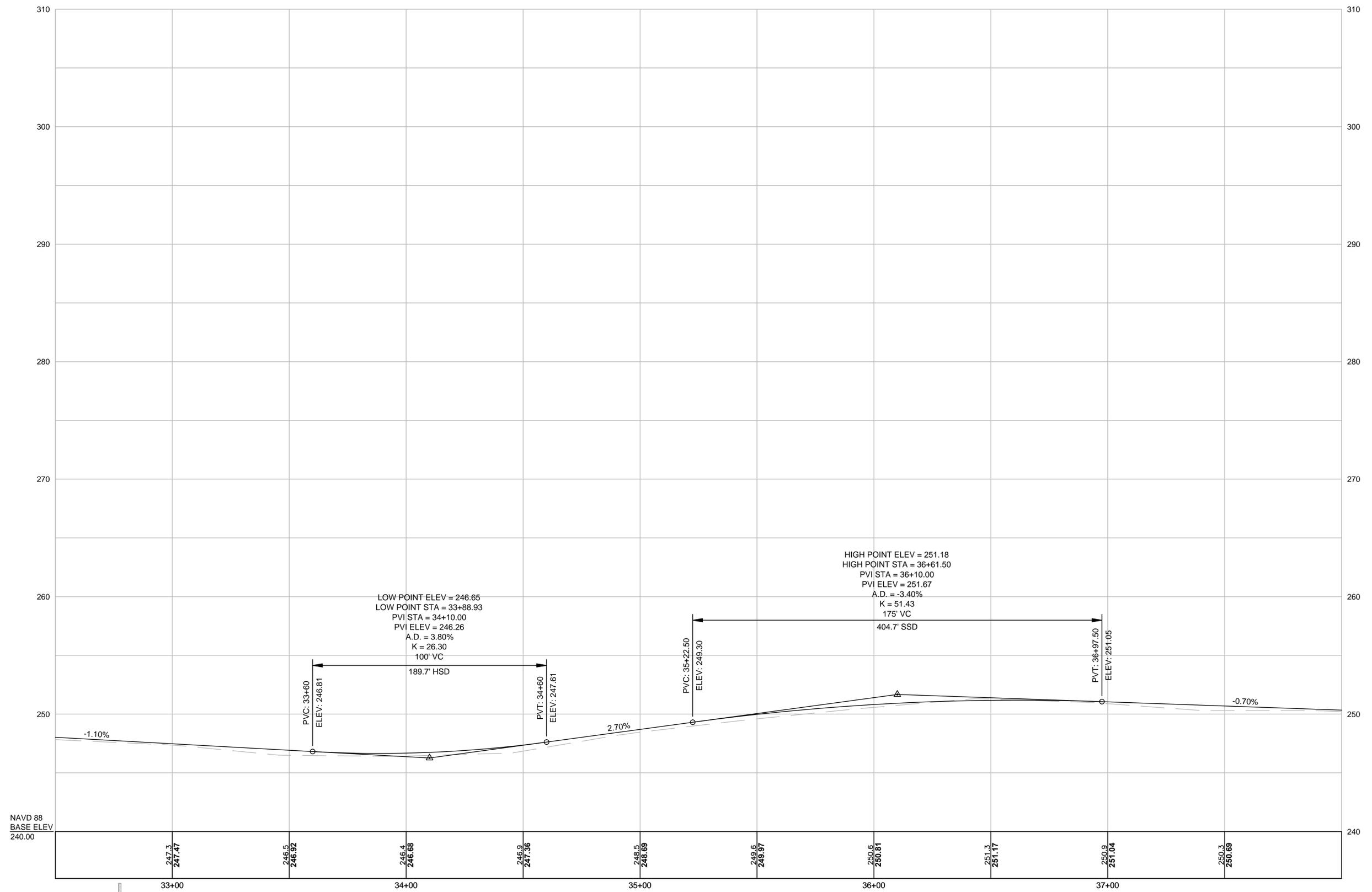
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SHEET NO. 16

CONTINUED ON  
SHEET NO. 18



# MAIN STREET

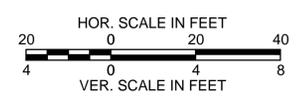
WESTFORD  
MAIN STREET  
PROFILES - 5  
SHEET 18 OF 63



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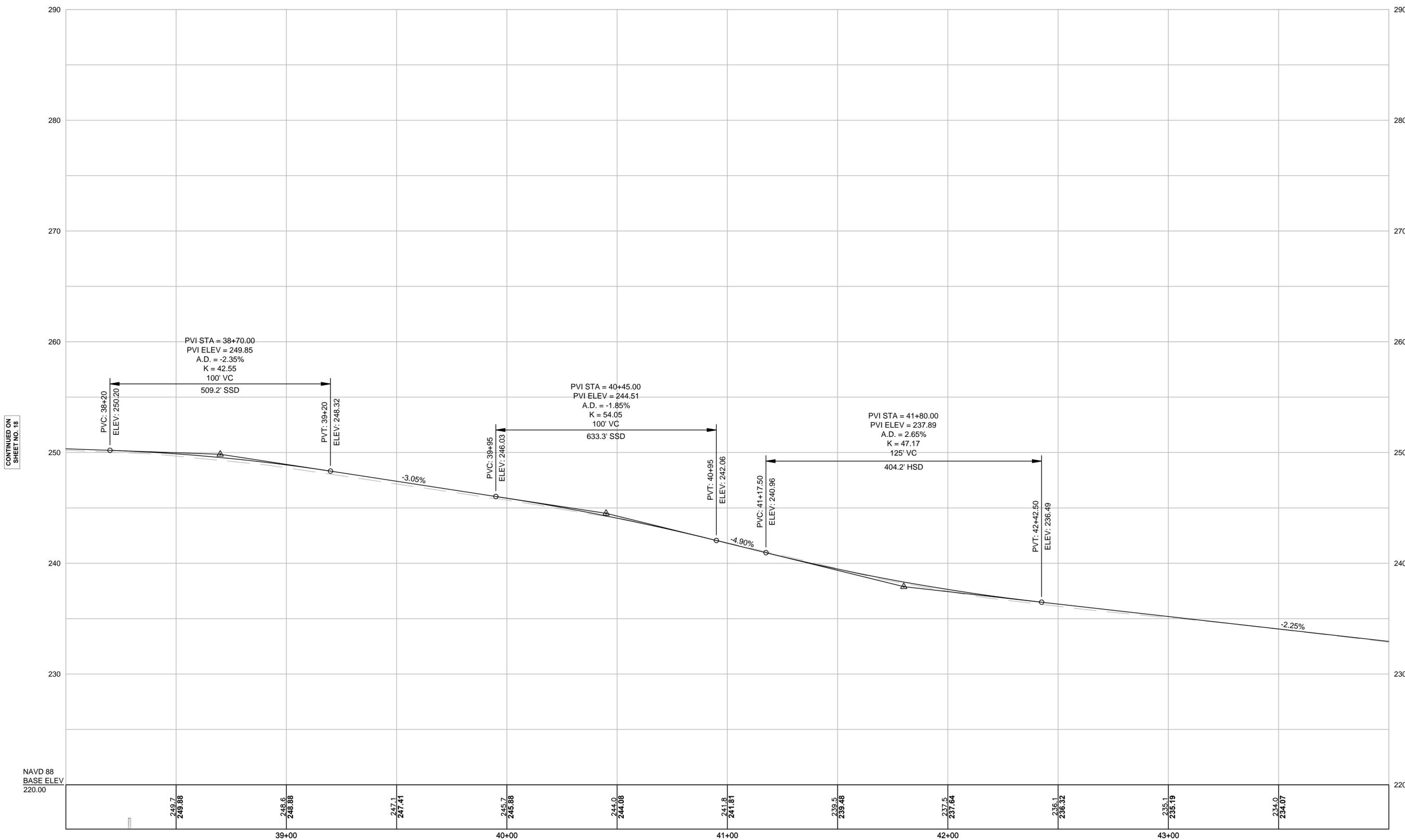
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NAVD 88  
BASE ELEV  
240.00



# MAIN STREET

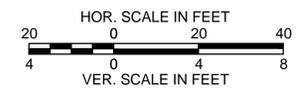
**WESTFORD  
MAIN STREET  
PROFILES - 6  
SHEET 19 OF 63**



CONTINUED ON  
SHEET NO. 18

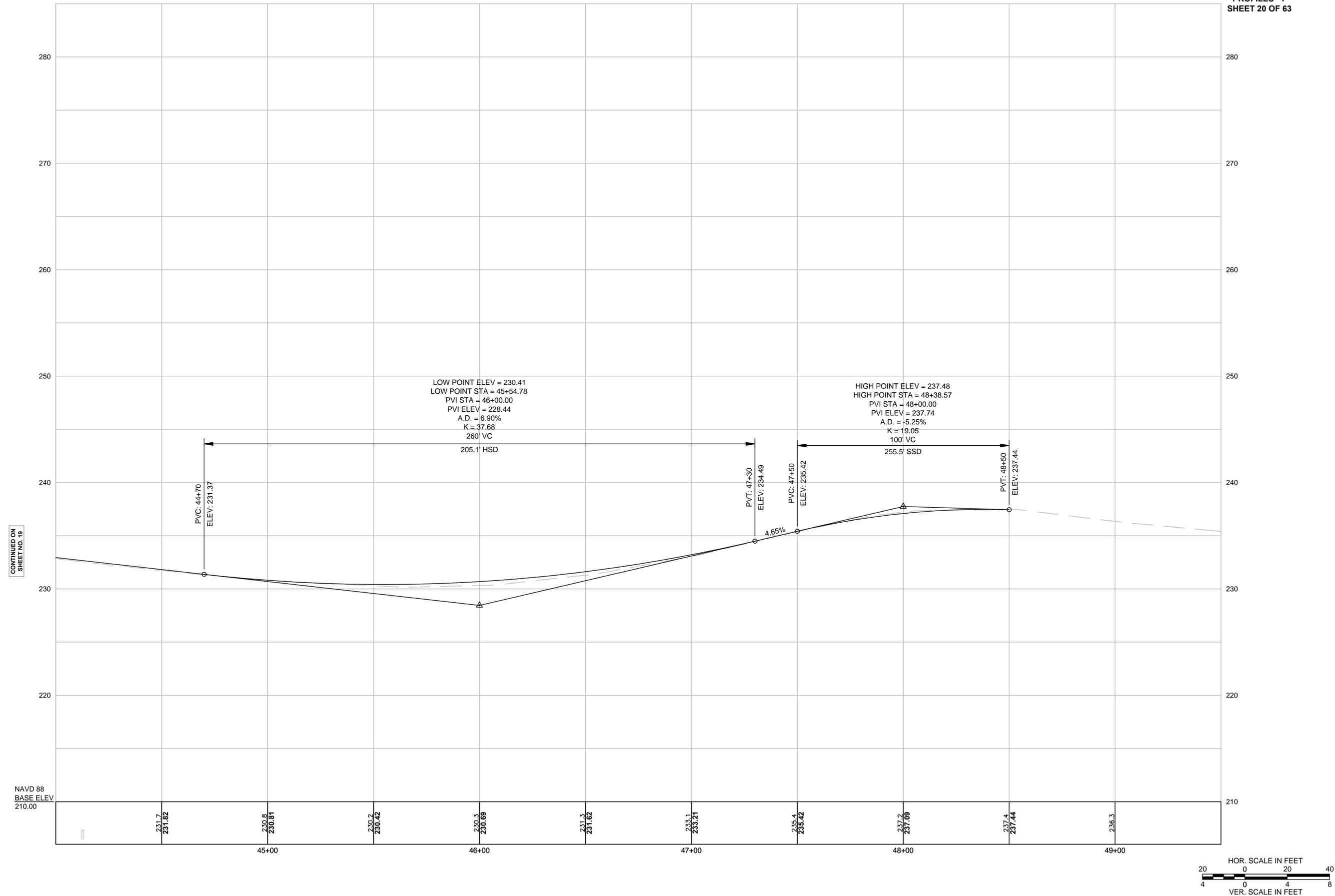
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NAVD 88  
BASE ELEV  
220.00



# MAIN STREET

WESTFORD  
MAIN STREET  
PROFILES - 7  
SHEET 20 OF 63

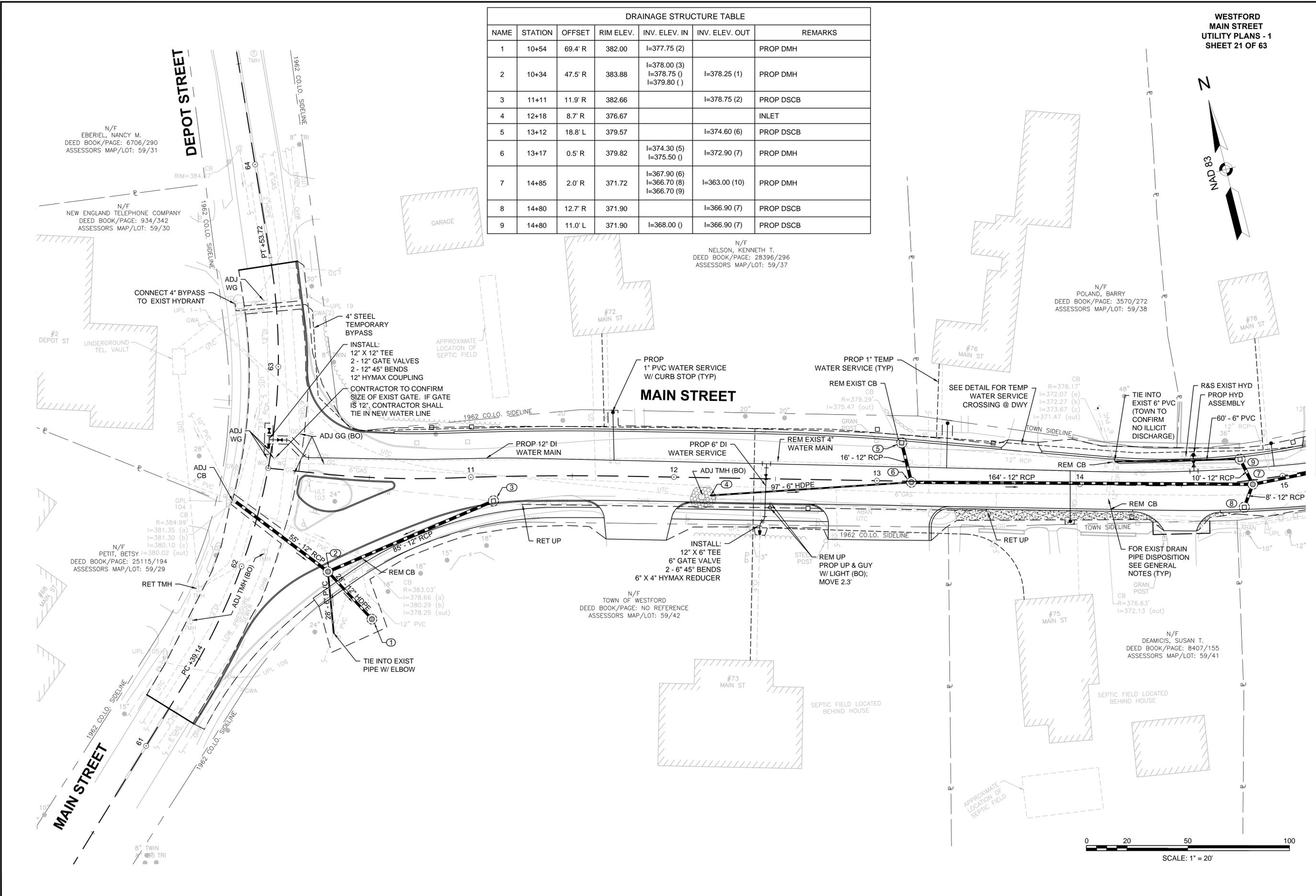
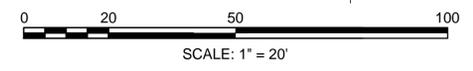
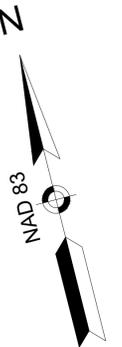


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BASE ELEV  
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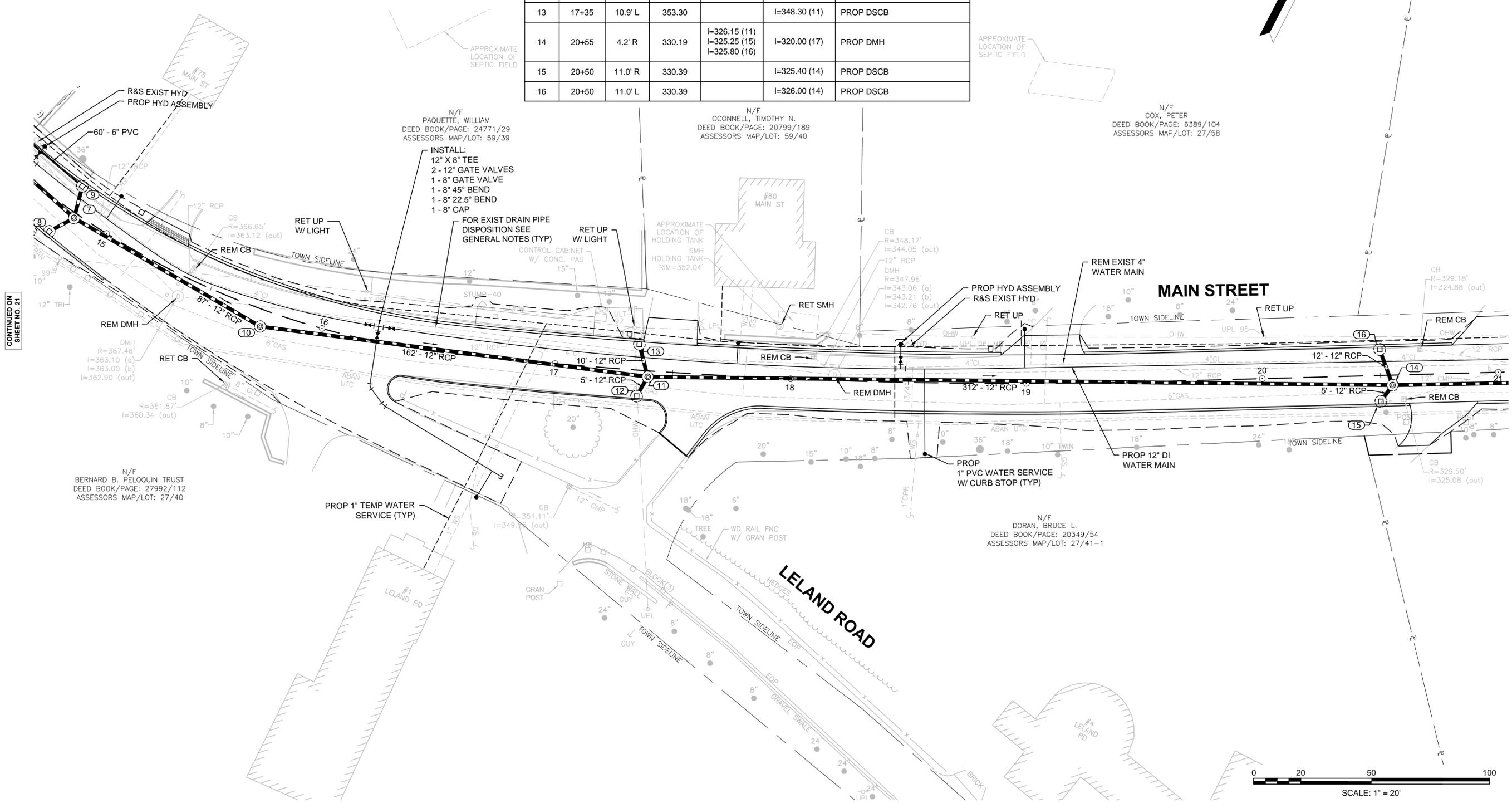


DRAINAGE STRUCTURE TABLE						
NAME	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
1	10+54	69.4' R	382.00	I=377.75 (2)		PROP DMH
2	10+34	47.5' R	383.88	I=378.00 (3) I=378.75 ( ) I=379.80 ( )	I=378.25 (1)	PROP DMH
3	11+11	11.9' R	382.66		I=378.75 (2)	PROP DSCB
4	12+18	8.7' R	376.67			INLET
5	13+12	18.8' L	379.57		I=374.60 (6)	PROP DSCB
6	13+17	0.5' R	379.82	I=374.30 (5) I=375.50 ( )	I=372.90 (7)	PROP DMH
7	14+85	2.0' R	371.72	I=367.90 (6) I=366.70 (8) I=366.70 (9)	I=363.00 (10)	PROP DMH
8	14+80	12.7' R	371.90		I=366.90 (7)	PROP DSCB
9	14+80	11.0' L	371.90	I=368.00 ( )	I=366.90 (7)	PROP DSCB



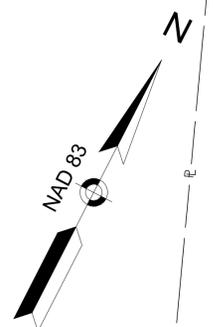
CONTINUED ON  
SHEET NO. 22

DRAINAGE STRUCTURE TABLE						
NAME	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
7	14+85	2.0' R	371.72	I=367.90 (6) I=366.70 (8) I=366.70 (9)	I=363.00 (10)	PROP DMH
8	14+80	12.7' R	371.90		I=366.90 (7)	PROP DSCB
9	14+80	11.0' L	371.90	I=368.00 ( )	I=366.90 (7)	PROP DSCB
10	15+75	7.1' R	364.39	I=360.40 (7)	I=356.00 (11)	PROP DMH
11	17+40	2.5' R	353.20	I=349.20 (10) I=348.10 (12) I=348.10 (13)	I=344.00 (14)	PROP DMH
12	17+35	10.9' R	353.28		I=348.25 (11)	PROP DSCB
13	17+35	10.9' L	353.30		I=348.30 (11)	PROP DSCB
14	20+55	4.2' R	330.19	I=326.15 (11) I=325.25 (15) I=325.80 (16)	I=320.00 (17)	PROP DMH
15	20+50	11.0' R	330.39		I=325.40 (14)	PROP DSCB
16	20+50	11.0' L	330.39		I=326.00 (14)	PROP DSCB



CONTINUED ON  
SHEET NO. 21

CONTINUED ON  
SHEET NO. 23



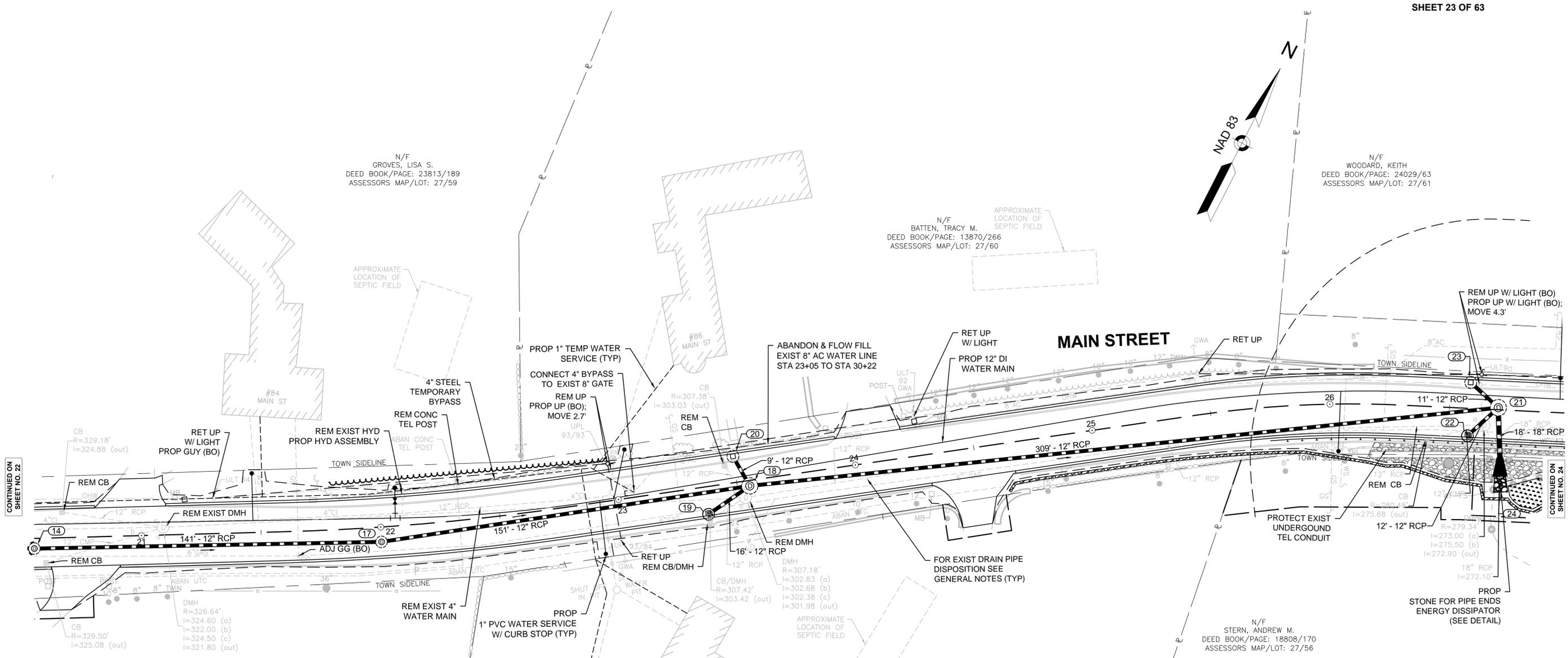
N/F GROVES, LISA S.  
DEED BOOK/PAGE: 23813/189  
ASSESSORS MAP/LOT: 27/59

N/F WOODARD, KEITH  
DEED BOOK/PAGE: 24029/63  
ASSESSORS MAP/LOT: 27/61

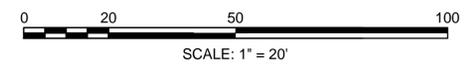
N/F BATTEN, TRACY M.  
DEED BOOK/PAGE: 13870/266  
ASSESSORS MAP/LOT: 27/60

N/F STERN, ANDREW M.  
DEED BOOK/PAGE: 18808/170  
ASSESSORS MAP/LOT: 27/56

N/F PIAZZA, JOSEPH  
DEED BOOK/PAGE: 23412/49  
ASSESSORS MAP/LOT: 27/57

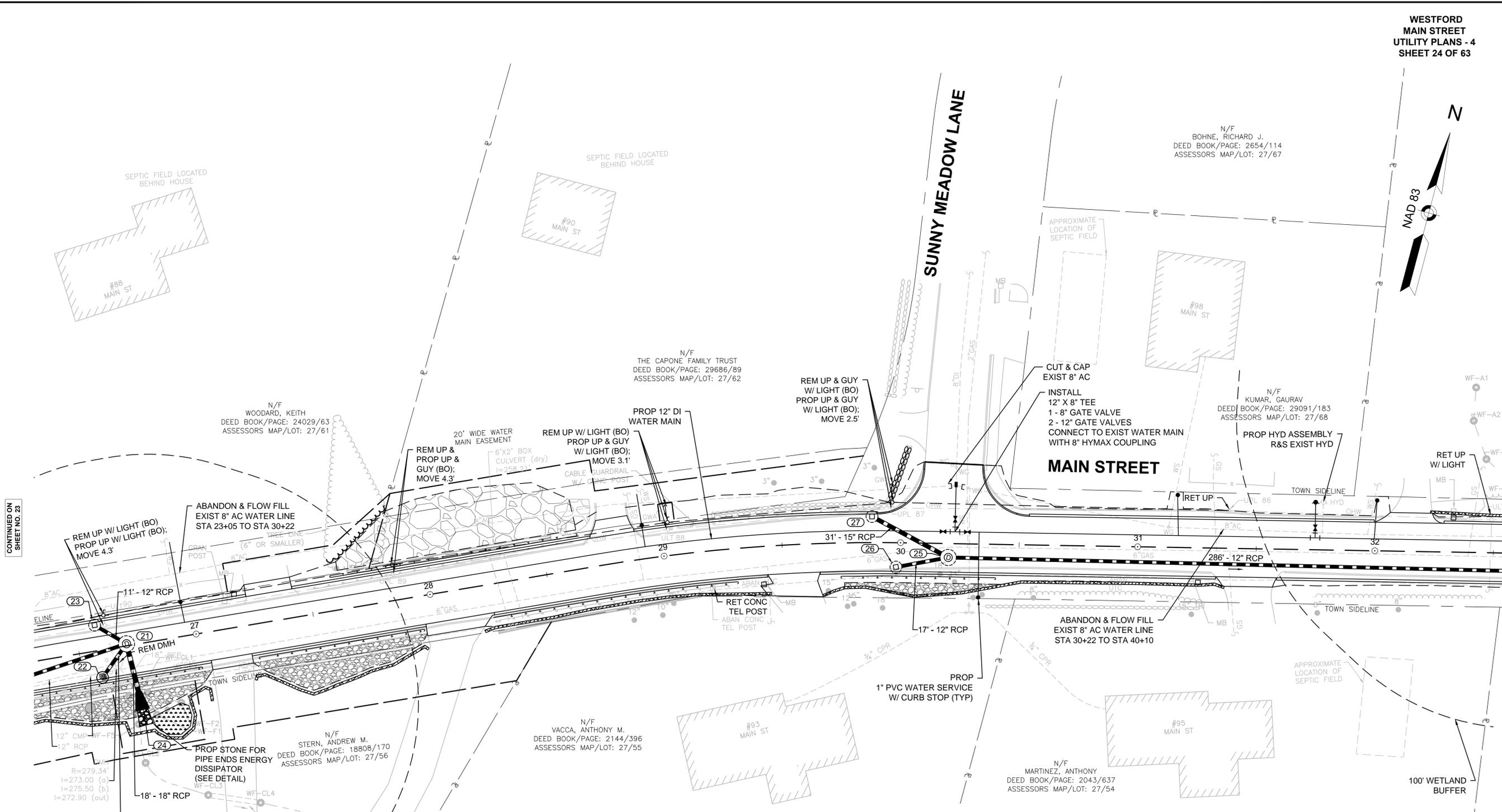
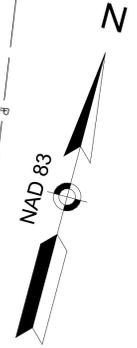


DRAINAGE STRUCTURE TABLE						
NAME	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
14	20+55	4.2' R	330.19	I=326.15 (11) I=325.25 (15) I=325.80 (16)	I=320.00 (17)	PROP DMH
15	20+50	11.0' R	330.39		I=325.40 (14)	PROP DSCB
16	20+50	11.0' L	330.39		I=326.00 (14)	PROP DSCB
17	22+00	6.1' R	320.07	I=316.00 (14)	I=311.00 (18)	PROP DMH
18	23+55	2.3' R	307.21	I=303.20 (17) I=303.20 (19) I=303.20 (20)	I=294.00 (21)	PROP DMH (6' DIA)
19	23+36	11.5' R	308.55		I=303.50 (18)	PROP DSCB (ECCENTRIC TOP)
20	23+50	10.9' L	307.46		I=303.40 (18)	PROP DSCB
21	26+70	0.8' L	278.71	I=274.70 (18) I=273.90 (22) I=274.80 (23)	I=272.50 (24)	PROP DMH (6' DIA)
22	26+58	11.4' R	279.62		I=274.10 (21)	PROP DSCB (ECCENTRIC TOP)
23	26+58	10.8' L	279.60		I=275.00 (21)	PROP DSCB
24	26+72	19.9' R	274.04	I=272.25 (21)		CONCRETE FLARED END SECTION



CONTINUED ON SHEET NO. 22

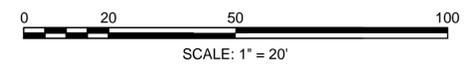
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CONTINUED ON  
SHEET NO. 23

CONTINUED ON  
SHEET NO. 25

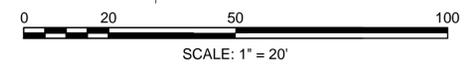
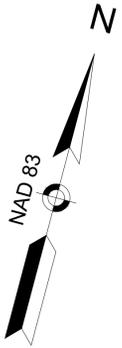
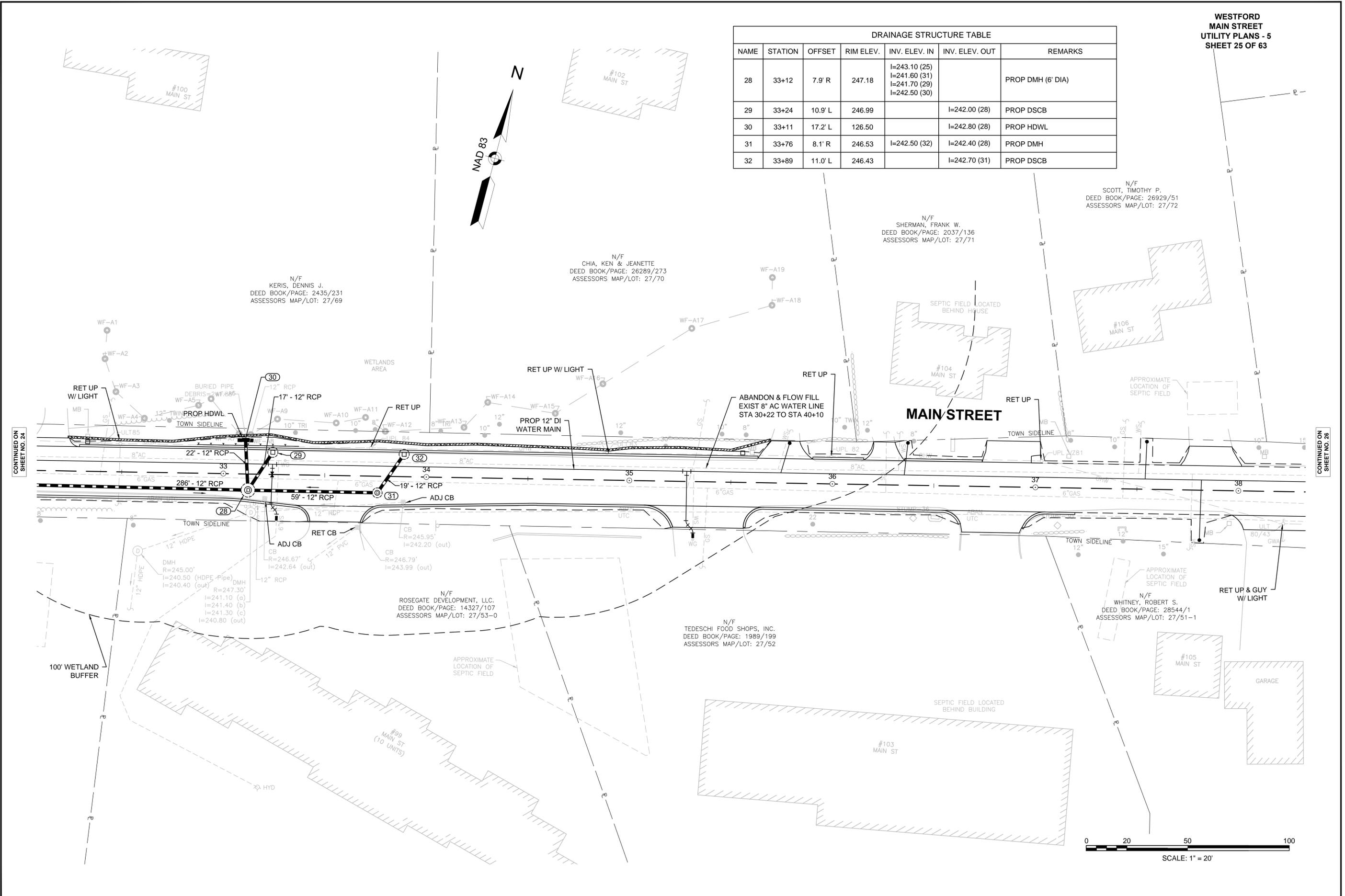
DRAINAGE STRUCTURE TABLE						
NAME	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
21	26+70	0.8' L	278.71	I=274.70 (18) I=273.90 (22) I=274.80 (23)	I=272.50 (24)	PROP DMH (6' DIA)
22	26+58	11.4' R	279.62		I=274.10 (21)	PROP DSCB (ECCENTRIC TOP)
23	26+58	10.8' L	279.60		I=275.00 (21)	PROP DSCB
24	26+72	19.9' R	274.04	I=272.25 (21)		CONCRETE FLARED END SECTION
25	30+20	5.8' R	253.75	I=249.60 (27) I=249.60 (26)	I=248.00 (28)	PROP DMH (6' DIA)
26	29+98	10.3' R	254.92		I=249.90 (25)	PROP DSCB
27	29+88	10.9' L	255.53		I=250.10 (25)	PROP DSCB



DRAINAGE STRUCTURE TABLE						
NAME	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
28	33+12	7.9' R	247.18	I=243.10 (25) I=241.60 (31) I=241.70 (29) I=242.50 (30)		PROP DMH (6' DIA)
29	33+24	10.9' L	246.99		I=242.00 (28)	PROP DSCB
30	33+11	17.2' L	126.50		I=242.80 (28)	PROP HDWL
31	33+76	8.1' R	246.53	I=242.50 (32)	I=242.40 (28)	PROP DMH
32	33+89	11.0' L	246.43		I=242.70 (31)	PROP DSCB

CONTINUED ON  
SHEET NO. 24

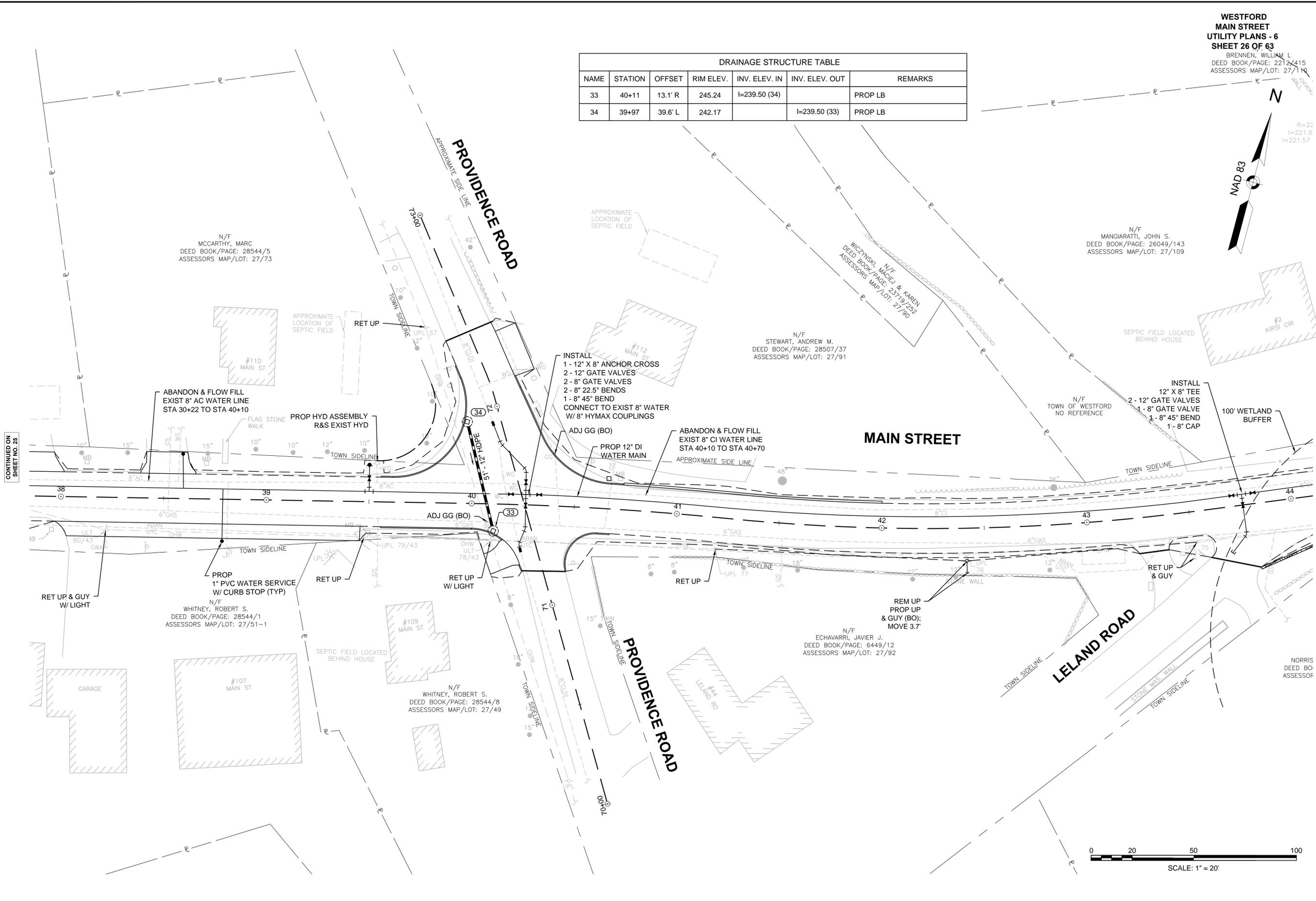
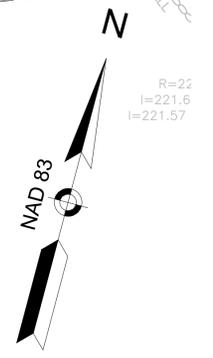
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SHEET NO. 26



**WESTFORD  
MAIN STREET - 6  
UTILITY PLANS - 6  
SHEET 26 OF 63**

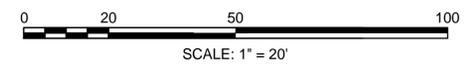
BRENNEN, WILLIAM L.  
DEED BOOK/PAGE: 2212/415  
ASSESSORS MAP/LOT: 27/119

DRAINAGE STRUCTURE TABLE						
NAME	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
33	40+11	13.1' R	245.24	I=239.50 (34)		PROP LB
34	39+97	39.6' L	242.17		I=239.50 (33)	PROP LB

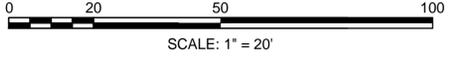
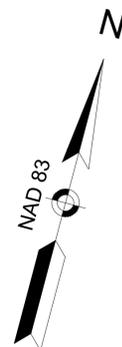
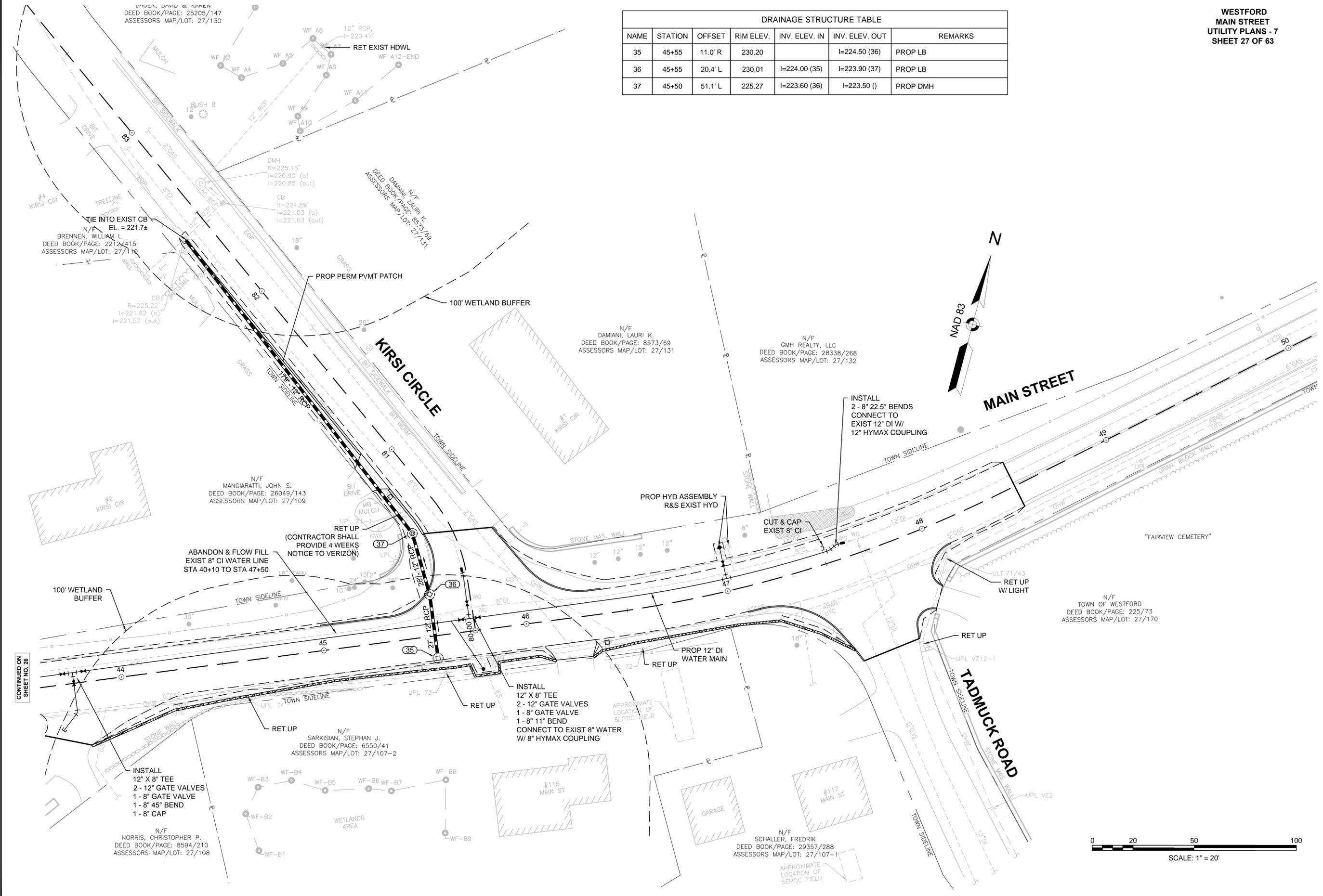


CONTINUED ON SHEET NO. 25

CONTINUED ON SHEET NO. 27



DRAINAGE STRUCTURE TABLE						
NAME	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
35	45+55	11.0' R	230.20		I=224.50 (36)	PROP LB
36	45+55	20.4' L	230.01	I=224.00 (35)	I=223.90 (37)	PROP LB
37	45+50	51.1' L	225.27	I=223.60 (36)	I=223.50 ( )	PROP DMH



CONTINUED ON  
SHEET NO. 26

DAUER, DAVID & MAREN  
DEED BOOK/PAGE: 25205/147  
ASSESSORS MAP/LOT: 27/130

DMH  
R=225.16'  
I=220.90 (a)  
I=220.85 (out)

CB  
R=224.89'  
I=221.03 (a)  
I=221.03 (out)

TIE INTO EXIST CB  
N/F  
EL. = 221.7±

BRENNEN, WILLIAM L  
DEED BOOK/PAGE: 2212/415  
ASSESSORS MAP/LOT: 27/114

PROP PERM PVMT PATCH

100' WETLAND BUFFER

KIRSI CIRCLE

N/F  
DAMIANI, LAURI K.  
DEED BOOK/PAGE: 8573/69  
ASSESSORS MAP/LOT: 27/131

N/F  
GMH REALTY, LLC  
DEED BOOK/PAGE: 28338/268  
ASSESSORS MAP/LOT: 27/132

MAIN STREET

INSTALL  
2 - 8\"/>

PROP HYD ASSEMBLY  
R&S EXIST HYD

CUT & CAP  
EXIST 8\"/>

ABANDON & FLOW FILL  
EXIST 8\"/>

RET UP  
(CONTRACTOR SHALL  
PROVIDE 4 WEEKS  
NOTICE TO VERIZON)

100' WETLAND BUFFER

N/F  
MANGIARATTI, JOHN S.  
DEED BOOK/PAGE: 26049/143  
ASSESSORS MAP/LOT: 27/109

N/F  
TOWN OF WESTFORD  
DEED BOOK/PAGE: 225/73  
ASSESSORS MAP/LOT: 27/170

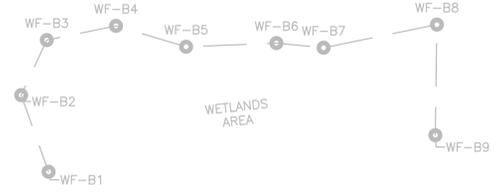
INSTALL  
12\"/>

INSTALL  
12\"/>

N/F  
NORRIS, CHRISTOPHER P.  
DEED BOOK/PAGE: 8594/210  
ASSESSORS MAP/LOT: 27/108

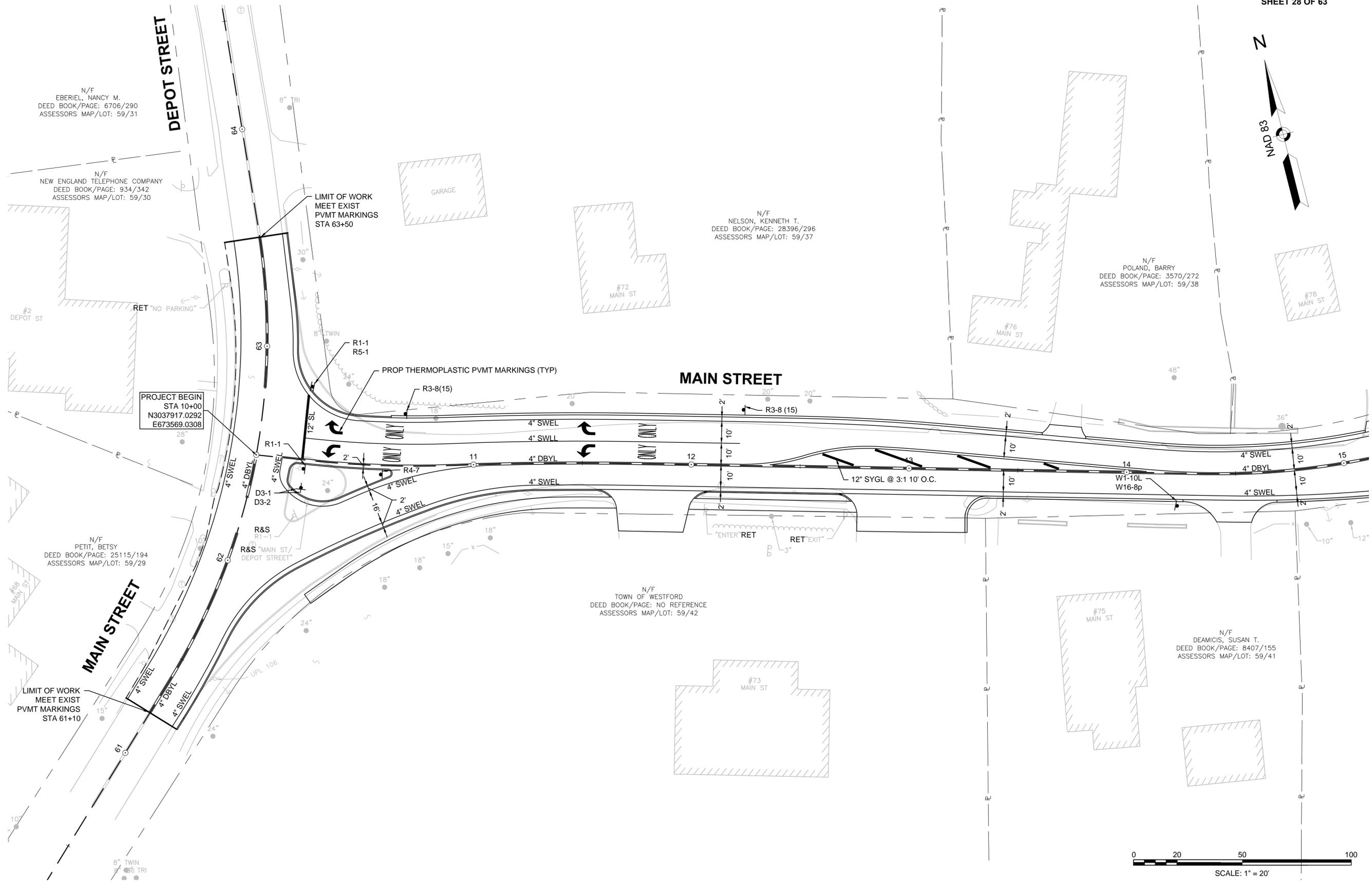
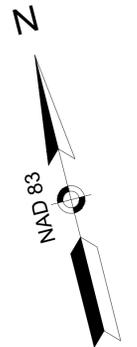
N/F  
SARKISIAN, STEPHAN J.  
DEED BOOK/PAGE: 6550/41  
ASSESSORS MAP/LOT: 27/107-2

N/F  
SCHALLER, FREDRIK  
DEED BOOK/PAGE: 29357/288  
ASSESSORS MAP/LOT: 27/107-1



APPROXIMATE  
LOCATION OF  
SEPTIC FIELD

APPROXIMATE  
LOCATION OF  
SEPTIC FIELD



N/F  
 EBERIEL, NANCY M.  
 DEED BOOK/PAGE: 6706/290  
 ASSESSORS MAP/LOT: 59/31

N/F  
 NEW ENGLAND TELEPHONE COMPANY  
 DEED BOOK/PAGE: 934/342  
 ASSESSORS MAP/LOT: 59/30

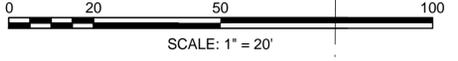
N/F  
 NELSON, KENNETH T.  
 DEED BOOK/PAGE: 28396/296  
 ASSESSORS MAP/LOT: 59/37

N/F  
 POLAND, BARRY  
 DEED BOOK/PAGE: 3570/272  
 ASSESSORS MAP/LOT: 59/38

N/F  
 PETIT, BETSY  
 DEED BOOK/PAGE: 25115/194  
 ASSESSORS MAP/LOT: 59/29

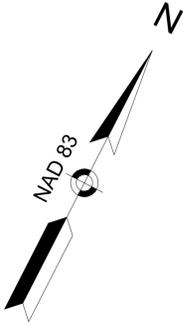
N/F  
 TOWN OF WESTFORD  
 DEED BOOK/PAGE: NO REFERENCE  
 ASSESSORS MAP/LOT: 59/42

N/F  
 DEAMICIS, SUSAN T.  
 DEED BOOK/PAGE: 8407/155  
 ASSESSORS MAP/LOT: 59/41



FOR SIGN SUMMARY: SEE SHEET 34

CONTINUED ON  
 SHEET NO. 29



CONTINUED ON  
SHEET NO. 28

CONTINUED ON  
SHEET NO. 30

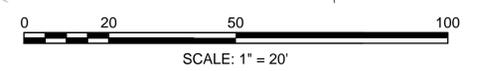
N/F  
PAQUETTE, WILLIAM  
DEED BOOK/PAGE: 24771/29  
ASSESSORS MAP/LOT: 59/39

N/F  
O'CONNELL, TIMOTHY N.  
DEED BOOK/PAGE: 20799/189  
ASSESSORS MAP/LOT: 59/40

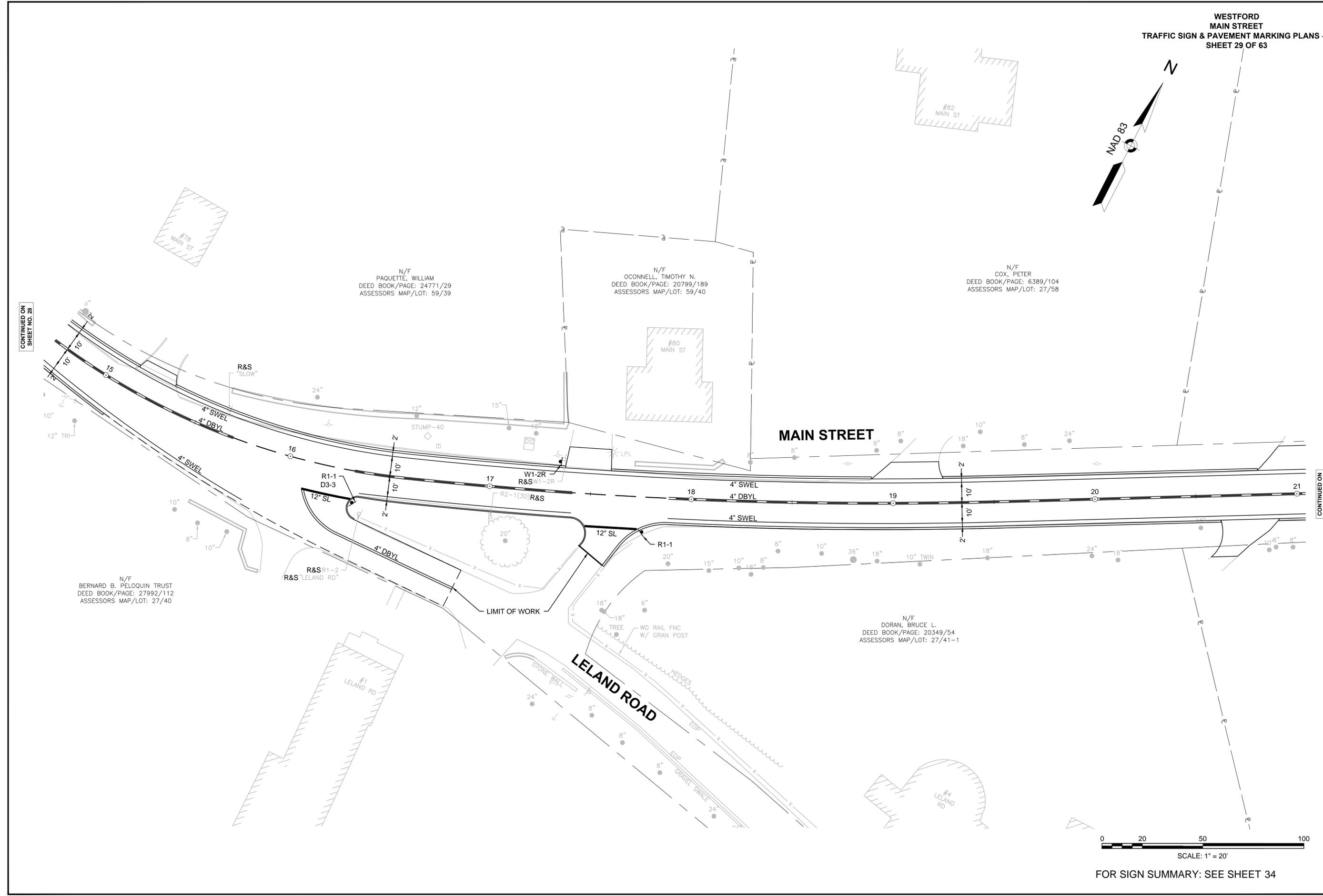
N/F  
COX, PETER  
DEED BOOK/PAGE: 6389/104  
ASSESSORS MAP/LOT: 27/58

N/F  
BERNARD B. PELOQUIN TRUST  
DEED BOOK/PAGE: 27992/112  
ASSESSORS MAP/LOT: 27/40

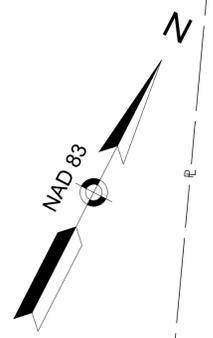
N/F  
DORAN, BRUCE L.  
DEED BOOK/PAGE: 20349/54  
ASSESSORS MAP/LOT: 27/41-1



FOR SIGN SUMMARY: SEE SHEET 34



WESTFORD  
MAIN STREET  
TRAFFIC SIGN & PAVEMENT MARKING PLANS - 3  
SHEET 30 OF 63



N/F  
GROVES, LISA S.  
DEED BOOK/PAGE: 23813/189  
ASSESSORS MAP/LOT: 27/59

N/F  
BATTEN, TRACY M.  
DEED BOOK/PAGE: 13870/266  
ASSESSORS MAP/LOT: 27/60

N/F  
WOODARD, KEITH  
DEED BOOK/PAGE: 24029/63  
ASSESSORS MAP/LOT: 27/61

MAIN STREET

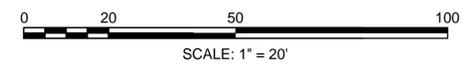
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SHEET NO. 29

CONTINUED ON  
SHEET NO. 24

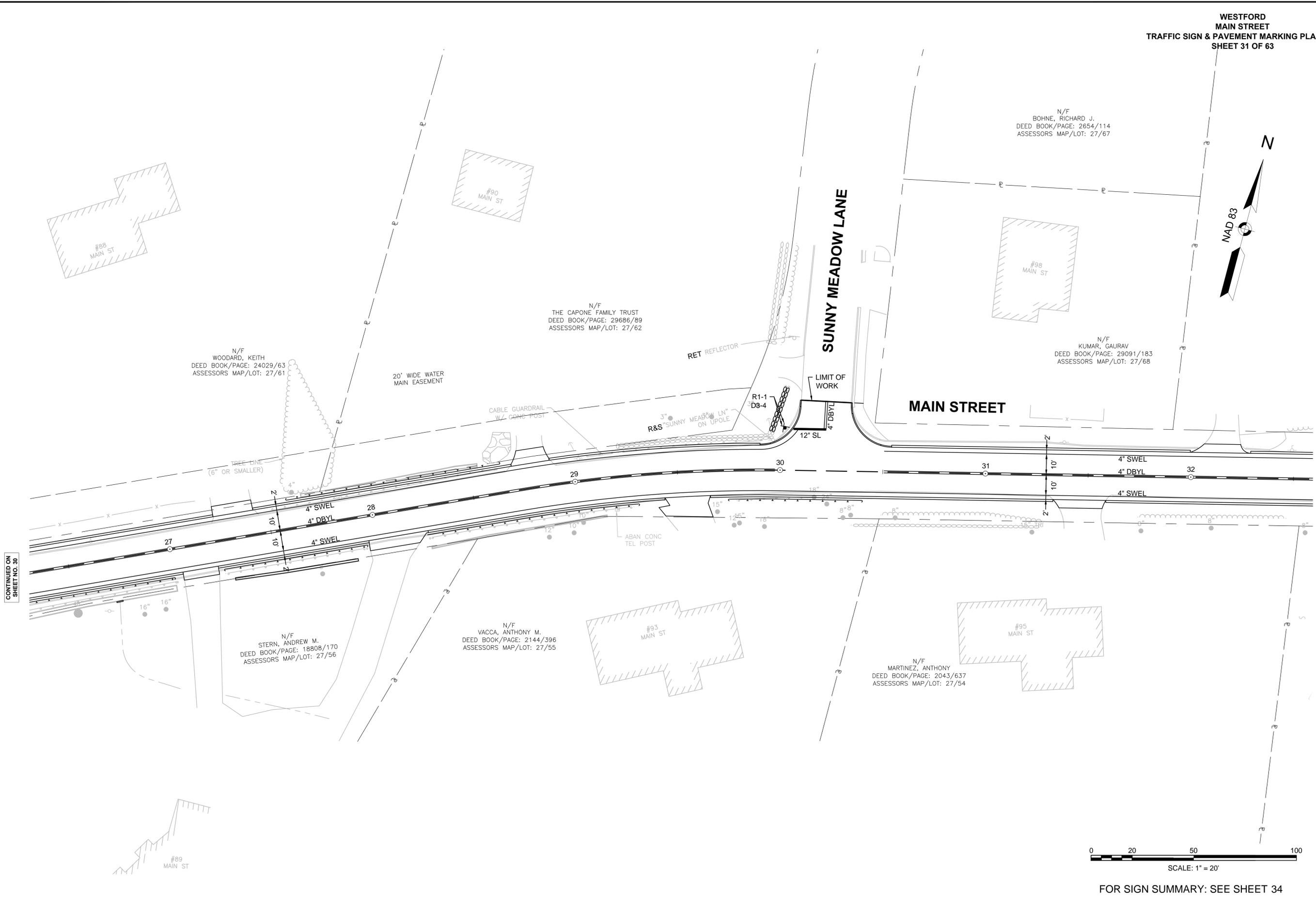
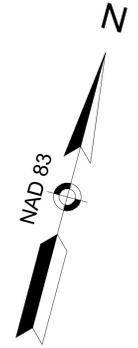
N/F  
DORAN, BRUCE L.  
DEED BOOK/PAGE: 20349/18  
ASSESSORS MAP/LOT: 27/41-2

N/F  
PIAZZA, JOSEPH  
DEED BOOK/PAGE: 23412/49  
ASSESSORS MAP/LOT: 27/57

N/F  
STERN, ANDREW M.  
DEED BOOK/PAGE: 18808/170  
ASSESSORS MAP/LOT: 27/56

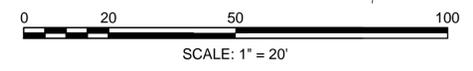


FOR SIGN SUMMARY: SEE SHEET 34

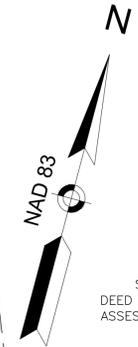


CONTINUED ON  
SHEET NO. 30

CONTINUED ON  
SHEET NO. 32



FOR SIGN SUMMARY: SEE SHEET 34



N/F  
 SCOTT, TIMOTHY P.  
 DEED BOOK/PAGE: 26929/51  
 ASSESSORS MAP/LOT: 27/72

N/F  
 SHERMAN, FRANK W.  
 DEED BOOK/PAGE: 2037/136  
 ASSESSORS MAP/LOT: 27/71

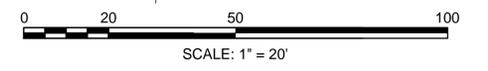
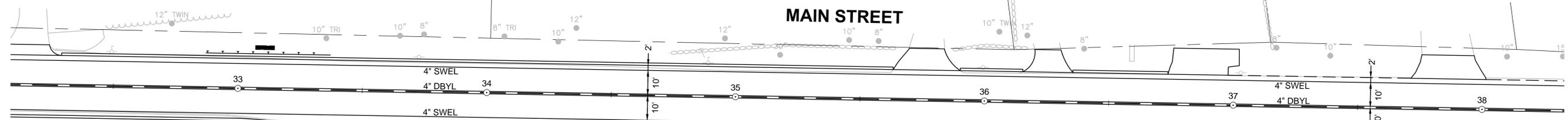
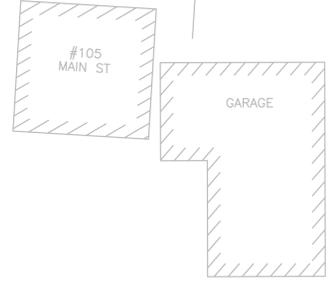
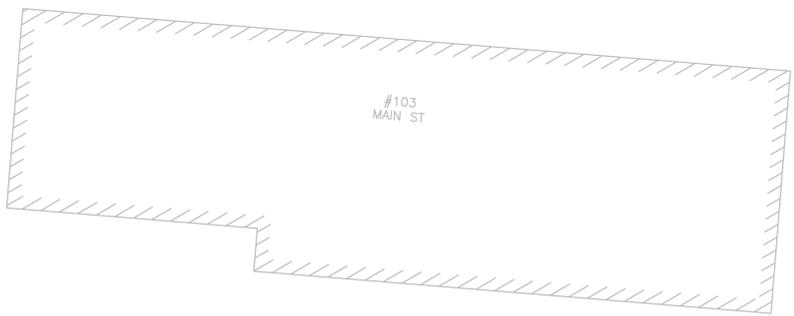
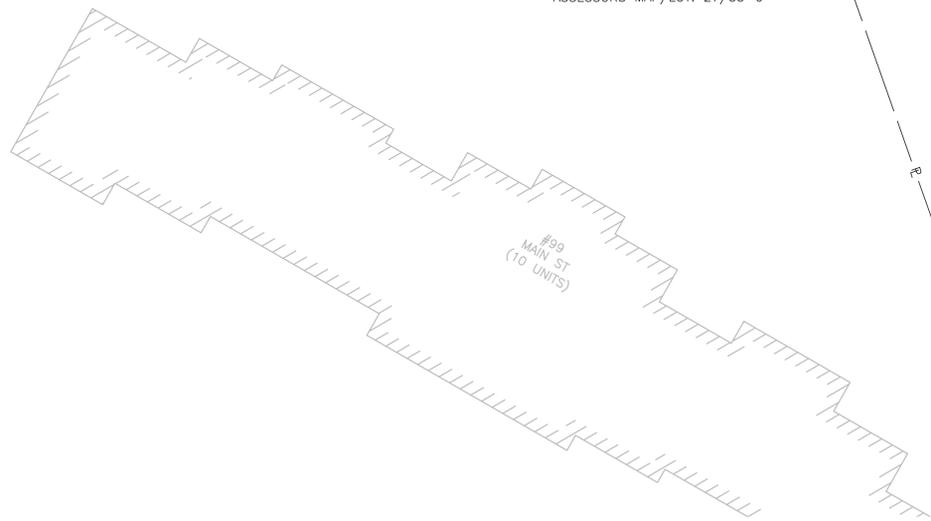
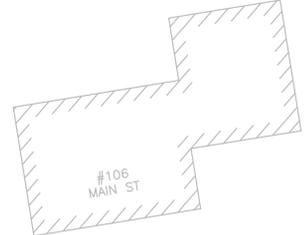
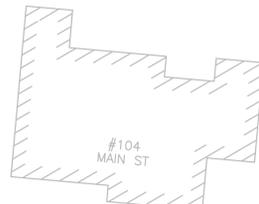
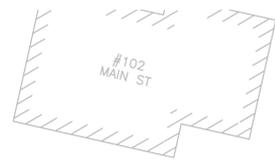
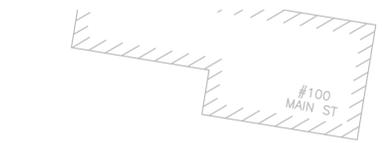
N/F  
 CHIA, KEN & JEANETTE  
 DEED BOOK/PAGE: 26289/273  
 ASSESSORS MAP/LOT: 27/70

N/F  
 KERIS, DENNIS J.  
 DEED BOOK/PAGE: 2435/231  
 ASSESSORS MAP/LOT: 27/69

N/F  
 ROSEGATE DEVELOPMENT, LLC.  
 DEED BOOK/PAGE: 14327/107  
 ASSESSORS MAP/LOT: 27/53-0

N/F  
 TEDESCHI FOOD SHOPS, INC.  
 DEED BOOK/PAGE: 1989/199  
 ASSESSORS MAP/LOT: 27/52

N/F  
 WHITNEY, ROBERT S.  
 DEED BOOK/PAGE: 28544/1  
 ASSESSORS MAP/LOT: 27/51-1



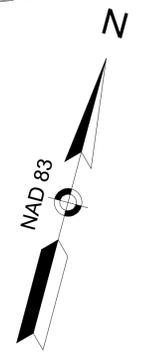
FOR SIGN SUMMARY: SEE SHEET 34

CONTINUED ON  
 SHEET NO. 31

CONTINUED ON  
 SHEET NO. 33

**WESTFORD  
MAIN STREET  
TRAFFIC SIGN & PAVEMENT MARKING PLANS - 6  
SHEET 33 OF 63**

BRENNEN, WILLIAM L  
DEED BOOK/PAGE: 2212/415  
ASSESSORS MAP/LOT: 27/110



N/F  
MANGIARATTI, JOHN S.  
DEED BOOK/PAGE: 26049/143  
ASSESSORS MAP/LOT: 27/109

N/F  
STEWART, ANDREW M.  
DEED BOOK/PAGE: 28507/37  
ASSESSORS MAP/LOT: 27/91

N/F  
WICZYNSKI, MACIEJ & KAREN  
DEED BOOK/PAGE: 23719/255  
ASSESSORS MAP/LOT: 27/90

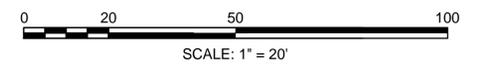
N/F  
MCCARTHY, MARC  
DEED BOOK/PAGE: 28544/5  
ASSESSORS MAP/LOT: 27/73

N/F  
WHITNEY, ROBERT S.  
DEED BOOK/PAGE: 28544/1  
ASSESSORS MAP/LOT: 27/51-1

N/F  
WHITNEY, ROBERT S.  
DEED BOOK/PAGE: 28544/8  
ASSESSORS MAP/LOT: 27/49

N/F  
ECHAVARRI, JAVIER J.  
DEED BOOK/PAGE: 6449/12  
ASSESSORS MAP/LOT: 27/92

NORRIS  
DEED BO-  
ASSESSOR



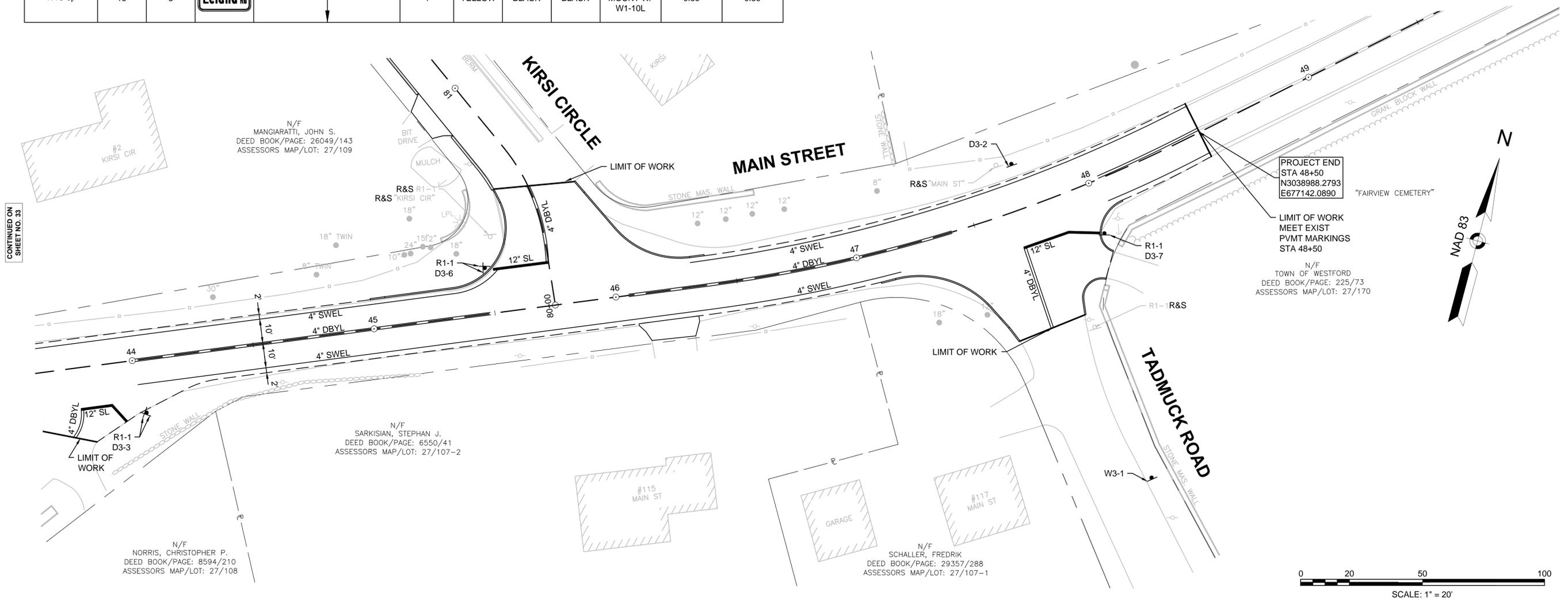
FOR SIGN SUMMARY: SEE SHEET 34

CONTINUED ON  
SHEET NO. 32

CONTINUED ON  
SHEET NO. 34

TRAFFIC SIGN SUMMARY													
IDENTIFICATION NUMBER	SIZE OF SIGN (in)		LEGEND	TEXT DIMENSIONS (in)			NUMBER OF SIGNS REQUIRED	COLOR			NUMBER OF POSTS REQUIRED	UNIT AREA (SF)	TOTAL AREA (SF)
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR		BACK-GROUND	LEGEND	BORDER			
R1-1	36	36		SEE 2009 MUTCD FOR TEXT AND LEGEND DIMENSIONS			10	RED	WHITE	WHITE	10	9.00	90.00
R3-8 (15)	30	30					2	WHITE	BLACK	BLACK	2	6.25	12.50
R4-7	24	30					1	WHITE	BLACK	BLACK	1	5.00	5.00
R5-1	30	30					1	WHITE	RED	RED	0 MOUNT W/ R1-1	6.25	6.25
W1-2R	30	30					1	YELLOW	BLACK	BLACK	1	6.25	6.25
W1-10L	30	30					1	YELLOW	BLACK	BLACK	1	6.25	6.25
W3-1	30	30					1	YELLOW	BLACK / RED	BLACK	1	6.25	6.25
W16-8p	16	8					1	YELLOW	BLACK	BLACK	0 MOUNT W/ W1-10L	0.89	0.89

TRAFFIC SIGN SUMMARY													
IDENTIFICATION NUMBER	SIZE OF SIGN (in)		LEGEND	TEXT DIMENSIONS (in)			NUMBER OF SIGNS REQUIRED	COLOR			NUMBER OF POSTS REQUIRED	UNIT AREA (SF)	TOTAL AREA (SF)
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR		BACK-GROUND	LEGEND	BORDER			
D3-1	30	12	SEE BELOW	SEE 2009 MUTCD FOR TEXT AND LEGEND DIMENSIONS			1	GREEN	WHITE	WHITE	0 MOUNT 1 W/ R1-1		PAID UNDER ITEM 874.
D3-2	30	12	SEE BELOW				2	GREEN	WHITE	WHITE	1 MOUNT 1 W/ R1-1		PAID UNDER ITEM 874.
D3-3	36	12	SEE BELOW				2	GREEN	WHITE	WHITE	0 MOUNT W/ R1-1		PAID UNDER ITEM 874.
D3-4	60	12	SEE BELOW				1	GREEN	WHITE	WHITE	0 MOUNT W/ R1-1		PAID UNDER ITEM 874.
D3-5	48	12	SEE BELOW				2	GREEN	WHITE	WHITE	0 MOUNT W/ R1-1		PAID UNDER ITEM 874.
D3-6	30	12	SEE BELOW				1	GREEN	WHITE	WHITE	0 MOUNT W/ R1-1		PAID UNDER ITEM 874.
D3-7	42	12	SEE BELOW				1	GREEN	WHITE	WHITE	0 MOUNT W/ R1-1		PAID UNDER ITEM 874.

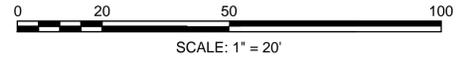
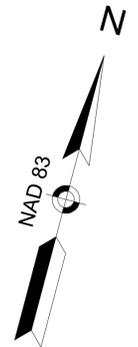


CONTINUED ON SHEET NO. 33

PROJECT END  
STA 48+50  
N3038988.2793  
E677142.0890

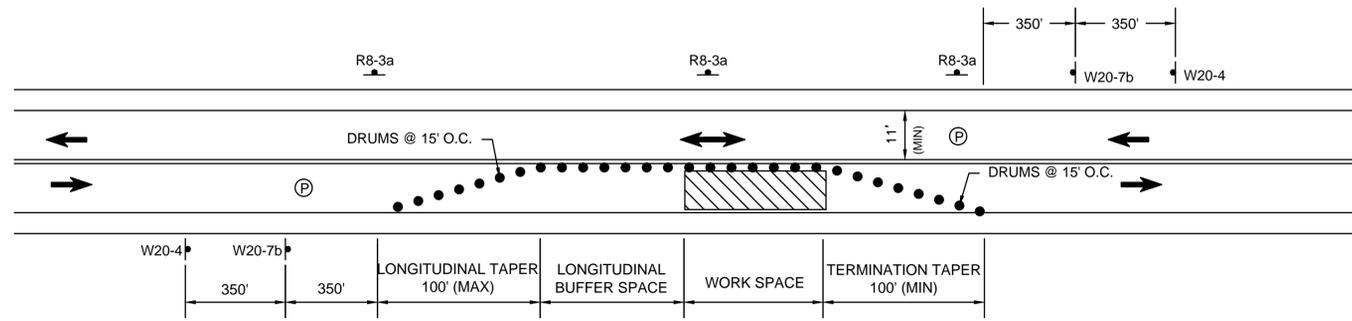
LIMIT OF WORK  
MEET EXIST  
PVMT MARKINGS  
STA 48+50

N/F  
TOWN OF WESTFORD  
DEED BOOK/PAGE: 225/73  
ASSESSORS MAP/LOT: 27/170



**GENERAL NOTES**

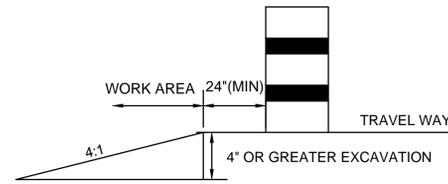
- ALL CONSTRUCTION SIGNING, DRUMS, BARRICADES AND OTHER DEVICES SHALL CONFORM WITH THE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D.) AS AMENDED.
- ALL DRUMS SHALL BE APPROXIMATELY PLACED AND MOVED AS NECESSARY TO MAINTAIN ADEQUATE ABUTTER ACCESS AT ALL TIMES. WORK MAY REQUIRE ADDITIONAL 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.
- 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, SUCH AS DRAINAGE AND WATER PIPE INSTALLATION, EXISTING PAVEMENT EXCAVATION, TEMPORARY DRIVEWAY PAVEMENT PLACEMENT AND SIMILAR OPERATIONS.
- 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.
- GRADE SEPARATIONS IN EXCESS OF 2" DURING NON-WORKING HOURS SHALL REQUIRE DELINEATION BY USE OF DRUMS.
- EXCAVATION EDGES IN EXCESS OF 4" DEEP SHALL BE PROTECTED DURING NON-WORKING HOURS BY BACKFILLING WITH A WEDGE OF GRAVEL OR SOIL TO COMPACTED 4:1 SLOPE.
- 11' MINIMUM LANE WIDTHS SHALL BE MAINTAINED AT ALL TIMES.
- NON-ESSENTIAL TRAFFIC CONTROL DEVICES SHALL BE COVERED OR REMOVED DURING NON-WORKING HOURS.
- ADVISORY SPEED PLATES (W13-1) SHALL BE USED IF APPROPRIATE AND AS DIRECTED BY THE ENGINEER.
- TEMPORARY FENCE SHOULD BE USED TO PROTECT WORK AREAS DURING NON-WORKING HOURS AS DIRECTED BY THE ENGINEER.
- CONSTRUCTION SIGNING MAY BE MOVED AT THE DISCRETION OF THE ENGINEER.
- DETOURS MAY BE ALLOWED FOR CERTAIN OPERATIONS AND WILL BE DISCUSSED IN FURTHER DETAIL AT THE PRE-CONSTRUCTION CONFERENCE. ALL DETOUR SIGNING, BARRICADES, AND OTHER TRAFFIC CONTROL DEVICES SHALL BE CONSIDERED INCIDENTAL TO VARIOUS CONTRACT ITEMS UNLESS OTHERWISE DIRECTED BY THE ENGINEER.



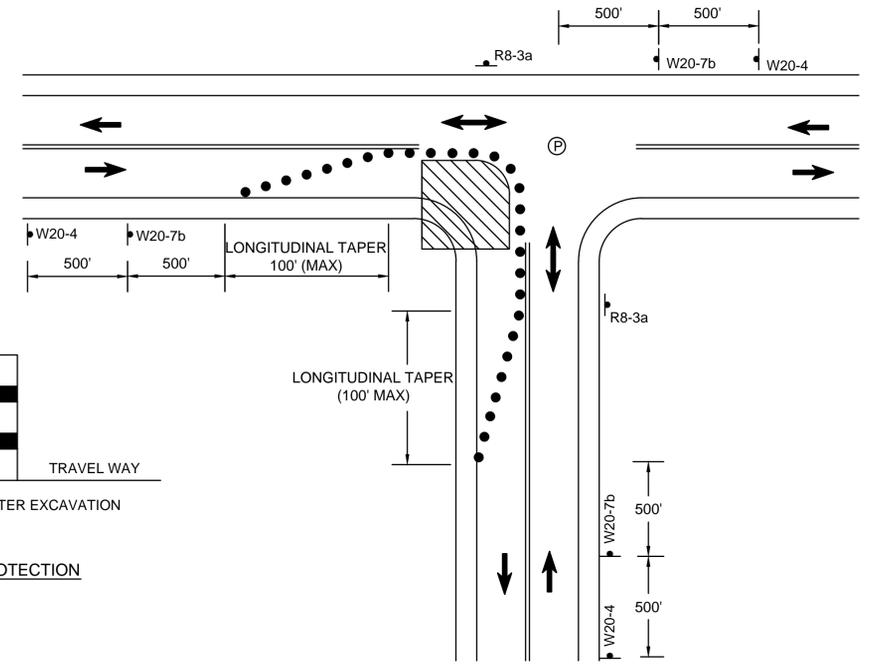
**NOTES:**

- DRUM SPACING FOR LONGITUDINAL TAPER SECTION SHALL NOT EXCEED A DISTANCE IN FEET EQUAL TO THE POSTED SPEED.
- DRUM SPACING FOR TANGENT SECTION SHALL NOT EXCEED A DISTANCE IN FEET EQUAL TO TWICE THE POSTED SPEED.
- DRUM SPACING FOR TERMINATION TAPER SECTION SHALL NOT EXCEED 20 FEET.

**TYPICAL LANE CLOSURE ON TWO-LANE ROAD USING POLICE OFFICERS**  
N.T.S.



**ROADWAY SLOPE PROTECTION**  
N.T.S.

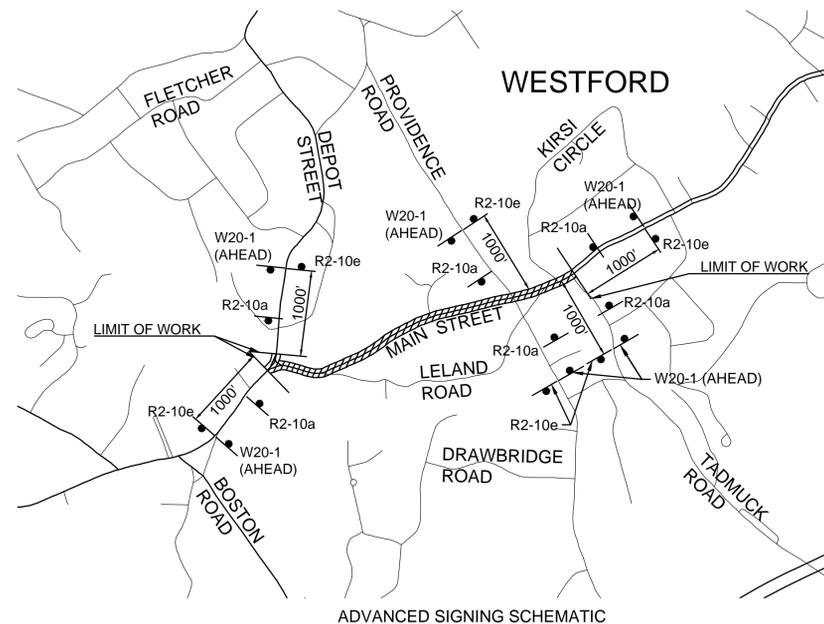


**NOTES:**

- DRUM SPACING FOR LONGITUDINAL TAPER SECTION SHALL NOT EXCEED A DISTANCE IN FEET EQUAL TO THE POSTED SPEED.
- DRUM SPACING FOR TANGENT SECTION SHALL NOT EXCEED A DISTANCE IN FEET EQUAL TO TWICE THE POSTED SPEED.
- DRUM SPACING FOR TERMINATION TAPER SECTION SHALL NOT EXCEED 20 FEET.

**TYPICAL LANE CLOSURE ON TWO-LANE ROAD USING POLICE OFFICERS**  
N.T.S.

ID NUMBER	SIZE OF SIGN (in)		LEGEND	TEXT DIMENSIONS(in)			COLOR			NUMBER OF SIGNS REQUIRED	UNIT AREA (SF)	TOTAL AREA (SF)
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.	BACK-GROUND	LEGEND	BORDER			
R8-3a	24	30		SEE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS			WHITE	RED	RED	3	5.00	25.00
W20-1 (AHEAD)	36	36					ORANGE	BLACK	BLACK	11	9.00	108.00
W20-4	36	36					ORANGE	BLACK	BLACK	3	9.00	45.00
R2-10a	48	36		MASSDOT STANDARD SIGN			ORANGE	WHITE	BLACK BLACK	11	12.00	121.00
R2-10e	36	48					ORANGE	WHITE	BLACK BLACK	11	12.00	121.00
W20-7b	36	36					ORANGE	BLACK	BLACK	3	9.00	27.00



**ADVANCED SIGNING SCHEMATIC**  
N.T.S.

**NOTES**

ALL SIDE STREETS WITHIN THE PROJECT LIMITS SHALL INCLUDE W20-1, R2-10a, AND R2-10e SIGNS. SIGNS SHALL BE PLACED IN CONFORMANCE WITH THE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

**LONGITUDINAL BUFFER**

SPEED (mph)	BUFFER (FT)
20	115
25	155
30	200
35	250
40	305
45	360

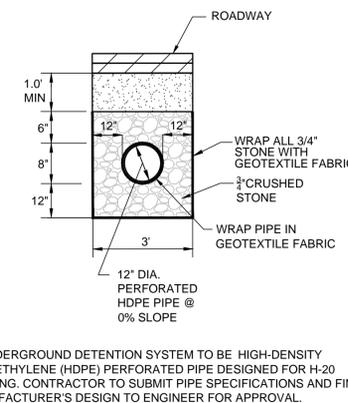
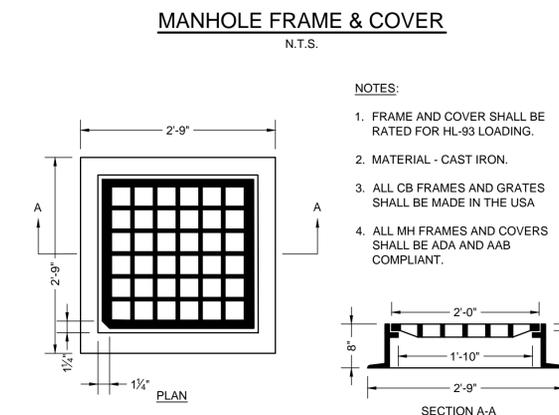
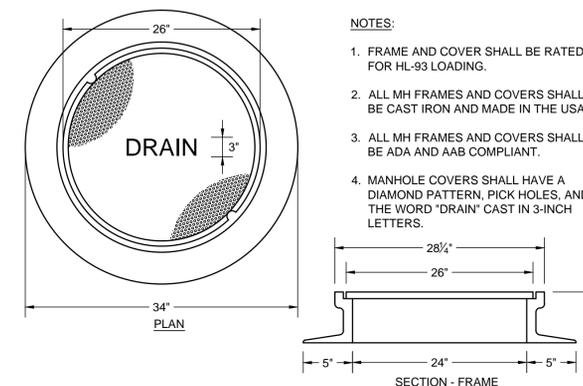
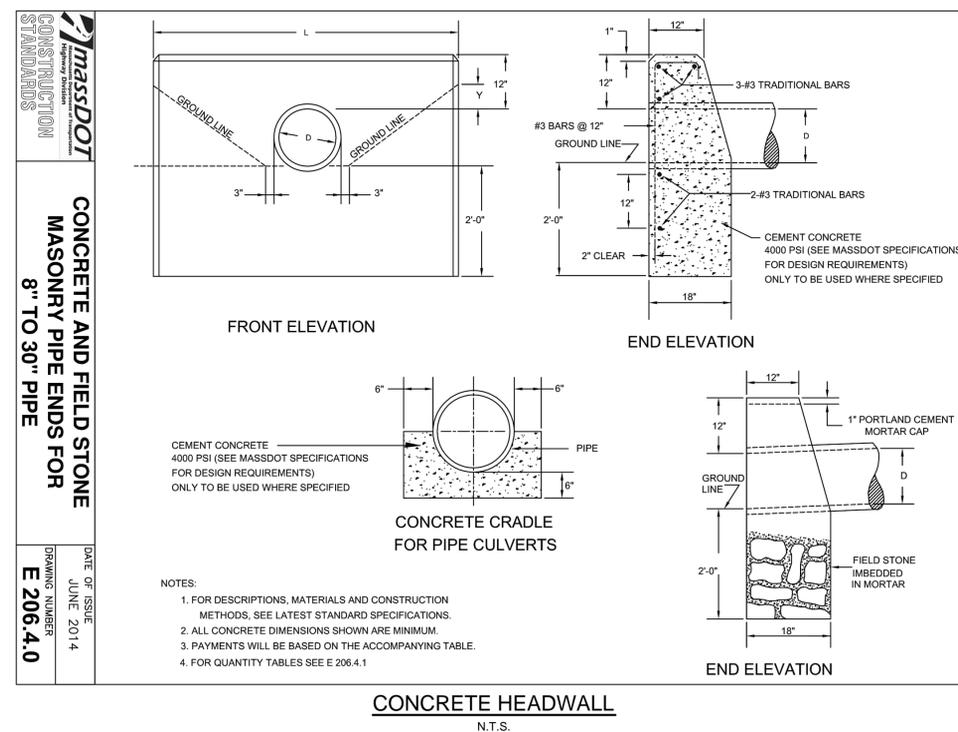
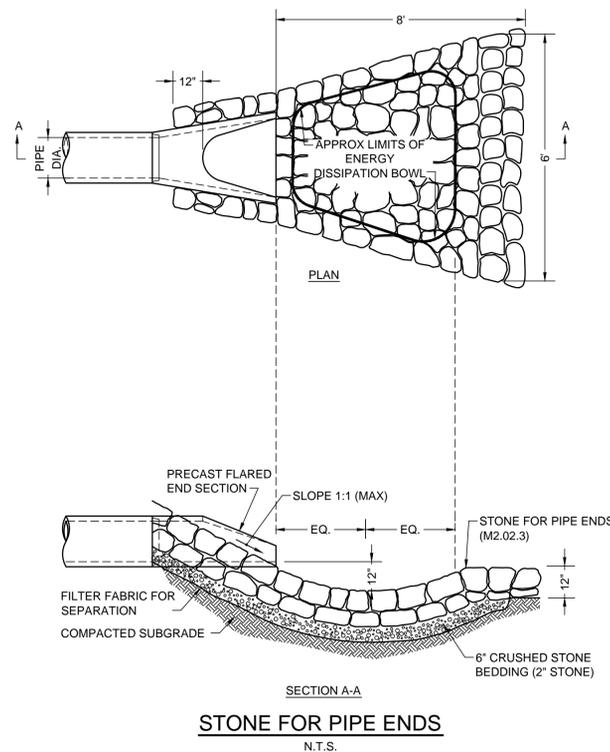
**MERGING TAPER LENGTH (L)**

SPEED (mph)	TAPER WIDTH (FT)		
	9	10	11
25	95	105	115
30	135	150	165
35	185	205	225
40	240	270	295
45	405	450	495

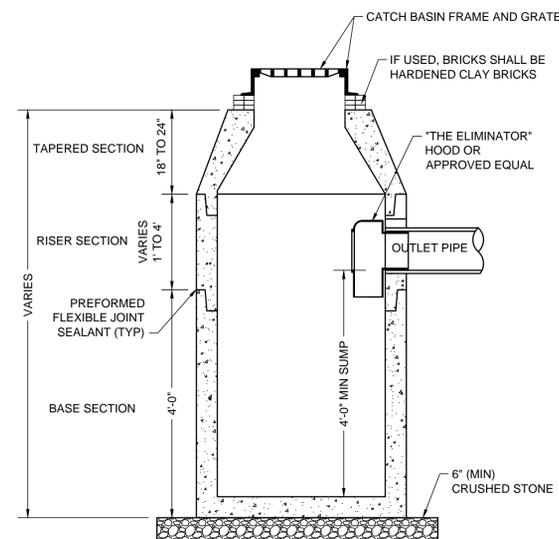
**LEGEND**

- DRUM
- Ⓟ POLICE OFFICER
- ⚠ CONSTRUCTION SIGN
- ⚡ TYPE III BARRICADE
- ▨ WORK AREA
- ➡ PROPOSED TRAFFIC FLOW
- N.T.S. NOT TO SCALE

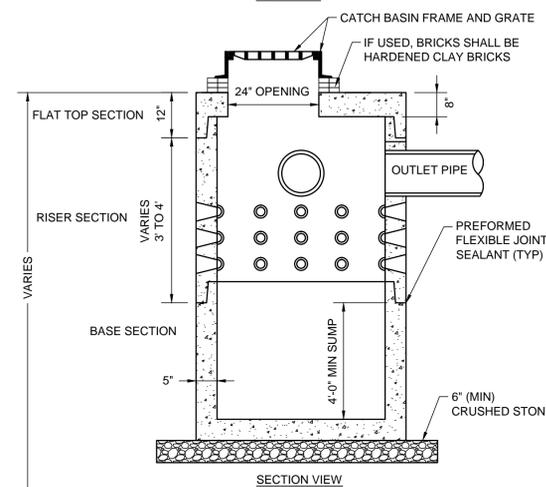
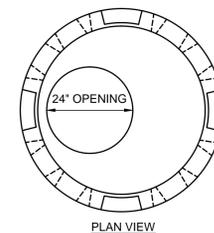




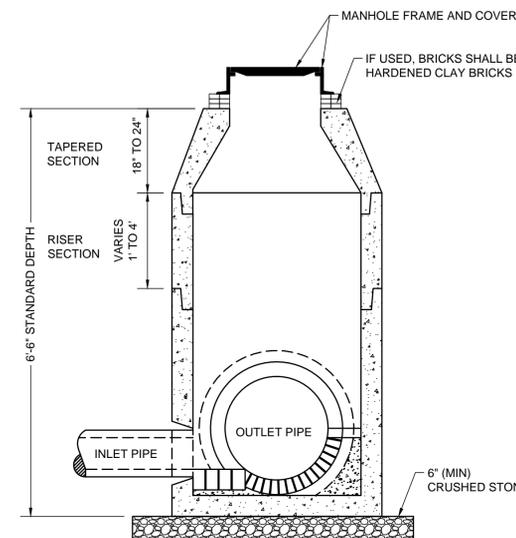
NOTE:  
1. UNDERGROUND DETENTION SYSTEM TO BE HIGH-DENSITY POLYETHYLENE (HDPE) PERFORATED PIPE DESIGNED FOR H-20 LOADING. CONTRACTOR TO SUBMIT PIPE SPECIFICATIONS AND FINAL MANUFACTURER'S DESIGN TO ENGINEER FOR APPROVAL.



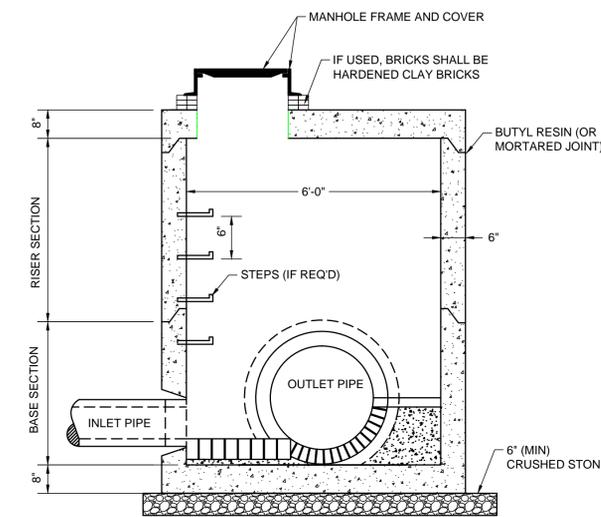
- NOTES:
- ALL CATCH BASINS SHALL CONFORM TO MASSDOT CONSTRUCTION STANDARD E 201.4.0 EXCEPT AS SHOWN ABOVE.
  - ALL CATCH BASINS SHALL INCLUDE A CATCH BASIN HOOD FOR THE OUTLET PIPE. HOODS SHALL BE "THE ELIMINATOR" HOOD OR APPROVED EQUAL.
  - CATCH BASIN AND ALL APPURTENANCES SHALL MEET HL-93 LOADING.
  - BRICK SHALL BE SOUND, HARD, AND UNIFORMLY BURNED BRICK, REGULAR IN SHAPE AND SIZE, OF COMPACT TEXTURE, AND SATISFACTORY TO THE ENGINEER. BRICKS SHALL COMPLY WITH ASTM C32, FOR GRADE SS, HARD BRICK, EXCEPT THAT THE MEAN OF FIVE TESTS FOR ABSORPTION SHALL NOT EXCEED 8 PERCENT BY WEIGHT.



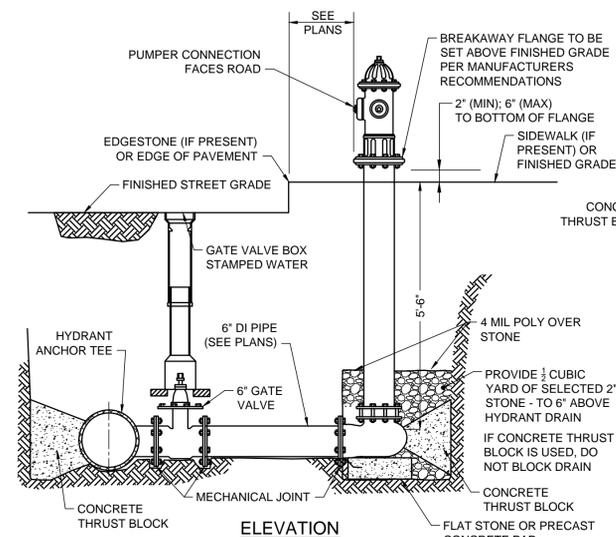
- NOTES:
- CONCRETE SHALL BE 4,000 PSI MINIMUM AFTER 28 DAYS
  - LEACHING CATCH BASINS SHALL BE DESIGNED FOR HL-93 LOADING
  - BRICK SHALL BE SOUND, HARD, AND UNIFORMLY BURNED BRICK, REGULAR IN SHAPE AND SIZE, OF COMPACT TEXTURE, AND SATISFACTORY TO THE ENGINEER. BRICKS SHALL COMPLY WITH ASTM C32, FOR GRADE SS, HARD BRICK, EXCEPT THAT THE MEAN OF FIVE TESTS FOR ABSORPTION SHALL NOT EXCEED 8 PERCENT BY WEIGHT.



- NOTES:
- ALL STANDARD MANHOLES SHALL CONFORM TO MASSDOT CONSTRUCTION STANDARD E 202.4.0 EXCEPT AS SHOWN ABOVE.
  - MANHOLE AND ALL APPURTENANCES SHALL MEET HL-93 LOADING.
  - BRICK SHALL BE SOUND, HARD, AND UNIFORMLY BURNED BRICK, REGULAR IN SHAPE AND SIZE, OF COMPACT TEXTURE, AND SATISFACTORY TO THE ENGINEER. BRICKS SHALL COMPLY WITH ASTM C32, FOR GRADE SS, HARD BRICK, EXCEPT THAT THE MEAN OF FIVE TESTS FOR ABSORPTION SHALL NOT EXCEED 8 PERCENT BY WEIGHT.



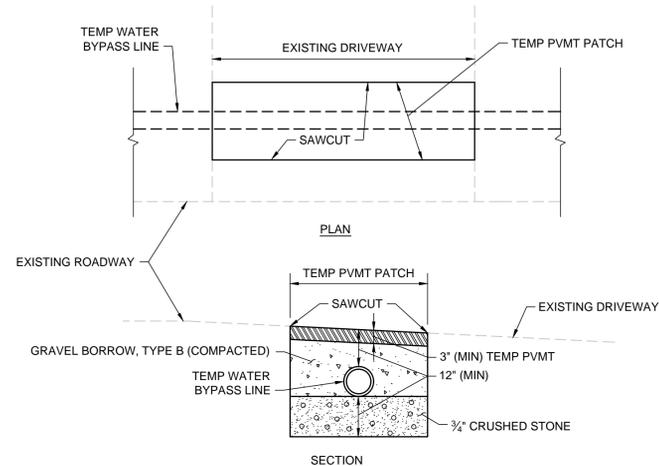
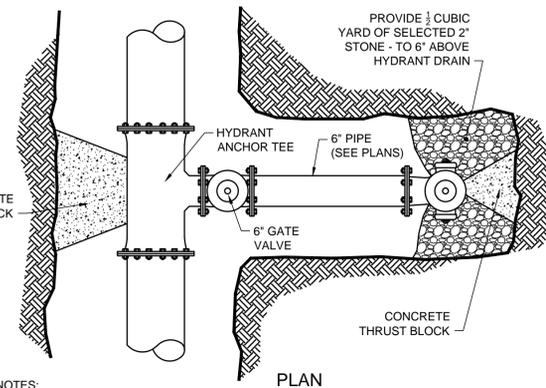
- NOTES:
- ALL 6' DIAMETER MANHOLES SHALL CONFORM TO MASSDOT CONSTRUCTION STANDARD E 202.4.0 EXCEPT AS SHOWN ABOVE.
  - MANHOLE AND ALL APPURTENANCES SHALL MEET HL-93 LOADING.
  - BRICK SHALL BE SOUND, HARD, AND UNIFORMLY BURNED BRICK, REGULAR IN SHAPE AND SIZE, OF COMPACT TEXTURE, AND SATISFACTORY TO THE ENGINEER. BRICKS SHALL COMPLY WITH ASTM C32, FOR GRADE SS, HARD BRICK, EXCEPT THAT THE MEAN OF FIVE TESTS FOR ABSORPTION SHALL NOT EXCEED 8 PERCENT BY WEIGHT.



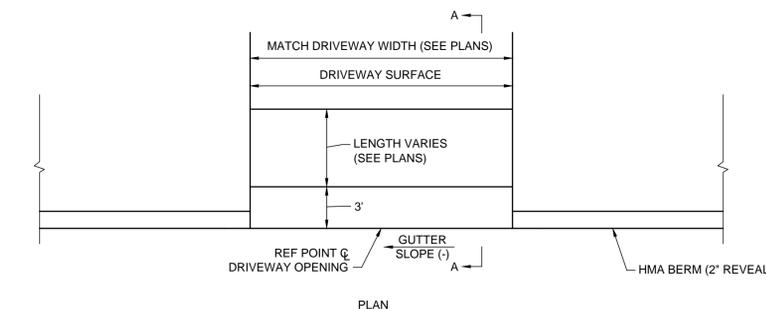
**NOTES:**

1. ALL CONCRETE TO BE CAST-IN-PLACE (MIN 3000 PSI)
2. CONCRETE THRUST BLOCK TO BE USED ONLY WHERE IT WILL BEAR ON UNDISTURBED EARTH.
3. CONTRACTOR SHALL SHIELD HYDRANT BASE DRAIN HOLES, MECHANICAL JOINT GLANDS, AND BOLTS DURING PLACEMENT OF CONCRETE THRUST BLOCKS. DRAIN HOLES, GLANDS AND BOLTS, SHALL BE VERIFIED AS OPEN AND FREE OF OBSTRUCTIONS PRIOR TO BACKFILLING.

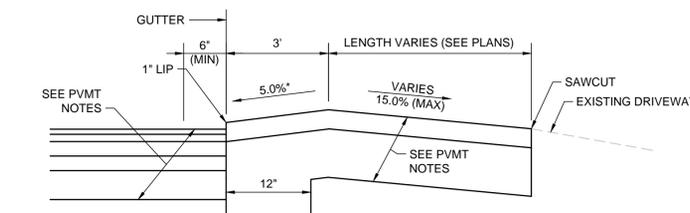
**HYDRANT ASSEMBLY**  
N.T.S.



**TEMPORARY WATER BYPASS AT DRIVEWAYS**  
N.T.S.

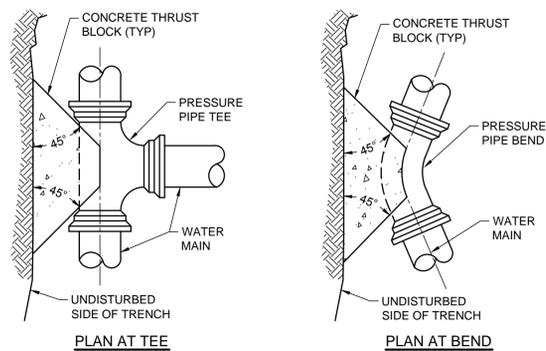
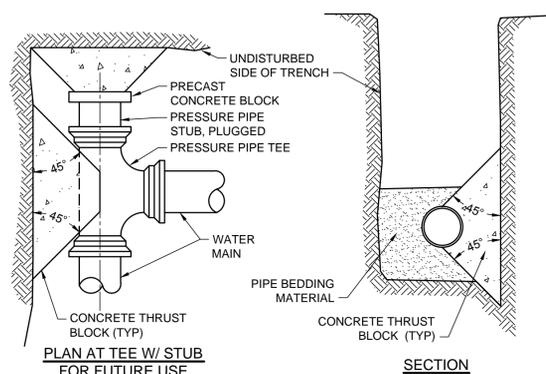


\*TOLERANCE FOR CONSTRUCTION ±0.5%



\*CROSS SLOPE MODIFIED TO MATCH STEEP DRIVEWAY SLOPES (SEE CROSS SECTIONS)

**HMA DRIVEWAY TO MATCH EXIST**  
N.T.S.



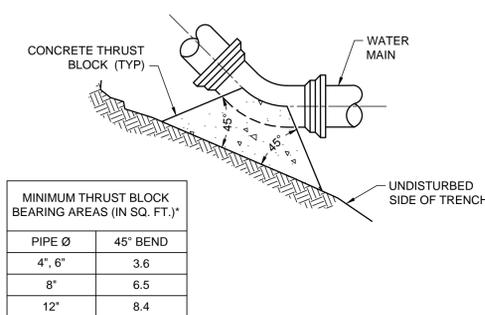
MINIMUM THRUST BLOCK BEARING AREAS (IN SQ. FT.)*				
PIPE Ø	90° BEND	45° BEND	22.5° BEND	TEE / END
4", 6", 8"	6.0	2.9	2.3	4.5
10"	9.6	5.2	2.3	6.7
12"	13.3	6.7	3.7	9.6

MINIMUM PIPE RESTRAINT LENGTH (IN FEET)*					
PIPE Ø	90° BEND	45° BEND	22.5° BEND	TEES	PLUG/CAP
8"	21.0	9.0	4.0	29.0	38.0
10"	26.0	11.0	5.0	38.0	46.0
12"	33.0	14.0	6.0	48.0	69.0

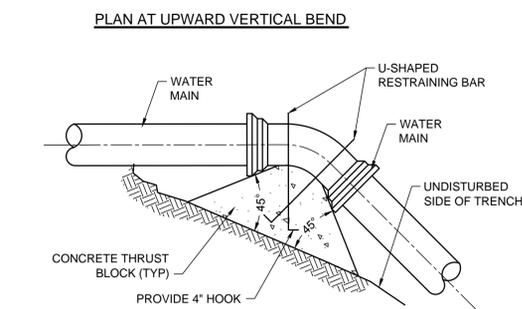
**NOTES:**

1. ALL WATER MAIN FITTINGS, BENDS, TEES, PLUGS ETC. SHALL BE RESTRAINED W/ THRUST BLOCKS EXCEPT WHERE NOTED.
2. ALL THRUST BLOCKS & COLLARS SHALL BE INSTALLED SO THAT THEY BEAR AGAINST UNDISTURBED EARTH.
3. MINIMUM COMPRESSIVE STRENGTH OF THRUST BLOCK CONCRETE SHALL BE 3,000 P.S.I.
4. KEEP CONCRETE CLEAR OF MECHANICAL JOINTS.
5. MINIMUM BEARING AREAS ARE BASED ON 250 P.S.I. INTERNAL PIPE PRESSURE & 1.5 TON/S.F. ALLOWABLE SOIL BEARING CAPACITY.
6. MINIMUM PIPE RESTRAINT LENGTH IS BASED ON DUCTILE IRON PIPE WITH A 150 P.S.I. INTERNAL PIPE PRESSURE WITH 5.0' OF BURY IN UNIFIED SOIL CLASSIFICATION SM.

**THRUST BLOCK DETAILS - HORIZONTAL BENDS**  
N.T.S.



MINIMUM THRUST BLOCK BEARING AREAS (IN SQ. FT.)*	
PIPE Ø	45° BEND
4", 6"	3.6
8"	6.5
12"	8.4

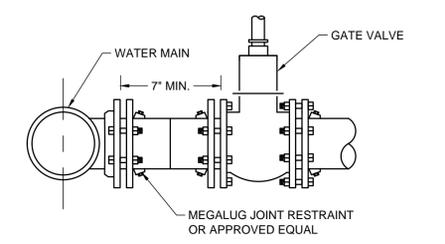


MINIMUM THRUST BLOCK BEARING AREAS (IN SQ. FT.)*		RESTRAINING BAR DIMENSIONS		
PIPE Ø	45° BEND	PIPE Ø	BAR SIZE	EMBEDMENT LENGTH
4", 6"	.9	4", 6"	#4	15"
8"	1.6	8"	#4	15"
12"	3.3	12"	#6	2'-0"

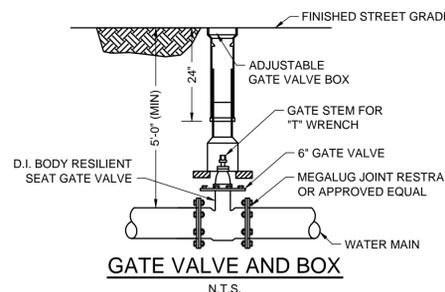
**NOTES:**

1. ALL WATER MAIN BENDS SHALL BE RESTRAINED W/ THRUST BLOCKS EXCEPT WHERE NOTED.
2. ALL THRUST BLOCKS & COLLARS SHALL BE INSTALLED SO THAT THEY BEAR AGAINST UNDISTURBED EARTH.
3. MINIMUM COMPRESSIVE STRENGTH OF THRUST BLOCK CONCRETE SHALL BE 3,000 P.S.I.
4. KEEP CONCRETE CLEAR OF MECHANICAL JOINTS.
5. MINIMUM BEARING AREAS ARE BASED ON 250 P.S.I. INTERNAL PIPE PRESSURE & 1.5 TON/S.F. ALLOWABLE SOIL BEARING CAPACITY.

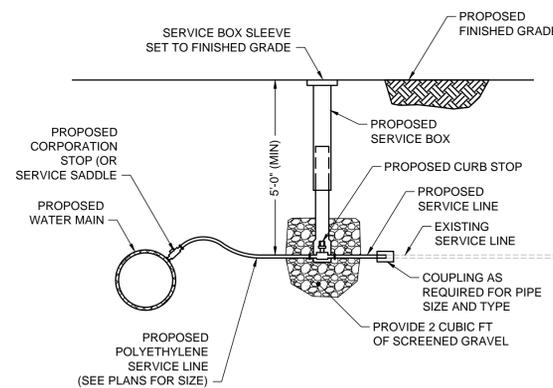
**THRUST BLOCK DETAILS - VERTICAL BENDS**  
N.T.S.



**MECHANICAL JOINT RESTRAINT**  
N.T.S.



**GATE VALVE AND BOX**  
N.T.S.



**WATER SERVICE CONNECTION**  
N.T.S.

DRIVEWAY DATA				
NUMBER	STREET NAME	DRIVEWAY REFERENCE		WIDTH
		STATION	OFFSET	
D1	MAIN STREET	11+82	12' RT	31.0
D2	MAIN STREET	13+01	12' RT	49.5
D3	MAIN STREET	13+72	17' LT	24.0
D4	MAIN STREET	14+47	12' RT	22.0
D5	MAIN STREET	15+24	12' LT	20.0
D6	MAIN STREET	17+49	12' LT	21.0
D7	MAIN STREET	19+10	12' LT	26.0
D8	MAIN STREET	20+74	12' RT	24.0
D9	MAIN STREET	20+98	12' LT	21.0
D10	MAIN STREET	24+10	12' LT	21.0
D11	MAIN STREET	24+49	12' RT	24.5
D12	MAIN STREET	27+13	12' RT	16.5
D13	MAIN STREET	27+33	12' LT	19.0
D14	MAIN STREET	28+06	12' RT	19.5
D15	MAIN STREET	28+80	12' LT	18.5
D16	MAIN STREET	29+56	12' RT	22.0
D17	MAIN STREET	31+47	12' RT	20.0

DRIVEWAY DATA				
NUMBER	STREET NAME	DRIVEWAY REFERENCE		WIDTH
		STATION	OFFSET	
D18	MAIN STREET	32+15	12' LT	16.0
D19	MAIN STREET	33+55	12' RT	38.5
D20	MAIN STREET	35+39	12' RT	59.0
D21	MAIN STREET	35+77	12' LT	21.5
D22	MAIN STREET	36+27	12' LT	14.0
D23	MAIN STREET	36+78	12' RT	51.0
D24	MAIN STREET	36+87	12' LT	22.0
D25	MAIN STREET	37+86	12' LT	21.0
D26	MAIN STREET	38+80	12' RT	150.0
D27	MAIN STREET	38+50	12' LT	27.0
D28	PROVIDENCE ROAD	71+25	10' LT	10.0
D29	PROVIDENCE ROAD	72+22	12' RT	23.5
D30	MAIN STREET	46+21	12' RT	18.0