MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION

WOBURN MONTVALE AVENUE			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	01	85
PROJECT FILE NO.	604935		

TITLE SHEET & INDEX

PLAN AND PROFILE OF

MONTVALE AVENUE

IN THE CITY OF

WOBURN

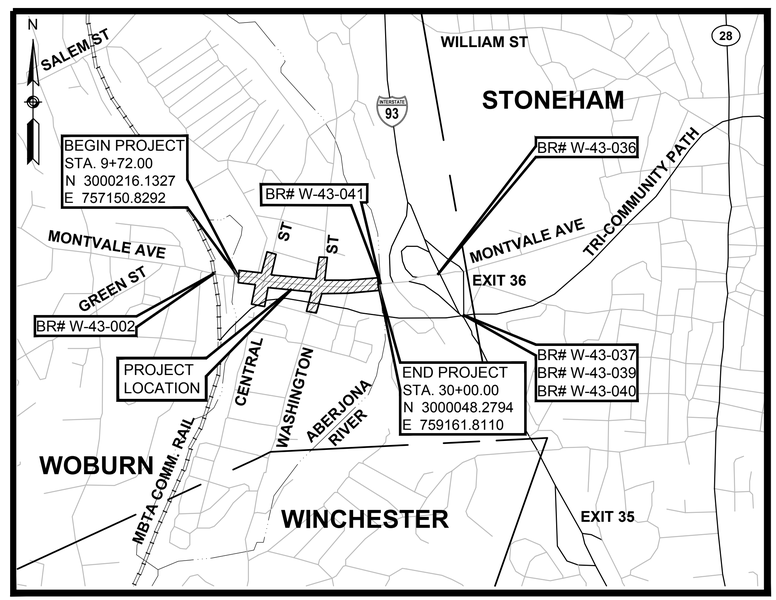
MIDDLESEX COUNTY

FEDERAL AID PROJECT NO. STP/HSI-003S(087)

THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES DATED 1988, AS AMENDED, THE SUPPLEMENTAL SPECIFICATIONS DATED JULY 1, 2015, THE 2016 CONSTRUCTION STANDARD DETAILS, THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE LATEST MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS WITH MASSACHUSETTS AMENDMENTS, 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

SHEET NO.	DESCRIPTION
01	TITLE SHEET & INDEX
02	LEGEND & GENERAL NOTES
03	KEY PLAN & BORING LOCATIONS
04	TYPICAL SECTIONS & PAVEMENT NOTES
05 - 10	EXISTING CONDITIONS
11 - 16	CONSTRUCTION PLANS
17 - 20	PROFILES
21 - 26	GRADING & TIE PLANS
27 - 34	TRAFFIC PLANS
35	COORDINATION DATA
36	SYSTEM ARCHTECTURE PLAN
37 - 38	TRAFFIC SIGN SUMMARY
39 - 42	TEMPORARY TRAFFIC CONTROL PLANS
43	TEMPORARY TRAFFIC CONTROL SIGN SUMMARY
44 - 49	DRAINAGE & UTILITY PLANS
50 - 54	CONSTRUCTION DETAILS
55 - 59	WHEELCHAIR RAMP & DRIVEWAY DETAILS
60 - 76	MONTVALE AVENUE CROSS SECTIONS
77 - 80	CENTRAL STREET CROSS SECTIONS
81 - 85	WASHINGTON STREET CROSS SECTIONS



0 1000 2000 3000 4000

SCALE: 1" = 1000'

LENGTH OF PROJECT = 2,028 FEET = 0.384 MILES

DESIGN DESIGNATION (MONTVALE AVENUE AT CENTRAL STREET)

DESIGN SPEED	40 MPH
ADT (2014)	15,800 VPD
ADT (2024, 2034)	16,600 VPD, 17,500 VPD
K	6%
D	58.5% (EB)
T (PEAK HOUR)	2.1%
T (AVERAGE DAY)	5.0%
DHV	1,050 VPH
DDHV	610 VPH
FUNCTIONAL CLASSIFICATION	URBAN PRINCIPAL ARTERIAL

DESIGN DESIGNATION (MONTVALE AVENUE EAST OF CENTRAL STREET)

DESIGN SPEED	35 MPH
ADT (2014)	16,900 VPD
ADT (2024, 2034)	17,800 VPD, 18,700 VPD
K	6%
D	61% (WB)
T (PEAK HOUR)	4.2%
T (AVERAGE DAY)	2.5%
DHV	1,100 VPH
DDHV	670 VPH
FUNCTIONAL CLASSIFICATION	URBAN PRINCIPAL ARTERIAL

DATE	DESCRIPTION	REV #

massDOT Massachusetts Department of Transportation Highway Division

RECOMMENDED FOR APPROVAL

CHIEF ENGINEER DATE

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED:

DIVISION ADMINISTRATOR DATE

APPROVED

HIGHWAY ADMINISTRATOR DATE

08363.40-COV.DWG Plotted on 23-Aug-2017 8:56 AM

GENERAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
JB	JB	JERSEY BARRIER
CB	CB	CATCH BASIN
		CATCH BASIN CURB INLET
MB	MB	MAIL BOX
EHH	EHH	ELECTRIC HANDHOLE
GG	GG	GAS GATE
BHL #	BHL #	BORING HOLE
MW #	MW #	MONITORING WELL
TP #	TP #	TEST PIT
		HYDRANT
		LIGHT POLE
		CABLE MANHOLE
		DRAINAGE MANHOLE
		ELECTRIC MANHOLE
		GAS MANHOLE
		MISC MANHOLE
		SEWER MANHOLE
		TELEPHONE MANHOLE
		WATER MANHOLE
MHB	MHB	MASSACHUSETTS HIGHWAY BOUND
MON		MONUMENT
SB		STONE BOUND
TB		TOWN OR CITY BOUND
		TRAVERSE OR TRIANGULATION STATION
TPL or GUY	TPL or GUY	TROLLEY POLE OR GUY POLE
UFB	UFB	UTILITY POLE W/ FIREBOX
UPDL	UPDL	UTILITY POLE WITH DOUBLE LIGHT
ULT	ULT	UTILITY POLE W / 1 LIGHT
UP	UP	UTILITY POLE
		BUSH
•SIZE & TYPE		TREE
WG	WG	WATER GATE
PM	PM	PARKING METER
		OVERHEAD CABLE/WIRE
		CURBING
100 99		CONTOURS (ON-THE-GROUND SURVEY DATA)
100 99		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
		EROSION CONTROL BARRIER
		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

TRAFFIC SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
Ø1	Ø1	CONTROLLER PHASE
		VIDEO DETECTION ZONE
		VEHICLE DETECTION CAMERA
		PEDESTRIAN PUSH BUTTON, SIGN AND SADDLE
		EMERGENCY PREEMPTION CONFIRMATION STROBE LIGHT
		VEHICULAR SIGNAL HEAD, WITH/WITHOUT BACKPLATE
		VEHICULAR SIGNAL HEAD, OPTICALLY PROGRAMMED, WITH/WITHOUT BACKPLATE
		FLASHING BEACON, WITH/WITHOUT BACKPLATE
		PEDESTRIAN SIGNAL HEAD, (TYPE AS NOTED OR AS SPECIFIED)
TS		SIGNAL POST AND BASE
		MAST ARM, SHAFT AND BASE
		SIGN AND POST
		SIGN AND POST (2 POSTS)
		OVERHEAD SIGN
		OPTICAL PRE-EMPTION DETECTOR
		CONTROL CABINET, GROUND MOUNTED
		PULL BOX 12"x12" (OR AS NOTED)
		ELECTRIC HANDHOLE - SD2.022 (OR AS NOTED)
		TRAFFIC SIGNAL CONDUIT

PAVEMENT MARKINGS SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		PAVEMENT ARROW - WHITE
ONLY	ONLY	LEGEND "ONLY" - WHITE
	SL	STOP LINE (12" WIDTH)
	CW	CROSSWALK (SEE CONSTRUCTION DETAIL)
	SWL	SOLID WHITE LINE (6" WIDTH)
	SYL	SOLID YELLOW LINE (6" WIDTH)
	BWL	BROKEN WHITE LINE (6" WIDTH)
	BYL	BROKEN YELLOW LINE (6" WIDTH)
	DWL	DOTTED WHITE LINE (6" WIDTH)
	DYL	DOTTED YELLOW LINE (6" WIDTH)
	DWLex	DOTTED WHITE LINE EXTENSION (6" WIDTH)
	DYLex	DOTTED YELLOW LINE EXTENSION (6" WIDTH)
	DBWL	DOUBLE WHITE LINE (6" WIDTH)
	DBYL	DOUBLE YELLOW LINE (6" WIDTH)
	SYCHL	SYCHL (12" WIDTH, SEE CONSTRUCTION DETAIL)
		BIKE LANE WHITE (SEE CONSTRUCTION DETAIL)
		SHARROW WHITE (SEE CONSTRUCTION DETAIL)

GENERAL NOTES:

1. TOPOGRAPHICAL INFORMATION FROM A SURVEY PROVIDED BY HANCOCK ASSOCIATES, CHELMSFORD, MASSACHUSETTS. THE HORIZONTAL DATUM FOR THIS SURVEY IS THE MASSACHUSETTS STATE PLANE COORDINATE SYSTEM, NAD 1983, MAINLAND ZONE. THE VERTICAL DATUM FOR THIS SURVEY IS THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). SAID DATUMS WERE ESTABLISHED VIA GPS OBSERVATIONS UTILIZING GEOID 12A. SURVEY AUGMENTED BY AN ON-THE-GROUND SURVEY BY VHB IN OCTOBER, 2016.
2. 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 CAUSED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
3. 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.
4. 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.
5. THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES.
6. IN INSTANCES WHERE UTILITY STRUCTURES ARE WITHIN CURB RAMPS, THE STRUCTURE COVER SHALL BE CAREFULLY CONSTRUCTED SO THAT THE COVER IS FLUSH WITH THE CURB RAMP SURFACE.
7. MASSACHUSETTS WATER RESOURCES AUTHORITY (MWRA) WATER LINES MUST BE PROTECTED AT ALL TIMES, AS THEY MAY BE OF SHALLOW DEPTH AND MAY NOT WITHSTAND ADDITIONAL SURFACE BEARING LOADS DERIVED FROM CONSTRUCTION ACTIVITIES. NO CONSTRUCTION EQUIPMENT OR MATERIALS MAY BE PARKED, STATIONED OR STORED OVER MWRA WATER LINES. ALL MWRA STRUCTURES, INCLUDING MANHOLES AND GATE BOXES MUST REMAIN UNOBSTRUCTED.
8. MASSACHUSETTS BAY TRANSPORTATION AUTHORITY (MBTA) BUS STOPS WILL BE AFFECTED BY CONSTRUCTION. TEMPORARY BUS STOP AND SIGNAGE REQUIREMENTS ARE PROVIDED ON THE TEMPORARY TRAFFIC CONTROL PLANS.
9. TREES AND SHRUBS WITHIN THE LIMITS OF GRADING SHALL BE REMOVED ONLY UPON APPROVAL OF THE ENGINEER.
10. 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.
11. 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).
12. AFTER MILLING OPERATIONS AND PRIOR TO PAVING THE SUPERPAVE INTERMEDIATE OR SURFACES COURSES THE ENGINEER SHALL EVALUATE THE MILLED SURFACE AND SHALL APPLY THE APPROPRIATE REPAIR METHOD IF REQUIRED.
13. JOINTS BETWEEN NEW ASPHALT CONCRETE ROADWAY PAVEMENT AND SAWCUT EXISTING PAVEMENT SHALL BE SEALED WITH HMA JOINT SEALER AND BACKSANDED.
14. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE REMOVED AND STACKED UNLESS INDICATED OTHERWISE ON THE DRAWINGS. ALL PROPOSED REINFORCED CONCRETED DRAINAGE PIPE WILL BE CLASS V UNLESS OTHERWISE NOTED ON THE PLAN.
15. ALL LATERAL DRAIN PIPES SHALL BE INSTALLED WITH A PITCH OF .01 FOOT PER FOOT (MINIMUM) UNLESS NOTED OTHERWISE ON THE DRAWINGS. ALL PROPOSED REINFORCED CONCRETED DRAINAGE PIPE WILL BE CLASS V UNLESS OTHERWISE NOTED ON THE PLAN.
16. EXISTING GRANITE CURB SUITABLE FOR RE-USE SHALL BE RE-USED IN THE PROPOSED WORK. EXISTING CURVED GRANITE CURB SUITABLE FOR RE-USE SHALL BE RE-USED IN THE PROPOSED WORK ONLY WHEN RADIUS IS THE SAME. NEW GRANITE CURB SHALL BE TYPE VA-4 UNLESS OTHERWISE SPECIFIED ON PLANS.
17. ALL EXISTING STATE, COUNTY, CITY, AND TOWN LOCATION LINES HAVE BEEN ESTABLISHED FROM AVAILABLE INFORMATION AND THEIR EXACT LOCATION ARE NOT GUARANTEED. PROPERTY LINES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN VERIFIED.
18. DRAINAGE ELEVATIONS ARE PROVIDED FOR DESIGN PURPOSES ONLY. THE CONTRACTOR SHALL VERIFY BY TEST PIT, THE LOCATIONS OF EXISTING UTILITIES WHICH MAY CONFLICT WITH THE PROPOSED DRAINAGE DESIGN. ANY FIELD ADJUSTMENTS REQUIRED WILL BE MADE AS APPROVED OR DIRECTED BY THE ENGINEER. ONLY AFTER THE CONTRACTOR VERIFIES ELEVATIONS FOR THE CONSTRUCTABILITY OF THE DRAINAGE SYSTEM SHALL ANY STRUCTURES BE ORDERED.

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	02	85
PROJECT FILE NO.	604935		

LEGEND & GENERAL NOTES

ABBREVIATIONS

GENERAL

ABAN	ABANDON
ADJ	ADJUST
APPROX.	APPROXIMATE
BIT.	BITUMINOUS
BM	BENCHMARK
BOS	BOTTOM OF SLOPE
(BO)	BY OTHERS
CB	CATCH BASIN
CBCI	CATCH BASIN WITH CURB INLET
CBSC	CATCH BASIN SHALLOW COVER
CEM	CEMENT
CLF	CHAIN LINK FENCE
CONC	CONCRETE
ELEV (or EL.)	ELEVATION
EOP	EDGE OF PAVEMENT
EPLP	ESCUTCHEON PIN IN LEAD PLUG
EXIST (or EX)	EXISTING
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
FDN.	FOUNDATION
FLDSTN	FIELDSTONE
GRAN	GRANITE
HMA	HOT MIX ASPHALT
LT	LEFT
MAX	MAXIMUM
MB	MAILBOX
MHB	MASSACHUSETTS HIGHWAY BOUND
MIN	MINIMUM
NTS	NOT TO SCALE
P.G.L.	PROFILE GRADE LINE
PROP	PROPOSED
PVMT	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	ASPHALT COATED CORRUGATED 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

ALIGNMENT/GRADING

CC	CENTER OF CURVE
HP	HIGH POINT
LP	LOW POINT
PC	POINT OF CURVE
PI	POINT OF INTERSECTION
PNT	POINT
PCC	POINT OF COMPOUND CURVE
PRC	POINT OF REVERSE CURVE
PT	POINT OF TANGENT

EL. 25.45	SPOT ELEVATION

PROFILES

AD	ALGEBRAIC DIFFERENCE IN RATES OF GRADES
ELEV	ELEVATION
HSD	HORIZONTAL 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 CURVER
SSD	STOPPING SIGHT DISTANCE
VC	VERTICAL CURVE

TRAFFIC SIGNAL

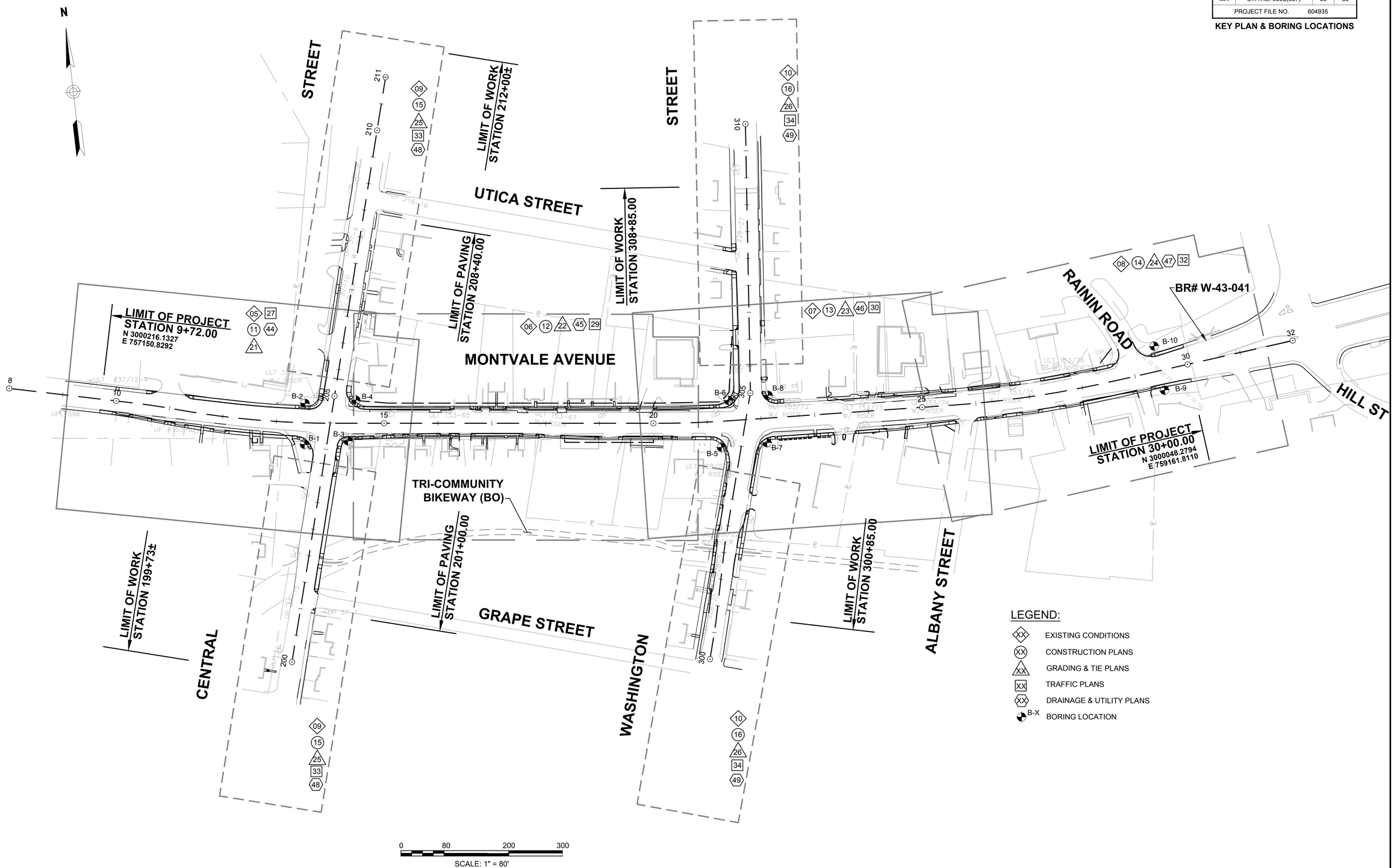
CAB.	CABINET
CCVE	CLOSED CIRCUIT VIDEO EQUIPMENT
DW	STEADY DON'T WALK
FDW	FLASHING DON'T WALK
FR	FLASHING CIRCULAR RED
FR	FLASHING RED LEFT ARROW
FR	FLASHING RED RIGHT ARROW
FY	FLASHING CIRCULAR YELLOW
FY	FLASHING YELLOW LEFT ARROW
FY	FLASHING YELLOW RIGHT ARROW
G	STEADY CIRCULAR GREEN
G	STEADY GREEN LEFT ARROW
G	STEADY GREEN RIGHT ARROW
GSL	STEADY GREEN SLASH LEFT ARROW
GSR	STEADY GREEN SLASH RIGHT ARROW
G	STEADY GREEN VERTICAL ARROW
OL	OVERLAP
PED	PEDESTRIAN
PTZ	PAN, TILT, ZOOM
R	STEADY CIRCULAR RED
R	STEADY RED LEFT ARROW
R	STEADY RED RIGHT ARROW
TR SIG	TRAFFIC SIGNAL
TSC	TRAFFIC SIGNAL CONDUIT
W	STEADY WALK
Y	STEADY CIRCULAR YELLOW
Y	STEADY YELLOW LEFT ARROW
Y	STEADY YELLOW RIGHT ARROW

08363.40-LEG.DWG Plotted on 31-Aug-2017 11:37 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	03	85
PROJECT FILE NO.	604935		

KEY PLAN & BORING LOCATIONS



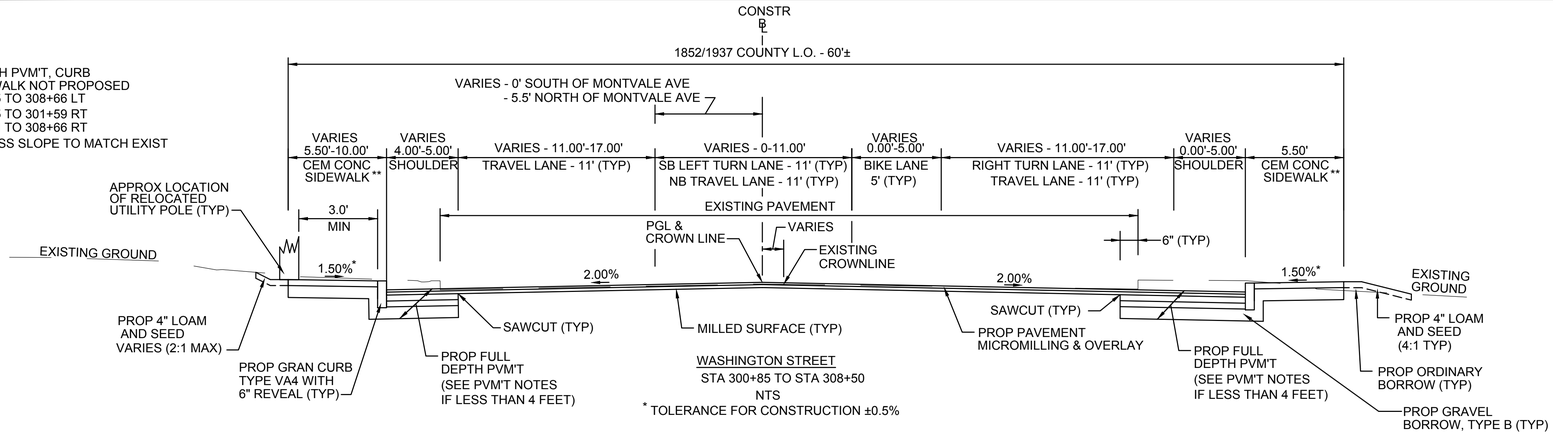
08363.40-KEY.DWG Plotted on 31-Aug-2017 11:38 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	04	85
PROJECT FILE NO.	604935		

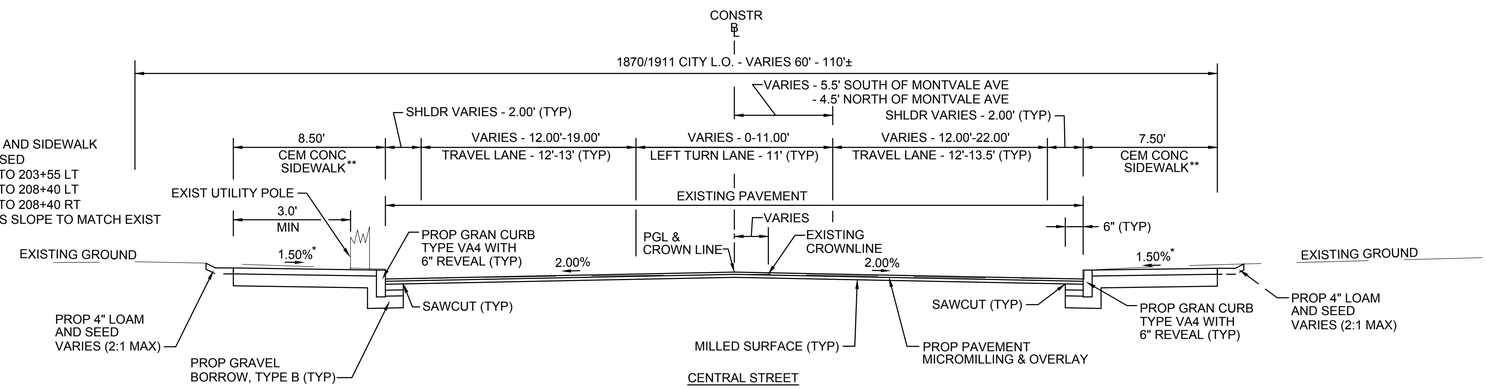
TYPICAL SECTIONS & PAVEMENT NOTES

FULL DEPTH PVM'T, CURB
AND SIDEWALK NOT PROPOSED
STA 307+75 TO 308+66 LT
STA 300+85 TO 301+59 RT
STA 305+01 TO 308+66 RT
PROP CROSS SLOPE TO MATCH EXIST

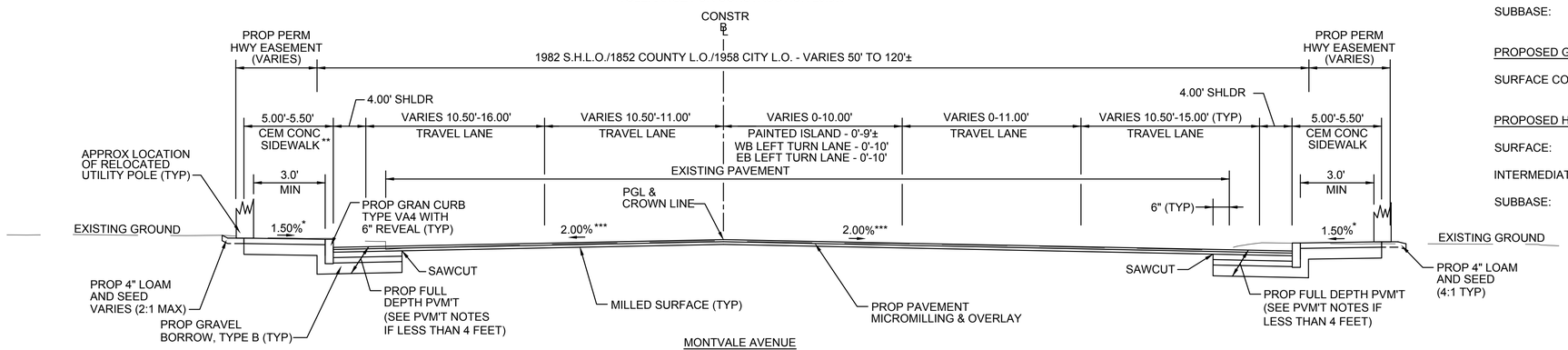


WASHINGTON STREET
STA 300+85 TO STA 308+50
NTS
* TOLERANCE FOR CONSTRUCTION ±0.5%

** GRAN CURB AND SIDEWALK
NOT PROPOSED
STA 201+00 TO 203+55 LT
STA 205+71 TO 208+40 LT
STA 205+23 TO 208+40 RT
PROP CROSS SLOPE TO MATCH EXIST



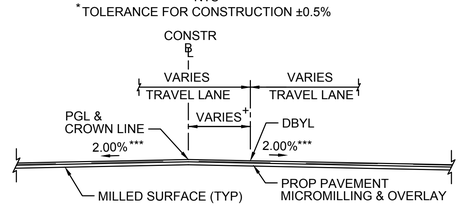
CENTRAL STREET
STA 201+00± TO STA 208+40±
NTS
* TOLERANCE FOR CONSTRUCTION ±0.5%



** FULL DEPTH PVM'T, CURB
AND SIDEWALK NOT PROPOSED
STA 9+72± TO 11+50± LT
STA 22+45± TO 23+27± LT
PROP CROSS SLOPE TO MATCH EXIST

MONTVALE AVENUE
STA 9+72± TO STA 30+00±
NTS
*TOLERANCE FOR CONSTRUCTION ±0.5%

***VARYING CROSS SLOPES:
STA 11+50 TO 13+75 RT - 0.5%-2.0%
STA 16+25 TO 17+50 LT - 2.0%-3.5%
STA 28+50 TO 29+50 LT - 2.0%-3.0%



MONTVALE AVENUE PARTIAL SECTION
STA 9+72± TO STA 12+20±
NTS
TOLERANCE FOR CONSTRUCTION ±0.5%

+ OFFSET OF DBYL FROM CONST BASELINE VARIES IN DISTANCE AND OCCURS ON LEFT AND RIGHT SIDES

PAVEMENT NOTES

PROPOSED FULL DEPTH PAVEMENT

SURFACE COURSE:	1.75" SUPERPAVE SURFACE COURSE - 12.5 (SSC-12.5) OVER ASPHALT EMULSION FOR TACK COAT RS-1H
INTERMEDIATE COURSE:	2" SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC-12.5) OVER ASPHALT EMULSION FOR TACK COAT RS-1H
BASE COURSE:	4" SUPERPAVE BASE COURSE - 37.5 (SBC-37.5)
SUBBASE:	4" DENSE GRADED CRUSHED STONE FOR SUB-BASE OVER 8" GRAVEL BORROW, TYPE b

PROPOSED FULL DEPTH PAVEMENT LESS THAN 4 FEET

SURFACE COURSE:	1.75" SUPERPAVE SURFACE COURSE - 12.5 (SSC-12.5) OVER ASPHALT EMULSION FOR TACK COAT RS-1H
INTERMEDIATE COURSE:	2" SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC-12.5) OVER ASPHALT EMULSION FOR TACK COAT RS-1H
BASE COURSE:	6" HIGH EARLY STRENGTH CEMENT CONCRETE
SUBBASE:	12" GRAVEL BORROW, TYPE b

PROPOSED MICROMILLING AND OVERLAY

SURFACE COURSE:	1.75" SUPERPAVE SURFACE COURSE - 12.5 (SSC - 12.5) OVER ASPHALT EMULSION FOR TACK COAT RS-1H
INTERMEDIATE COURSE:	2" SUPERPAVE INTERMEDIATE COURSE 12.5 (SIC-12.5) OVER ASPHALT EMULSION FOR TACK COAT RS-1H
MICROMILLING:	VARIABLE DEPTH PAVEMENT MICROMILLING (3" MAX)

PROPOSED CEMENT CONCRETE SIDEWALK, DRIVEWAY & WCR

SURFACE COURSE:	4" CEMENT CONCRETE AT SIDEWALK & WCR - 6" AT DRIVEWAYS (AIR ENTRAINED 4000 PSI, $\frac{3}{4}$", 610 LB)
SUBBASE:	8" GRAVEL BORROW, TYPE b

PROPOSED HOT MIX ASPHALT DRIVEWAY

SURFACE COURSE:	1.5" SUPERPAVE SURFACE COURSE - 9.5 (SSC-9.5)
	2" SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC-12.5)
SUBBASE:	8" GRAVEL BORROW, TYPE b

PROPOSED GRAVEL DRIVEWAY

SURFACE COURSE:	8" GRAVEL BORROW, TYPE b

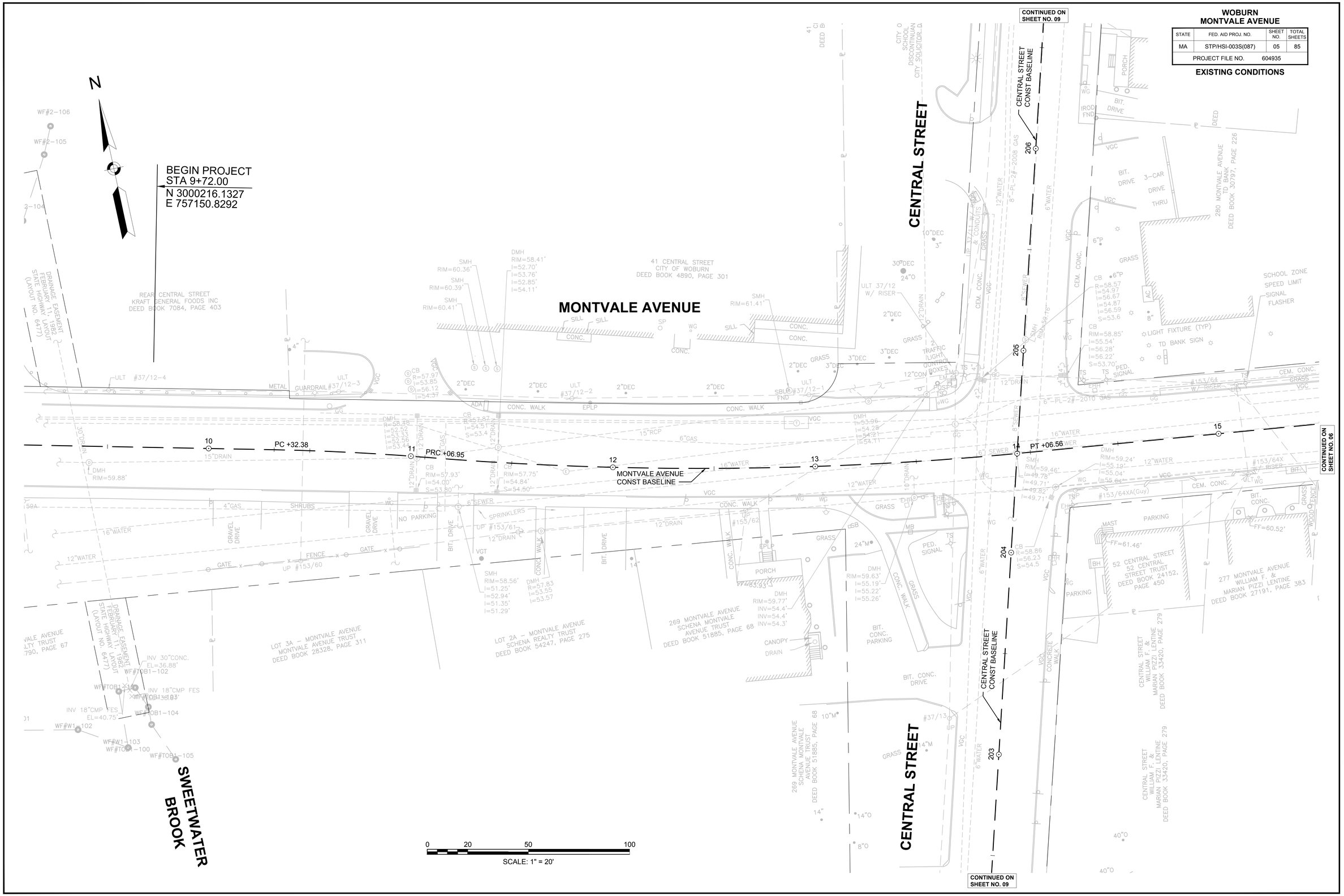
PROPOSED HOT MIX ASPHALT WALK

SURFACE:	1"	SUPERPAVE SURFACE COURSE - 9.5 (SSC-9.5)
INTERMEDIATE:	1.5"	SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC-12.5)
SUBBASE:	8"	GRAVEL BORROW (TYPE b)

GENERAL NOTES:

1. ALL SUPERPAVE HOT MIX ASPHALT SHALL BE PRODUCED WITH A WARM MIX ASPHALT TECHNOLOGY.
2. SUPERPAVE SURFACE COURSE - 12.5 (SSC-12.5) SHALL BE LATEX MODIFIED.
3. ALL SUPERPAVE HOT MIX ASPHALT, HOT MIX ASPHALT FOR PATCHING, ASPHALT EMULSION FOR TACK COAT, AND HOT MIX ASPHALT JOINT SEALANT SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 450 QUALITY ASSURANCE FOR HMA.
4. ALL HOT MIX ASPHALT PAVEMENT SHALL BE PRODUCED IN ACCORDANCE WITH SECTION 455 SUPERPAVE HMA SPECIFICATIONS.
5. ASPHALT EMULSION FOR TACK COAT (ITEM 452.) SHALL BE SPRAY APPLIED FOR DOUBLE OVERLAP COVERAGE AT 0.07 GAL/SY OVER MILLED SURFACES AND 0.05 GAL/SY OVER SMOOTH SURFACES.
6. HMA JOINT SEALANT (ITEM 453.) SHALL BE APPLIED IN SURFACE COURSE AT ALL VERTICAL COLD JOINTS PRIOR TO HMA PAVING.
7. THE PERFORMANCE GRADE ASPHALT BINDER USED FOR ALL SUPERPAVE HMA MIXTURES FOR THIS CONTRACT IS A PG 64-28 (LEVEL 2).
8. ALL HOT MIX ASPHALT WALKS SHALL BE ESTIMATED AND PAID FOR UNDER ITEM 702 OF STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES.
9. ALL HOT MIX ASPHALT DRIVEWAYS SHALL BE ESTIMATED AND PAID FOR UNDER ITEM 703 OF STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES.
10. PAVEMENT MICROMILLING TO ESTABLISH PROPOSED CROSS SLOPES.

08363.40-TYP.DWG Plotted on 31-Aug-2017 11:38 AM

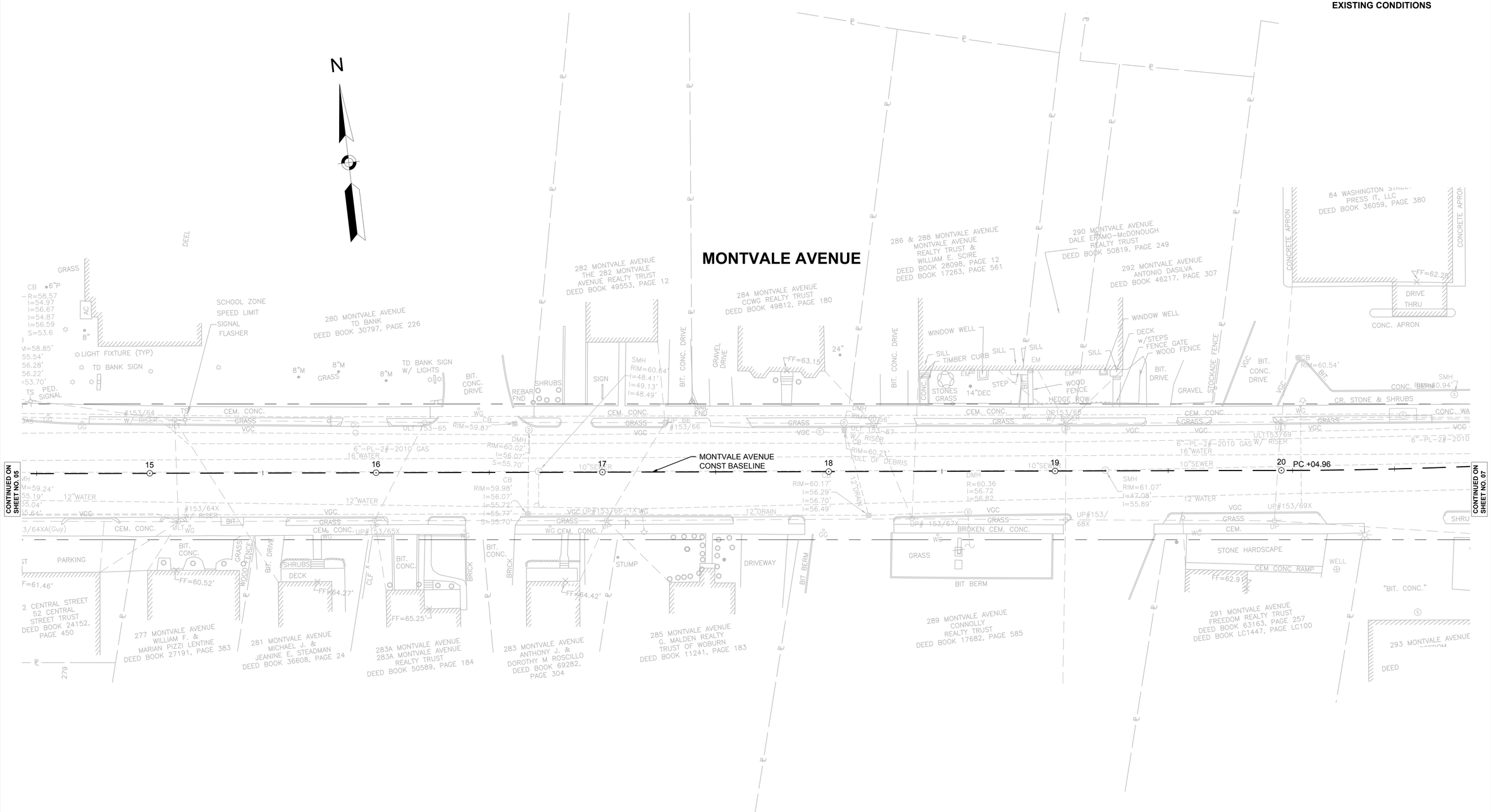


08363-40-EXIST.DWG Plotted on 31-Aug-2017 11:38 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	06	85
PROJECT FILE NO.	604935		

EXISTING CONDITIONS

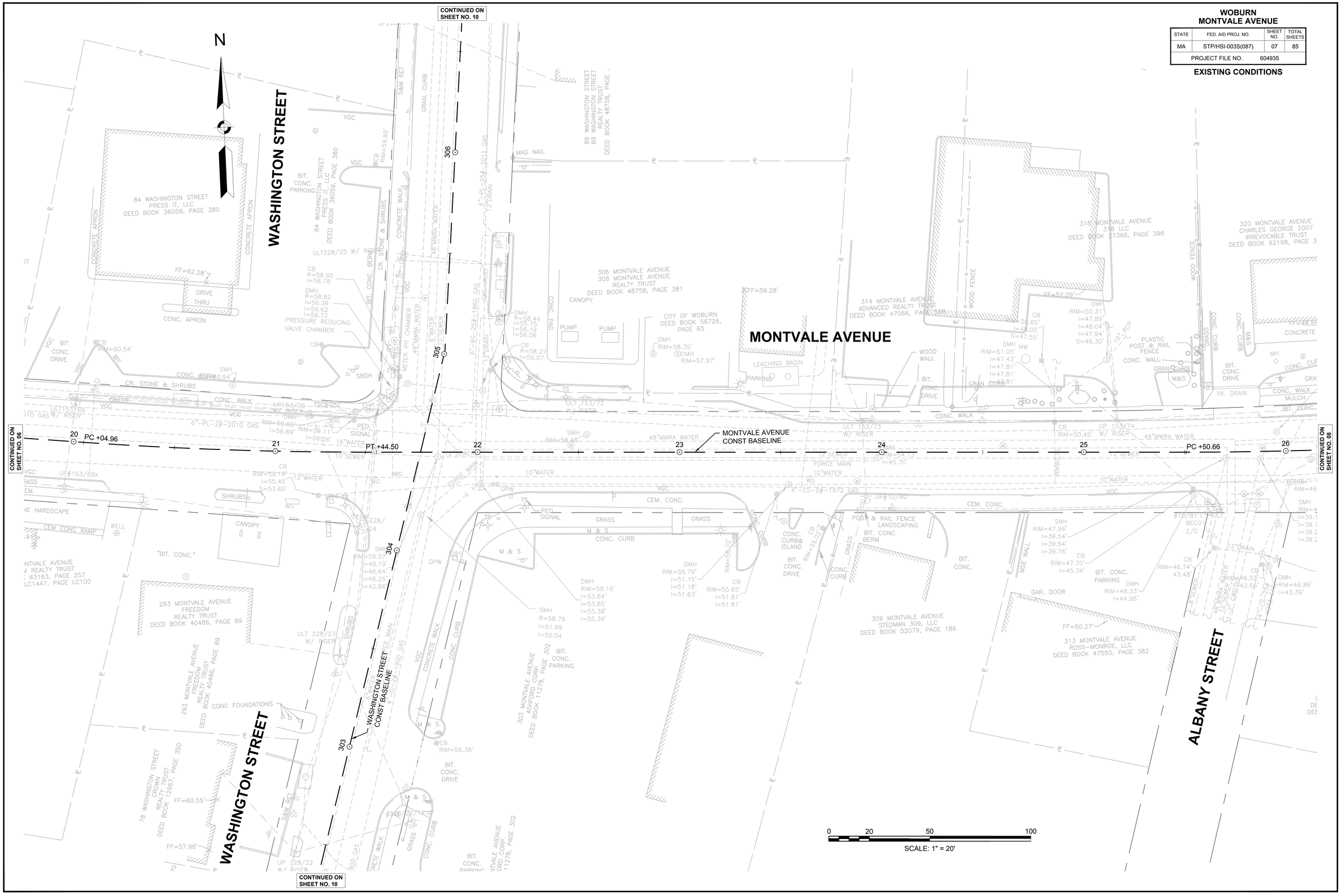


08363-40-EXIST.DWG Plotted on 31-Aug-2017 11:38 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	07	85
PROJECT FILE NO.	604935		

EXISTING CONDITIONS

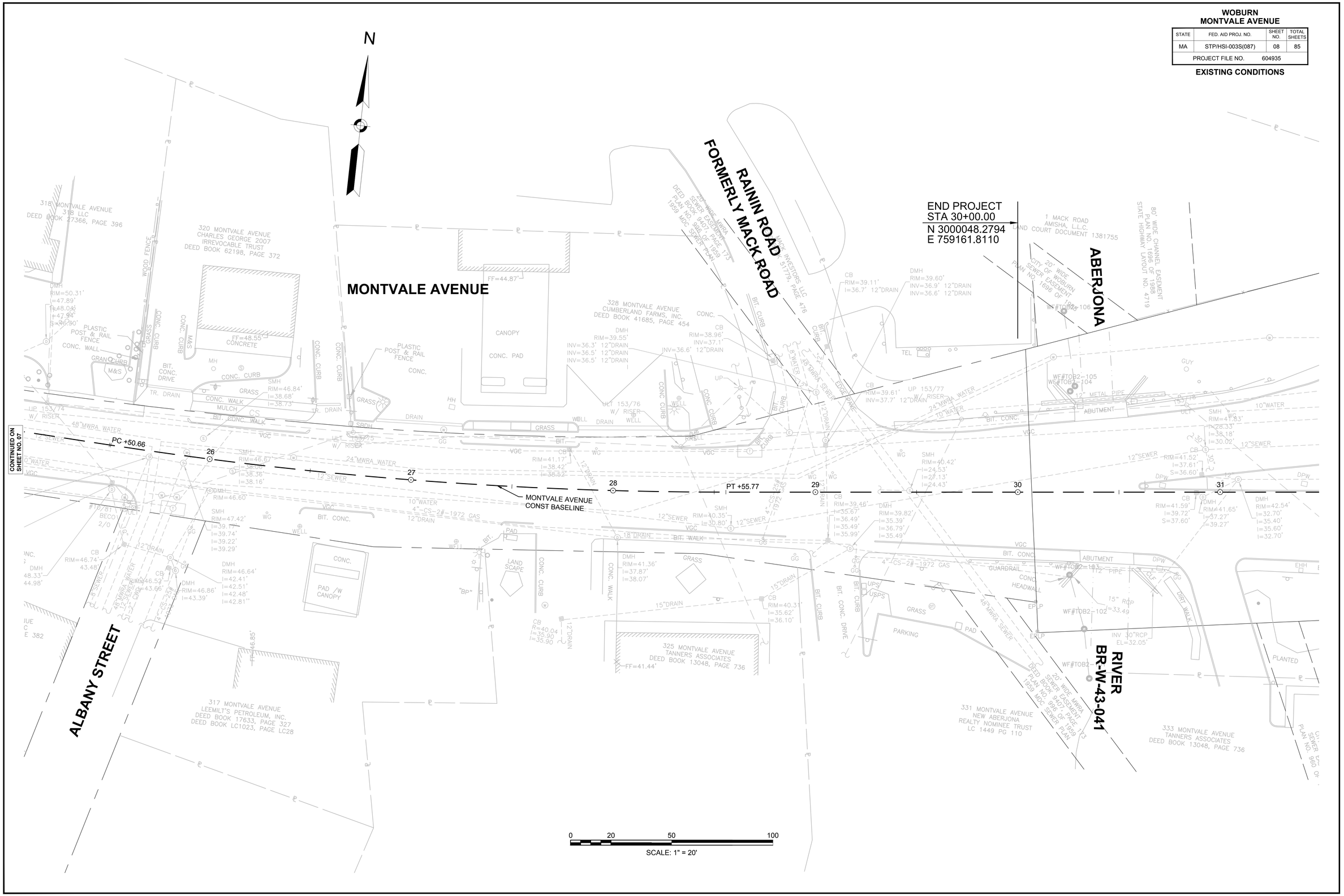


08363-40-EXIST.DWG Plotted on 31-Aug-2017 11:38 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	08	85
PROJECT FILE NO.	604935		

EXISTING CONDITIONS

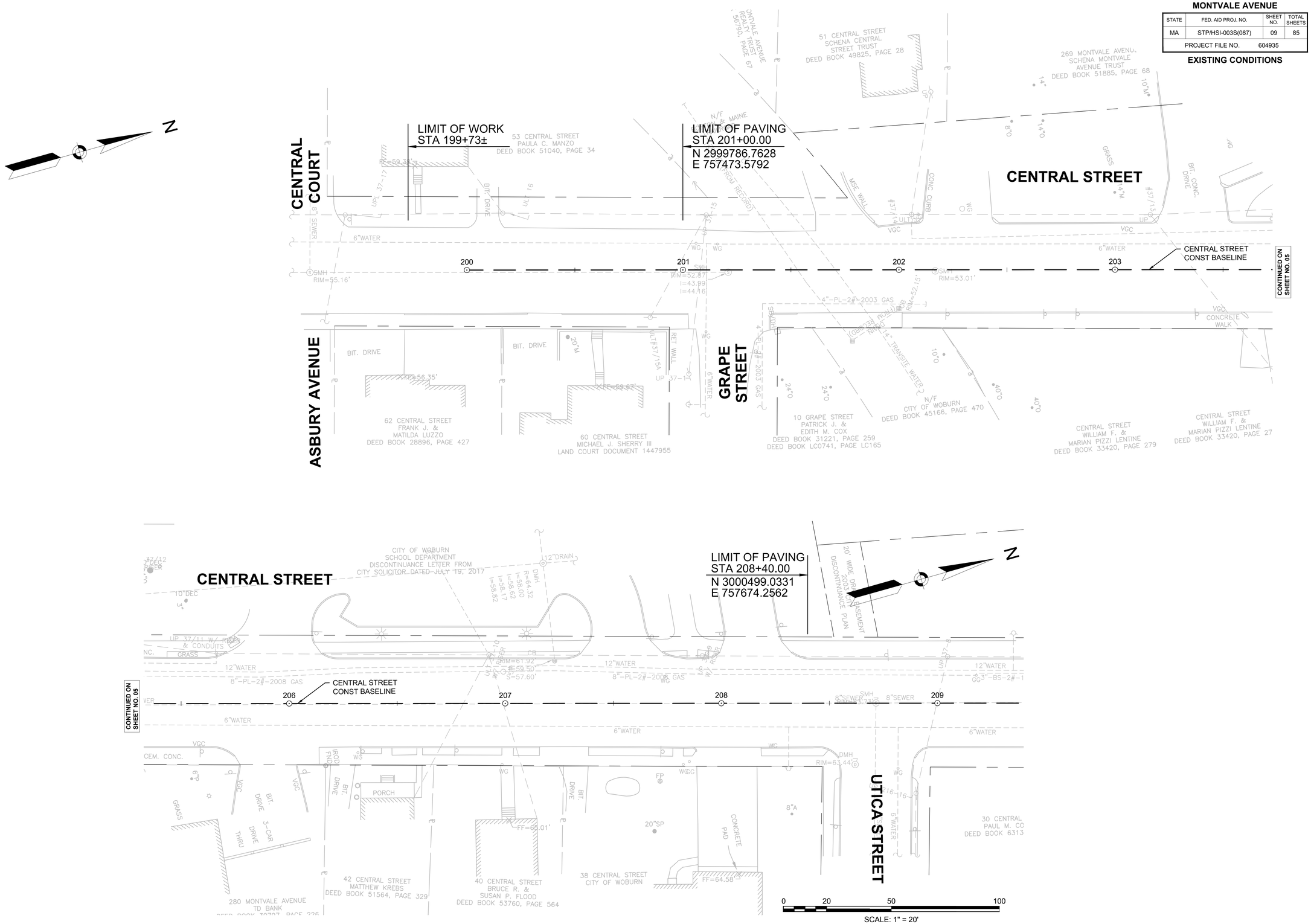


08363-40-EXIST.DWG Plotted on 31-Aug-2017 11:39 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	09	85
PROJECT FILE NO.	604935		

EXISTING CONDITIONS

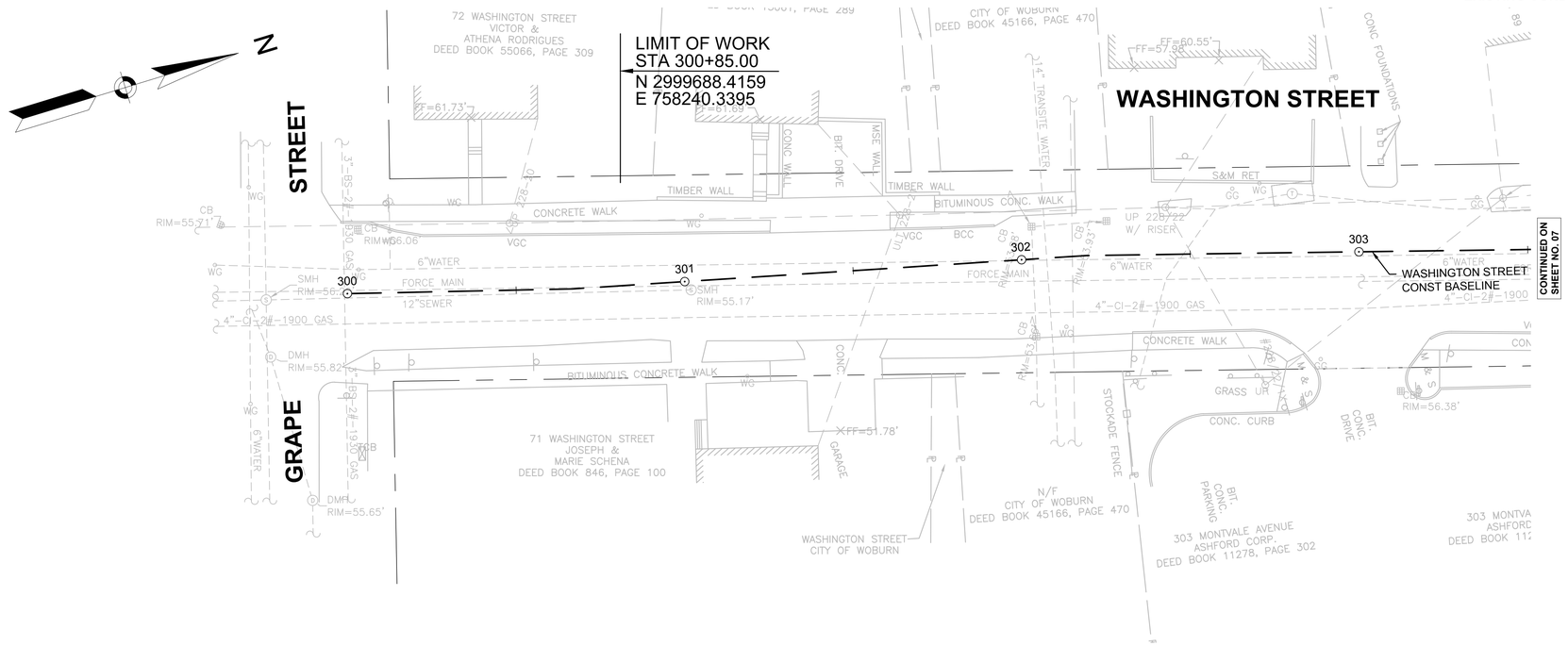


08363-40-EXIST.DWG Plotted on 31-Aug-2017 11:39 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	10	85
PROJECT FILE NO.	604935		

EXISTING CONDITIONS



08363-40-EXIST.DWG Plotted on 31-Aug-2017 11:39 AM

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

SEE SHEET 27

WATER SUPPLY ALTERATIONS

SEE SHEET 44

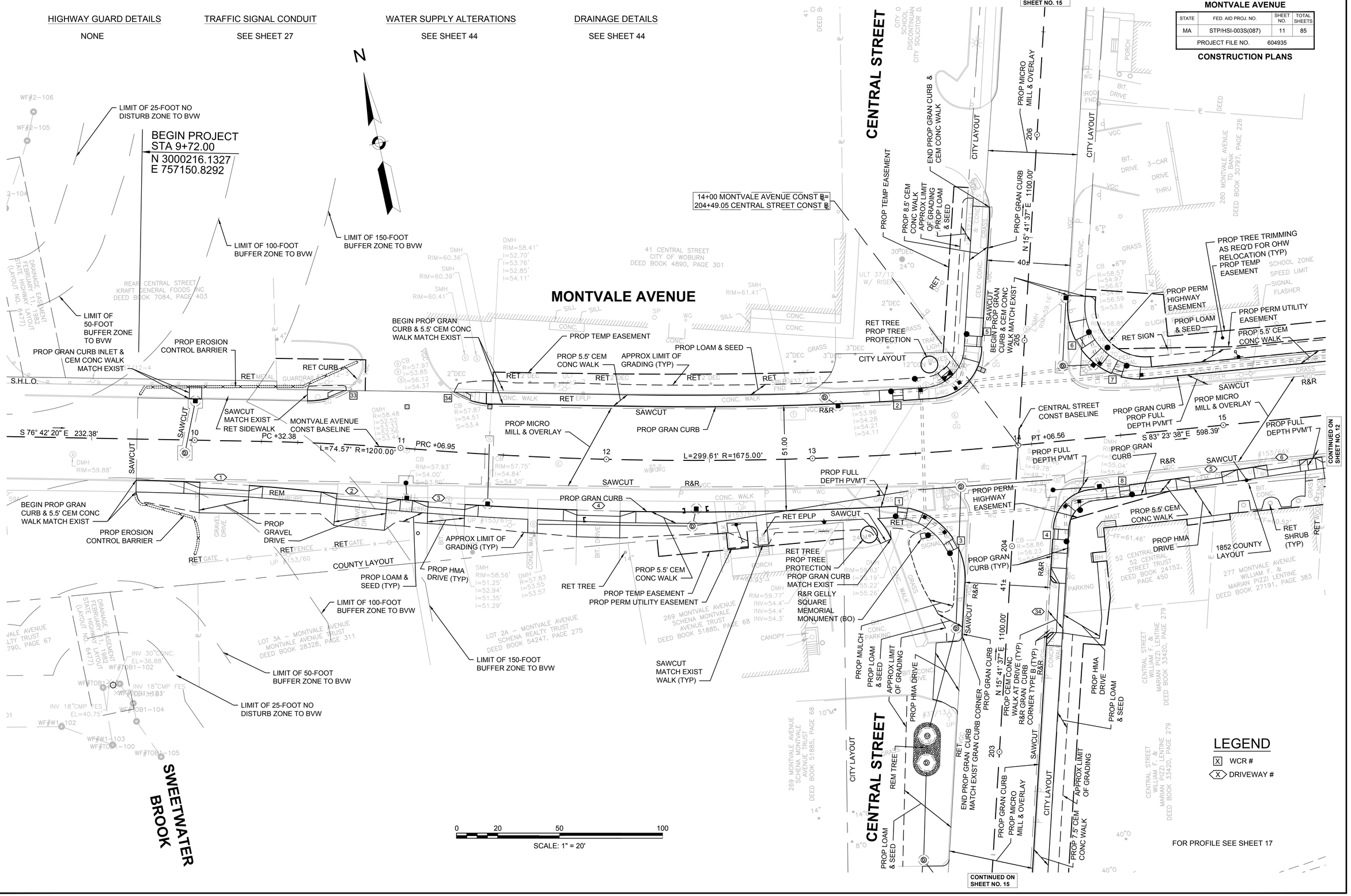
DRAINAGE DETAILS

SEE SHEET 44

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	11	85
PROJECT FILE NO.	604935		

CONSTRUCTION PLANS



08363.40-GEN.DWG Plotted on 31-Aug-2017 11:39 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	12	85
PROJECT FILE NO.	604935		

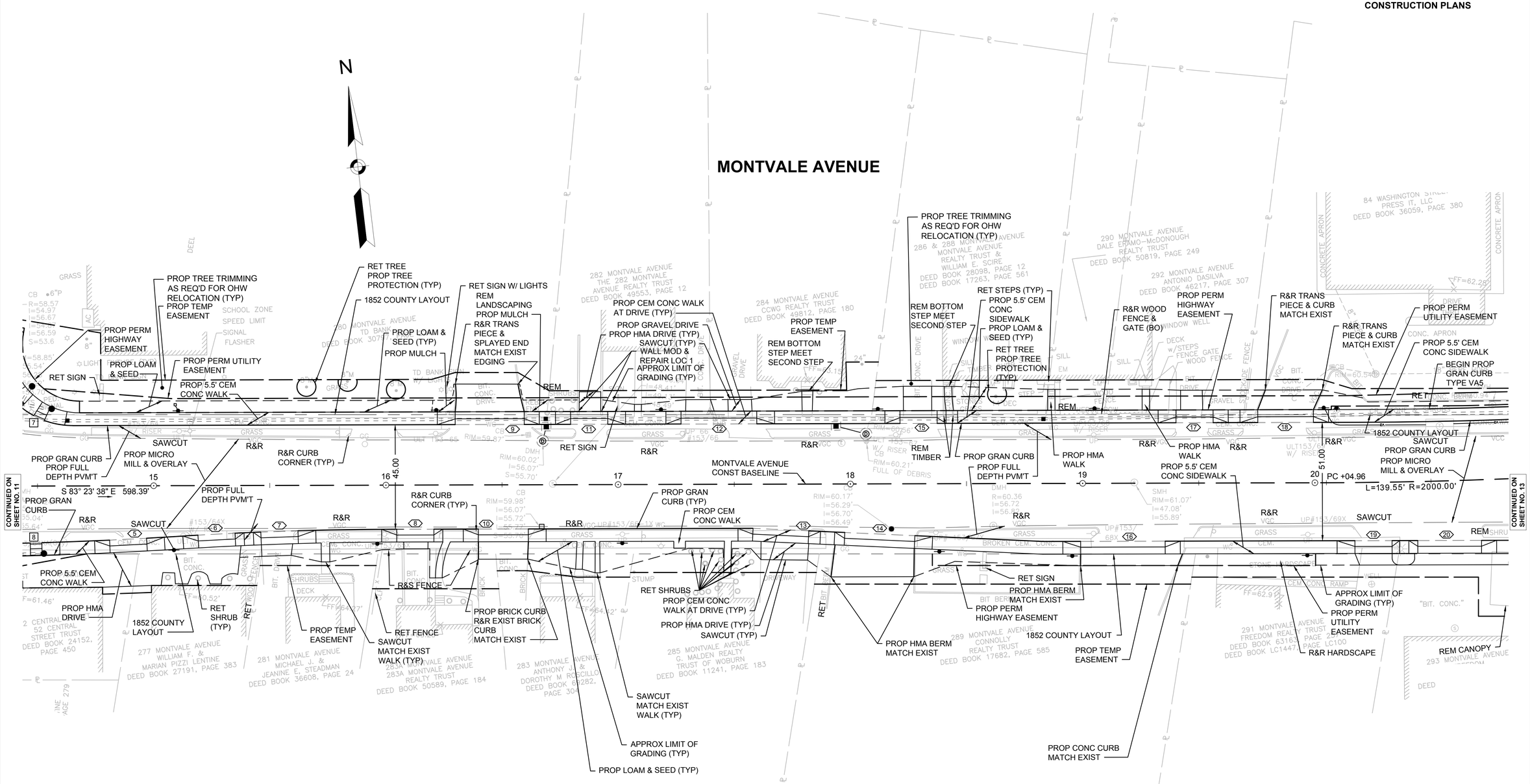
CONSTRUCTION PLANS

HIGHWAY GUARD DETAILS
NONE

TRAFFIC SIGNAL CONDUIT
SEE SHEET 29

WATER SUPPLY ALTERATIONS
SEE SHEET 45

DRAINAGE DETAILS
SEE SHEET 45



LEGEND

[X] WCR #

<X> DRIVEWAY #

0 20 50 100
SCALE: 1" = 20'

FOR PROFILE SEE SHEET 17

08363.40-GEN.DWG Plotted on 31-Aug-2017 11:40 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	13	85
PROJECT FILE NO.	604935		

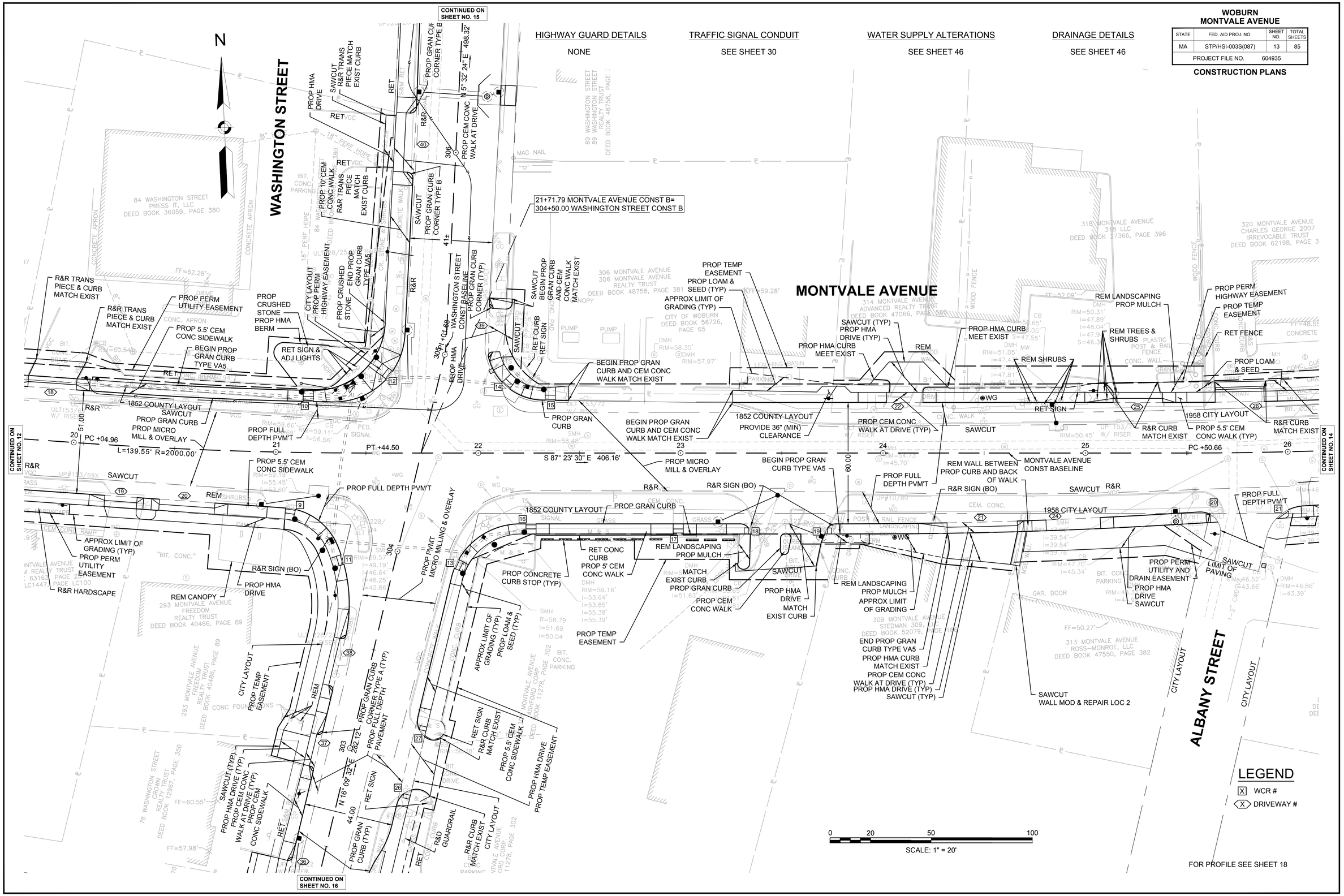
CONSTRUCTION PLANS

HIGHWAY GUARD DETAILS
NONE

TRAFFIC SIGNAL CONDUIT
SEE SHEET 30

WATER SUPPLY ALTERATIONS
SEE SHEET 46

DRAINAGE DETAILS
SEE SHEET 46



08363.40-GEN.DWG Plotted on 31-Aug-2017 11:40 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	14	85
PROJECT FILE NO.	604935		

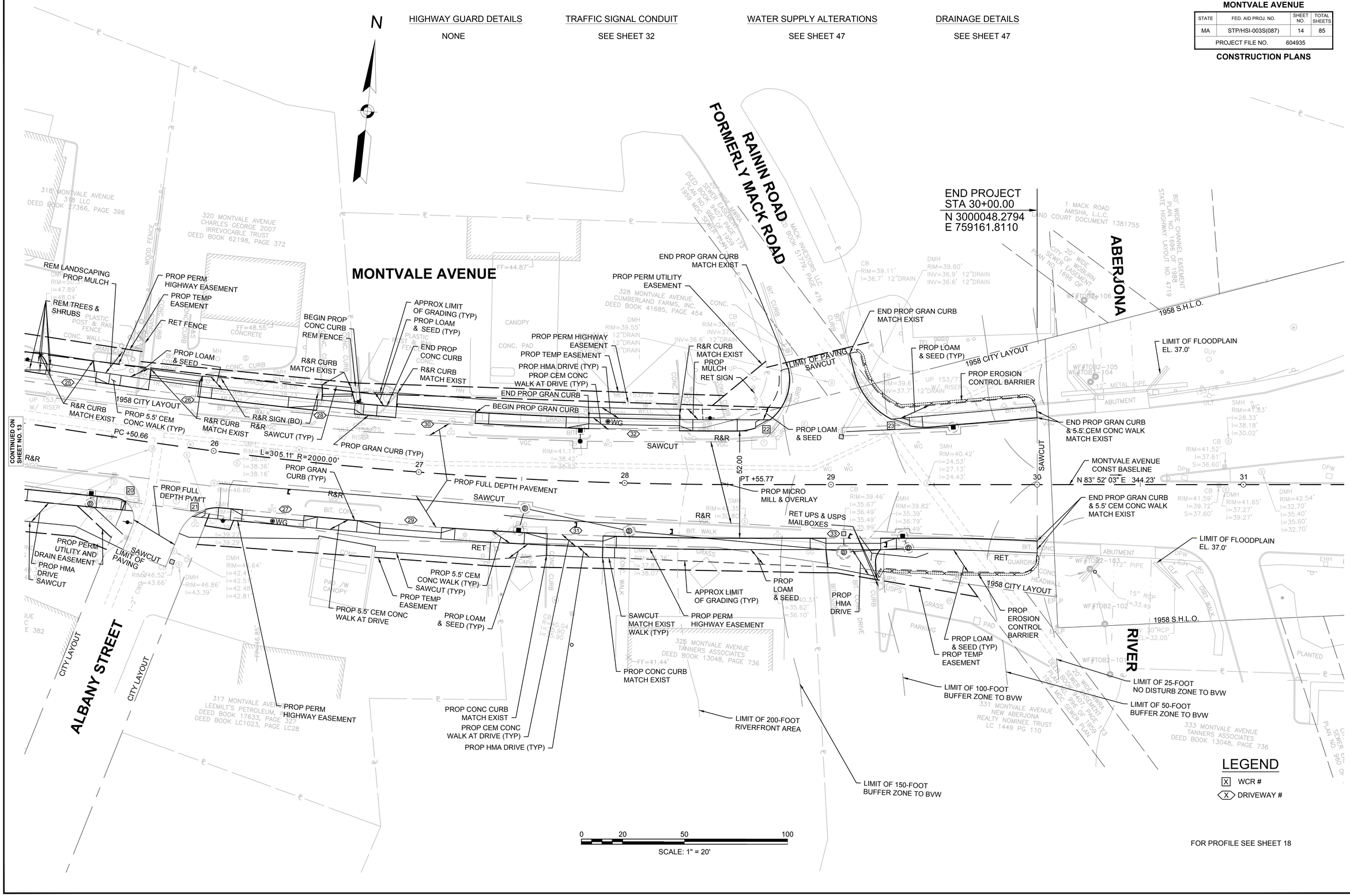
CONSTRUCTION PLANS

HIGHWAY GUARD DETAILS
NONE

TRAFFIC SIGNAL CONDUIT
SEE SHEET 32

WATER SUPPLY ALTERATIONS
SEE SHEET 47

DRAINAGE DETAILS
SEE SHEET 47



LEGEND

[X] WCR #

<X> DRIVEWAY #

FOR PROFILE SEE SHEET 18

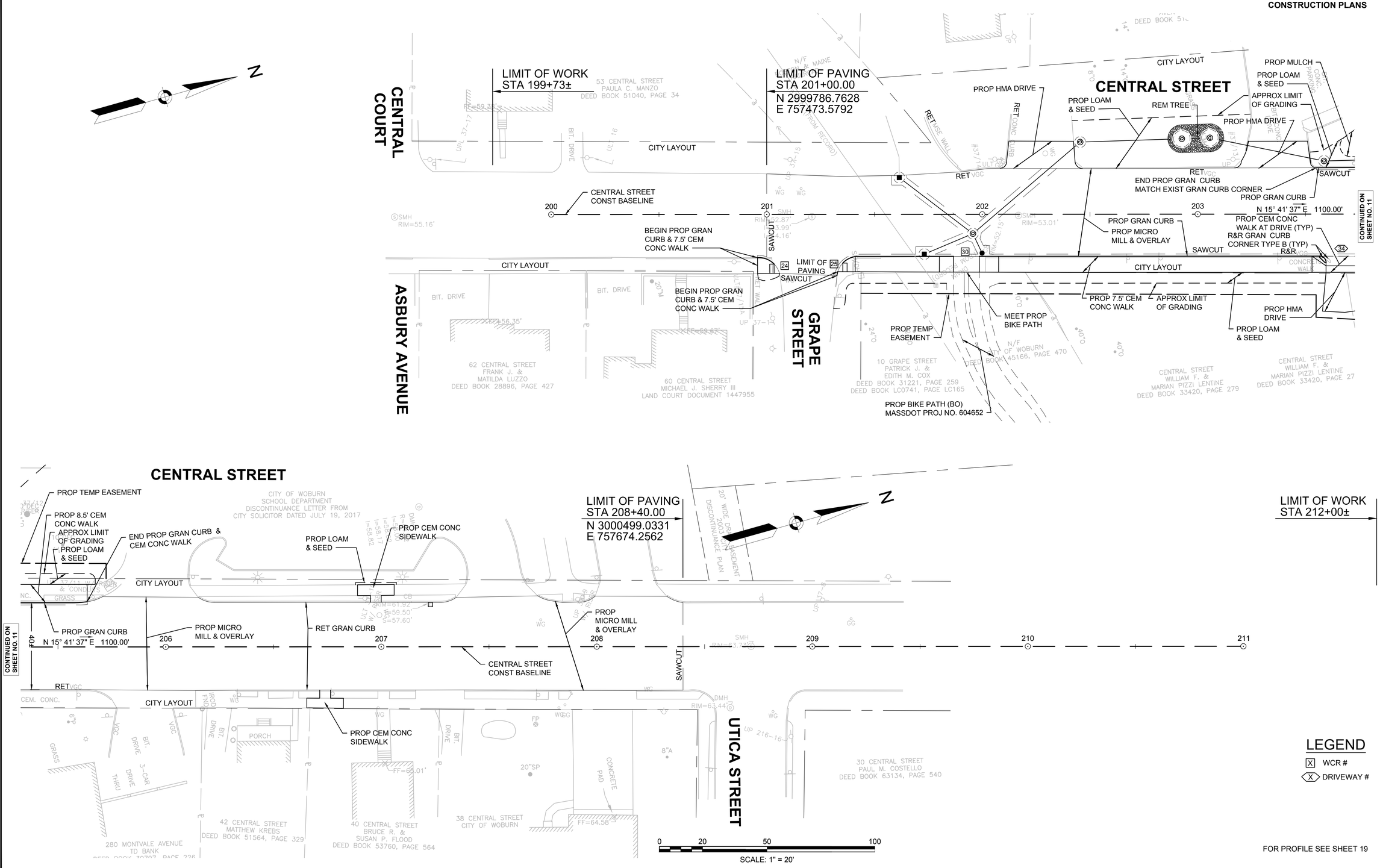
08363.40-GEN.DWG Plotted on 31-Aug-2017 11:40 AM

HIGHWAY GUARD DETAILS	TRAFFIC SIGNAL CONDUIT	WATER SUPPLY ALTERATIONS	DRAINAGE DETAILS
NONE	SEE SHEET 33	SEE SHEET 48	SEE SHEET 48

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	15	85
PROJECT FILE NO.	604935		

CONSTRUCTION PLANS



LEGEND

[X] WCR #

<X> DRIVEWAY #

FOR PROFILE SEE SHEET 19

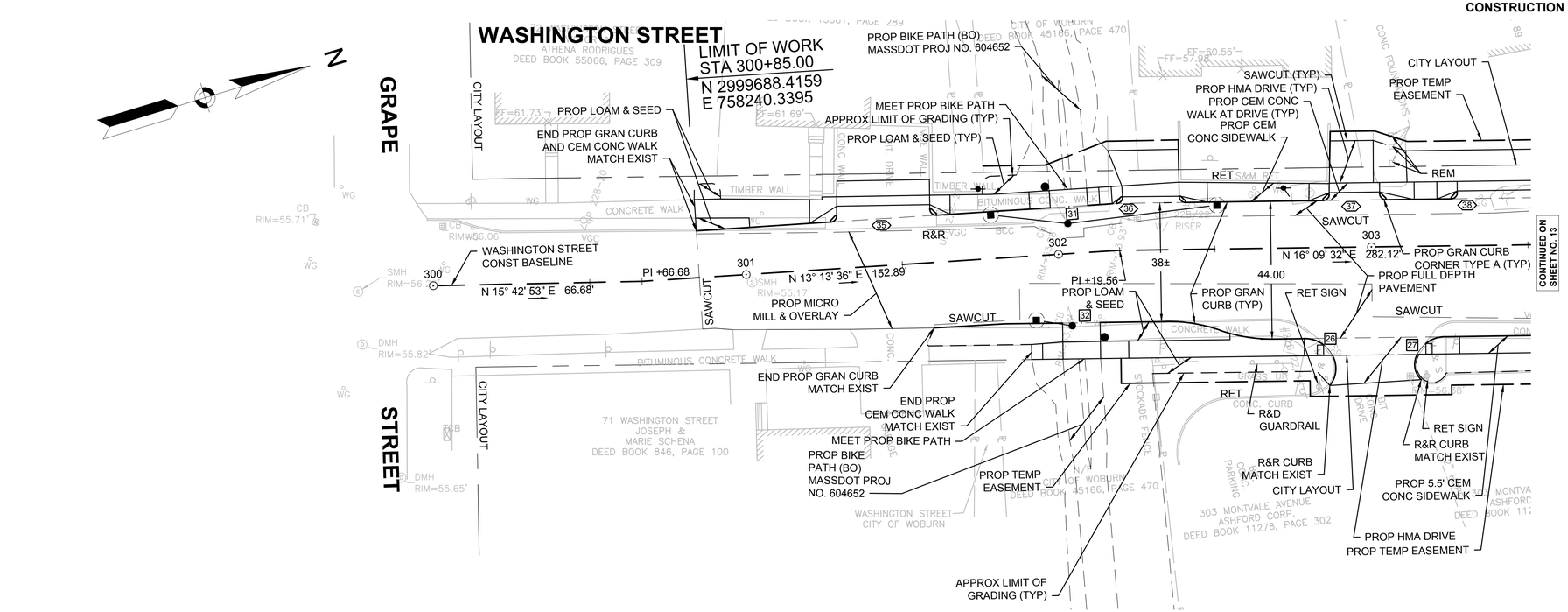
08363.40-GEN.DWG Plotted on 31-Aug-2017 11:41 AM

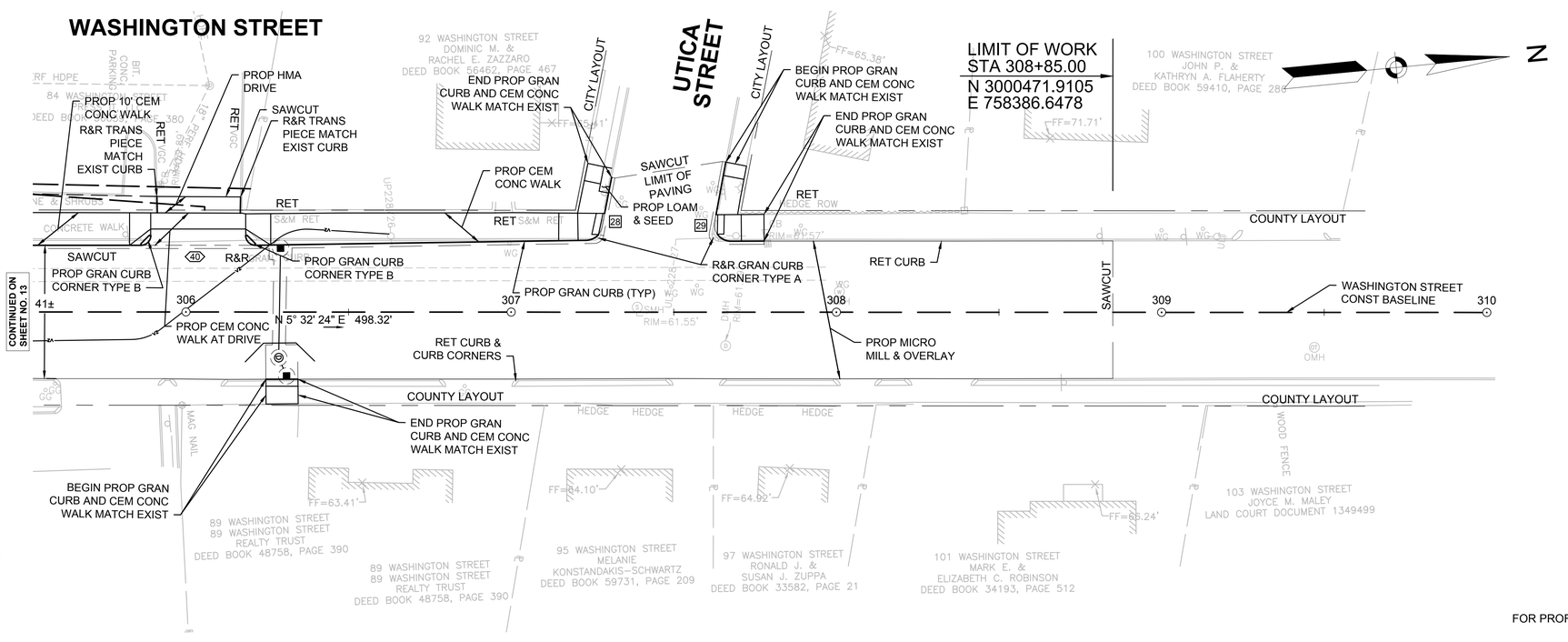
HIGHWAY GUARD DETAILS	TRAFFIC SIGNAL CONDUIT	WATER SUPPLY ALTERATIONS	DRAINAGE DETAILS
NONE	SEE SHEET 34	SEE SHEET 49	SEE SHEET 49

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	16	85
PROJECT FILE NO.	604935		

CONSTRUCTION PLANS





LEGEND

[X] WCR #

<X> DRIVEWAY #

0 20 50 100

SCALE: 1" = 20'

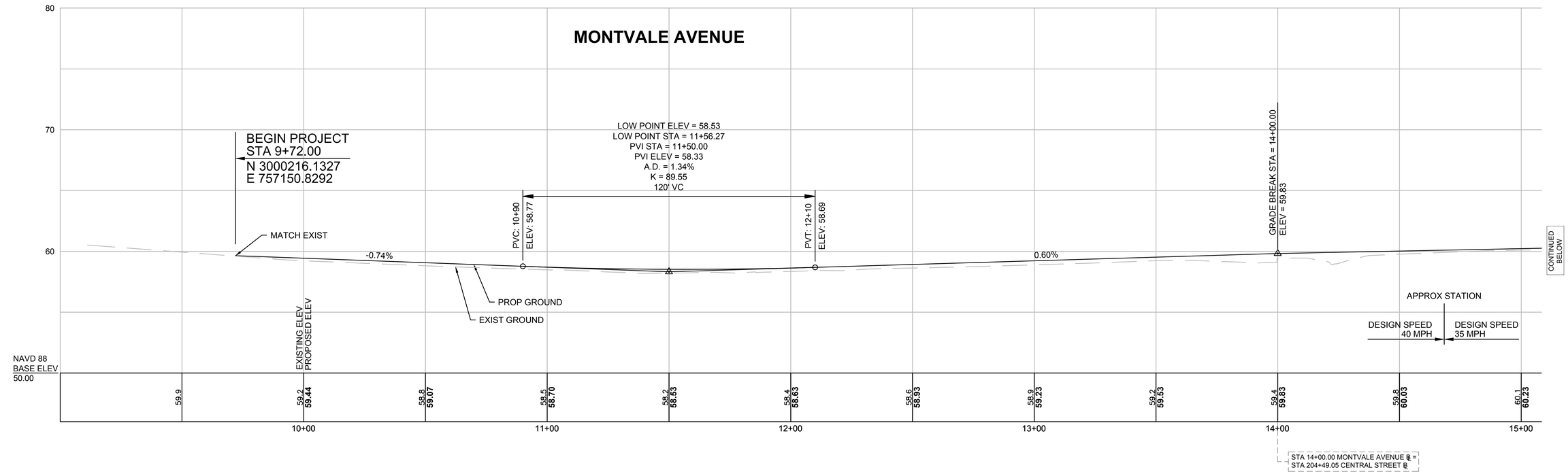
FOR PROFILE SEE SHEET 20

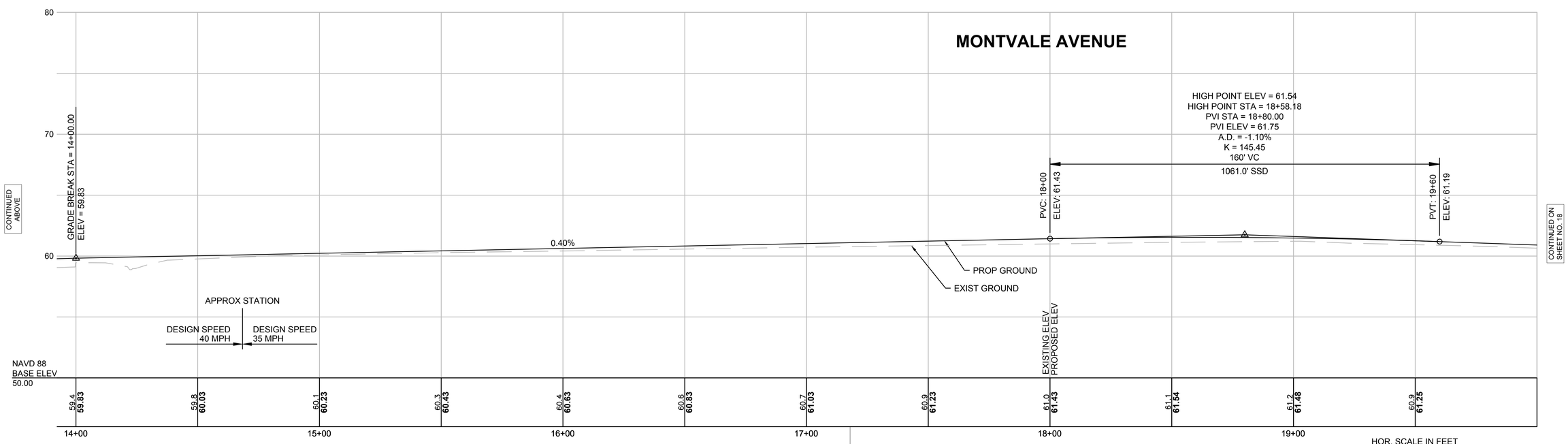
08363.40-GEN.DWG Plotted on 31-Aug-2017 11:41 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	17	85
PROJECT FILE NO.	604935		

PROFILES





FOR CONSTRUCTION PLANS:
SEE SHEET NOS. 11-12

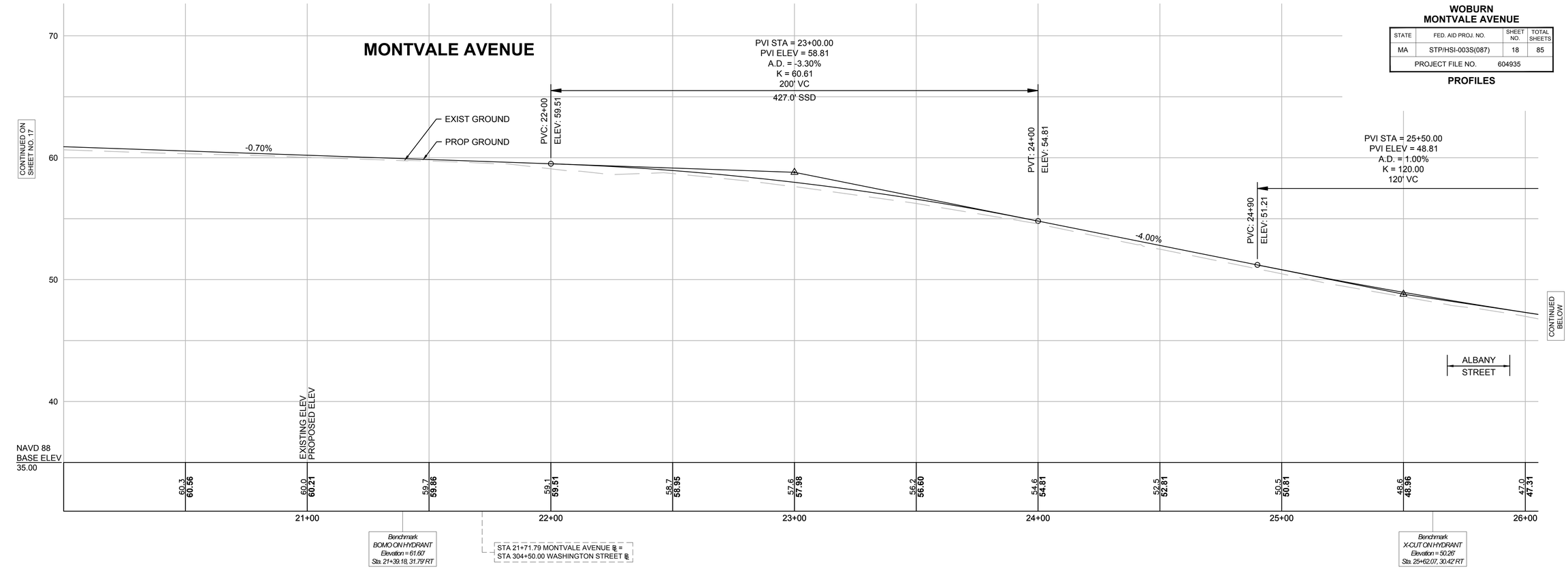
HOR. SCALE IN FEET
20 0 20 40
4 0 4 8
VER. SCALE IN FEET

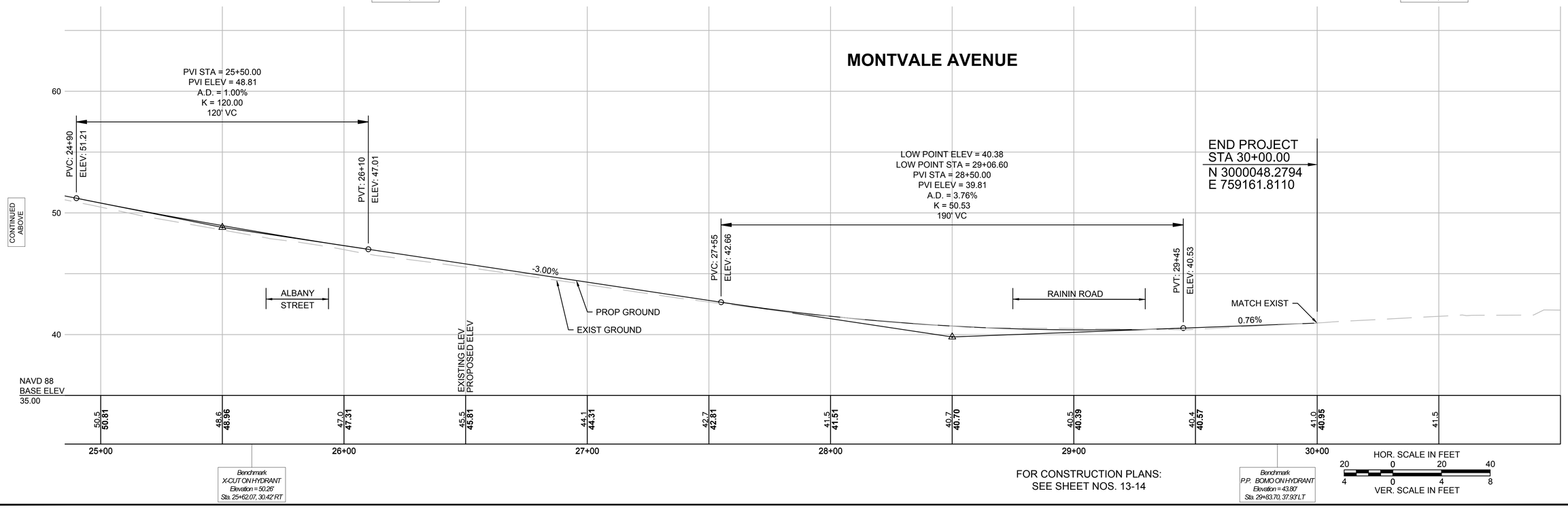
08363.40-PROF.DWG Plotted on 31-Aug-2017 11:41 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	18	85
PROJECT FILE NO.	604935		

PROFILES





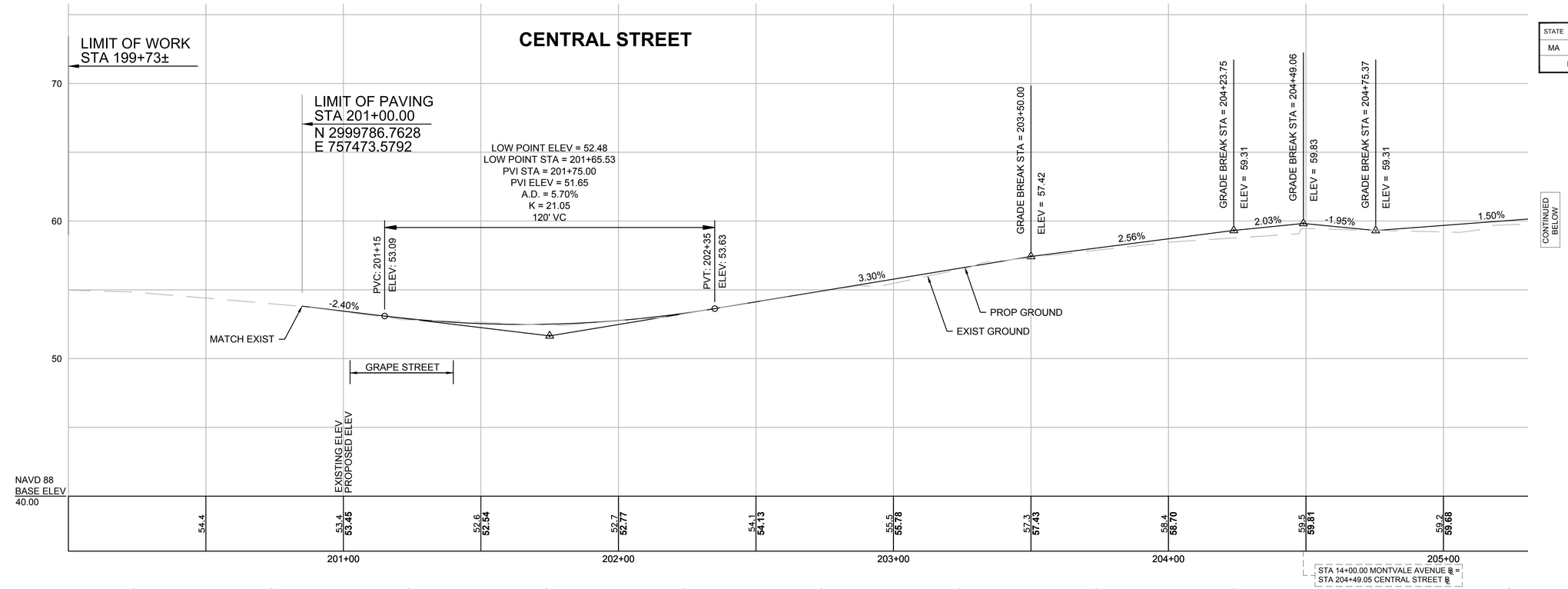
FOR CONSTRUCTION PLANS:
SEE SHEET NOS. 13-14

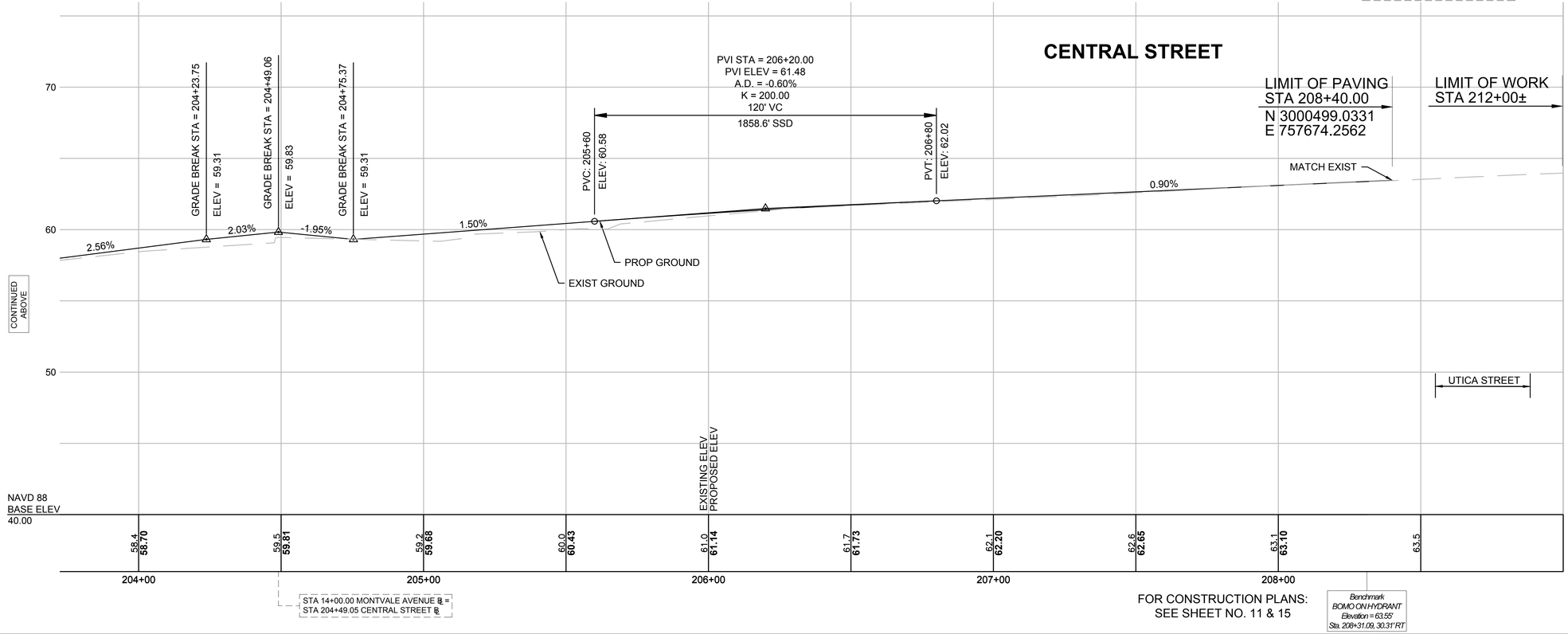
08363.40-PROF.DWG Plotted on 31-Aug-2017 11:41 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	19	85
PROJECT FILE NO.	604935		

PROFILES





FOR CONSTRUCTION PLANS:
SEE SHEET NO. 11 & 15

Benchmark
BOMO ON HYDRANT
Elevation = 63.55'
Sta. 208+31.09, 30.31' RT

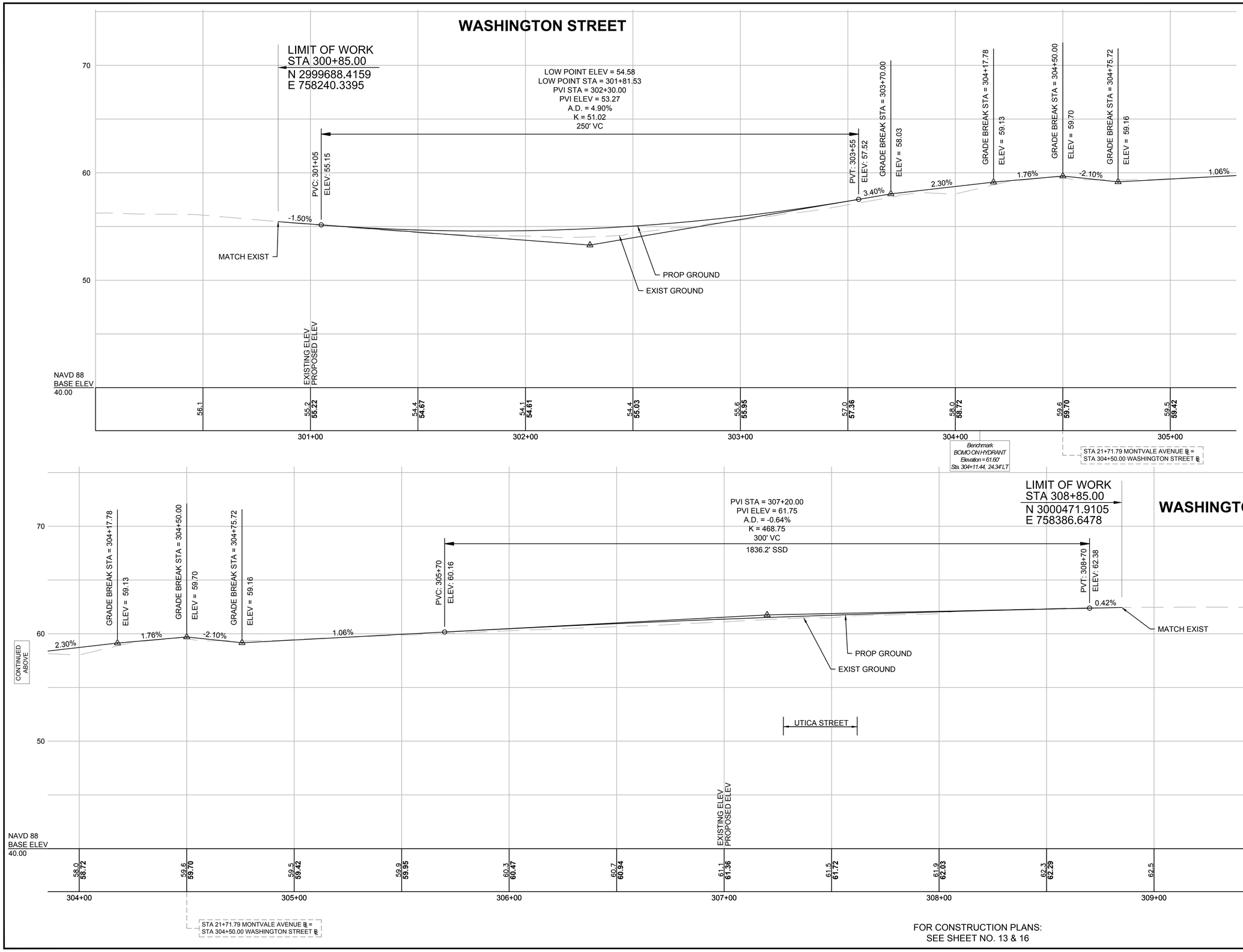
HOR. SCALE IN FEET
20 0 20 40
4 0 4 8
VER. SCALE IN FEET

08363-40-PROF.DWG Plotted on 31-Aug-2017 11:41 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	20	85
PROJECT FILE NO.	604935		

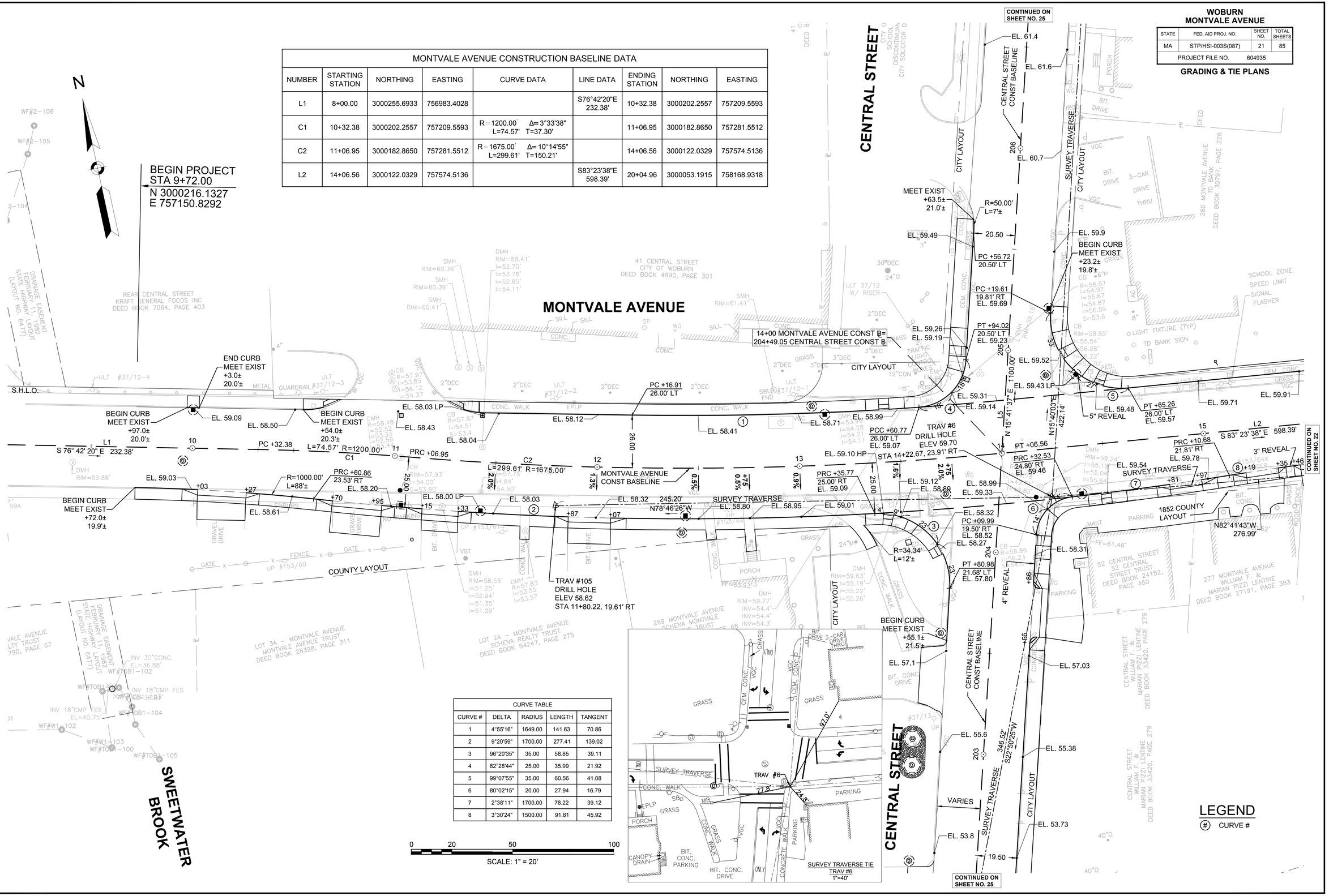
PROFILES



FOR CONSTRUCTION PLANS:
SEE SHEET NO. 13 & 16

08363-40-PROF.DWG Plotted on 31-Aug-2017 11:42 AM

08363.40-ALGN.DWG Plotted on 31-Aug-2017 11:47 AM



MONTVALE AVENUE CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L1	8+00.00	3000255.6933	756983.4028		S76°42'20"E 232.38'	10+32.38	3000202.2557	757209.5593
C1	10+32.38	3000202.2557	757209.5593	R=1200.00' Δ=3°33'38" L=74.57' T=37.30'		11+06.95	3000182.8650	757281.5512
C2	11+06.95	3000182.8650	757281.5512	R=1675.00' Δ=10°14'55" L=299.61' T=150.21'		14+06.56	3000122.0329	757574.5136
L2	14+06.56	3000122.0329	757574.5136		S83°23'38"E 598.39'	20+04.96	3000053.1915	758168.9318

CURVE TABLE				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
1	4°55'16"	1649.00	141.63	70.86
2	9°20'59"	1700.00	277.41	139.02
3	96°20'35"	35.00	58.85	39.11
4	82°28'44"	25.00	35.99	21.92
5	99°07'55"	35.00	60.56	41.08
6	80°02'15"	20.00	27.94	16.79
7	2°38'11"	1700.00	78.22	39.12
8	3°30'24"	1500.00	91.81	45.92

WOBURN
MONTVALE AVENUE

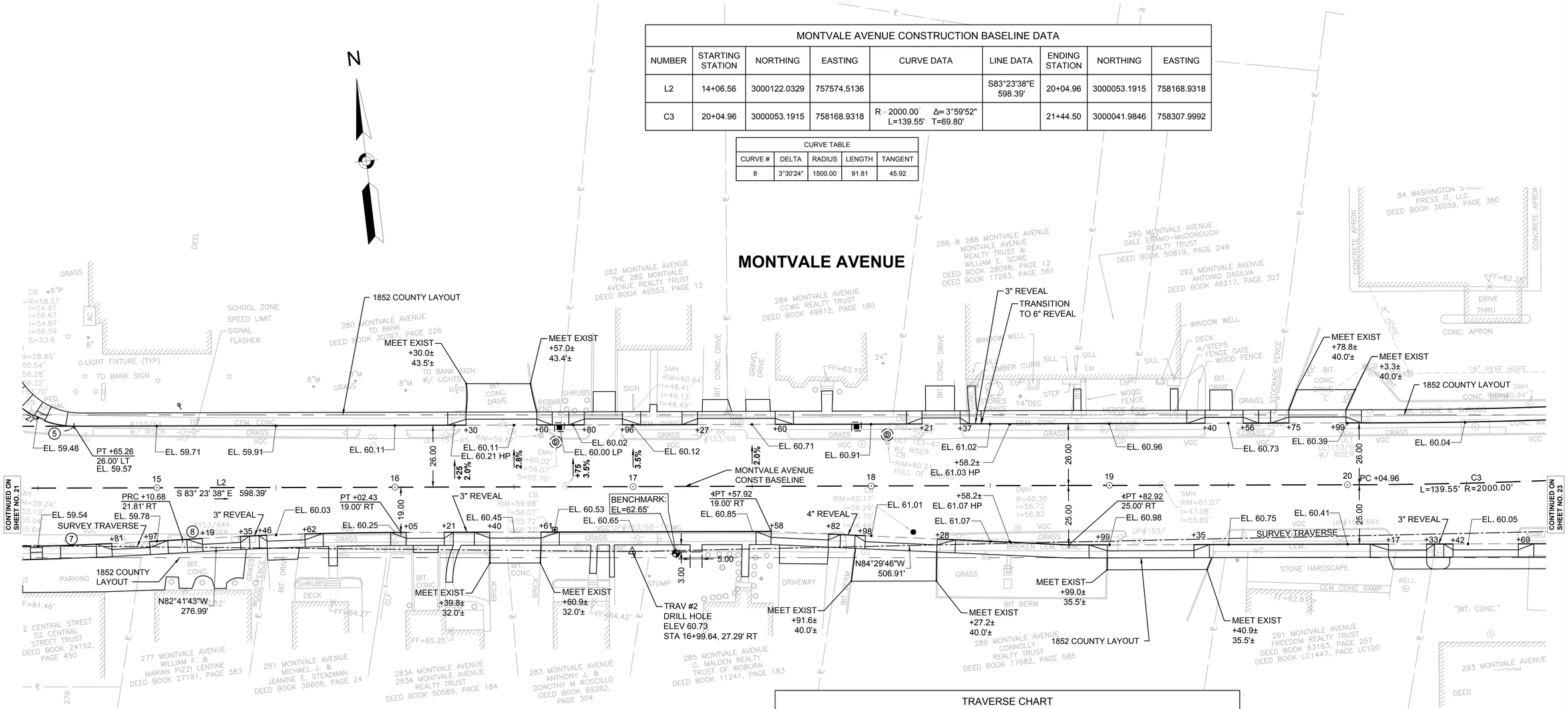
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	22	85
PROJECT FILE NO.	604935		

GRADING & TIE PLANS

08363.40-ALGN.DWG Plotted on 31-Aug-2017 11:48 AM

MONTVALE AVENUE CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L2	14+06.56	3000122.0329	757574.5136		S83°23'38"E 598.39'	20+04.96	3000053.1915	758168.9318
C3	20+04.96	3000053.1915	758168.9318	R=2000.00' Δ=3°59'52" L=139.55' T=69.80'		21+44.50	3000041.9846	758307.9992

CURVE TABLE				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
8	3°30'24"	1500.00	91.81	45.92



TRAVERSE CHART						
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION	STATION	OFFSET
TRAV NO.1	3000012.5879	758367.0771	58.91	MAG NAIL	22+04.86	26.68' RT
TRAV NO.2	3000061.2076	757862.5041	60.73	DRILL HOLE	16+99.64	27.29' RT
TRAV NO.3	2999731.1250	758232.1789	55.49	DRILL HOLE	301+24.71	17.72' LT
TRAV NO.4	3000001.7184	758717.7087	48.40	PUNCH MARK	5+55.57	21.58' RT
TRAV NO.5	3000314.2233	758345.3073	61.63	ENGINEER'S DISK	307+24.06	25.92' LT
TRAV NO.6	3000096.4260	757587.7620	59.70	DRILL HOLE	14+22.67	23.91' RT
TRAV NO.7	3000025.7964	759295.2299	42.26	MAG NAIL	31+30.25	36.61' RT
TRAV NO.8	3000085.2477	759136.0817	40.87	SPIKE SET	29+78.37	39.51' LT
TRAV NO.12	2999777.0720	757453.2540	53.43	CONC NAIL	200+85.17	16.95' LT
TRAV NO.13	3000502.8810	757701.7630	63.71	LARGE SPIKE W/ CROSSCUT	208+51.18	25.98' RT
TRAV NO.105	3000144.1620	757347.2537	58.62	DRILL HOLE	11+80.22	19.61' RT

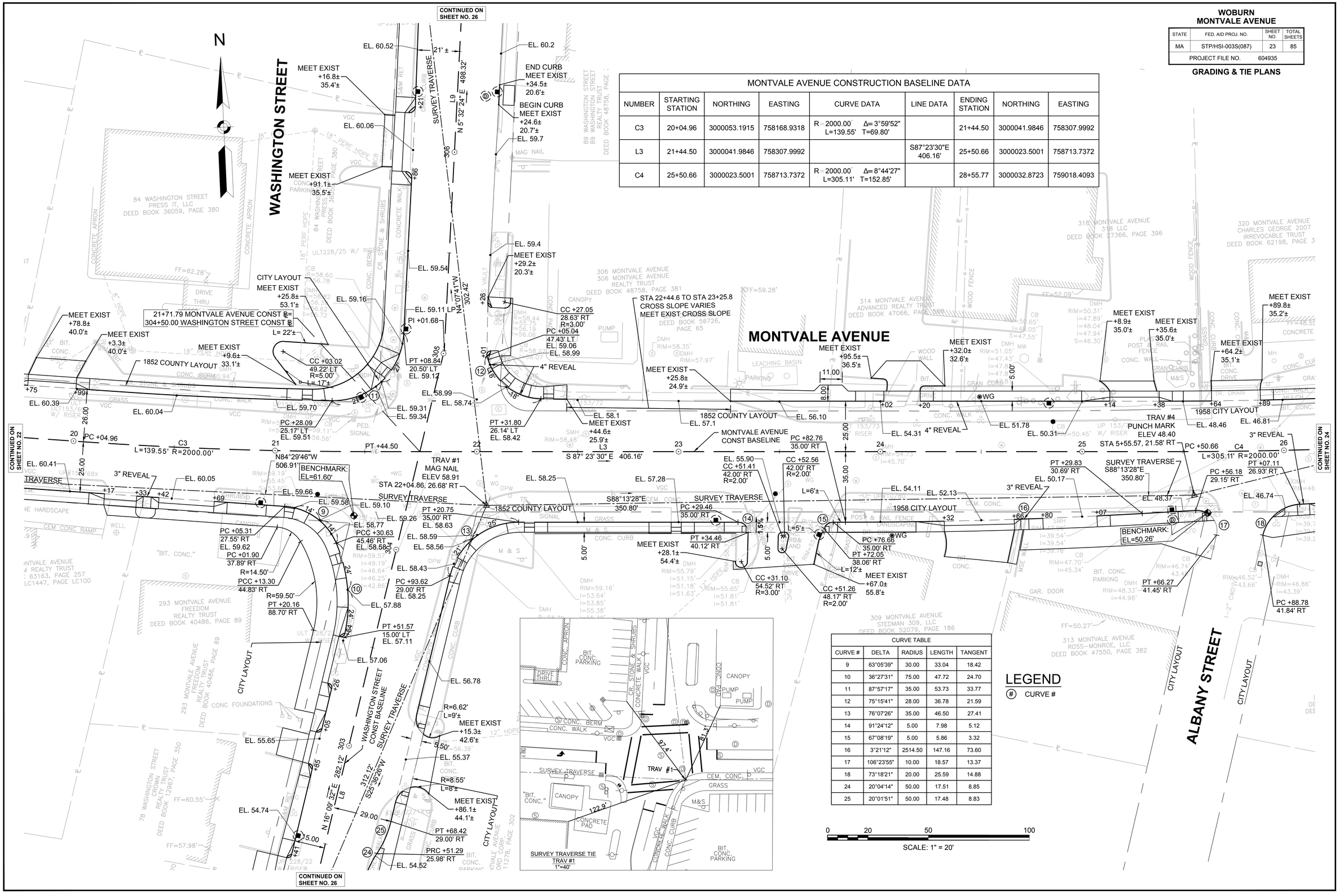
0 20 50 100
SCALE: 1" = 20'

LEGEND
(#) CURVE #

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	23	85
PROJECT FILE NO.	604935		

GRADING & TIE PLANS



MONTVALE AVENUE CONSTRUCTION BASELINE DATA

NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C3	20+04.96	3000053.1915	758168.9318	R=2000.00' Δ=3°59'52" L=139.55' T=69.80'		21+44.50	3000041.9846	758307.9992
L3	21+44.50	3000041.9846	758307.9992		S87°23'30"E 406.16'	25+50.66	3000023.5001	758713.7372
C4	25+50.66	3000023.5001	758713.7372	R=2000.00' Δ=8°44'27" L=305.11' T=152.85'		28+55.77	3000032.8723	759018.4093

CURVE TABLE

CURVE #	DELTA	RADIUS	LENGTH	TANGENT
9	63°05'39"	30.00	33.04	18.42
10	36°27'31"	75.00	47.72	24.70
11	87°57'17"	35.00	53.73	33.77
12	75°15'41"	28.00	36.78	21.59
13	76°07'26"	35.00	46.50	27.41
14	91°24'12"	5.00	7.98	5.12
15	67°08'19"	5.00	5.86	3.32
16	3°21'12"	2514.50	147.16	73.60
17	106°23'55"	10.00	18.57	13.37
18	73°18'21"	20.00	25.59	14.88
24	20°04'14"	50.00	17.51	8.85
25	20°01'51"	50.00	17.48	8.83

LEGEND

(#) CURVE #

08363.40-ALGN.DWG Plotted on 31-Aug-2017 11:48 AM

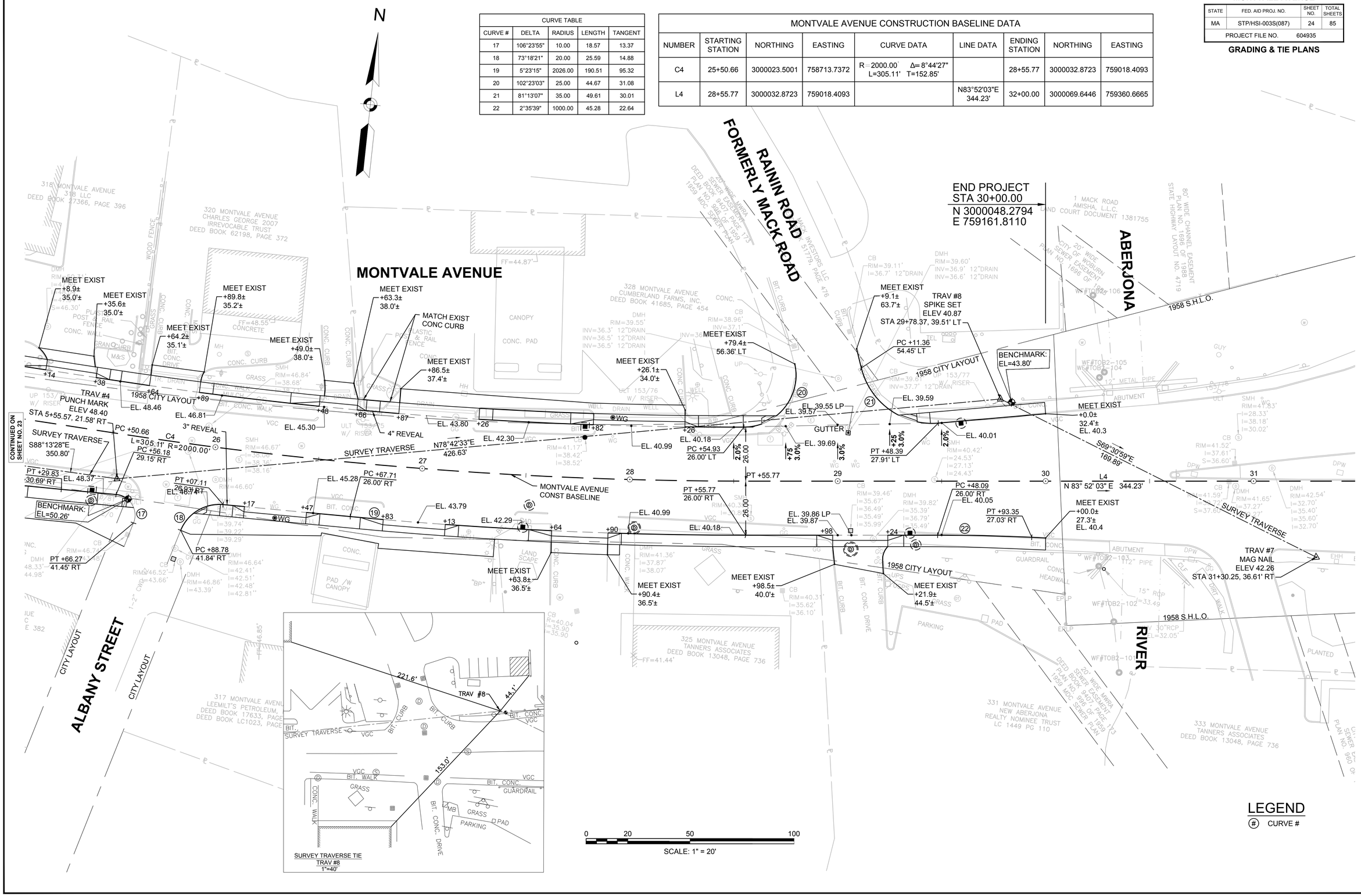
WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	24	85
PROJECT FILE NO.	604935		

GRADING & TIE PLANS

CURVE TABLE				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
17	106°23'55"	10.00	18.57	13.37
18	73°18'21"	20.00	25.59	14.88
19	5°23'15"	2026.00	190.51	95.32
20	102°23'03"	25.00	44.67	31.08
21	81°13'07"	35.00	49.61	30.01
22	2°35'39"	1000.00	45.28	22.64

MONTVALE AVENUE CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C4	25+50.66	3000023.5001	758713.7372	R=2000.00' Δ=8°44'27" L=305.11' T=152.85'		28+55.77	3000032.8723	759018.4093
L4	28+55.77	3000032.8723	759018.4093		N83°52'03"E 344.23'	32+00.00	3000069.6446	759360.6665



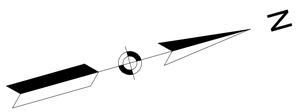
08363.40-ALGN.DWG Plotted on 31-Aug-2017 11:48 AM

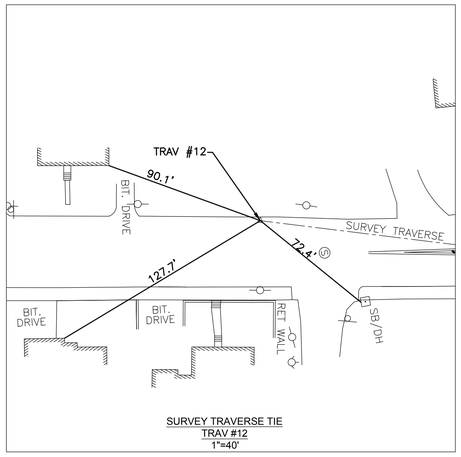
WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	25	85
PROJECT FILE NO.	604935		

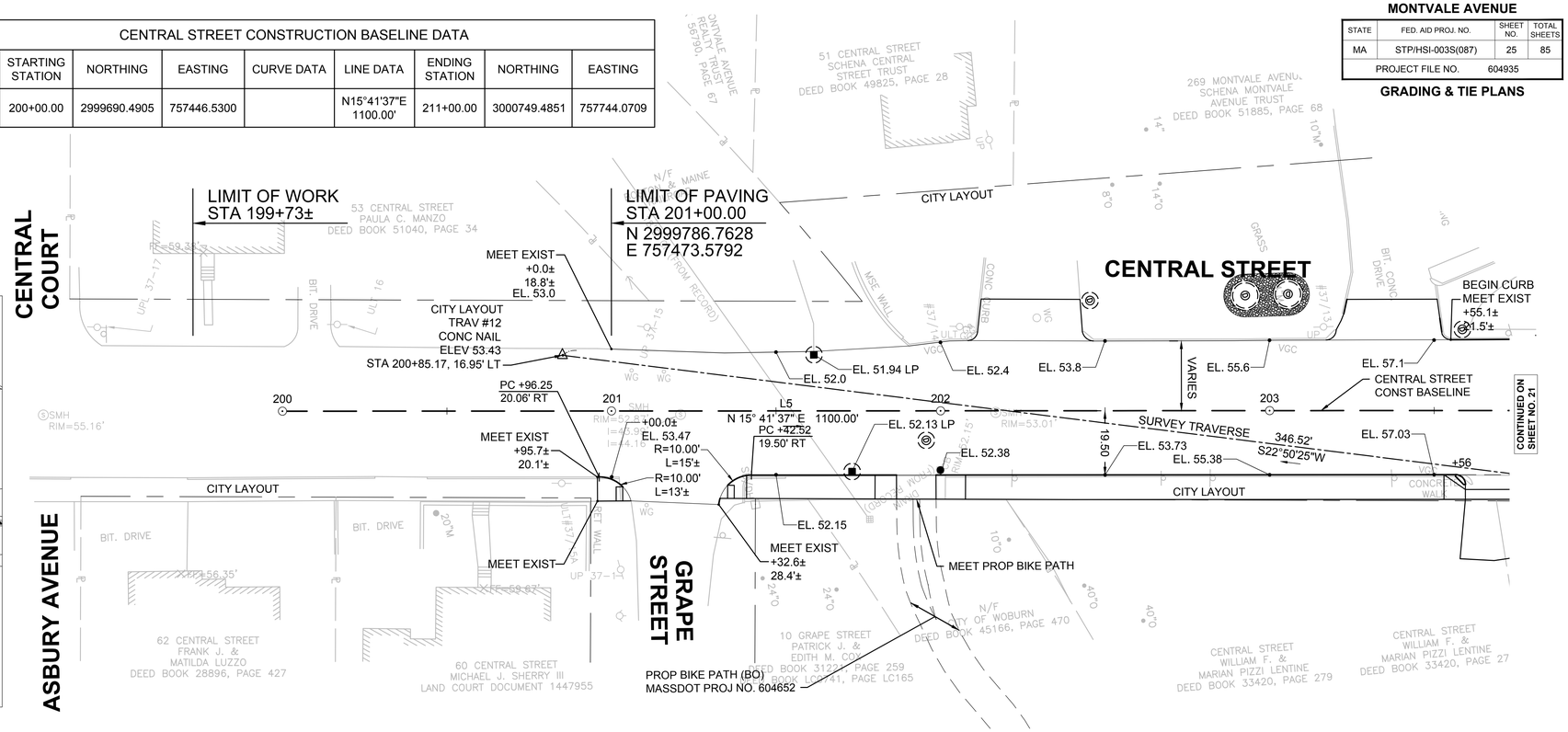
GRADING & TIE PLANS

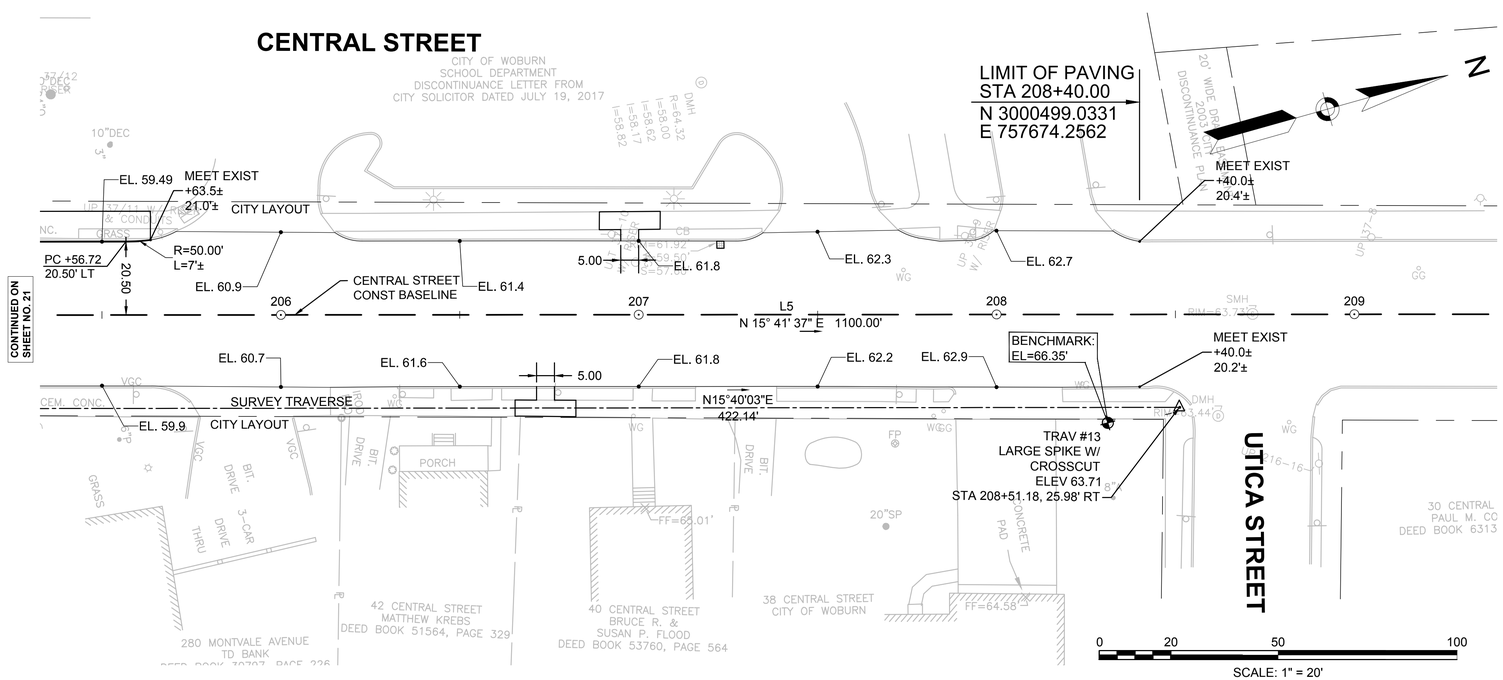
CENTRAL STREET CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L5	200+00.00	2999690.4905	757446.5300		N15°41'37"E 1100.00'	211+00.00	3000749.4851	757744.0709

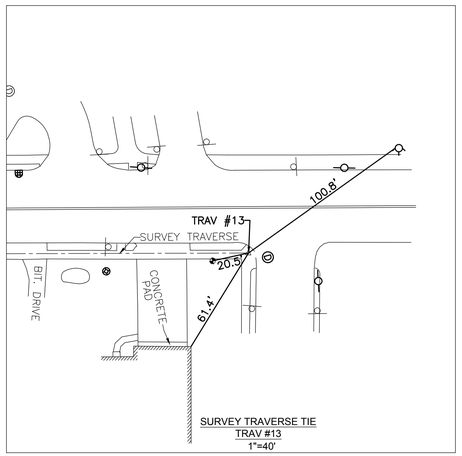




SURVEY TRAVERSE TIE
TRAV #12
1"=40'







SURVEY TRAVERSE TIE
TRAV #13
1"=40'

LEGEND

(#) CURVE #

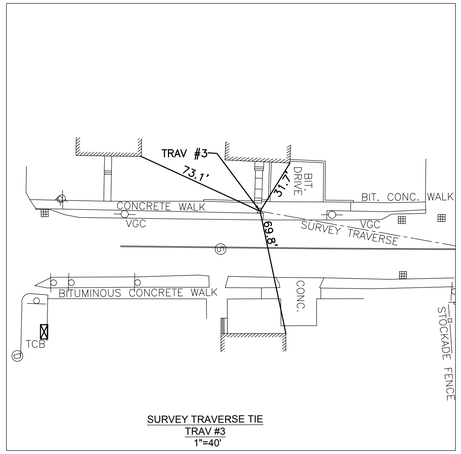
0 20 50 100
SCALE: 1" = 20'

08363.40-ALGN.DWG Plotted on 31-Aug-2017 11:48 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	26	85
PROJECT FILE NO.	604935		

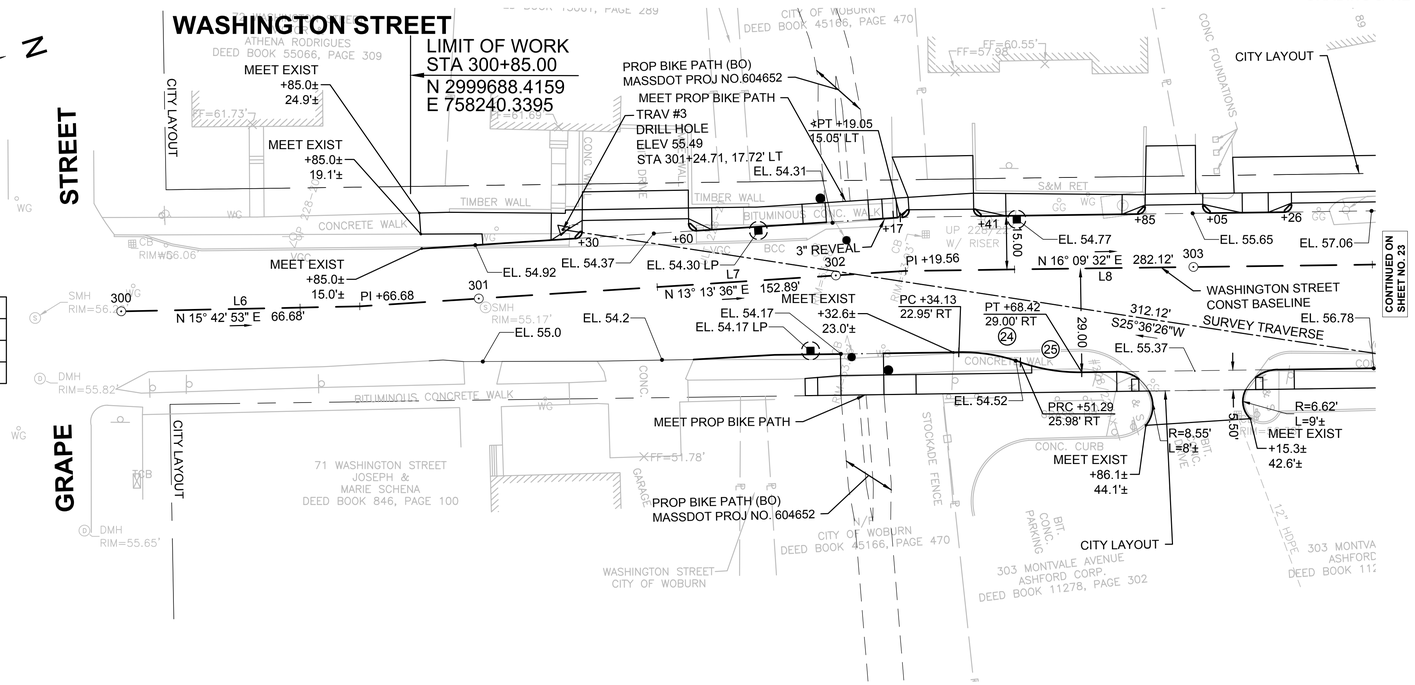
GRADING & TIE PLANS

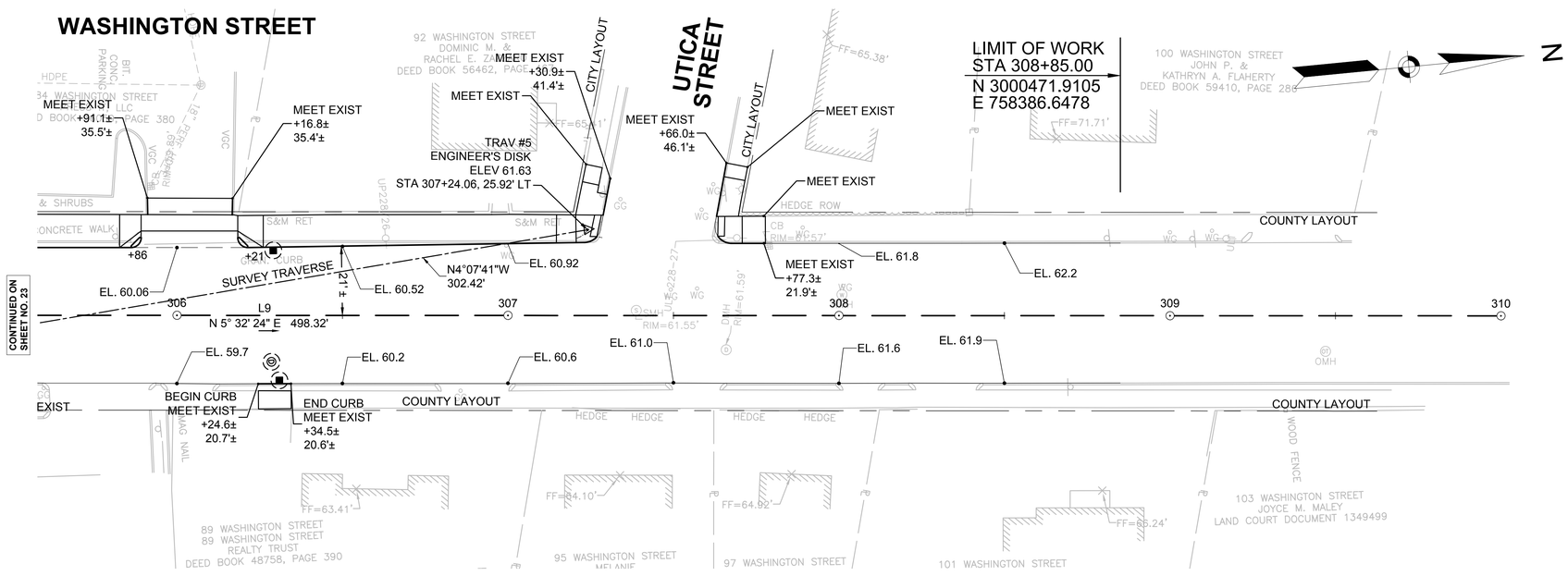


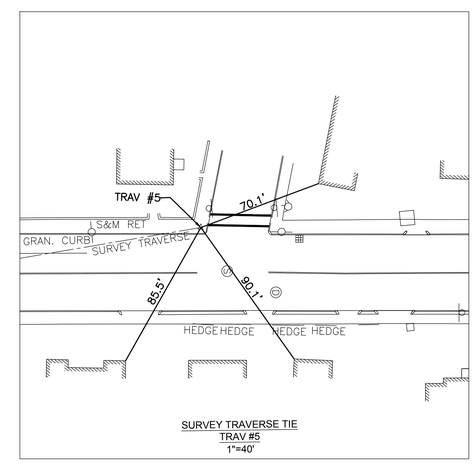
SURVEY TRAVERSE TIE
TRAV #3
1"=40'

CURVE TABLE				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
24	20°04'14"	50.00	17.51	8.85
25	20°01'51"	50.00	17.48	8.83

WASHINGTON STREET CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L6	300+00.00	2999606.3943	758218.0877		N15°42'53"E 66.68'	300+66.68	2999670.5787	758236.1470
L7	300+66.68	2999670.5787	758236.1470		N13°13'36"E 152.89'	302+19.56	2999819.4094	758271.1284
L8	302+19.56	2999819.4094	758271.1284		N16°09'32"E 282.12'	305+01.68	3000090.3798	758349.6413
L9	305+01.68	3000090.3798	758349.6413		N5°32'24"E 498.32'	310+00.00	3000586.3733	758397.7500





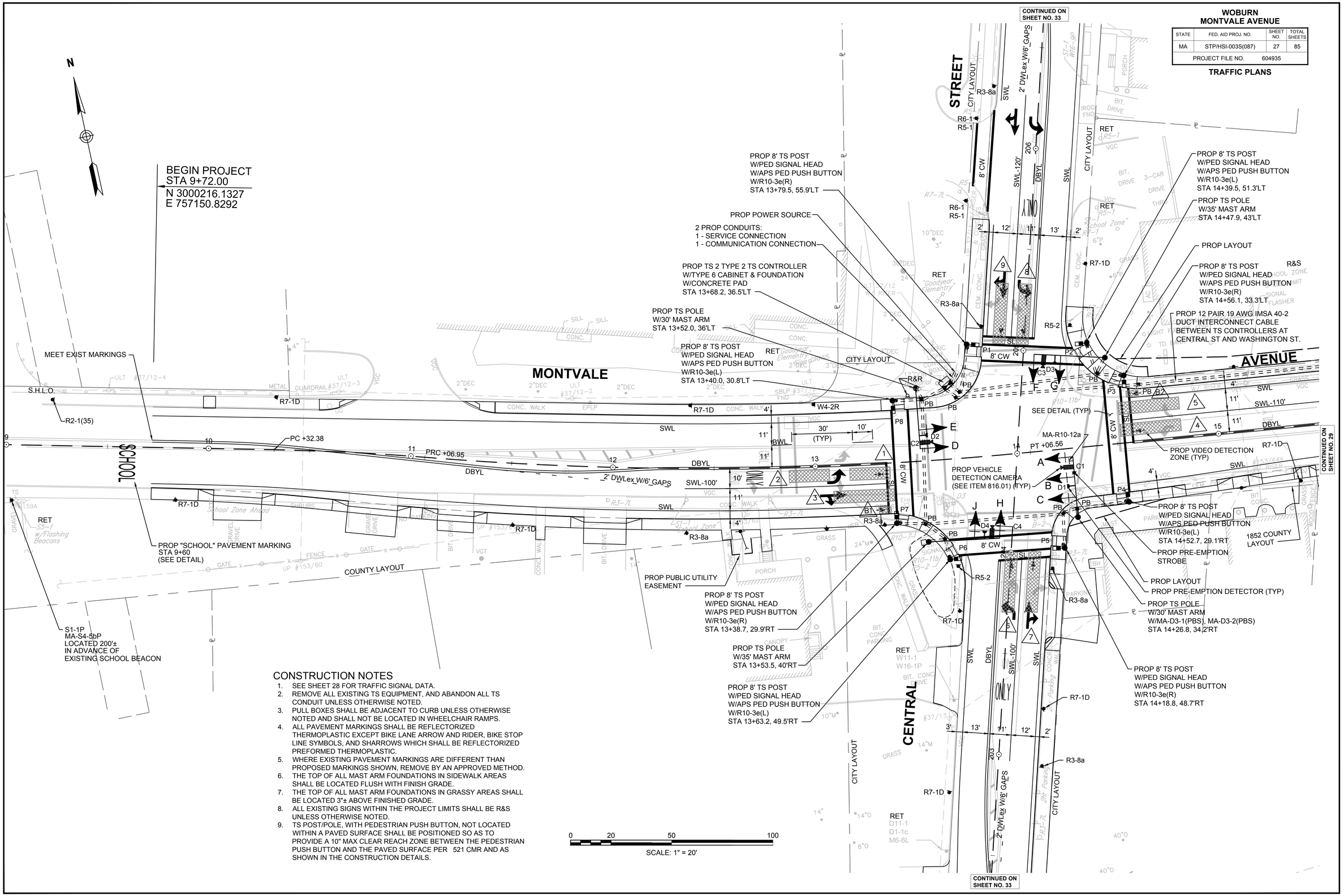


0 20 50 100
SCALE: 1" = 20'

LEGEND

(#) CURVE #

08363.40-ALGN.DWG Plotted on 31-Aug-2017 11:49 AM

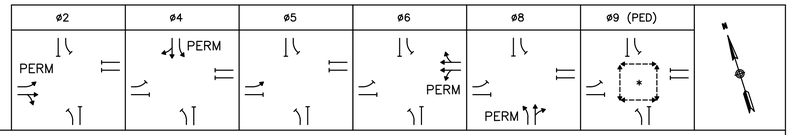


CONSTRUCTION NOTES

1. SEE SHEET 28 FOR TRAFFIC SIGNAL DATA.
2. REMOVE ALL EXISTING TS EQUIPMENT, AND ABANDON ALL TS CONDUIT UNLESS OTHERWISE NOTED.
3. PULL BOXES SHALL BE ADJACENT TO CURB UNLESS OTHERWISE NOTED AND SHALL NOT BE LOCATED IN WHEELCHAIR RAMPS.
4. ALL PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC EXCEPT BIKE LANE ARROW AND RIDER, BIKE STOP LINE SYMBOLS, AND SHARROWS WHICH SHALL BE REFLECTORIZED PREFORMED THERMOPLASTIC.
5. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
6. THE TOP OF ALL MAST ARM FOUNDATIONS IN SIDEWALK AREAS SHALL BE LOCATED FLUSH WITH FINISH GRADE.
7. THE TOP OF ALL MAST ARM FOUNDATIONS IN GRASSY AREAS SHALL BE LOCATED 3"± ABOVE FINISHED GRADE.
8. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE R&S 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.

08363.40-TSIG.DWG Plotted on 31-Aug-2017 11:49 AM

08363.40-TSIG.DWG Plotted on 31-Aug-2017 11:49 AM



SEQUENCE AND TIMING FOR FULLY ACTUATED CONTROL (COORDINATED)

APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	FLASH
MONTVALE AVENUE	EB	A	FY-	Y-	R-	R-	R-	R-	G-	Y-	R-	R-	R-	R-	R-	R-	R-	R-	R-	R-	FR-
MONTVALE AVENUE	EB	B,C	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FY
MONTVALE AVENUE	WB	D,E	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	FY
CENTRAL STREET	NB	F,G	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	FR
CENTRAL STREET	SB	H,J	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	FR
PEDESTRIAN X-ING	ALL	P1-P8	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	FDW	DW	OUT

TIMING IN SECONDS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	FLASH
MINIMUM GREEN (INITIAL)	10			6			6			10			6						CONFLICT FLASH OPERATION ONLY
PASSAGE TIME (VEHICLE)	2			2			2			2			2						
MAXIMUM 1	50			20			10			35			20						
MAXIMUM 2																			
YELLOW CLEARANCE		3.5			3.0			3.0			3.5			3.0			3.0		
RED CLEARANCE			1.5			2.0			0			2.0			2.0			1.0	
PEDESTRIAN WALK																7			
PEDESTRIAN CLEARANCE																12			
DETECTOR MEMORY	NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			–			
RECALL	MIN			OFF			OFF			MIN			OFF			–			

COORDINATION DATA			COORDINATION PHASE SPLIT TIMES					
TIMING PLAN	CYCLE	OFFSET	ø2	ø4	ø5	ø6	ø8	ø9 (PED)
1/1/1 M-F 7AM-9AM	105	100	56	26	12	44	26	23
2/1/1 M-F 2:30PM-7PM	105	0	59	23	18	41	23	23
3/1/1 SAT-SUN 10AM-6PM	105	99	57	25	11	46	25	23
			COORD ø			COORD ø		

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. STOP AND GO OPERATION FOR 24 HOURS PER DAY. FLASHING OPERATION FOR EMERGENCY ONLY.
7. DURING PEDESTRIAN INTERVAL, FDW THROUGH YELLOW OPERATION SHALL NOT BE IN EFFECT.
8. SEE SHEET 35 FOR COORDINATION DATA

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.

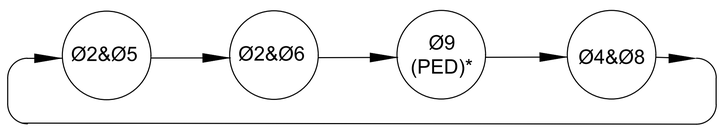
EMERGENCY VEHICLE PRE-EMPTION OPERATION

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 IS ACTIVE.
6. EMERGENCY VEHICLE PRE-EMPTION SHALL OVERRIDE COORDINATION.

PRE-EMPTION PHASING & PRIORITY

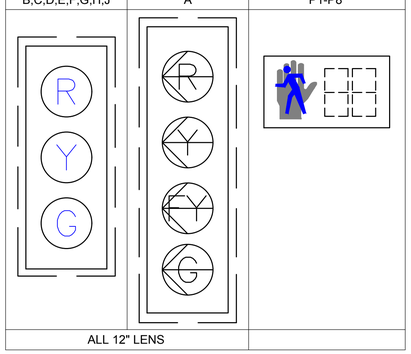
DETECTOR & PRIORITY	PRE-EMPT PHASE ASSIGNMENT	MOVEMENT	VEHICLE PHASE ASSIGNMENT
D1	1		Ø2 & Ø5
D2	2		Ø6
D3	3		Ø8
D4	4		Ø4

PREFERENTIAL PHASE SEQUENCE



* UPON PEDESTRIAN PUSH BUTTON ACTUATION

SIGNAL HEAD DATA



NOTES:
1. ALL SIGNAL HEADS SHALL BE RIGID MOUNTED.
2. ALL SIGNAL HEADS SHALL BE EQUIPPED WITH 5"± NON-LOUVERED BACKPLATES. ALL BACKPLATES SHALL CONTAIN A 3" WIDE YELLOW REFLECTIVE BORDER.
3. ALL SIGNAL HEADS SHALL BE EQUIPPED WITH TUNNEL VISORS.
4. ALL SIGNAL DISPLAYS SHALL BE EQUIPPED WITH L.E.D. MODULES.

VIDEO DETECTION DATA

DETECTION ZONE	APPROACH/LANE	CAMERA	DELAY	EXTEND	CALL PHASE
1	MONTVALE AVE EB LEFT-TURN LANE (FRONT)	C1	3	0	Ø5
2	MONTVALE AVE EB THRU-RIGHT LANE (BACK)	C1	0	0	Ø2
3	MONTVALE AVE EB THRU-RIGHT LANE	C1	0	0	Ø2
4	MONTVALE AVE WB LEFT-THRU LANE	C2	0	0	Ø6
5	MONTVALE AVE WB THRU-RIGHT LANE	C2	0	0	Ø6
6	CENTRAL ST NB LEFT TURN LANE	C3	0	0	Ø8
7	CENTRAL ST NB THRU-RIGHT LANE	C3	0	0	Ø8
8	CENTRAL ST SB LEFT TURN LANE	C4	0	0	Ø4
9	CENTRAL ST SB THRU-RIGHT LANE	C4	0	0	Ø4
B1	MONTVALE AVE EB	C1	0	0	Ø2
B2	MONTVALE AVE WB	C2	0	0	Ø6

NOTES:
1. DELAY AND EXTENSION TIMINGS SHALL BE PROGRAMMED IN THE CONTROLLER ONLY.
2. DETECTION ZONES SHALL BE ADJUSTED BY THE CONTRACTOR IN THE PRESENCE OF THE ENGINEER.

LIST OF MAJOR ITEMS REQUIRED

MONTVALE AVENUE AT CENTRAL STREET

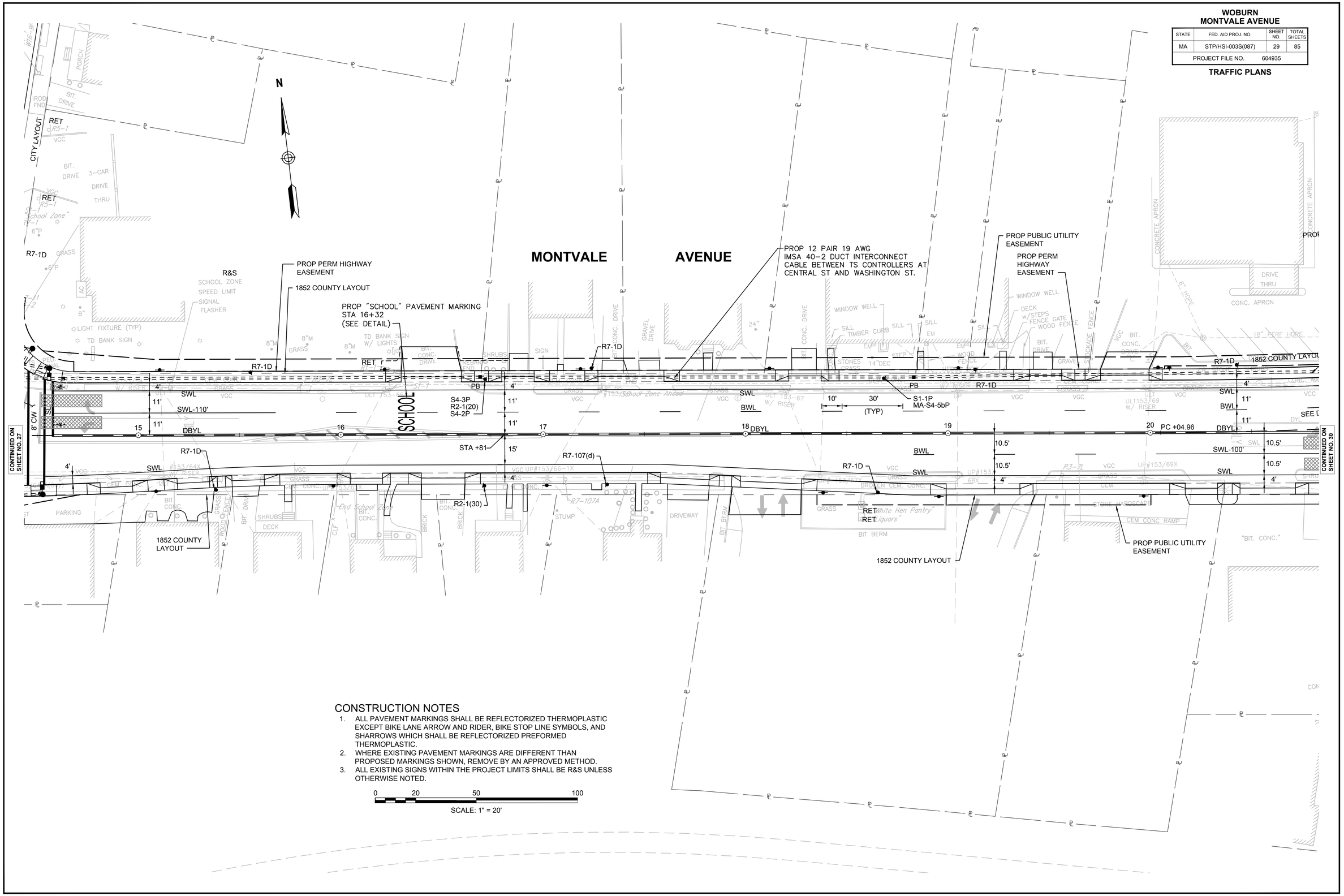
PAY ITEM	QUANTITY	DESCRIPTION
816.01	1	8Ø TS 2 TYPE 2 CONTROLLER IN A TYPE 6 BASE MOUNTED CABINET INCLUDING FOUNDATION AND CONCRETE PAD
	1	NEMA MMU TYPE 2
	2	TS 30' MAST ARM TYPE 2, STEEL, INCL. FOUNDATION
	2	TS 35' MAST ARM TYPE 2, STEEL, INCL. FOUNDATION
	8	TS POST 8' STANDARD INCL. FOUNDATION
	8	SIGNAL HEAD, 3-SECTION, 12" LENSES
	1	SIGNAL HEAD, 4-SECTION, 12" LENSES, W/ FLASHING YELLOW ARROW
	8	PEDESTRIAN SIGNAL HEAD WITH COUNTDOWN UNIT
	4	APS PEDESTRIAN PUSH BUTTON W/R10-3e(L) AND SIGN SADDLE
	4	APS PEDESTRIAN PUSH BUTTON W/R10-3e(R) AND SIGN SADDLE
	1	MANAGED ETHERNET SWITCH W/ SFPs
	1	VIDEO DETECTION SYSTEM (1 OR 4 CAMERA(S), VDP & CABLES)
	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)
811.31	10	PULL BOX-12"x12"
804.3	785'±	3 INCH ELECTRICAL CONDUIT TYPE NM. - PLASTIC (UL)

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

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	29	85
PROJECT FILE NO.	604935		

TRAFFIC PLANS



CONSTRUCTION NOTES

1. ALL PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC EXCEPT BIKE LANE ARROW AND RIDER, BIKE STOP LINE SYMBOLS, AND SHARROWS WHICH SHALL BE REFLECTORIZED PREFORMED 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 R&S UNLESS OTHERWISE NOTED.

0 20 50 100

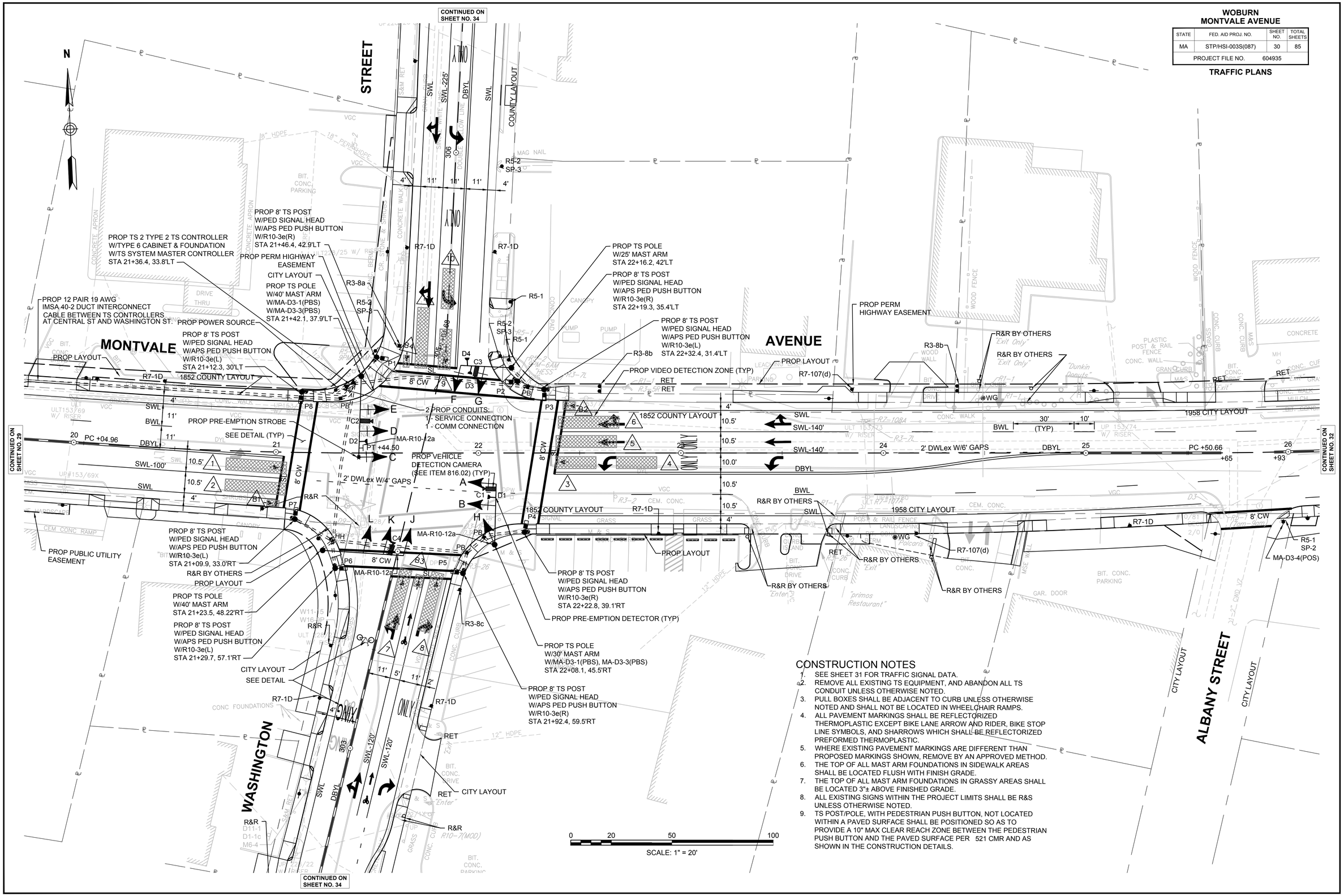
SCALE: 1" = 20'

08363.40-TSIG.DWG Plotted on 31-Aug-2017 11:49 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	30	85
PROJECT FILE NO.	604935		

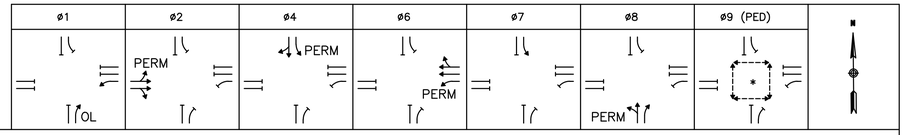
TRAFFIC PLANS



CONSTRUCTION NOTES

1. SEE SHEET 31 FOR TRAFFIC SIGNAL DATA.
2. REMOVE ALL EXISTING TS EQUIPMENT, AND ABANDON ALL TS CONDUIT UNLESS OTHERWISE NOTED.
3. PULL BOXES SHALL BE ADJACENT TO CURB UNLESS OTHERWISE NOTED AND SHALL NOT BE LOCATED IN WHEELCHAIR RAMPS.
4. ALL PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC EXCEPT BIKE LANE ARROW AND RIDER, BIKE STOP LINE SYMBOLS, AND SHARROWS WHICH SHALL BE REFLECTORIZED PREFORMED THERMOPLASTIC.
5. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
6. THE TOP OF ALL MAST ARM FOUNDATIONS IN SIDEWALK AREAS SHALL BE LOCATED FLUSH WITH FINISH GRADE.
7. THE TOP OF ALL MAST ARM FOUNDATIONS IN GRASSY AREAS SHALL BE LOCATED 3"± ABOVE FINISHED GRADE.
8. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE R&S 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.

08363.40-TSIG.DWG Plotted on 31-Aug-2017 11:50 AM

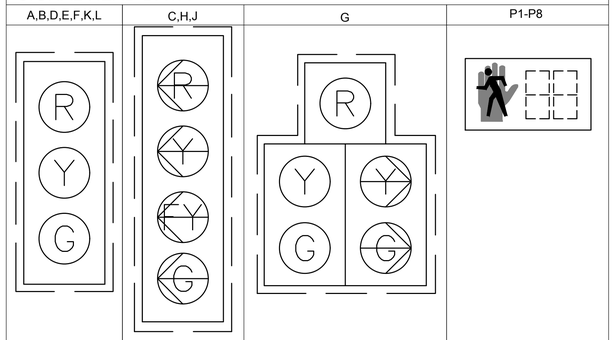


SEQUENCE AND TIMING FOR FULLY ACTUATED CONTROL (COORDINATED)

APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	FLASH
MONTVALE AVENUE	EB	A,B	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FY
MONTVALE AVENUE	WB	C	G	Y	R	R	R	R	R	R	R	FY	Y	R	R	R	R	R	R	R	R	R	R	FR
MONTVALE AVENUE	WB	D,E	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	FY
WASHINGTON STREET	NB	F	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	FR
WASHINGTON STREET	NB	G	R G	R Y	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	FR
WASHINGTON STREET	SB	H,J	R	R	R	R	R	R	FY	Y	R	R	R	R	G	Y	R	R	R	R	R	R	R	FR
WASHINGTON STREET	SB	K,L	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	FR
PEDESTRIAN X-ING	ALL	P1-P8	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	FDW	DW	OUT
TIMING IN SECONDS																								
MINIMUM GREEN (INITIAL)			6			10			6			10			6			6						CONFLICT FLASH OPERATION ONLY
PASSAGE TIME (VEHICLE)			2			2			2			2			2			2						
MAXIMUM 1			10			20			35			35			10			20						
MAXIMUM 2																								
YELLOW CLEARANCE				3.0			3.0			3.0			3.0			3.0			3.0			3.0		
RED CLEARANCE					0			2.5			2.0			2.5			2.5			2.0			1.0	
PEDESTRIAN WALK																					7			
PEDESTRIAN CLEARANCE																					14			
DETECTOR MEMORY			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			–			
RECALL			OFF			MIN			OFF			MIN			OFF			OFF			–			
COORDINATION DATA			COORDINATION PHASE SPLIT TIMES																					
TIMING PLAN	CYCLE	OFFSET	ø1			ø2			ø4			ø6			ø7			ø8			ø9 (PED)			
1/1/1 M-F 7AM-9AM	105	0	15			25			40			40			17			23			25			
2/1/1 M-F 2:30PM-7PM	105	0	15			25			40			40			17			23			25			
3/1/1 SAT-SUN 10AM-6PM	105	0	15			25			40			40			17			23			25			
						COORD ø						COORD ø												

NOTES:
1. AUTOMATIC FLASHING OPERATION PER 2009 M.U.T.C.D., AS AMENDED.
2. * UPON PEDESTRIAN PUSH BUTTON ACTUATION
3. PERM = PERMISSIVE
4. OL = OVERLAP
5. ø4 & ø8 DUAL ENTRY
6. MAXIMUM 1 = NORMAL OPERATION
7. STOP AND GO OPERATION FOR 24 HOURS PER DAY. FLASHING OPERATION FOR EMERGENCY ONLY.
8. DURING PEDESTRIAN INTERVAL, FDW THROUGH YELLOW OPERATION SHALL NOT BE IN EFFECT.
9. SEE SHEET 35 FOR COORDINATION DATA.

SIGNAL HEAD DATA



NOTES:
1. ALL SIGNAL HEADS SHALL BE RIGID MOUNTED.
2. ALL SIGNAL HEADS SHALL BE EQUIPPED WITH 5"± NON-LOUVERED BACKPLATES. ALL BACKPLATES SHALL CONTAIN A 3" WIDE YELLOW REFLECTIVE BORDER.
3. ALL SIGNAL HEADS SHALL BE EQUIPPED WITH TUNNEL VISORS.
4. ALL SIGNAL DISPLAYS SHALL BE EQUIPPED WITH L.E.D. MODULES.

VIDEO DETECTION DATA

DETECTION ZONE	APPROACH/LANE	CAMERA	DELAY	EXTEND	CALL PHASE
1	MONTVALE AVE EB LEFT-THRU LANE	C1	0	0	Ø2
2	MONTVALE AVE EB THRU-RIGHT LANE	C1	0	0	Ø2
3	MONTVALE AVE WB LEFT TURN LANE (FRONT)	C2	3	0	Ø1
4	MONTVALE AVE WB LEFT TURN LANE (BACK)	C2	0	0	Ø6
5	MONTVALE AVE WB THRU LANE	C2	0	0	Ø6
6	MONTVALE AVE WB THRU-RIGHT LANE	C2	0	0	Ø6
7	WASHINGTON ST NB LEFT-THRU LANE	C3	0	0	Ø8
8	WASHINGTON ST NB RIGHT TURN LANE	C3	0	0	Ø8
9	WASHINGTON ST SB LEFT TURN LANE (FRONT)	C4	3	0	Ø7
10	WASHINGTON ST SB LEFT TURN LANE (BACK)	C4	0	0	Ø4
11	WASHINGTON ST SB THRU-RIGHT LANE	C4	0	0	Ø4
B1	MONTVALE AVE EB SHOULDER	C1	0	0	Ø2
B2	MONTVALE AVE WB SHOULDER	C2	0	0	Ø6
B3	WASHINGTON ST NB BICYCLE LANE	C3	0	0	Ø8
B4	WASHINGTON ST SB SHOULDER	C4	0	0	Ø4

NOTES:
1. DELAY AND EXTENSION TIMINGS SHALL BE PROGRAMMED IN THE CONTROLLER ONLY.
2. DETECTION ZONES SHALL BE ADJUSTED BY THE CONTRACTOR IN THE PRESENCE OF THE ENGINEER.

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.

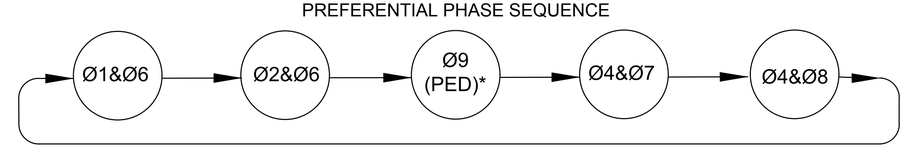
EMERGENCY VEHICLE PRE-EMPTION OPERATION

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 IS ACTIVE.
6. EMERGENCY VEHICLE PRE-EMPTION SHALL OVERRIDE COORDINATION.

PRE-EMPTION PHASING & PRIORITY

DETECTOR & PRIORITY	PRE-EMPT PHASE ASSIGNMENT	MOVEMENT	VEHICLE PHASE ASSIGNMENT
D1	1		ø2
D2	2		ø1&ø6
D3	3		ø8
D4	4		ø4&ø7

PREFERENTIAL PHASE SEQUENCE



* UPON PEDESTRIAN PUSH BUTTON ACTUATION

LIST OF MAJOR ITEMS REQUIRED

MONTVALE AVENUE AT WASHINGTON STREET

PAY ITEM	QUANTITY	DESCRIPTION
816.02	1	8Ø TS 2 TYPE 2 CONTROLLER IN A TYPE 6 BASE MOUNTED CABINET INCLUDING FOUNDATION
	1	TS SYSTEM MASTER CONTROLLER
	1	NEMA MMU TYPE 2
	1	TS 25' MAST ARM TYPE 2, STEEL, INCL. FOUNDATION
	1	TS 30' MAST ARM TYPE 2, STEEL, INCL. FOUNDATION
	2	TS 40' MAST ARM TYPE 2, STEEL, INCL. FOUNDATION
	8	TS POST 8' STANDARD INCL. FOUNDATION
	7	SIGNAL HEAD, 3-SECTION, 12" LENSES
	3	SIGNAL HEAD, 4-SECTION, 12" LENSES, W/ FLASHING YELLOW ARROW
	1	SIGNAL HEAD, 5-SECTION CLUSTER, 12" LENSES
	8	PEDESTRIAN SIGNAL HEAD WITH COUNTDOWN UNIT
	4	APS PEDESTRIAN PUSH BUTTON W/R10-3e(L) AND SIGN SADDLE
	4	APS PEDESTRIAN PUSH BUTTON W/R10-3e(R) AND SIGN SADDLE
	1	MANAGED ETHERNET SWITCH W/ SFPs
	1	VIDEO DETECTION SYSTEM (1 OR 4 CAMERA(S), VDP & CABLES)
	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)
	1	TS SYSTEM MASTER CONTROLLER
811.31	5	PULL BOX-12"x12"
811.22	1	HANDHOLE-12"x24"
804.3	750'±	3 INCH ELECTRICAL CONDUIT TYPE NM. - PLASTIC (UL)

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

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	31	85
PROJECT FILE NO.	604935		

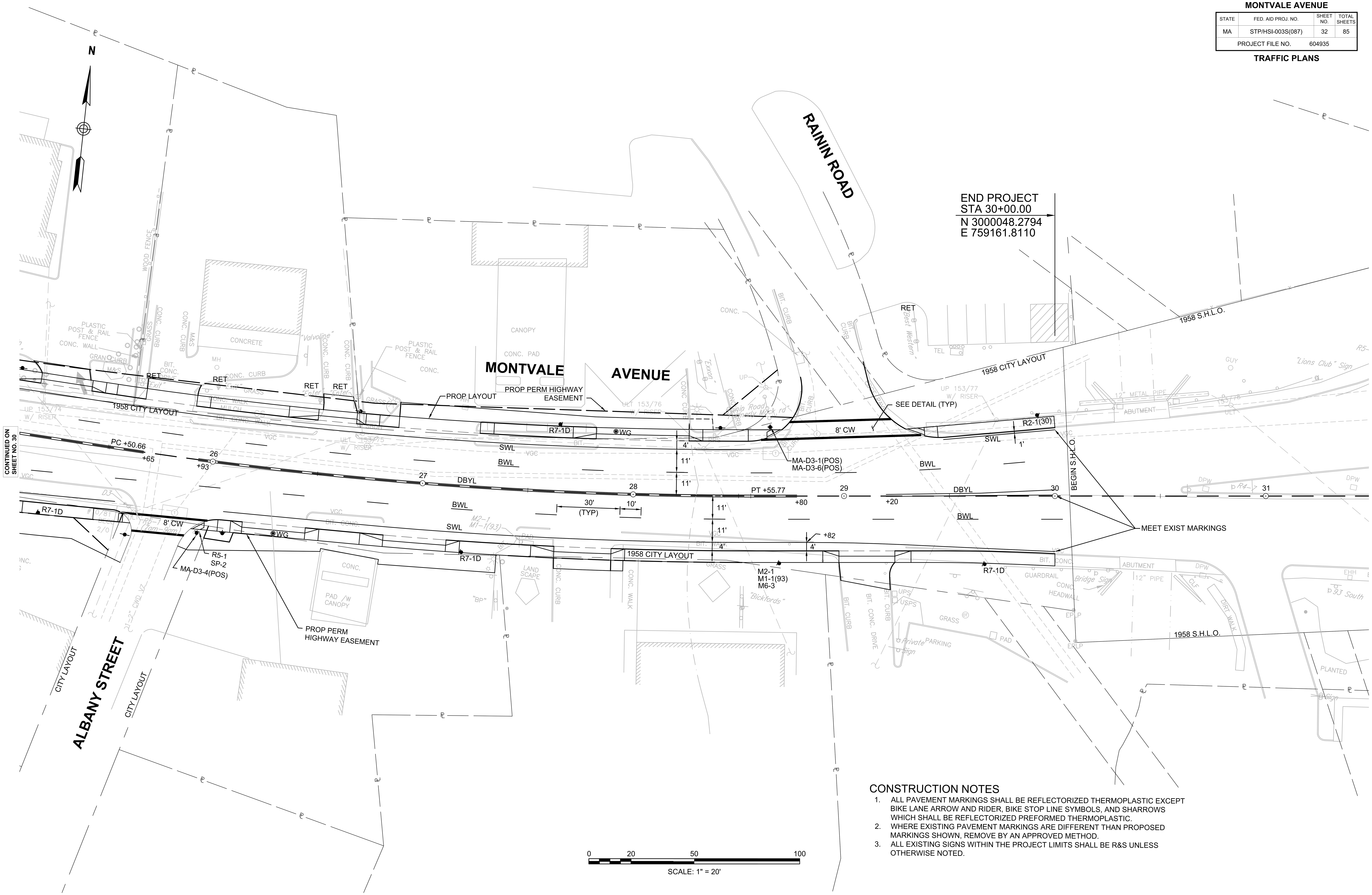
TRAFFIC PLANS

08363.40-TSIG.DWG Plotted on 7-Sep-2017 12:11 PM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	32	85
PROJECT FILE NO.	604935		

TRAFFIC PLANS



CONSTRUCTION NOTES

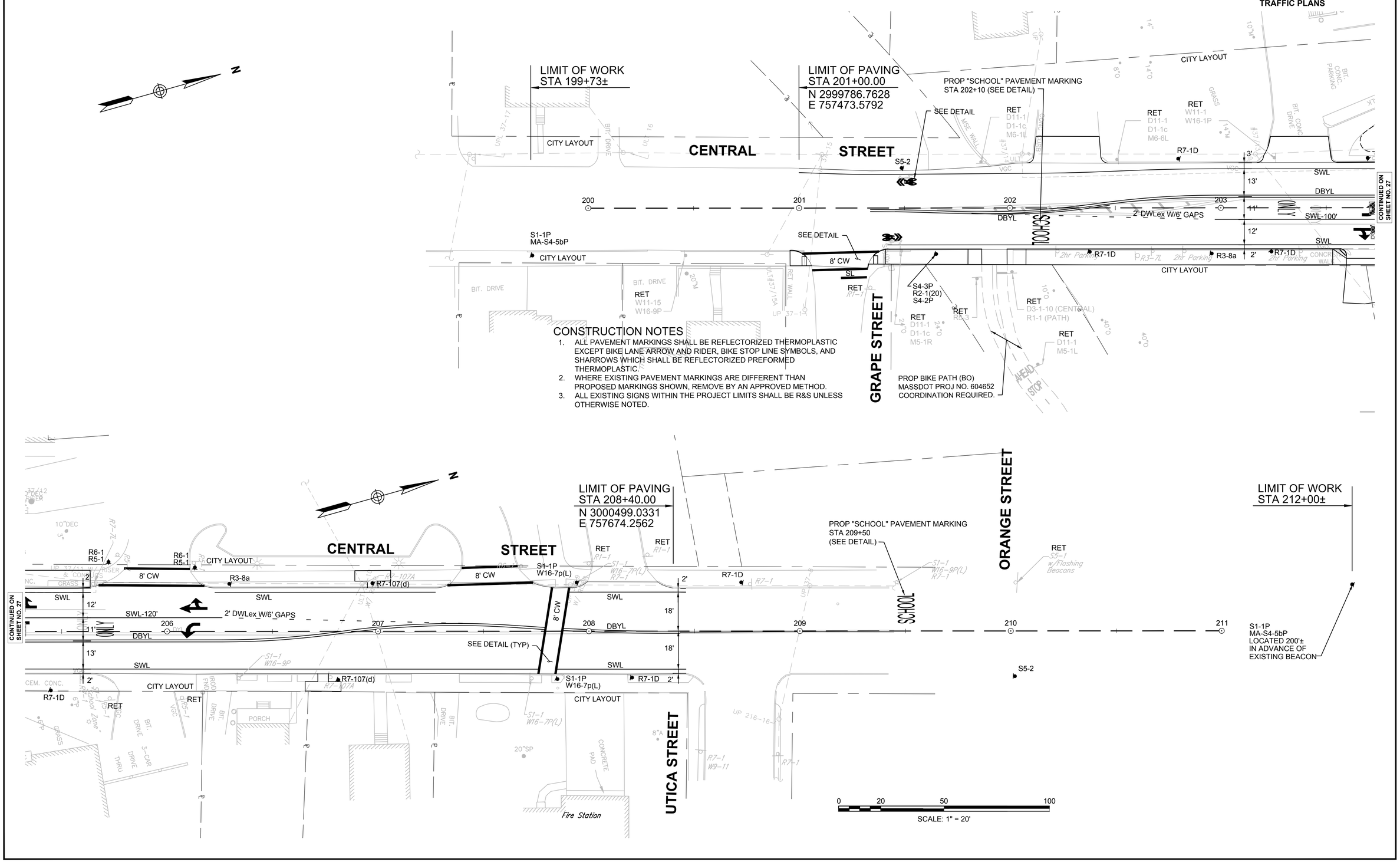
1. ALL PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC EXCEPT BIKE LANE ARROW AND RIDER, BIKE STOP LINE SYMBOLS, AND SHARROWS WHICH SHALL BE REFLECTORIZED PREFORMED THERMOPLASTIC.
2. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
3. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE R&S UNLESS OTHERWISE NOTED.

08363-40-TSIG.DWG Plotted on 31-Aug-2017 11:50 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	33	85
PROJECT FILE NO.	604935		

TRAFFIC PLANS

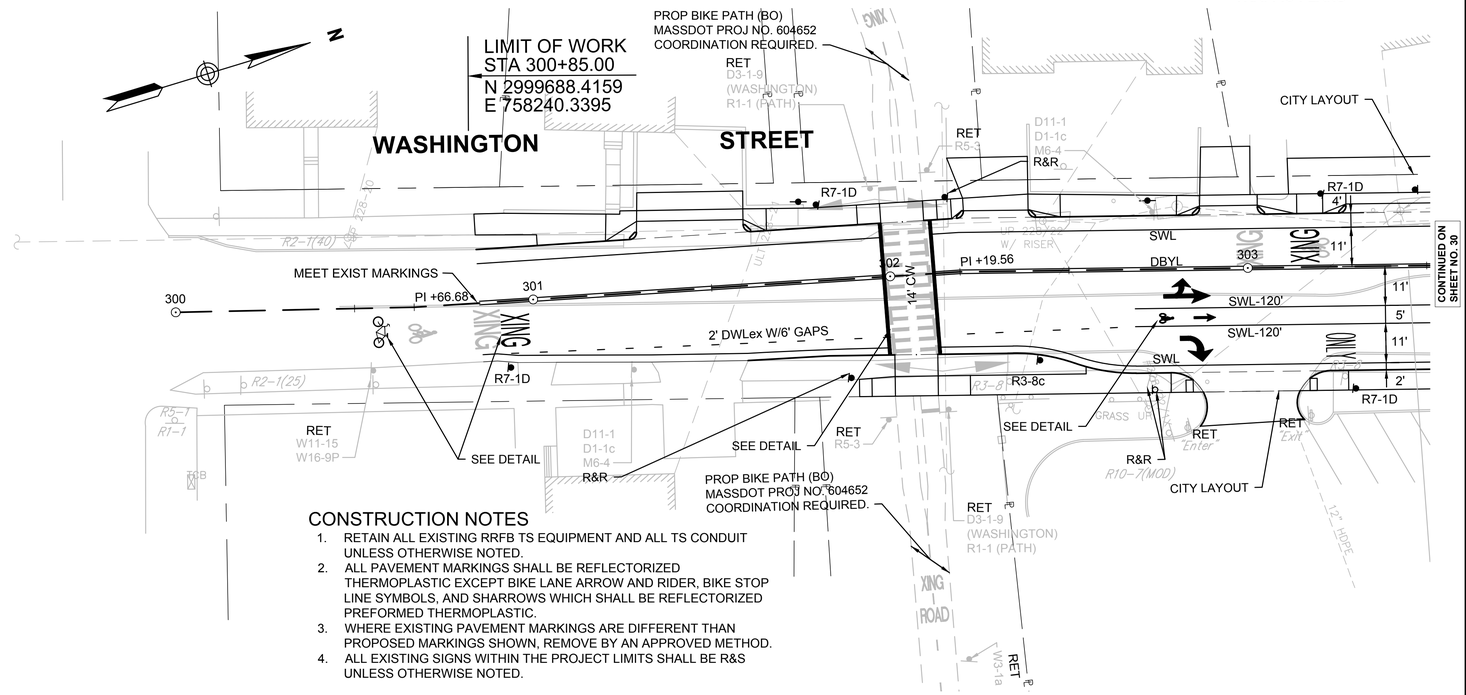


08363.40-TSIG.DWG Plotted on 31-Aug-2017 11:50 AM

WOBURN
MONTVALE AVENUE

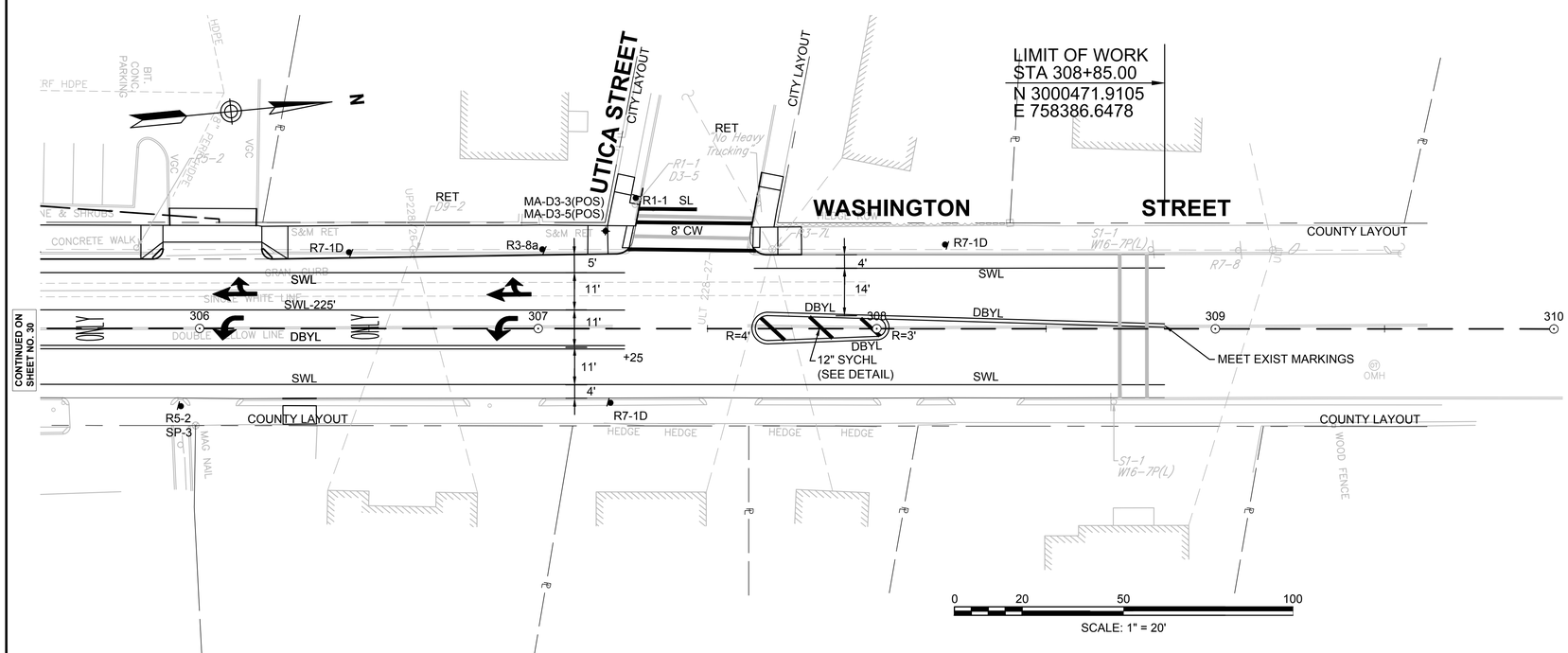
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	34	85
PROJECT FILE NO.	604935		

TRAFFIC PLANS



CONSTRUCTION NOTES

1. RETAIN ALL EXISTING RRFB TS EQUIPMENT AND ALL TS CONDUIT UNLESS OTHERWISE NOTED.
2. ALL PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC EXCEPT BIKE LANE ARROW AND RIDER, BIKE STOP LINE SYMBOLS, AND SHARROWS WHICH SHALL BE REFLECTORIZED PREFORMED 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 R&S UNLESS OTHERWISE NOTED.



Plotted on 31-Aug-2017 11:50 AM
08363.40-TSIG.DWG

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	35	85
PROJECT FILE NO. 604935			

COORDINATION DATA

COORDINATION DATA
LOCATION 1: MONTVALE AVENUE AT CENTRAL STREET

	PLAN 1	PLAN 2	PLAN 3
CYCLE LENGTH	105 SEC	105 SEC	105 SEC
OFFSET	100	0	99
SPLIT Ø2	56	59	57
SPLIT Ø4	26	23	25
SPLIT Ø5	12	18	11
SPLIT Ø6	44	41	46
SPLIT Ø8	26	23	25
SPLIT Ø9 (PED)	23	23	23
COORDINATED PHASE	Ø2&Ø6	Ø2&Ø6	Ø2&Ø6

COORDINATION DATA
LOCATION 2: MONTVALE AVENUE AT WASHINGTON STREET

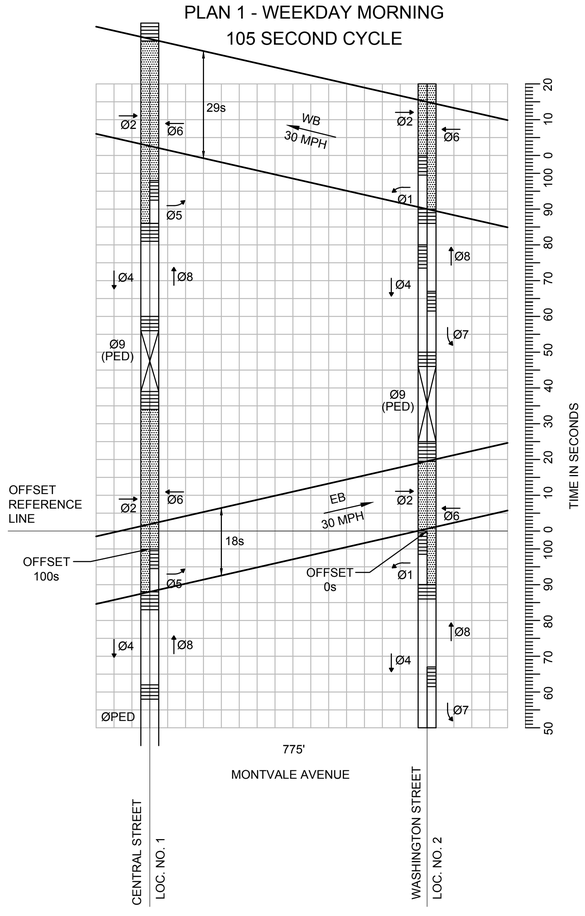
	PLAN 1	PLAN 2	PLAN 3
CYCLE LENGTH	105 SEC	105 SEC	105 SEC
OFFSET	0	0	0
SPLIT Ø1	15	15	15
SPLIT Ø2	25	25	25
SPLIT Ø4	40	40	40
SPLIT Ø6	40	40	40
SPLIT Ø7	17	17	17
SPLIT Ø8	23	23	23
SPLIT Ø9 (PED)	25	25	25
COORDINATED PHASE	Ø2&Ø6	Ø2&Ø6	Ø2&Ø6

CONTROLLER COORDINATION SETUP

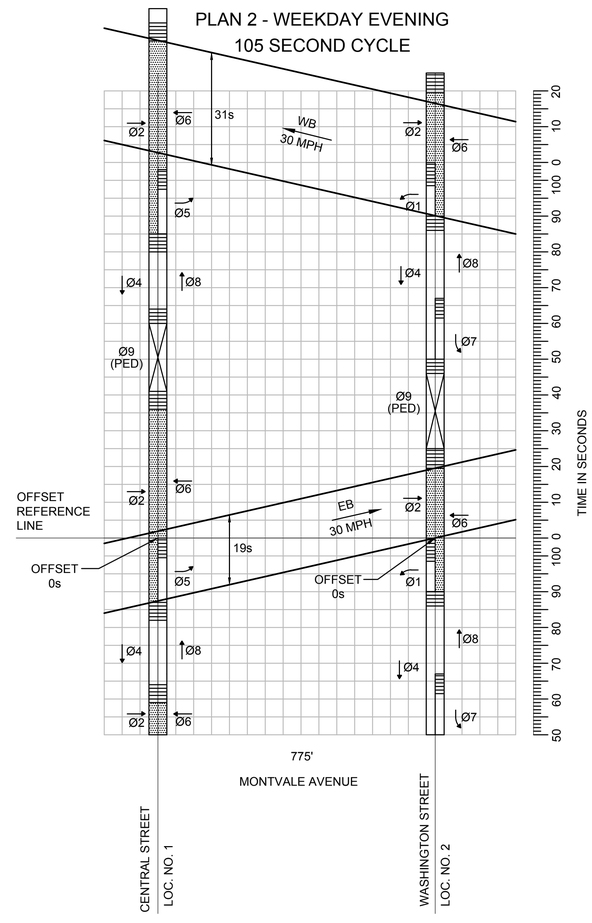
SET-UP	CODE		0	1	2	3
OPERATION	1	1	FREE	AUTO	MANUAL	---
MODE (NORMAL)	0	0	PERM	YIELD	PM YLD	PM OMT
MAXIMUM	2	2	M INH	MAX 1	MAX 2	---
CORRECTION	2	2	DWELL	MX DW	SH WAY	SW+
OFFSET	0	0	BEGIN	END	---	---
FORCE	1	1	PLAN	CYCLE	---	---
INTERSECTION	LOC. NO. 1	LOC. NO. 2				

COORDINATION DATA GENERAL NOTES
1. ALL ENTRIES IN SECONDS.
2. SPLIT TIMES EQUAL GREEN PLUS CLEARANCES.
3. Ø2&Ø6 "CALL NOT ACTUATED" DURING COORDINATION.

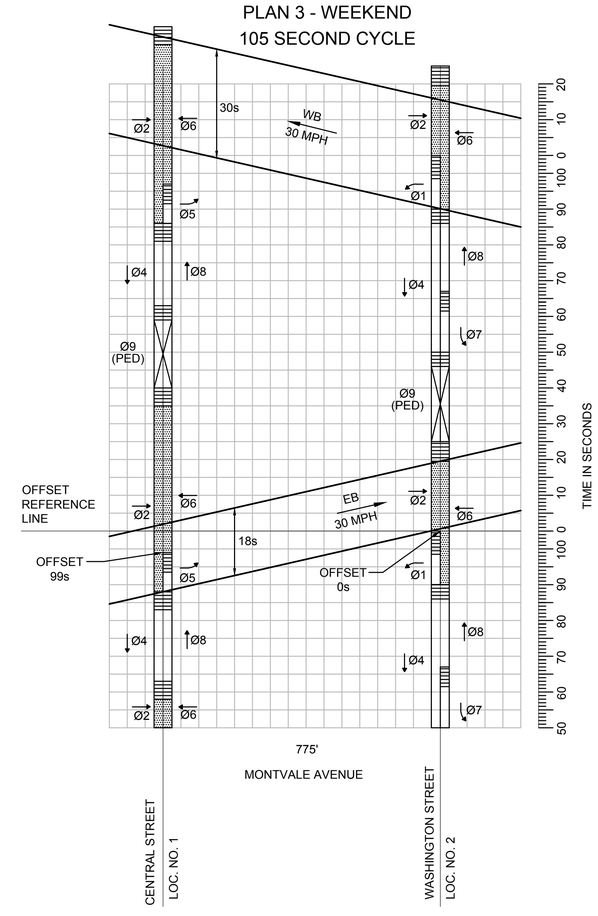
PLAN 1 - WEEKDAY MORNING
105 SECOND CYCLE



PLAN 2 - WEEKDAY EVENING
105 SECOND CYCLE



PLAN 3 - WEEKEND
105 SECOND CYCLE



DAILY & WEEKLY COORDINATION PROGRAM

	MONDAY THRU FRIDAY	SATURDAY	SUNDAY
PLAN 1 105" CYCLE	0600-0900	-	-
PLAN 2 105" CYCLE	1430-1900	-	-
PLAN 3 105" CYCLE	-	1000-1800	1000-1800
FREE OPERATION	0000-0600 0900-1430 1900-2400	0000-1000 1800-2400	0000-1000 1800-2400
FLASH OPERATION	-	-	-

200 0 200 400
SCALE IN FEET

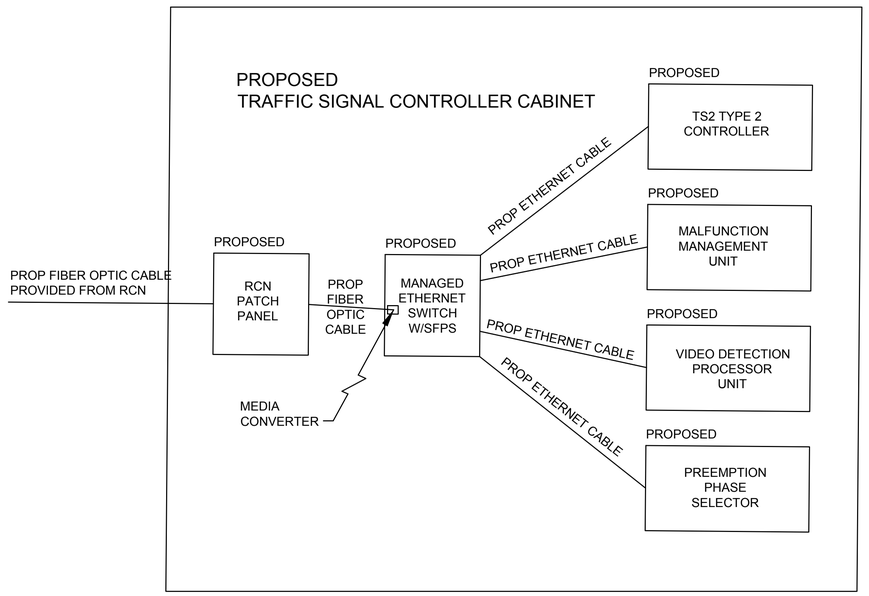
LEGEND
- COORDINATED PHASE GREEN TIME
- NON-COORDINATED VEHICLE PHASE GREEN TIME
- CLEARANCE TIME (YELLOW + RED)
- EXCLUSIVE PEDESTRIAN PHASE
- PHASE MOVEMENT
- INTERSECTION-INTERSECTION COORDINATION BAND

08363.40-TSD.DWG Plotted on 31-Aug-2017 11:50 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	36	85
PROJECT FILE NO.	604935		

SYSTEM ARCHTECTURE PLAN



SYSTEM COMMUNICATIONS NETWORK PLAN
N.T.S

08363.40-TSIG.DWG Plotted on 31-Aug-2017 11:51 AM

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 BACK-GROUND	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			1	RED	WHITE	WHITE	1-P5	5.18	5.18
R2-1(20)	24"	30"	SPEED LIMIT 20				2	WHITE	BLACK	BLACK	2 MTD W/ OTHER	5.00	10.00
R2-1(30)	24"	30"	SPEED LIMIT 30				2	WHITE	BLACK	BLACK	2-P5	5.00	10.00
R2-1(35)	24"	30"	SPEED LIMIT 35				1	WHITE	BLACK	BLACK	1-P5	5.00	5.00
R3-8a	30"	30"	ONLY				8	WHITE	BLACK	BLACK	8-P5	6.25	50.00
R3-8b	48"	30"	ONLY ONLY				2	WHITE	BLACK	BLACK	4-P5	10.00	20.00
R3-8c	30"	30"	ONLY				2	WHITE	BLACK	BLACK	2-P5	6.25	12.50
R5-1	30"	30"	DO NOT ENTER				5	RED	WHITE	- - -	3 - P5 2 MTD W/ OTHER	6.25	31.25
R5-2	24"	24"					5	WHITE	RED/ BLACK	BLACK	4 - P5 1 MTD W/ OTHER	4.00	20.00
R6-1 (PBS)	36"	12"	ONE WAY				2	BLACK	BLACK/ WHITE	WHITE	2-P5	3.00	6.00
R7-1D	12"	18"	NO PARKING ANY TIME				30	WHITE	RED	RED	31-P5	1.50	45.00
R7-107(d)	12"	30"					5	RED/ BLACK	WHITE	RED	5-P5	2.50	12.50
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				9	WHITE	WHITE/ BLACK/ ORANGE	BLACK	9 MTD ON TS POSTS	PAID 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				7	WHITE	WHITE/ BLACK/ ORANGE	BLACK	7 MTD ON TS POSTS	PAID UNDER ITEMS 816.01 & 816.02	

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 BACK-GROUND	COLOR LEGEND	COLOR BORDER	POST SIZE AND NUMBER REQUIRED	UNIT AREA (S.F.)	AREA IN SQUARE FEET
MA-R10-12a	30"	36"	LEFT TURN YIELD ON FLASHING	AS PER MASSDOT STANDARD			4	WHITE	BLACK/ YELLOW	BLACK	3 MTD ON MAST ARM 1 MTD ON TS POLE	7.50	22.50
W4-2R	36"	36"		SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION", AS AMENDED			1	YELLOW	BLACK	BLACK	1-P5	9.00	9.00
W16-7P(L)	24"	12"					2	FLUORESCENT YELLOW-GREEN	BLACK	BLACK	2 MTD W/ OTHER	2.00	8.00
S1-1P	30"	30"		AS PER MASSDOT STANDARD			6	FLUORESCENT YELLOW-GREEN	BLACK	BLACK	6-P5	5.00	40.00
S4-2P	24"	10"	WHEN CHILDREN ARE PRESENT				2	WHITE	BLACK	BLACK	2 MTD W/ OTHER	1.67	3.33
S4-3P	24"	8"	SCHOOL	SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION", AS AMENDED			2	FLUORESCENT YELLOW-GREEN	BLACK	BLACK	2-P5	1.33	2.66
MA-S4-5bP	24"	30"	SCHOOL ZONE AHEAD	AS PER MASSDOT STANDARD			4	FLUORESCENT YELLOW-GREEN	BLACK	BLACK	4 MTD W/ OTHER	5.00	20.00
S5-2	24"	30"	END SCHOOL ZONE	SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION", AS AMENDED			2	WHITE	BLACK	BLACK	2-P5	5.00	10.00
SP-2	24"	12"	7AM-9AM				1	WHITE	BLACK	BLACK	1 MTD W/ OTHER	2.00	2.00
SP-3	24"	12"	9PM-6AM				3	WHITE	BLACK	BLACK	3 MTD W/ OTHER	2.00	6.00

NOTES:
1. REFLECTIVE SHEETING SHALL BE USED FOR ALL SIGNS IN ACCORDANCE WITH SUBSECTION 828.41 OF MASSDOT'S SUPPLEMENTAL SPECIFICATIONS, LATEST EDITION. THE 2009 "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES," THE 1990 MASSACHUSETTS DEPARTMENT OF TRANSPORTATION "STANDARD DRAWINGS FOR SIGNS AND SUPPORTS" AND ALL AMENDMENTS WILL GOVERN.
2. PBS = PRINTED BOTH SIDES

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	38	85
PROJECT FILE NO.	604935		

TRAFFIC SIGN SUMMARY

08363.40-SS.DWG 31-Aug-2017

TRAFFIC SIGN SUMMARY (CONT.)

IDENTIFI-CATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED	UNIT AREA (S.F.)	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACK-GROUND	LEGEND	BORDER			
M1-1(93)	36"	36"	INTERSTATE 93	SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION", AS AMENDED			1	RED/ BLUE	WHITE	WHITE	1 MTD W/ OTHER	9.00	9.00
M2-1	21"	15"	JCT				1	BLUE	WHITE	WHITE	1-P5	2.19	2.19
M6-3	30"	21"	↑				1	BLUE	WHITE	WHITE	1 MTD W/ OTHER	4.38	4.38
MA-D3-1 (PBS) SEE NOTE 4	48"	12"	Montvale Ave	6C/4C	3 3	N/A	3	GREEN	WHITE	WHITE	3 MTD ON TS POLE	PAID UNDER ITEM 874	
MA-D3-1a (POS)	48"	12"	Montvale Ave	6C/4C	3 3	N/A	2	GREEN	WHITE	WHITE	1 - P5 1 MTD W/ OTHER	PAID UNDER ITEM 874	
MA-D3-2 (PBS) SEE NOTE 4	42"	12"	Central St	6C/4C	3 3	N/A	1	GREEN	WHITE	WHITE	1 MTD ON TS POLE	PAID UNDER ITEM 874	
MA-D3-3 (PBS) SEE NOTE 4	54"	12"	Washington St	6C/4C	3 3	N/A	2	GREEN	WHITE	WHITE	2 MTD ON TS POLE	PAID UNDER ITEM 874	
MA-D3-3a (POS)	54"	12"	Washington St	6C/4C	3 3	N/A	2	GREEN	WHITE	WHITE	1 - P5 1 MTD W/ OTHER	PAID UNDER ITEM 874	
MA-D3-4 (POS)	42"	12"	Albany St	6C/4C	3 3	N/A	2	GREEN	WHITE	WHITE	2 MTD W/ OTHER	PAID UNDER ITEM 874	
MA-D3-5 (POS)	36"	12"	Utica St	6C/4C	3 3	N/A	2	GREEN	WHITE	WHITE	2 MTD W/ OTHER	PAID UNDER ITEM 874	
MA-D3-6 (POS)	36"	12"	Rainin Rd	6C/4C	3 3	N/A	2	GREEN	WHITE	WHITE	2 MTD W/ OTHER	PAID UNDER ITEM 874	

NOTES:
1. REFLECTIVE SHEETING SHALL BE USED FOR ALL SIGNS IN ACCORDANCE WITH SUBSECTION 828.41 OF MASSDOT'S SUPPLEMENTAL SPECIFICATIONS, LATEST EDITION. THE 2009 "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES," THE 1990 MASSACHUSETTS DEPARTMENT OF TRANSPORTATION "STANDARD DRAWINGS FOR SIGNS AND SUPPORTS" AND ALL AMENDMENTS WILL GOVERN.
2. PBS = PRINTED BOTH SIDES
3. POS = PRINTED ONE SIDE
4. MOUNTING SYSTEM FOR STREET NAME SIGNS 48" OR LESS IN LENGTH SHALL CONSIST OF TWO ALUMINUM BRACKETS AND TWO ALUMINUM DOUBLE-TEE EXTENSIONS. MOUNTING SYSTEM FOR SIGNS OVER 48" IN LENGTH SHALL CONSIST OF 4 BRACKETS (2 EACH ON TOP AND BOTTOM) AND TWO ALUMINUM DOUBLE-TEE EXTENSIONS. THE DOUBLE-TEE EXTENSIONS SHALL RUN THE LENGTH OF THE SIGN PANELS FOR PANEL STIFFING.

TRAFFIC SIGN SUMMARY (REMOVE AND RESET)

IDENTIFI-CATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED	UNIT AREA (S.F.)	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACK-GROUND	LEGEND	BORDER			
R10-7 (R&R)	24"	30"	DO NOT BLOCK INTERSECTION	EXISTING SIGN			1	WHITE	BLACK	BLACK	1-P5	5.00	5.00
W11-15 (R&R)	30"	30"					1	YELLOW	BLACK	BLACK	1-P5	6.25	6.25
W16-9p (R&R)	24"	12"	AHEAD				1	YELLOW	BLACK	BLACK	1 MTD WITH OTHER	2.00	2.00
D1-1c (R&R)	24"	9"	Tri-Community Bikeway				2	GREEN	WHITE	WHITE	1 MTD WITH OTHER	1.50	1.50
D9-2 (R&R)	18"	24"	HOSPITAL H				1	BLUE	WHITE	WHITE	1-P5	3.00	3.00
D11-1 (R&R)	24"	18"	BIKE ROUTE				2	GREEN	WHITE	WHITE	1-P5	3.00	3.00
M6-4 (R&R)	12"	9"	↔				2	GREEN	WHITE	WHITE	1 MTD WITH OTHER	0.75	0.75

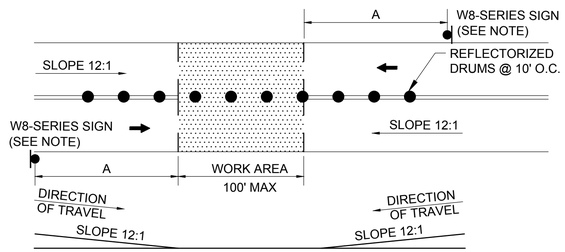
TEMPORARY TRAFFIC CONTROL GENERAL NOTES

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 MASSDOT STANDARD DETAILS AND DRAWINGS FOR THE DEVELOPMENT OF TEMPORARY TRAFFIC CONTROL PLANS, 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. WORK HOURS SHALL BE 7:00AM TO 3:30PM MONDAY THRU FRIDAY UNLESS OTHERWISE APPROVED BY THE ENGINEER. WORK REQUIRING A LANE CLOSURE WILL NOT BE ALLOWED DURING PEAK TRAFFIC PERIODS. PEAK TRAFFIC PERIODS ARE DEFINED AS MONDAY THRU FRIDAY 7:00AM-9:00AM AND 3:00PM-6:00PM.
3. NO WORK SHALL OCCUR WITHIN THE PUBLIC WAY ON STATE RECOGNIZED HOLIDAYS UNLESS OTHERWISE APPROVED BY THE ENGINEER.
4. 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.
5. ALL DRUMS OUTSIDE TAPERS SHALL BE SET AT 20' ON CENTER MAX. UNLESS OTHERWISE NOTED OR ADJUSTED BY THE ENGINEER.
6. ALL DRUMS SHALL BE APPROXIMATELY PLACED AND MOVED AS NECESSARY TO MAINTAIN SAFE AND REASONABLE 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.
7. THE CONTRACTOR SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OR RESTRICTION OF ACCESS.
8. FOR DROP-OFFS 4" OR LESS WITHIN THE CLEAR ZONE, CONDITION MAY BE MITIGATED WITH W8-9 (LOW SHOULDER) SIGN OR TEMPORARY CHANNELIZATION DEVICES. FOR DROP-OFFS GREATER THAN 4" BUT NO MORE THAN 12", DETERMINE WHETHER IT IS MORE COST EFFECTIVE TO INSTALL BOTH TEMPORARY CHANNELIZATION DEVICES AND A 1V:4H (MIN) TO 1V:6H (DESIRED) WEDGE OR TO SHIELD IT.
9. CONTRACTOR SHALL STAGE WORK SUCH THAT A DROP-OFF OF NO MORE THAN 12" AT THE END OF EACH WORK DAY EXISTS WITHIN THE CLEAR ZONE AT ANY TIME AND ENSURE DROP-FF IS MITIGATED PER NOTE 8.
10. 11' MINIMUM LANE WIDTHS SHALL BE MAINTAINED UNLESS OTHERWISE NOTED.
11. NON-ESSENTIAL TRAFFIC CONTROL DEVICES AND SIGNS SHALL BE COVERED OR REMOVED DURING NON-WORKING HOURS WHEN NOT IN USE.
12. SIGNS INSTALLED ON PORTABLE STANDS REQUIRE 12 INCH MINIMUM MOUNTING HEIGHT FROM THE ROADWAY SURFACE TO THE BOTTOM OF THE SIGN.
13. 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.
14. SIGNS MOUNTED ON P5 POSTS REQUIRE A MINIMUM 84 INCH MOUNTING HEIGHT FROM THE ROADWAY OR SIDEWALK SURFACE TO THE BOTTOM OF THE SIGN.
15. ALL SIGNS SHALL BE MOUNTED ON THEIR OWN NCHRP 350 AND/OR MASH CRASH TESTED SIGN SUPPORTS AND INSTALLED IN ACCORDANCE WITH THE MUTCD.
16. TEMPORARY MARKINGS SHALL BE WATER-BORNE PAINT OR SURFACE-APPLIED REMOVABLE TAPE, AS APPROVED BY THE ENGINEER.
17. ALL TEMPORARY CROSSWALKS AND STOP LINES SHALL BE 12 INCHES WIDE.
18. ALL TEMPORARY DOUBLE YELLOW CENTER LINES (DBYL) SHALL BE 6 INCHES WIDE.
19. THE FIRST 10 DRUMS ON TAPERS SHALL BE REFLECTORIZED DRUMS WITH SEQUENTIAL FLASHING WARNING LIGHTS.
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. CONTRACTOR SHALL SECURE WORK AREAS TO PREVENT UNAUTHORIZED ACCESS AT ALL TIMES.
23. THERE IS NO DESIGNATED BICYCLE LANE ON THE ROADWAY WITHIN THE PROJECT LIMITS. BICYCLES ARE EXPECTED TO SHARE THE ROAD WITH GENERAL VEHICULAR TRAFFIC.
24. W21-7 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.
25. W8-15 SIGNS SHALL BE INSTALLED IN ADVANCE (100' MIN) OF PAVEMENT MILLING AREAS OR AS REQUESTED BY THE ENGINEER.
26. W20-1c OR MA-R2-10a SIGNS SHOWN ON ADVANCE SIGN SCHEMATIC MAY BE USED IN LIEU OF THOSE SIGNS SHOWN ON TYPICAL DETAILS IF MINIMUM SIGN SPACING IS MET.
27. MA-W20-7b SIGNS SHALL BE REPLACED BY W20-7 SIGNS WHEN FLAGGERS ARE USED IN LIEU OF POLICE OFFICER DETAILS.
28. THE CONTRACTOR SHALL COORDINATE WITH THE MBTA A MINIMUM OF 60 DAYS PRIOR TO THE TEMPORARY CLOSURE AND RELOCATION OF THE EXISTING BUS STOP ON CENTRAL STREET ACROSS FROM THE GOODYEAR ELEMENTARY SCHOOL. THE CONTRACTOR SHALL COORDINATE WITH THE MBTA TO SELECT A TEMPORARY BUS STOP LOCATION BEYOND THE LIMIT OF WORK ON CENTRAL STREET. THE CONTRACTOR SHALL PROVIDE THE NECESSARY TEMPORARY SIGNS AND POSTS, AS DIRECTED BY THE MBTA, TO NOTIFY BUS CUSTOMERS, AT THE CURRENT CENTRAL STREET BUS STOP LOCATION, OF THE NEW TEMPORARY STOP LOCATION. THIS SHALL ALSO INCLUDE ANY SIGNS NEEDED TO MARK THE NEW TEMPORARY BUS STOP LOCATION ON CENTRAL STREET. UPON COMPLETION OF WORK, CONTRACTOR TO REMOVE ALL TEMPORARY SIGNS AND RESTORE THE SITE BACK TO ORIGINAL CONDITION.
29. THE CONTRACTOR SHALL COORDINATE WITH THE MBTA A MINIMUM OF 60 DAYS PRIOR TO THE TEMPORARY CLOSURE OF THE EXISTING BUS STOPS ON MONTVALE AVENUE EASTBOUND:
    1. LOCATED AT 285 WASHINGTON STREET
    2. LOCATED AT WASHINGTON STREET INTERSECTION (309 MONTVALE AVENUE).

    THE CONTRACTOR SHALL COORDINATE WITH THE MBTA TO TEMPORARILY CLOSE BOTH THE BUS STOP LOCATIONS. THE CONTRACTOR SHALL ALSO PROVIDE THE NECESSARY TEMPORARY SIGNS AND POSTS, AS DIRECTED BY THE MBTA, TO NOTIFY BUS CUSTOMERS, AT THE CURRENT BUS STOP LOCATIONS, OF THE CLOSURE AND TO DIRECT CUSTOMERS TO TWO ALTERNATE BUS STOP LOCATIONS AT THE MONTVALE AVENUE/HILL STREET AND TEMPORARY RELOCATED CENTRAL STREET LOCATION.

TEMPORARY TRAFFIC CONTROL SETUPS SUMMARY

LOCATION	TYPICAL DETAILS	SHEET NO.
MONTVALE AVE	- TYPICAL TWO-WAY STREET LANE SHIFT - TYPICAL TWO-WAY LANE CLOSURE - ALTERNATING TRAFFIC - TYPICAL TWO-WAY STREET LANE SHIFT - CENTER WORKZONE - TYPICAL PEDESTRIAN BYPASS TYPE II	40
MONTVALE AVE AT CENTRAL ST	- ONE LANE CLOSURE AT INTERSECTION - NEAR SIDE - ONE LANE CLOSURE AT INTERSECTION - FAR SIDE - CENTRAL ST	41
MONTVALE AVE AT WASHINGTON ST	- ONE LANE CLOSURE AT INTERSECTION - NEAR SIDE - ONE LANE CLOSURE AT INTERSECTION - FAR SIDE - WASHINGTON ST	41
WASHINGTON ST	- TYPICAL TWO-WAY STREET LANE SHIFT - TYPICAL PEDESTRIAN BYPASS TYPE II	40
CENTRAL ST	- TYPICAL TWO-WAY STREET LANE SHIFT - TYPICAL PEDESTRIAN BYPASS TYPE I (SOUTH SIDE) - TYPICAL PEDESTRIAN BYPASS TYPE II (NORTH SIDE)	40

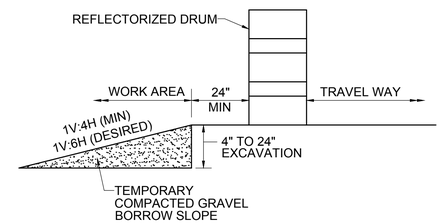


SQUARE OFF THE FULL WIDTH OF THE ROADWAY AT THE END OF WORK DAY

NOTE:
CONTRACTOR SHALL INSTALL W8-1, W8-3, OR W8-8 SIGN, AS APPROPRIATE, ON ALL ROADWAYS IN ADVANCE OF THE TRANSITION UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

TEMPORARY PAVEMENT TRANSITION DETAIL

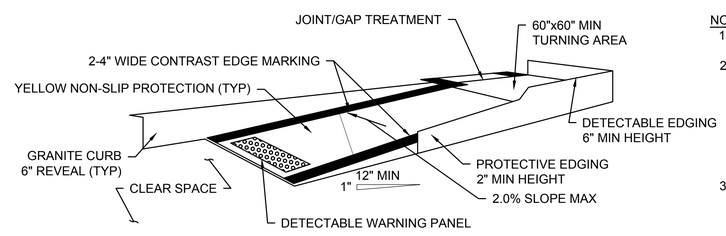
SCALE: NTS



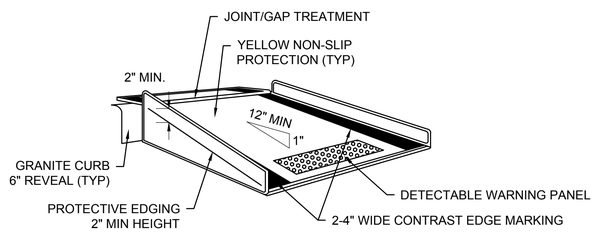
NOTE:
CONTRACTOR SHALL INSTALL W8-9 SIGN ON ALL ROADWAYS 350 FT IN ADVANCE OF THE START OF DROP-OFF CONDITION.

TYPICAL ROADWAY DROP-OFF PROTECTION

SCALE: NTS



TEMPORARY CURB RAMP-PARALLEL TO CURB



TEMPORARY CURB RAMP-PERPENDICULAR TO CURB

NOTES:
1. CURB RAMPS SHALL BE 60" MINIMUM WIDTH WITH A FIRM, STABLE AND NON-SLIP SURFACE.
2. PROTECTIVE EDGING WITH A 2" MINIMUM HEIGHT SHALL BE INSTALLED WHEN THE CURB RAMP OR LANDING PLATFORM HAS A VERTICAL DROP OF 6" OR GREATER OR HAS A SIDE APRON SLOPE STEEPER THAN 1:3 (33%). PROTECTIVE EDGING SHOULD BE CONSIDERED WHEN THE CURB RAMPS OR LANDING PLATFORMS HAVE A VERTICAL DROP OF 3" OR MORE.
3. DETECTABLE EDGING WITH 6" MINIMUM HEIGHT AND CONTRASTING COLOR SHALL BE INSTALLED ON ALL CURB RAMP LANDINGS WHERE THE WALKWAY CHANGES DIRECTION (TURNS).
4. THE CURB RAMP WALKWAY AND LANDING AREA SURFACE SHALL BE OF A SOLID CONTINUOUS CONTRASTING COLOR ABUTTING UP TO THE EXISTING SIDEWALK.
5. CURB RAMPS AND LANDINGS SHOULD HAVE A 1:50 (2%) MAX CROSS-SLOPE.
6. CLEAR SPACE OF 48"x48" MINIMUM SHALL BE PROVIDED ABOVE AND BELOW THE CURB RAMP.
7. WATER FLOW IN THE GUTTER SYSTEM SHALL HAVE MINIMAL RESTRICTION.
8. LATERAL JOINTS OR GAPS BETWEEN SURFACES SHALL BE LESS THAN 0.5" WIDTH.
9. CHANGES BETWEEN SURFACE HEIGHTS SHOULD NOT EXCEED 0.5" LATERAL EDGES SHOULD BE VERTICAL UP TO 0.25" HIGH, AND BEVELED AT 1:2 BETWEEN 0.25" AND 0.5" HEIGHT.
10. IF A TEMPORARY PEDESTRIAN RAMP LEADS TO A CROSSWALK, THEN A DETECTABLE WARNING PAD MUST BE ADHERED TO THE BASE OF THE RAMP. IF IT LEADS TO A PROTECTED PEDESTRIAN BYPASS THAT DOES NOT CONFLICT WITH VEHICULAR TRAFFIC, THEN A PAD SHALL NOT BE INSTALLED ON THE RAMP.

TEMPORARY CURB RAMPS

SCALE: NTS

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	39	85
PROJECT FILE NO.	604935		

TEMPORARY TRAFFIC CONTROL PLANS
GENERAL NOTES & LEGEND

LEGEND

	POLICE OFFICER
	FLAGGER
	TRAFFIC SIGNAL
	REFLECTORIZED DRUM
	REFLECTORIZED DRUM WITH SEQUENTIAL FLASHING WARNING LIGHTS (SEE GENERAL NOTE 19)
	TEMPORARY CONSTRUCTION SIGN
	TRAFFIC CONE
	TYPE III BARRICADE
	WORK AREA (PUBLIC ACCESS RESTRICTED)
	TRAFFIC FLOW
	PEDESTRIAN ROUTE
	CONSTRUCTION FENCE
	PEDESTRIAN CHANNELIZATION DEVICE
NTS	NOT TO SCALE
TTCP	TEMPORARY TRAFFIC CONTROL PLAN

BUFFER SPACING

SPEED (MPH)	DISTANCE (FEET)
15	80
20	115
25	155
30	200
35	250
40	305
45	360
50	425

ADVANCE SIGN SPACING

ROAD	DISTANCE BETWEEN SIGNS (FEET)			
	A	B	C	D
I-93 RAMPS	500	250	500	500
MONTVALE AVE & WASHINGTON ST	350	200	350	350
ALL OTHER ROADWAYS	100	50	100	100

LANE TAPER LENGTH FORMULAS

L= TAPER LENGTH IN FEET

W= WIDTH OF ROADWAY TO BE SHIFTED OR REDIRECTED IN FEET

S= POSTED SPEED LIMIT IN MPH

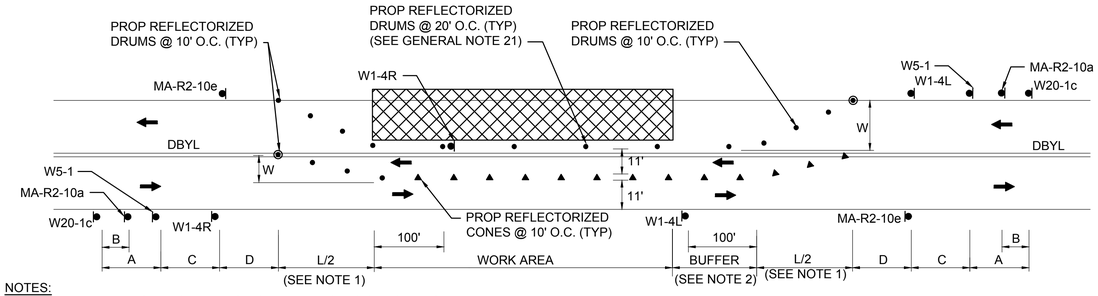
POSTED SPEED
40 MPH OR LESS
$L=\frac{WS^2}{60}$

08363.40-TTCP.DWG Plotted on 31-Aug-2017 11:51 AM

08363.40-TTCP.DWG Plotted on 31-Aug-2017 11:51 AM

OPERATIONAL SIGNING

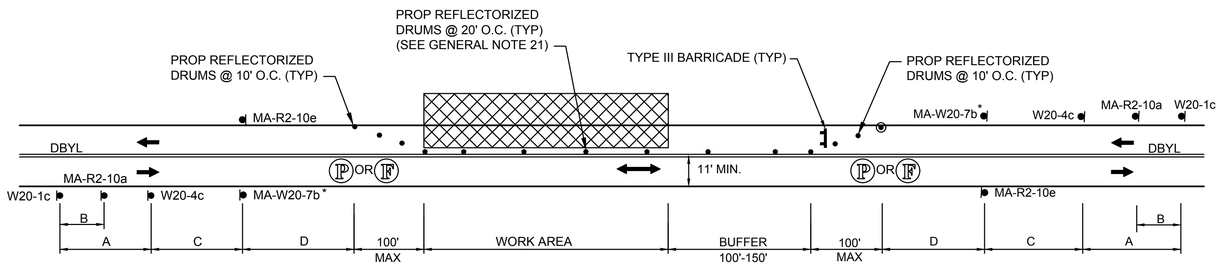
LANE CLOSURES SHOWN ARE FOR TEMPORARY CONSTRUCTION.
ALL DRUMS AND SIGNS ARE SHOWN AS THEY SHOULD APPEAR
DURING THE WORKING DAY, OR WHILE OPERATING IN THE WORK ZONE.



NOTES:
1. SEE TAPER LENGTH FORMULA ON GENERAL NOTES & LEGEND SHEET.
2. SEE BUFFER SPACING CHART ON GENERAL NOTES & LEGEND SHEET.
3. REFER TO ADVANCE SIGN SPACING TABLE ON GENERAL NOTES & LEGEND SHEET.

TYPICAL TWO-WAY STREET LANE SHIFT

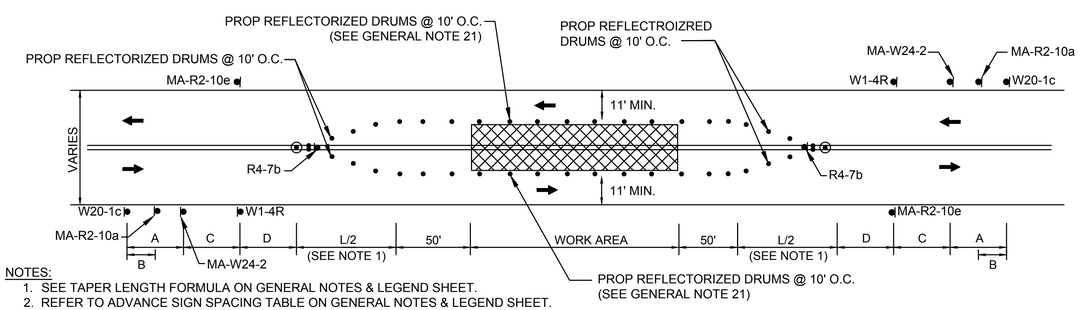
SCALE: NTS



NOTES:
1. SEE ADVANCE SIGN SPACING CHART ON GENERAL NOTES & LEGEND SHEET.
2. * SEE NOTE 27 ON GENERAL NOTES & LEGEND SHEET.

TYPICAL TWO-WAY STREET LANE CLOSURE - ALTERNATING TRAFFIC

SCALE: NTS

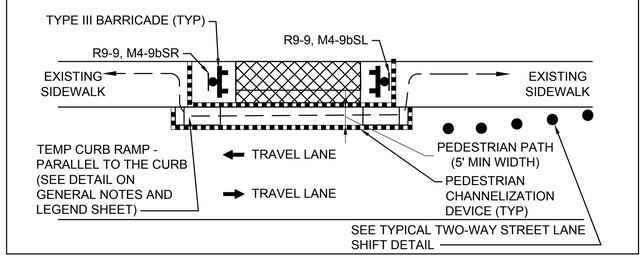


NOTES:
1. SEE TAPER LENGTH FORMULA ON GENERAL NOTES & LEGEND SHEET.
2. REFER TO ADVANCE SIGN SPACING TABLE ON GENERAL NOTES & LEGEND SHEET.

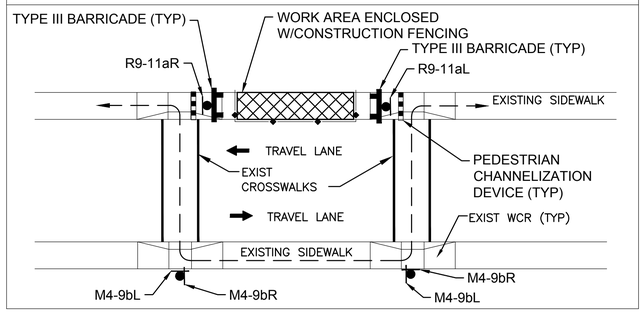
TYPICAL TWO-WAY STREET LANE SHIFT - CENTER WORKZONE

SCALE: NTS

PEDESTRIAN BYPASS TYPE I



PEDESTRIAN BYPASS TYPE II



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, THE APPROPRIATE SIGNS SHALL BE INSTALLED TO CROSS PEDESTRIANS TO THE OPPOSITE SIDE OF THE STREET AT EXISTING OR TEMPORARY CROSSWALKS AS SHOWN IN PEDESTRIAN BYPASS TYPE II, AND AS DIRECTED BY THE ENGINEER.
6. ALL TEMPORARY PEDESTRIAN PATHWAYS SHALL COMPLY FULLY WITH ALL REQUIREMENTS OF THE MUTCD AND ALL APPLICABLE MAAB AND ADAAG REQUIREMENTS AND INCLUDE THE USE OF A COMPLIANT TEMPORARY PEDESTRIAN MANAGEMENT GUIDANCE SYSTEM AT ALL TIMES.
7. 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. A 5' x 5' PASSING AREA SHALL BE PROVIDED IN INTERVALS NOT EXCEEDING 200 FEET.
8. TEMPORARY WHEELCHAIR RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH MASSDOT, MAAB, AND ADAAG REQUIREMENTS.

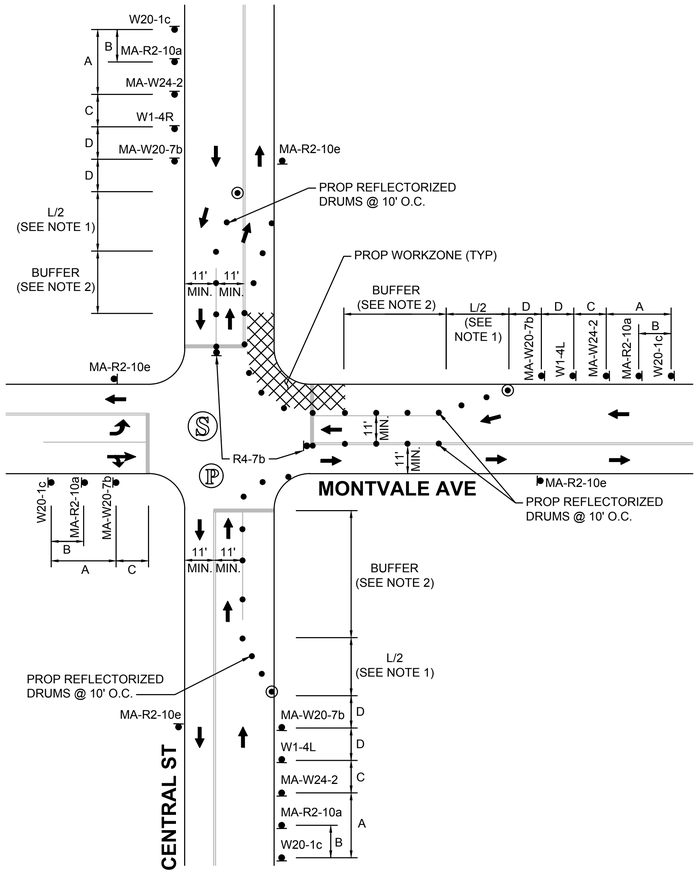
PEDESTRIAN BYPASS DETAIL

SCALE: NTS

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	41	85
PROJECT FILE NO.	604935		

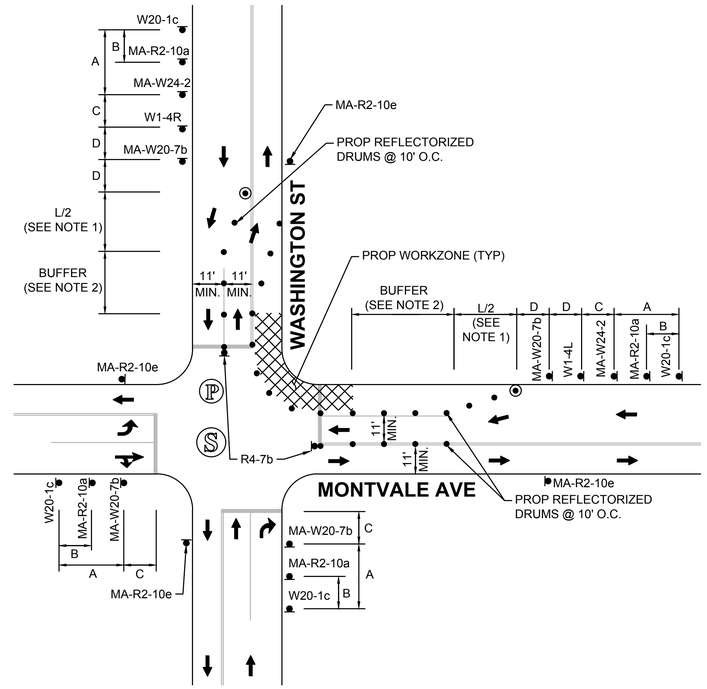
TEMPORARY TRAFFIC CONTROL PLANS
TYPICAL DETAILS



NOTES:
1. SEE TAPER LENGTH FORMULA ON GENERAL NOTES & LEGEND SHEET.
2. SEE BUFFER SPACING CHART ON GENERAL NOTES & LEGEND SHEET.
3. REFER TO ADVANCE SIGN SPACING TABLE ON GENERAL NOTES & LEGEND SHEET.

ONE LANE CLOSURE AT INTERSECTION - FAR SIDE - CENTRAL ST

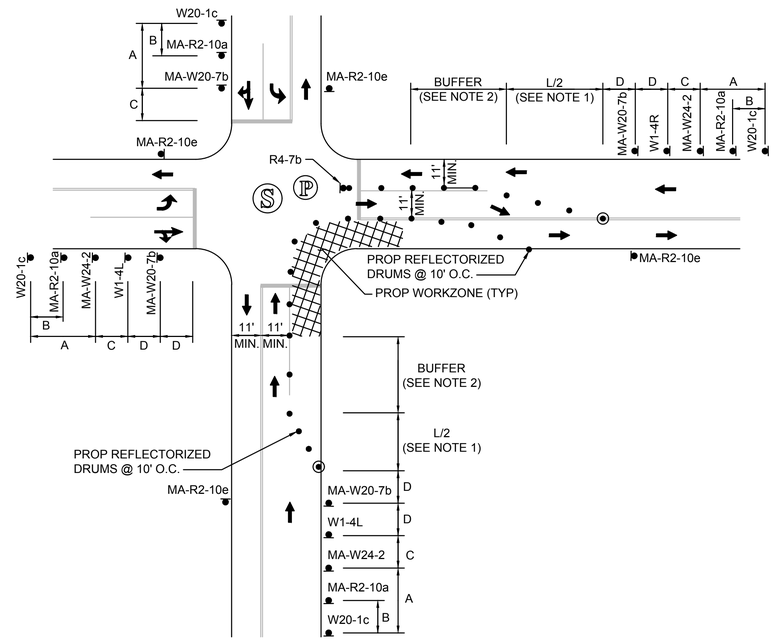
SCALE: NTS



NOTES:
1. SEE TAPER LENGTH FORMULA ON GENERAL NOTES & LEGEND SHEET.
2. SEE BUFFER SPACING CHART ON GENERAL NOTES & LEGEND SHEET.
3. REFER TO ADVANCE SIGN SPACING TABLE ON GENERAL NOTES & LEGEND SHEET.

ONE LANE CLOSURE AT INTERSECTION - FAR SIDE - WASHINGTON ST

SCALE: NTS



NOTES:
1. SEE TAPER LENGTH FORMULA ON GENERAL NOTES & LEGEND SHEET.
2. SEE BUFFER SPACING CHART ON GENERAL NOTES & LEGEND SHEET.
3. REFER TO ADVANCE SIGN SPACING TABLE ON GENERAL NOTES & LEGEND SHEET.

ONE LANE CLOSURE AT INTERSECTION - NEAR SIDE

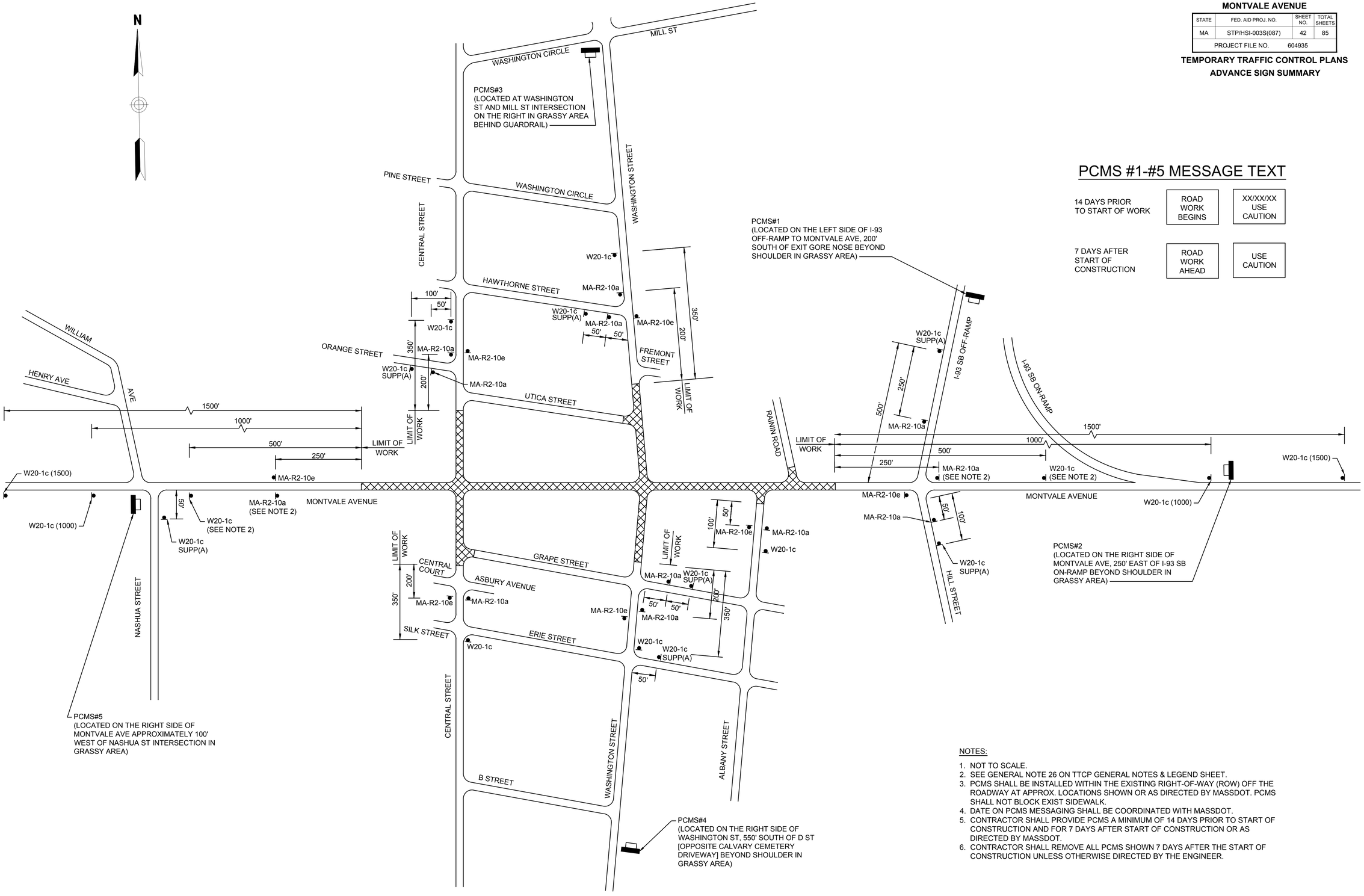
SCALE: NTS

08363.40-TTCP.DWG Plotted on 31-Aug-2017 11:52 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	42	85
PROJECT FILE NO.	604935		

TEMPORARY TRAFFIC CONTROL PLANS
ADVANCE SIGN SUMMARY



PCMS #1-#5 MESSAGE TEXT

14 DAYS PRIOR TO START OF WORK	ROAD WORK BEGINS	XX/XX/XX USE CAUTION
7 DAYS AFTER START OF CONSTRUCTION	ROAD WORK AHEAD	USE CAUTION

NOTES:

1. NOT TO SCALE.
2. SEE GENERAL NOTE 26 ON TTCP GENERAL NOTES & LEGEND SHEET.
3. PCMS SHALL BE INSTALLED WITHIN THE EXISTING RIGHT-OF-WAY (ROW) OFF THE ROADWAY AT APPROX. LOCATIONS SHOWN OR AS DIRECTED BY MASSDOT. PCMS SHALL NOT BLOCK EXIST SIDEWALK.
4. DATE ON PCMS MESSAGING SHALL BE COORDINATED WITH MASSDOT.
5. CONTRACTOR SHALL PROVIDE PCMS A MINIMUM OF 14 DAYS PRIOR TO START OF CONSTRUCTION AND FOR 7 DAYS AFTER START OF CONSTRUCTION OR AS DIRECTED BY MASSDOT.
6. CONTRACTOR SHALL REMOVE ALL PCMS SHOWN 7 DAYS AFTER THE START OF CONSTRUCTION UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

08363.40-TTCP.DWG Plotted on 31-Aug-2017 11:52 AM

TEMPORARY TRAFFIC CONTROL SIGN SUMMARY

IDENTIFI–CATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			COLOR		
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.	BACK–GROUND	LEGEND	BORDER
MA-R2-10a	48"	36"	WORK ZONE / SPEEDING FINES DOUBLED	AS PER MASSDOT STANDARD			FLUOR-ESCENT ORANGE --- WHITE	BLACK	BLACK
MA-R2-10e	36"	48"	END ROAD WORK / DOUBLE FINES END				FLUOR-ESCENT ORANGE --- WHITE	BLACK	BLACK
R4-7b	24"	30"	KEEP RIGHT	SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION", AS AMENDED			WHITE	BLACK	BLACK
R9-9	24"	12"	SIDEWALK CLOSED				WHITE	BLACK	BLACK
R9-11aR	48"	24"	SIDEWALK CLOSED / CROSS HERE				WHITE	BLACK	BLACK
R9-11aL	48"	24"	SIDEWALK CLOSED / CROSS HERE				WHITE	BLACK	BLACK
W1-4R	36"	36"					FLUOR-ESCENT ORANGE	BLACK	BLACK
W1-4L	36"	36"					FLUOR-ESCENT ORANGE	BLACK	BLACK
W5-1	36"	36"	ROAD NARROWS				FLUOR-ESCENT ORANGE	BLACK	BLACK
W8-1	36"	36"	BUMP				FLUOR-ESCENT ORANGE	BLACK	BLACK
W8-3	36"	36"	PAVEMENT ENDS				FLUOR-ESCENT ORANGE	BLACK	BLACK
W8-8	36"	36"	ROUGH ROAD				FLUOR-ESCENT ORANGE	BLACK	BLACK
W8-9	36"	36"	LOW SHOULDER				FLUOR-ESCENT ORANGE	BLACK	BLACK
W8-15	36"	36"	GROOVED PAVEMENT AHEAD				FLUOR-ESCENT ORANGE	BLACK	BLACK

TEMPORARY TRAFFIC CONTROL SIGN SUMMARY (CONTINUED)

IDENTIFI–CATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			COLOR		
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.	BACK–GROUND	LEGEND	BORDER
W20-1c	36"	36"	ROAD WORK AHEAD	SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION", AS AMENDED			FLUOR-ESCENT ORANGE	BLACK	BLACK
W20-1(1000)	36"	36"	ROAD WORK 1000 FT				FLUOR-ESCENT ORANGE	BLACK	BLACK
W20-1(1500)	36"	36"	ROAD WORK 1500 FT				FLUOR-ESCENT ORANGE	BLACK	BLACK
W20-4c	36"	36"	ONE LANE ROAD AHEAD				FLUOR-ESCENT ORANGE	BLACK	BLACK
W20-7	36"	36"					FLUOR-ESCENT ORANGE	BLACK	BLACK
MA-W20-7b	36"	36"	POLICE OFFICER AHEAD	AS PER MASSDOT STANDARD			FLUOR-ESCENT ORANGE	BLACK	BLACK
W21-7	36"	36"	UTILITY WORK	SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION", AS AMENDED			FLUOR-ESCENT ORANGE	BLACK	BLACK
MA-W24-2	36"	36"	LANE SHIFT AHEAD	AS PER MASSDOT STANDARD			FLUOR-ESCENT ORANGE	BLACK	BLACK
M4-9bR	30"	24"	DETOUR	SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION", AS AMENDED			FLUOR-ESCENT ORANGE	BLACK	BLACK
M4-9bL	30"	24"	DETOUR				FLUOR-ESCENT ORANGE	BLACK	BLACK
M4-9bSL	30"	24"	DETOUR				FLUOR-ESCENT ORANGE	BLACK	BLACK
M4-9bSR	30"	24"	DETOUR				FLUOR-ESCENT ORANGE	BLACK	BLACK
SUPP(A)	42"	12"	MONTVALE AVE	4"D	4" 4"	N/A	FLUOR-ESCENT ORANGE	BLACK	BLACK

NOTES:
1. HIGH INTENSITY REFLECTIVE SHEETING SHALL BE USED FOR ALL SIGNS. SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION" FOR TEXT DIMENSIONS, AS AMENDED; THE 1977 MASSHIGHWAY DEPARTMENT CONSTRUCTION AND TRAFFIC STANDARD DETAILS, AS AMENDED, FOR SIGNS AND SUPPORTS; THE MASSHIGHWAY DEPARTMENT SIGN LISTINGS 1993 EDITION, AS AMENDED; AND THE 2017 MASSDOT STANDARD SIGNS BOOK, AS AMENDED.
2. ALL SIGNS SHOWN GRAPHICALLY FOR INFORMATION ONLY. SIGN VENDOR SHALL FABRICATE ALL SIGNS IN ACCORDANCE WITH THE APPLICABLE STANDARDS.
3. SEE NOTE 15 ON GENERAL NOTES & LEGEND SHEET.

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	43	85
PROJECT FILE NO.	604935		

TEMPORARY TRAFFIC CONTROL SIGN SUMMARY
SIGN SUMMARY

08363.40-TTCP.DWG Plotted on 31-Aug-2017 11:52 AM

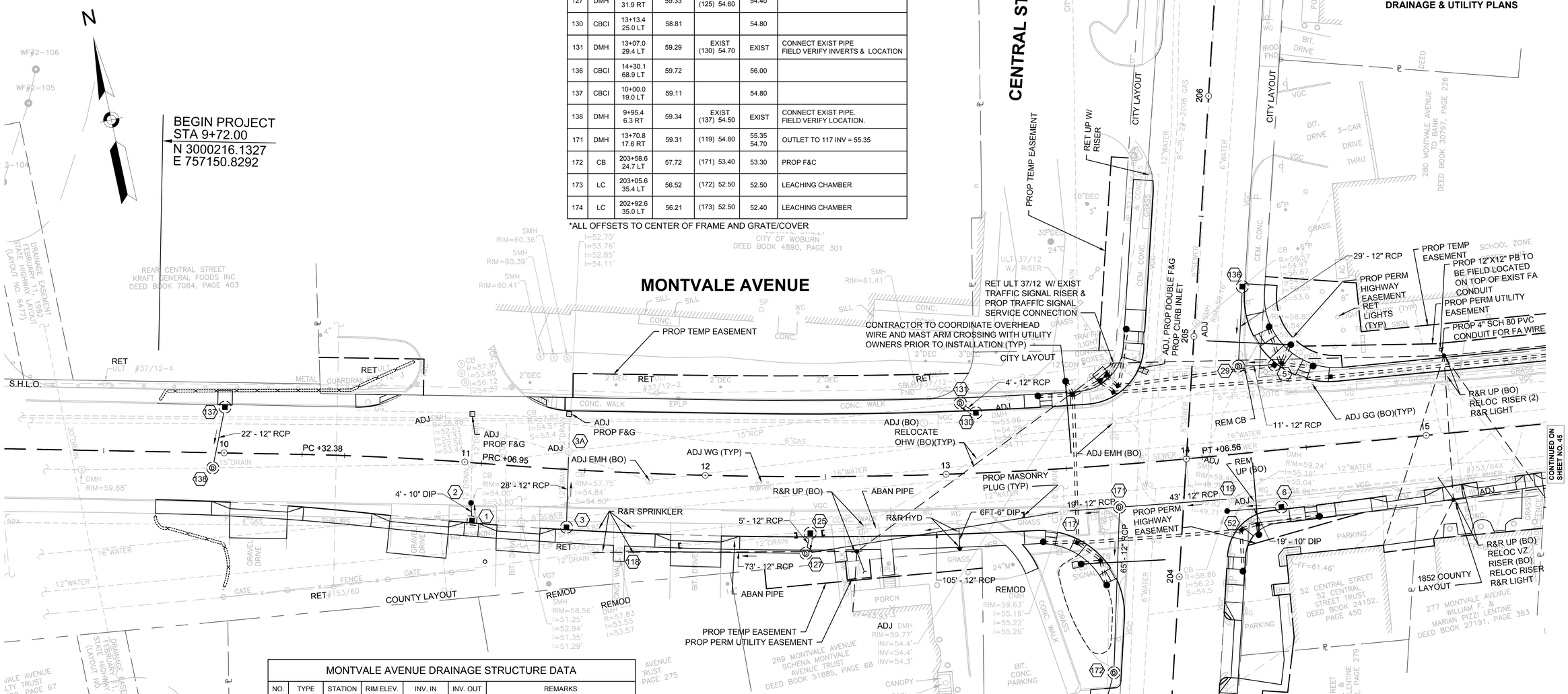
WOBURN MONTVALE AVENUE			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	44	85
PROJECT FILE NO.	604935		

DRAINAGE & UTILITY PLANS

CONTINUED ON SHEET NO. 48

CONTINUED ON SHEET NO. 45

CONTINUED ON SHEET NO. 48



MONTVALE AVENUE DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
125	CBCI	12+43.6 23.5 RT	58.75		54.70	
127	DMH	12+41.8 31.9 RT	59.33	(117) 54.50 (125) 54.60	54.40	
130	CBCI	13+13.4 25.0 LT	58.81		54.80	
131	DMH	13+07.0 29.4 LT	59.29	EXIST (130) 54.70	EXIST	CONNECT EXIST PIPE FIELD VERIFY INVERTS & LOCATION
136	CBCI	14+30.1 68.9 LT	59.72		56.00	
137	CBCI	10+00.0 19.0 LT	59.11		54.80	
138	DMH	9+95.4 6.3 RT	59.34	EXIST (137) 54.50	EXIST	CONNECT EXIST PIPE. FIELD VERIFY LOCATION.
171	DMH	13+70.8 17.6 RT	59.31	(119) 54.80	55.35 54.70	OUTLET TO 117 INV = 55.35
172	CB	203+58.6 24.7 LT	57.72	(171) 53.40	53.30	PROP F&C
173	LC	203+05.6 35.4 LT	56.52	(172) 52.50	52.50	LEACHING CHAMBER
174	LC	202+92.6 35.0 LT	56.21	(173) 52.50	52.40	LEACHING CHAMBER

*ALL OFFSETS TO CENTER OF FRAME AND GRATE/COVER

MONTVALE AVENUE DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
1	GICI	11+04.9 24.0 RT	58.19		55.69	GUTTER INLET SPECIAL; 6" F&G
2	EX CB	11+03.9 16.7 RT	58.34	(1) 55.30	EXIST	REM F&G; PROP F&C; RET SUMP; REBUILD
3	CBCI	11+43.8 24.0 RT	58.00		54.10	
3A	EX DMH	11+42.8 7.5 LT	58.37	EXIST (3) 53.76 EXIST	EXIST	
5	CBCI	14+40.2 35.3 LT	59.43		55.90	CONTRACTOR TO PERFORM A TEST TO LOCATE 4" SUBDRAIN AND RECONNECT AS DIRECTED BY THE ENGINEER
6	CBCI	14+37.3 23.7 RT	59.50		56.60	SHALLOW COVER
29	DMH	14+25.2 36.2 LT	59.44	(5) 55.65 (136) 55.65	55.54	CONNECT EXIST PIPES
52	CIT	14+14.7 23.2 RT	59.42	(6) 56.30	EXIST	
117	EX DMH	13+47.9 17.7 RT	59.23	(171) 55.22	55.19	
118	EX DMH	11+66.1 32.7 RT	57.73	(127) 53.55	EXIST	
119	EX DMH	14+17.4 18.3 RT	59.64	EXIST	55.04	

*ALL OFFSETS TO CENTER OF FRAME AND GRATE/COVER

NOTE:

1) ALL UNDERGROUND DRAINAGE, WATER, SEWER AND PRIVATE UTILITIES ARE TO BE RETAINED UNLESS OTHERWISE NOTED ON PLANS

2) THE DRAINAGE INVERTS SHOWN ARE FOR BIDDING PURPOSES ONLY. ACTUAL INVERT ELEVATIONS WILL BE CONFIRMED IN THE FIELD.

3) ADJUST ALL GAS GATES (BY OTHERS) AND WATER GATES AS REQUIRED.

4) ALL DRAINAGE PIPE SHALL BE CLASS V RCP UNLESS OTHERWISE NOTED ON PLANS.

0 20 50 100

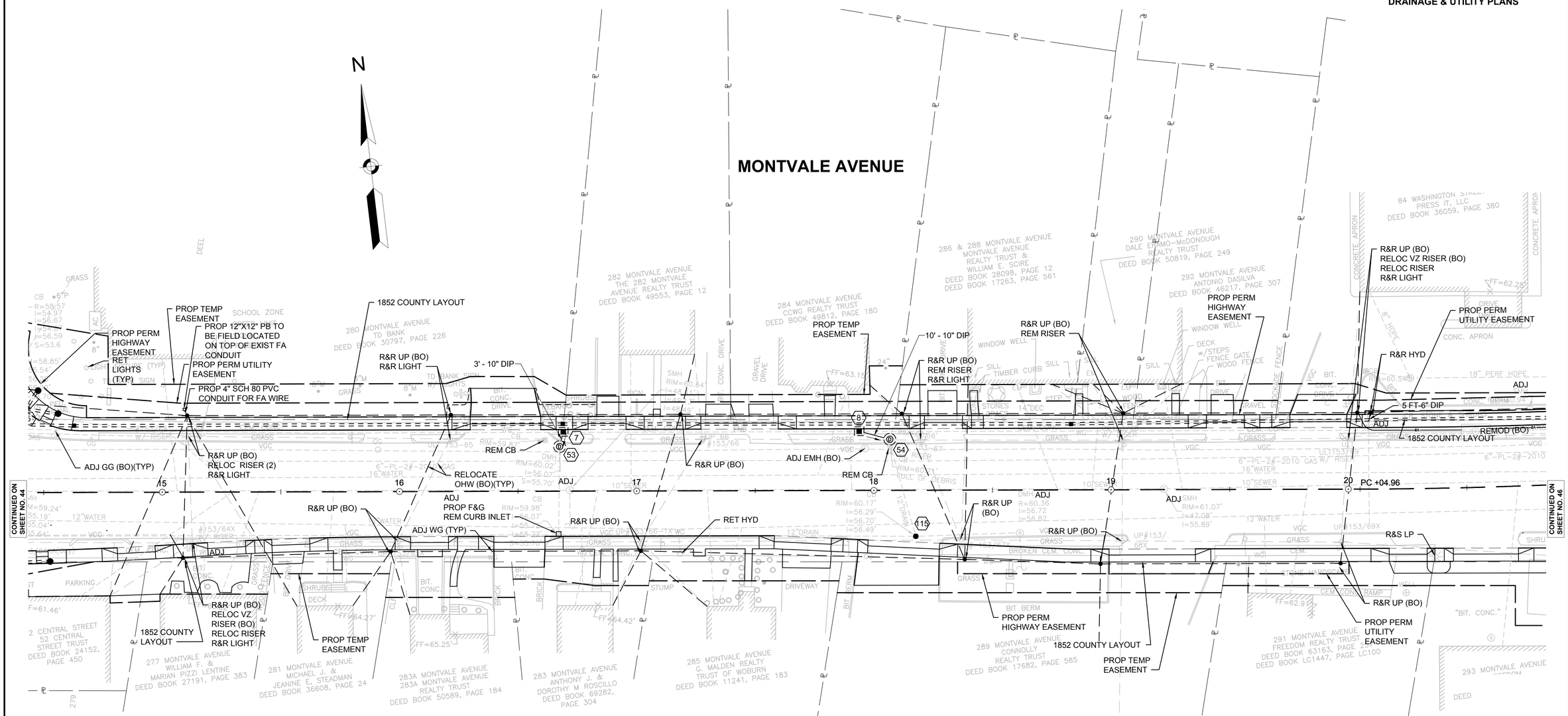
SCALE: 1" = 20'

08363.40-UTIL.DWG Plotted on 31-Aug-2017 11:53 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	45	85
PROJECT FILE NO.	604935		

DRAINAGE & UTILITY PLANS



MONTVALE AVENUE DRAINAGE STRUCTURE DATA

NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
7	GICI	16+69.1 25.0 LT	60.00		57.50	GUTTER INLET SPECIAL; 6" F&G
8	GICI	17+93.9 25.0 LT	60.90		58.39	GUTTER INLET SPECIAL; 6" F&G
53	CB	16+67.5 18.8 LT	60.28	(7) 57.30	EXIST	REM EXIST DMH; PROP F&C
54	CB	18+06.8 21.5 LT	61.02	(8) 58.00	EXIST	REM EXIST DMH & CB; PROP F&C
115	CIT	18+17.6 19.4 RT	61.10	EXIST	EXIST	

*ALL OFFSETS TO CENTER OF FRAME AND GRATE/COVER

0 20 50 100

SCALE: 1" = 20'

NOTE:

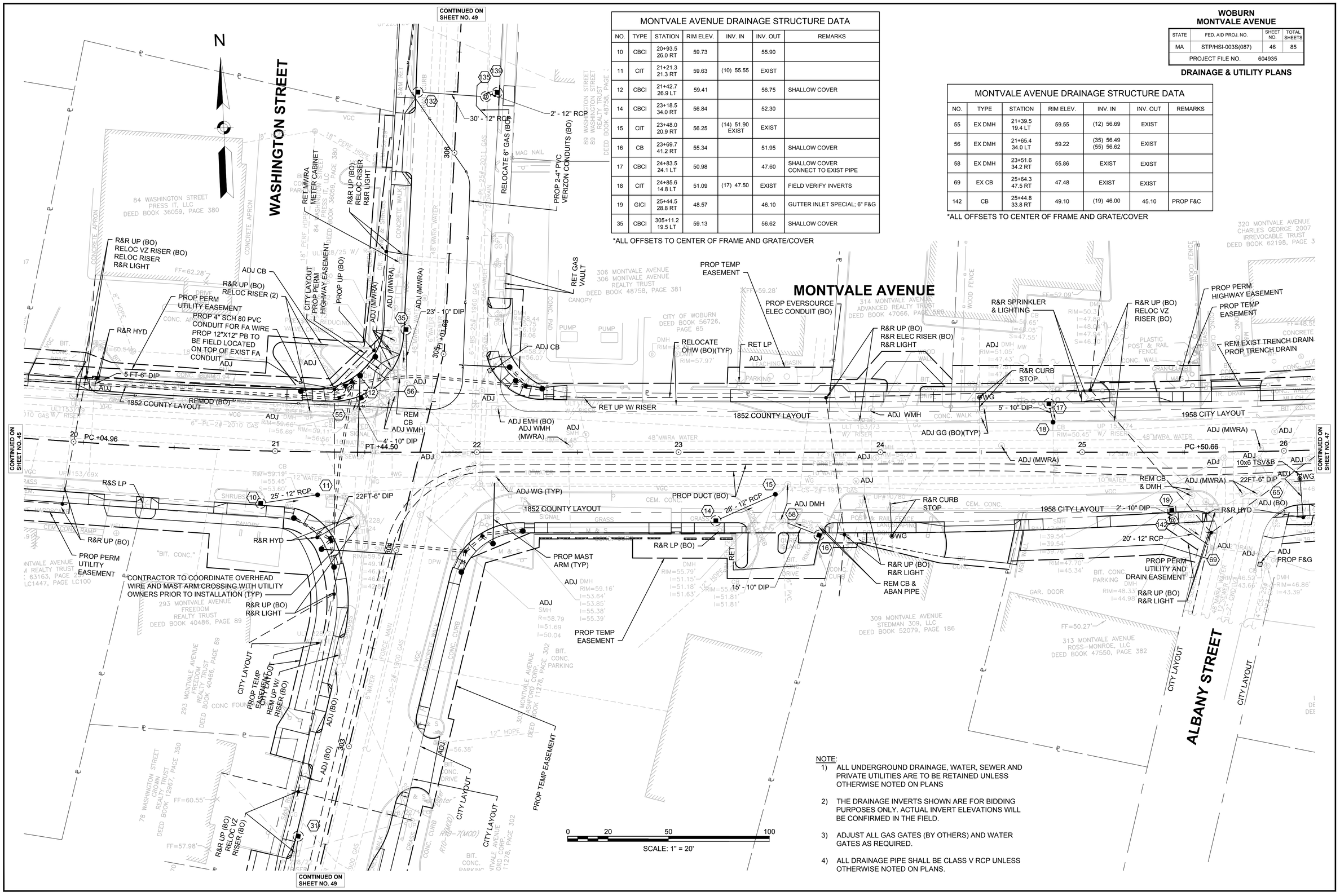
1) ALL UNDERGROUND DRAINAGE, WATER, SEWER AND PRIVATE UTILITIES ARE TO BE RETAINED UNLESS OTHERWISE NOTED ON PLANS

2) THE DRAINAGE INVERTS SHOWN ARE FOR BIDDING PURPOSES ONLY. ACTUAL INVERT ELEVATIONS WILL BE CONFIRMED IN THE FIELD.

3) ADJUST ALL GAS GATES (BY OTHERS) AND WATER GATES AS REQUIRED.

4) ALL DRAINAGE PIPE SHALL BE CLASS V RCP UNLESS OTHERWISE NOTED ON PLANS.

08363.40-UTIL.DWG Plotted on 31-Aug-2017 11:53 AM



MONTVALE AVENUE DRAINAGE STRUCTURE DATA

NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
10	CBCI	20+93.5 26.0 RT	59.73		55.90	
11	CIT	21+21.3 21.3 RT	59.63	(10) 55.55	EXIST	
12	CBCI	21+42.7 26.9 RT	59.41		56.75	SHALLOW COVER
14	CBCI	23+18.5 34.0 RT	56.84		52.30	
15	CIT	23+48.0 20.9 RT	56.25	(14) 51.90 EXIST	EXIST	
16	CB	23+69.7 41.2 RT	55.34		51.95	SHALLOW COVER
17	CBCI	24+83.5 24.1 LT	50.98		47.60	SHALLOW COVER CONNECT TO EXIST PIPE
18	CIT	24+85.6 14.8 LT	51.09	(17) 47.50	EXIST	FIELD VERIFY INVERTS
19	GICI	25+44.5 28.8 RT	48.57		46.10	GUTTER INLET SPECIAL; 6" F&G
35	CBCI	305+11.2 19.5 LT	59.13		56.62	SHALLOW COVER

*ALL OFFSETS TO CENTER OF FRAME AND GRATE/COVER

MONTVALE AVENUE DRAINAGE STRUCTURE DATA

NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
55	EX DMH	21+39.5 19.4 LT	59.55	(12) 56.69	EXIST	
56	EX DMH	21+65.4 34.0 LT	59.22	(35) 56.49 (55) 56.62	EXIST	
58	EX DMH	23+51.6 34.2 RT	55.86	EXIST	EXIST	
69	EX CB	25+64.3 47.5 RT	47.48	EXIST	EXIST	
142	CB	25+44.8 33.8 RT	49.10	(19) 46.00	45.10	PROP F&C

*ALL OFFSETS TO CENTER OF FRAME AND GRATE/COVER

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	46	85
PROJECT FILE NO.	604935		

DRAINAGE & UTILITY PLANS

NOTE:

1) ALL UNDERGROUND DRAINAGE, WATER, SEWER AND PRIVATE UTILITIES ARE TO BE RETAINED UNLESS OTHERWISE NOTED ON PLANS

2) THE DRAINAGE INVERTS SHOWN ARE FOR BIDDING PURPOSES ONLY. ACTUAL INVERT ELEVATIONS WILL BE CONFIRMED IN THE FIELD.

3) ADJUST ALL GAS GATES (BY OTHERS) AND WATER GATES AS REQUIRED.

4) ALL DRAINAGE PIPE SHALL BE CLASS V RCP UNLESS OTHERWISE NOTED ON PLANS.

08363.40-UTIL.DWG Plotted on 31-Aug-2017 11:53 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	47	85
PROJECT FILE NO.	604935		

DRAINAGE & UTILITY PLANS

MONTVALE AVENUE DRAINAGE STRUCTURE DATA

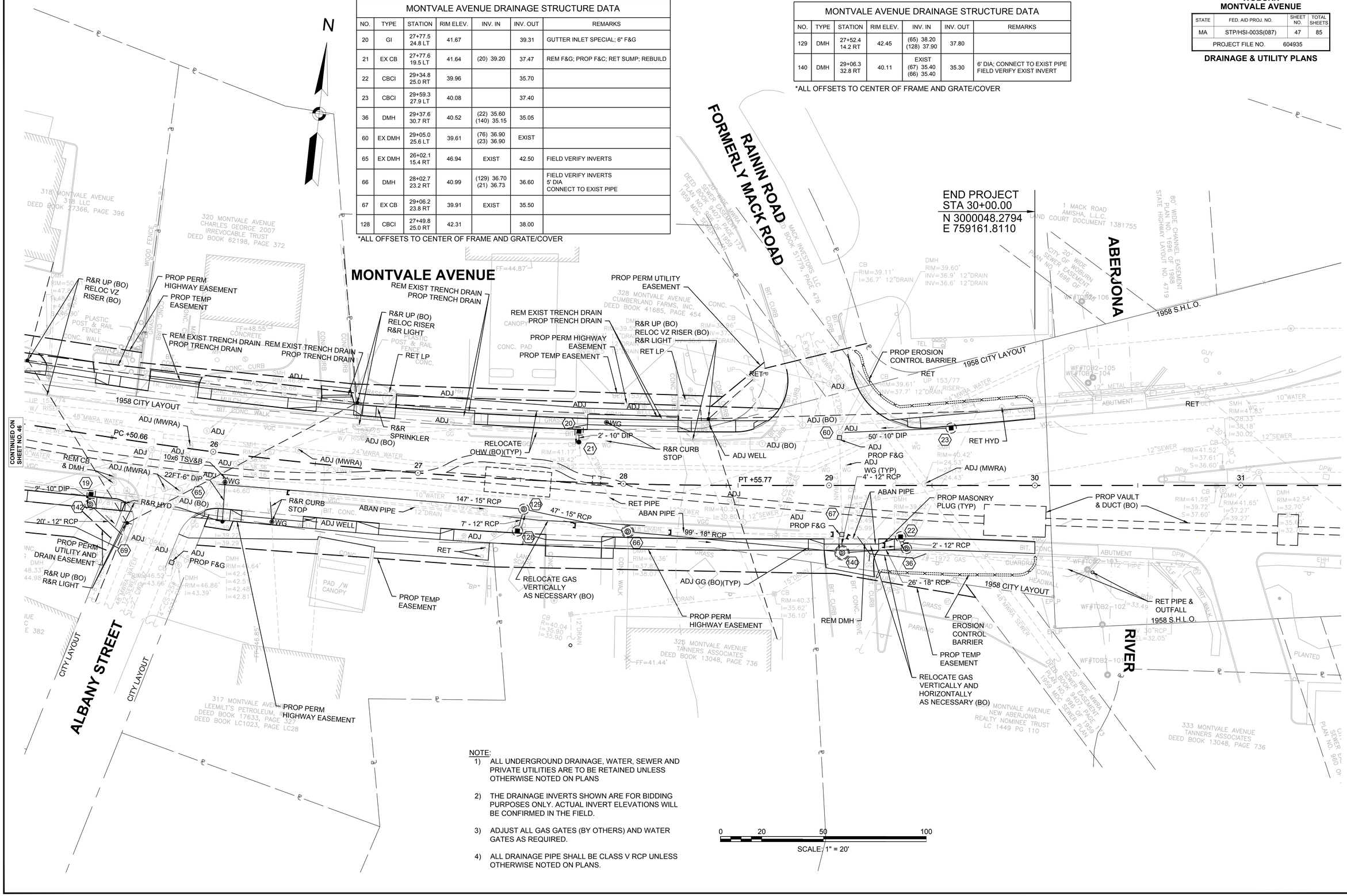
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
20	GI	27+77.5 24.8 LT	41.67		39.31	GUTTER INLET SPECIAL; 6" F&G
21	EX CB	27+77.6 19.5 LT	41.64	(20) 39.20	37.47	REM F&G; PROP F&C; RET SUMP; REBUILD
22	CBCI	29+34.8 25.0 RT	39.96		35.70	
23	CBCI	29+59.3 27.9 LT	40.08		37.40	
36	DMH	29+37.6 30.7 RT	40.52	(22) 35.60 (140) 35.15	35.05	
60	EX DMH	29+05.0 25.6 LT	39.61	(76) 36.90 (23) 36.90	EXIST	
65	EX DMH	26+02.1 15.4 RT	46.94	EXIST	42.50	FIELD VERIFY INVERTS
66	DMH	28+02.7 23.2 RT	40.99	(129) 36.70 (21) 36.73	36.60	FIELD VERIFY INVERTS 5' DIA CONNECT TO EXIST PIPE
67	EX CB	29+06.2 23.8 RT	39.91	EXIST	35.50	
128	CBCI	27+49.8 25.0 RT	42.31		38.00	

*ALL OFFSETS TO CENTER OF FRAME AND GRATE/COVER

MONTVALE AVENUE DRAINAGE STRUCTURE DATA

NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
129	DMH	27+52.4 14.2 RT	42.45	(65) 38.20 (128) 37.90	37.80	
140	DMH	29+06.3 32.8 RT	40.11	EXIST (67) 35.40 (66) 35.40	35.30	6' DIA; CONNECT TO EXIST PIPE FIELD VERIFY EXIST INVERT

*ALL OFFSETS TO CENTER OF FRAME AND GRATE/COVER



NOTE:

1) ALL UNDERGROUND DRAINAGE, WATER, SEWER AND PRIVATE UTILITIES ARE TO BE RETAINED UNLESS OTHERWISE NOTED ON PLANS

2) THE DRAINAGE INVERTS SHOWN ARE FOR BIDDING PURPOSES ONLY. ACTUAL INVERT ELEVATIONS WILL BE CONFIRMED IN THE FIELD.

3) ADJUST ALL GAS GATES (BY OTHERS) AND WATER GATES AS REQUIRED.

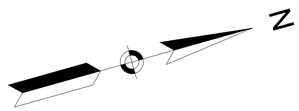
4) ALL DRAINAGE PIPE SHALL BE CLASS V RCP UNLESS OTHERWISE NOTED ON PLANS.

08363.40-UTIL.DWG Plotted on 31-Aug-2017 11:54 AM

WOBURN
MONTVALE AVENUE

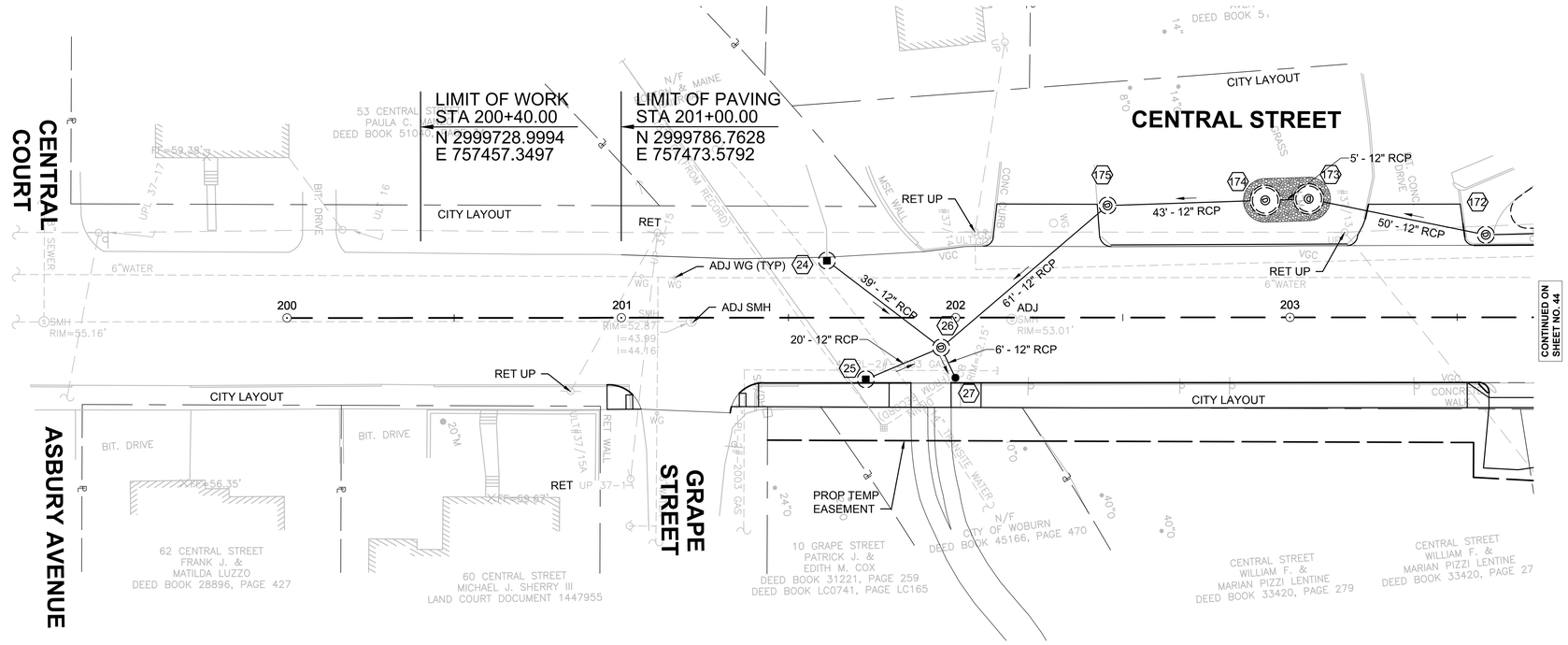
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	48	85
PROJECT FILE NO.	604935		

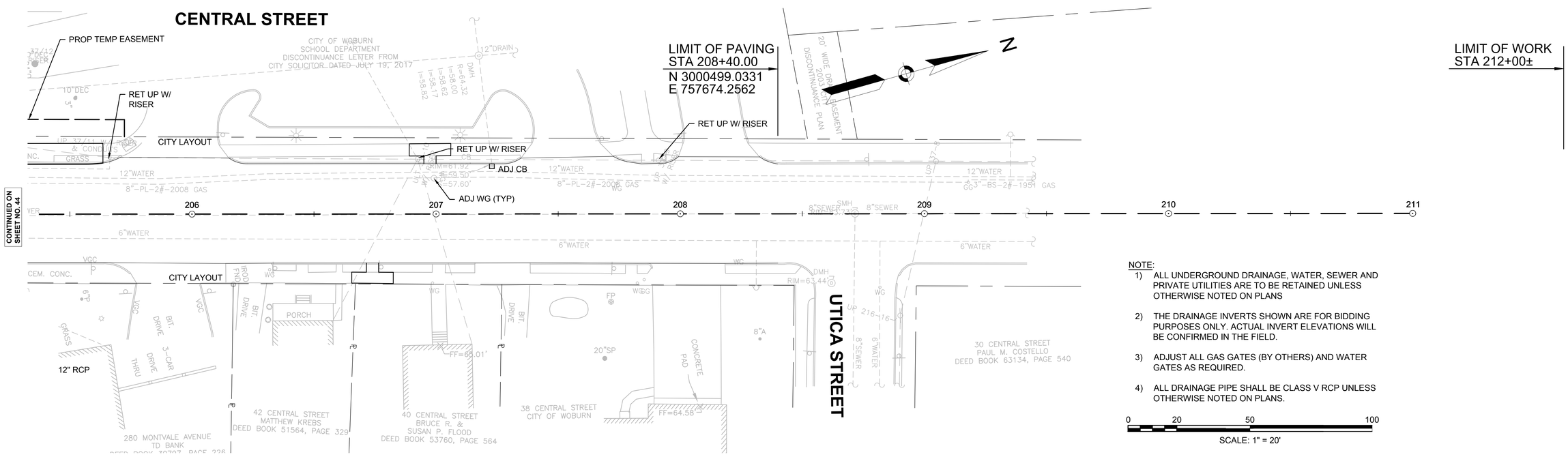
DRAINAGE & UTILITY PLANS



CENTRAL STREET DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
24	CB	201+61.5 17.1 LT	51.94		48.00	FIELD VERIFY INVERT
25	CBCI	201+73.1 18.5 RT	52.13		48.00	FIELD VERIFY INVERT
26	DMH	201+95.7 9.0 RT	52.52	(24) 47.50 (25) 47.50 (175) 48.00	47.40	FIELD VERIFY INVERTS
27	CIT	201+99.9 18.0 RT	52.40	(26) 47.10	47.00	FIELD VERIFY INVERTS
172	CB	203+58.6 24.7 LT	57.72	(171) 53.40	53.30	PROP F&C
173	LC	203+05.6 35.4 LT	56.52	(172) 52.50	52.50	LEACHING CHAMBER
174	LC	202+92.6 35.0 LT	56.21	(173) 52.50	52.40	LEACHING CHAMBER
175	DMH	202+45.4 33.5 LT	54.99	(174) 50.70	49.60	

*ALL OFFSETS TO CENTER OF FRAME AND GRATE/COVER





NOTE:

1) ALL UNDERGROUND DRAINAGE, WATER, SEWER AND PRIVATE UTILITIES ARE TO BE RETAINED UNLESS OTHERWISE NOTED ON PLANS

2) THE DRAINAGE INVERTS SHOWN ARE FOR BIDDING PURPOSES ONLY. ACTUAL INVERT ELEVATIONS WILL BE CONFIRMED IN THE FIELD.

3) ADJUST ALL GAS GATES (BY OTHERS) AND WATER GATES AS REQUIRED.

4) ALL DRAINAGE PIPE SHALL BE CLASS V RCP UNLESS OTHERWISE NOTED ON PLANS.

0 20 50 100

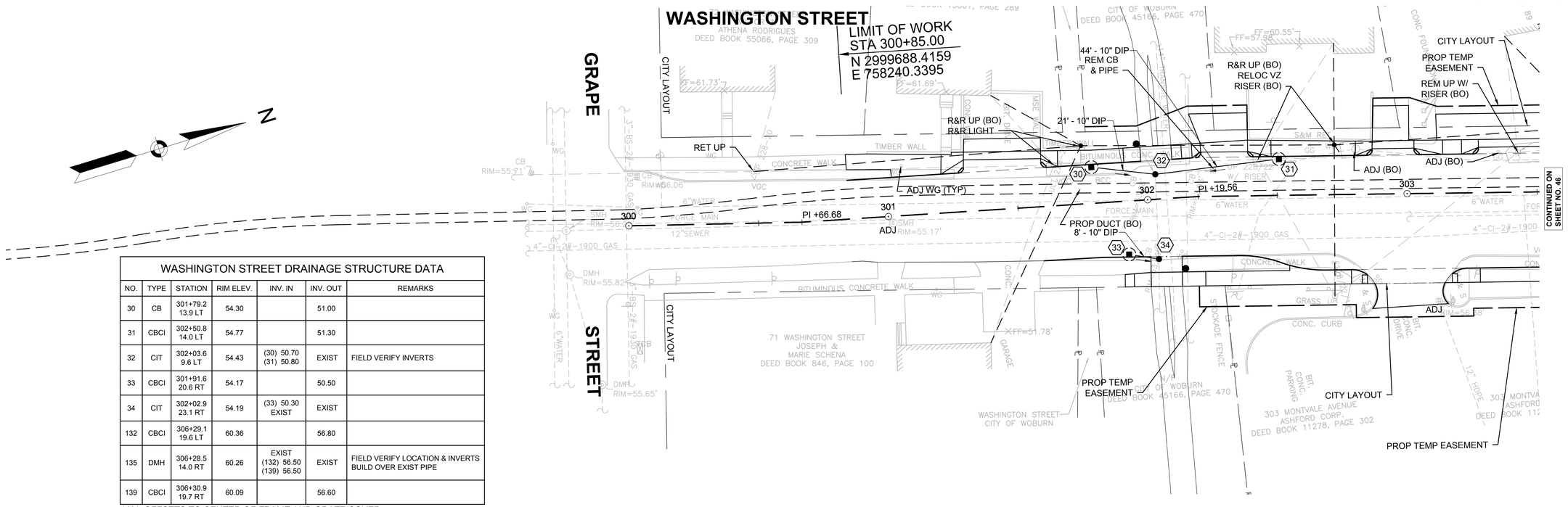
SCALE: 1" = 20'

08363.40-UTIL.DWG Plotted on 31-Aug-2017 11:54 AM

WOBURN
MONTVALE AVENUE

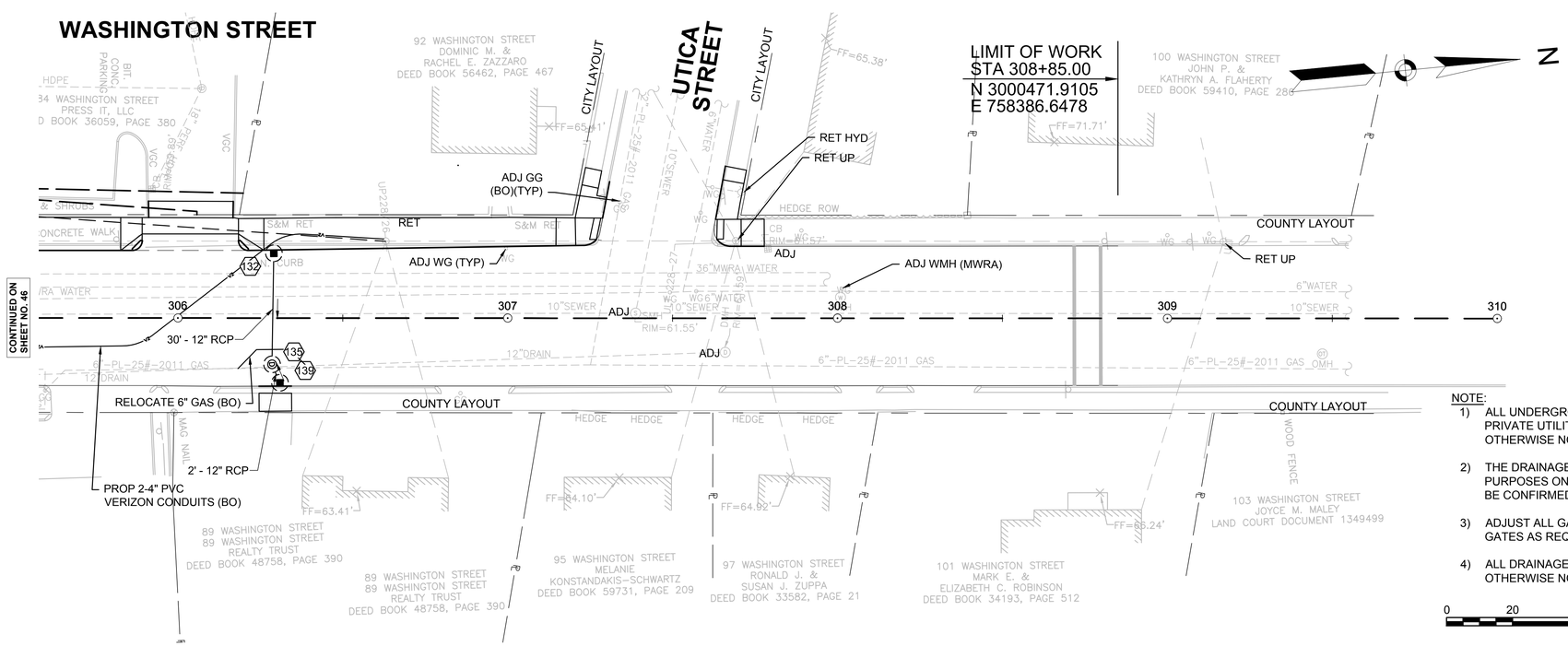
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	49	85
PROJECT FILE NO.	604935		

DRAINAGE & UTILITY PLANS



WASHINGTON STREET DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
30	CB	301+79.2 13.9 LT	54.30		51.00	
31	CBCI	302+50.8 14.0 LT	54.77		51.30	
32	CIT	302+03.6 9.6 LT	54.43	(30) 50.70 (31) 50.80	EXIST	FIELD VERIFY INVERTS
33	CBCI	301+91.6 20.6 RT	54.17		50.50	
34	CIT	302+02.9 23.1 RT	54.19	(33) 50.30 EXIST	EXIST	
132	CBCI	306+29.1 19.6 LT	60.36		56.80	
135	DMH	306+28.5 14.0 RT	60.26	EXIST (132) 56.50 (139) 56.50	EXIST	FIELD VERIFY LOCATION & INVERTS BUILD OVER EXIST PIPE
139	CBCI	306+30.9 19.7 RT	60.09		56.60	

*ALL OFFSETS TO CENTER OF FRAME AND GRATE/COVER



NOTE:

1) ALL UNDERGROUND DRAINAGE, WATER, SEWER AND PRIVATE UTILITIES ARE TO BE RETAINED UNLESS OTHERWISE NOTED ON PLANS

2) THE DRAINAGE INVERTS SHOWN ARE FOR BIDDING PURPOSES ONLY. ACTUAL INVERT ELEVATIONS WILL BE CONFIRMED IN THE FIELD.

3) ADJUST ALL GAS GATES (BY OTHERS) AND WATER GATES AS REQUIRED.

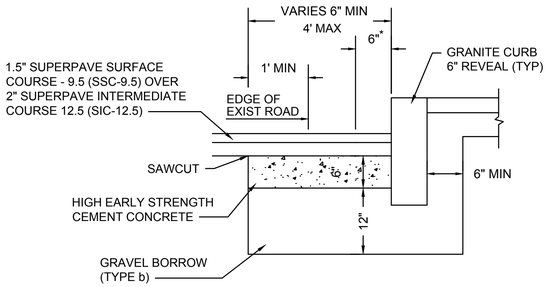
4) ALL DRAINAGE PIPE SHALL BE CLASS V RCP UNLESS OTHERWISE NOTED ON PLANS.

0 20 50 100

SCALE: 1" = 20'

08363.40-UTIL.DWG Plotted on 31-Aug-2017 11:54 AM

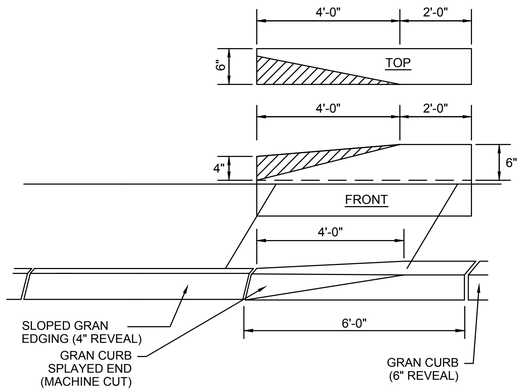
08363.40-DET.DWG Plotted on 31-Aug-2017 11:54 AM



* 6" OF HIGH EARLY STRENGTH CEMENT CONCRETE BASE COURSE SHALL BE INCLUDED IN PRICE BID FOR GRANITE CURB.

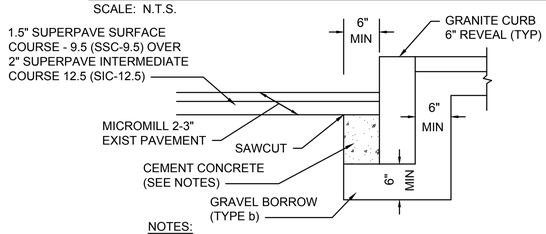
GRANITE CURB IN FULL DEPTH PAVEMENT LESS THAN 4' WIDE

SCALE: N.T.S.



GRANITE CURB SPLAYED END

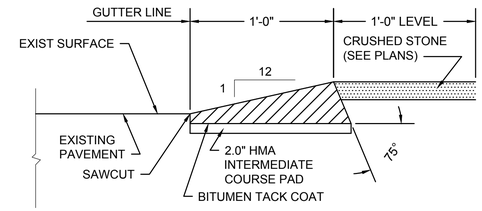
SCALE: N.T.S.



NOTES:
1. CONCRETE SHALL BE INCLUDED IN PRICE BID FOR GRANITE CURB.
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.
3. REFER TO MASSDOT STD. 106.3.0 FOR ADDITIONAL INFORMATION.

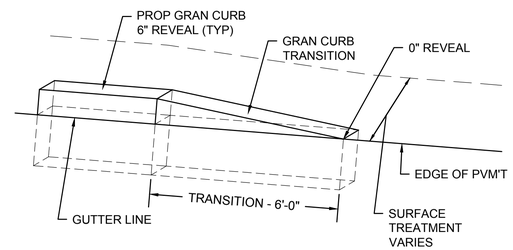
GRANITE CURB IN MICROMILL & OVERLAY

SCALE: N.T.S.



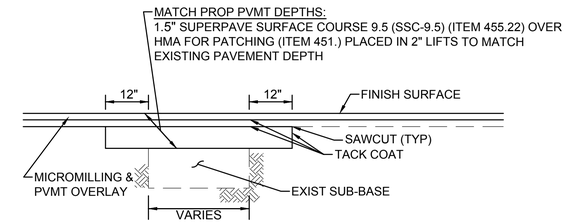
HMA BERM TYPE A-MODIFIED

SCALE: N.T.S.



GRANITE CURB TRANSITION PIECE

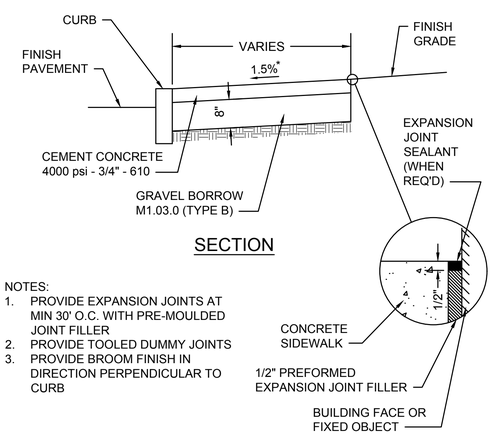
SCALE: N.T.S.



NOTE:
1. LOCATION OF PAVEMENT PATCH SHALL BE AS REQUIRED BY THE ENGINEER.

PARTIAL DEPTH PAVEMENT PATCH (AT DETERIORATED PAVEMENT)

SCALE: NTS

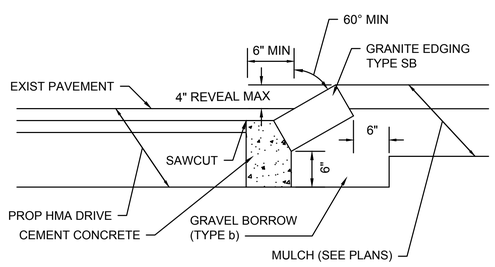


NOTES:
1. PROVIDE EXPANSION JOINTS AT MIN 30' O.C. WITH PRE-MOULDED JOINT FILLER
2. PROVIDE TOOLED DUMMY JOINTS
3. PROVIDE BROOM FINISH IN DIRECTION PERPENDICULAR TO CURB

*TOLERANCE FOR CONSTRUCTION ±0.5%

CEMENT CONCRETE SIDEWALK

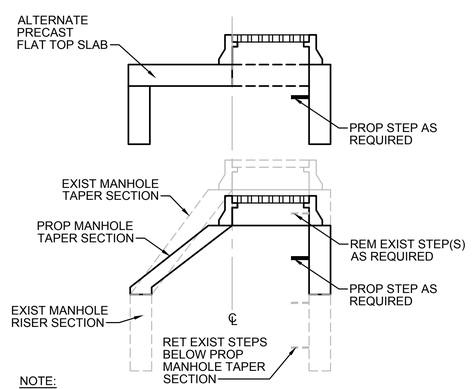
SCALE: N.T.S. DWG: WALK-01 DATE: MARCH 2013



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.
3. REFER TO MASSDOT STD. 106.5.0 FOR ADDITIONAL INFORMATION.

GRANITE EDGING IN EXISTING PAVEMENT

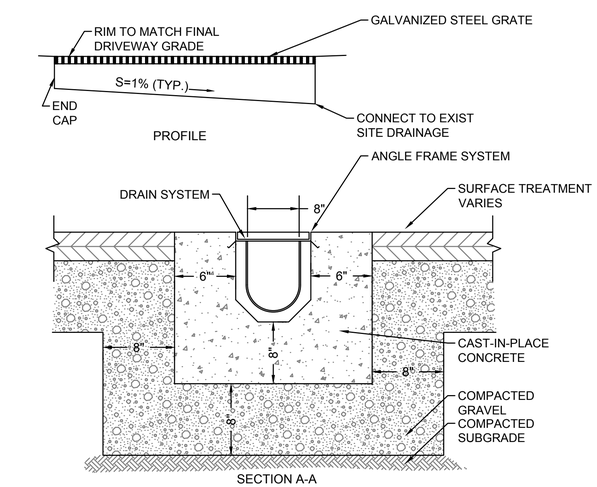
SCALE: N.T.S.

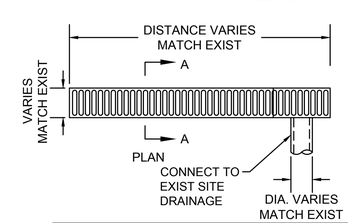


NOTE:
BASED ON ACTUAL FIELD CONDITIONS; THE CONTRACTOR SHALL DETERMINE WHICH STYLE OF TOP SECTION SHOULD BE USED.

DRAINAGE MANHOLE REBUILD

SCALE: NTS





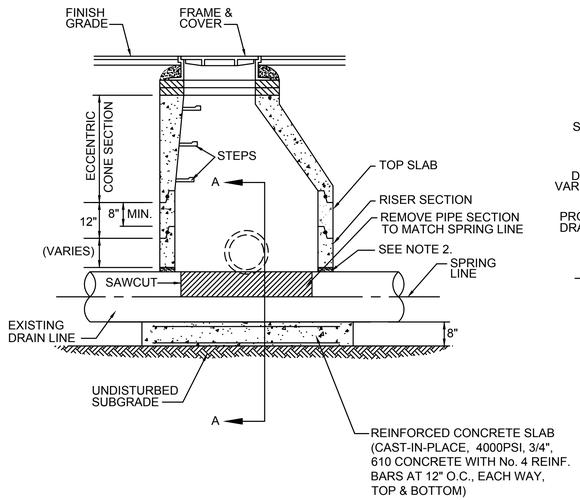
NOTES

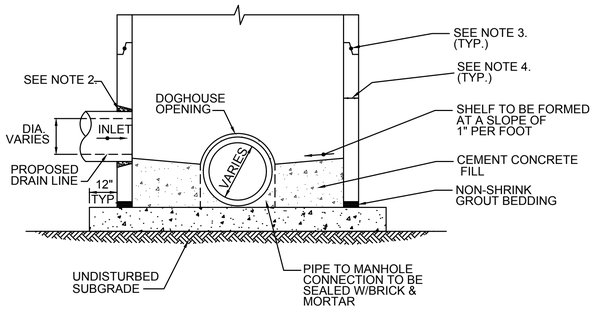
1. TRENCH DRAIN SHALL BE HEAVY DUTY TYPE DESIGNED FOR HS-20 LOADING.
2. CONCRETE SHALL BE 5000 PSI CEMENT CONCRETE (TYPE ||) 6% (1.5%±) AIR ENTRAINED.
3. TRENCH DRAIN GRATE SHALL MEET AMERICANS WITH DISABILITY ACT (ADA) REGULATIONS.

TRENCH DRAIN

SCALE: N.T.S.

Plotted on 11-Sep-2017 10:47 AM
08363.40-DET.DWG





SECTION A-A

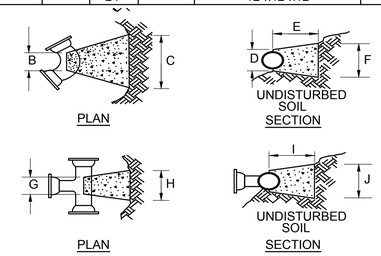
NOTES:

1. STRUCTURE SHALL BE DESIGNED FOR HS-20 LOADING.
2. PROVIDE OPENINGS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS (NON-SHRINK GROUT).
3. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.
4. FOR MANHOLES OVER 9' IN DEPTH, WALL THICKNESS SHALL BE 6" MIN. FOR MANHOLES 9' OR LESS IN DEPTH, WALL THICKNESS SHALL BE 5" MIN.

DRAIN MANHOLE OVER EXISTING PIPE

SCALE: N.T.S.

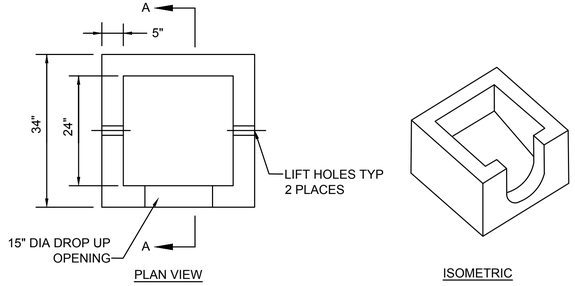
BENDS		B	C	D	E	F	BENDS		B	C	D	E	F
6"	11-1/4°	8"	15"	12"	24"	12"	6"	45°	8"	30"	12"	24"	14"
6"	22-1/2°	"	19"	"	"	13"	6"	90°	"	30"	"	"	27"
8"	11-1/4°	"	20"	"	"	12"	8"	45°	"	30"	"	"	24"
8"	22-1/2°	"	22"	"	"	17"	8"	90°	"	38"	"	"	36"
12"	11-1/4°	"	30"	"	"	15"	12"	45°	"	40"	"	"	40"
12"	22-1/2°	"	35"	"	"	25"	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"	

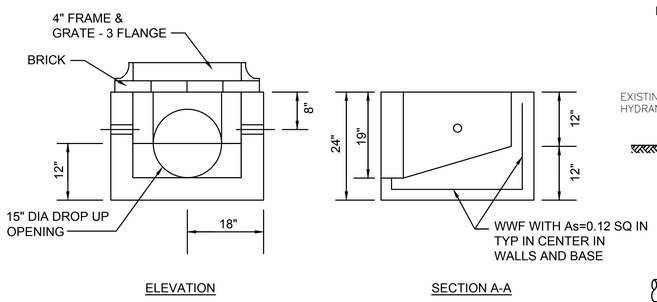


NOTES:
1. PROVIDE BLOCKS FOR TAPPING SLEEVES, DEAD ENDS, GATE VALVES AND VERTICAL BENDS, SAME SIZE AS REQUIRED FOR TEES.
2. PROVIDE ANCHOR RODS AT VERTICAL BENDS AND GATE VALVES
3. CONCRETE SHALL NOT BE PLACED AGAINST PIPE BEYOND FITTING.

CONCRETE THRUST BLOCK

SCALE: NTS

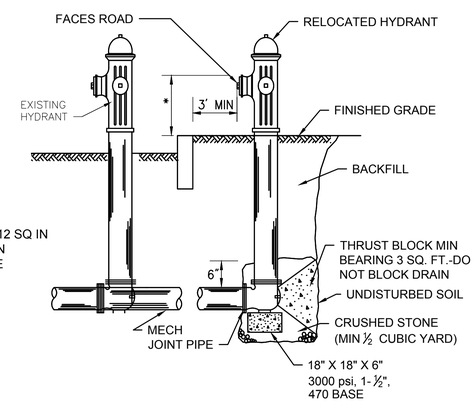




NOTES:
1. DESIGNED FOR AASHTO HS25-44 LOADING.
2. CONCRETE STRENGTH f'c=4000 PSI
3. REINFORCING STEEL: ASTM A185 (wwf) fy=60,000 PSI

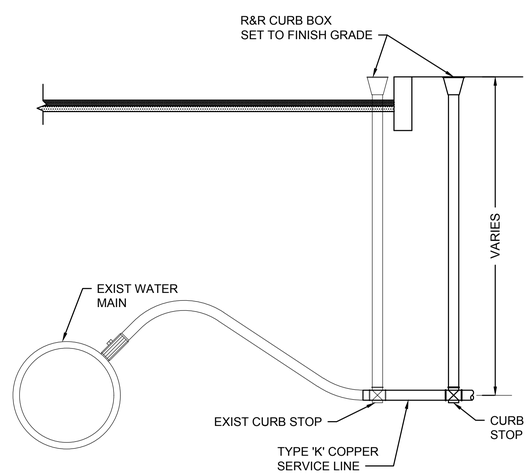
SPECIAL GUTTER INLET

SCALE: N.T.S.



HYDRANT RELOCATION

SCALE: NTS

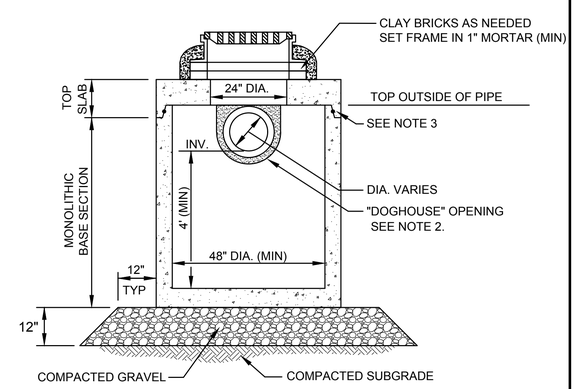


NOTES:

1. INSTALATIONS SHALL CONFORM WITH MUNICIPAL WATER WORKS SPECIFICATIONS AND STANDARDS.

REMOVE & RESET CURB STOP

SCALE: NTS



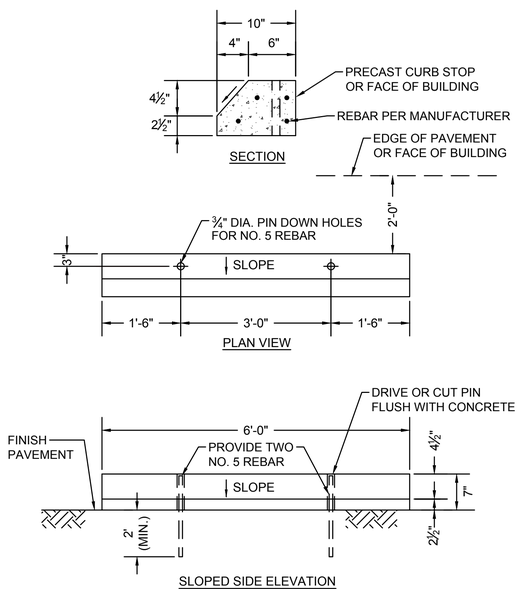
NOTES:

1. ALL SECTIONS SHALL BE DESIGNED FOR HS-20 LOADING.
2. PROVIDE DOGHOUSE OPENING FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. TOP SLAB SHALL NOT REST DIRECTLY ON PIPE. GROUT ALL PIPE CONNECTIONS (NON-SHRINK GROUT).
3. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.
4. CATCH BASIN FRAME AND GRATE (4"DEPTH) SHALL BE SET IN FULL MORTAR BED.
5. ADJUST TO FINISH GRADE WITH CLAY BRICK AND MORTAR AS REQUIRED.

CATCH BASIN SHALLOW COVER (CBSC)

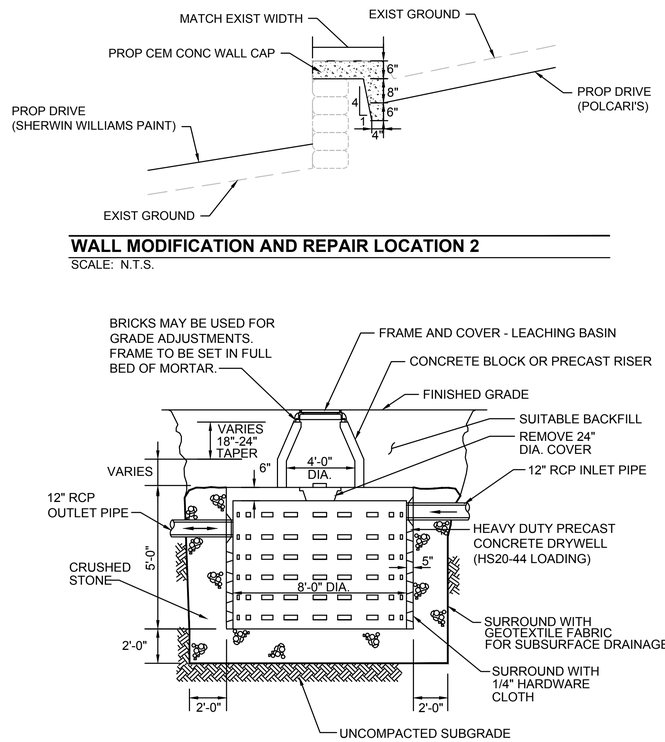
SCALE: N.T.S.

08363.40-DET.DWG Plotted on 31-Aug-2017 11:55 AM



CONCRETE CURB STOP

SCALE: N.T.S.



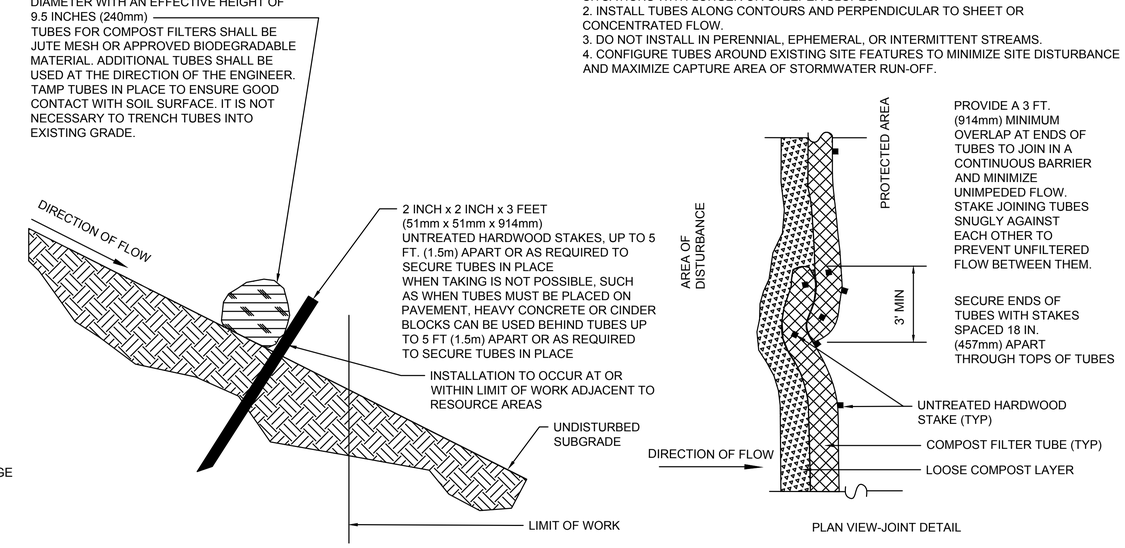
WALL MODIFICATION AND REPAIR LOCATION 2

SCALE: N.T.S.

LEACHING BASIN

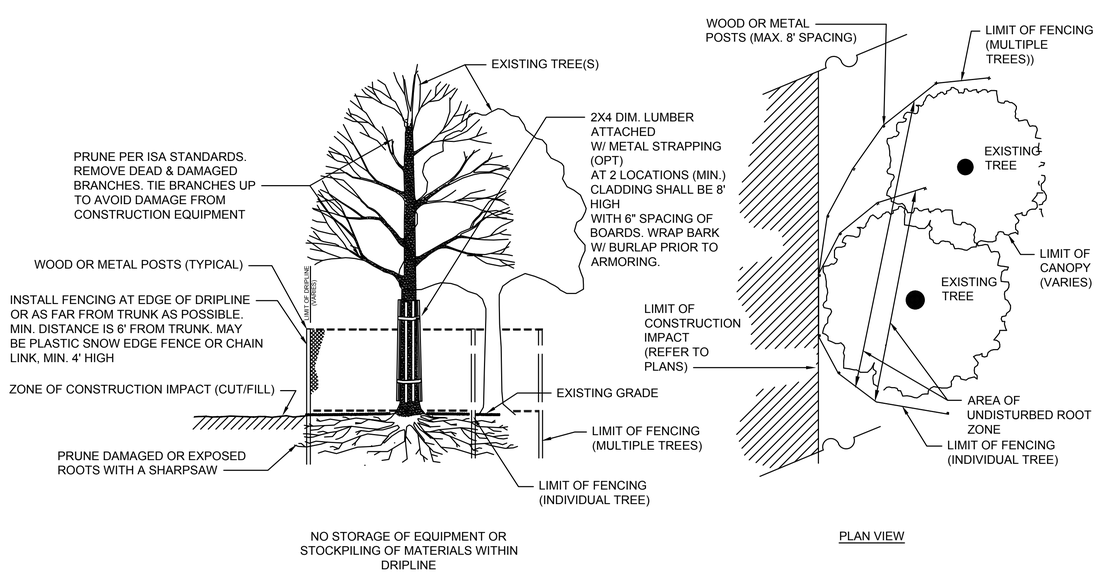
SCALE: N.T.S.

GENERAL NOTES:
1. PROVIDE A MINIMUM TUBE DIAMETER OF 12 INCHES (300mm) FOR SLOPES UP TO 50 FEET (15.24m) IN LENGTH WITH A SLOPE RATIO OF 3H:1V OR STEEPER. LONGER SLOPES OF 3H:1V MAY REQUIRE LARGER TUBE DIAMETER OR ADDITIONAL COURSING OF FILTER TUBES TO CREATE A FILTER BERM. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR SITUATIONS WITH LONGER OR STEEPER SLOPES.
2. INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.
3. DO NOT INSTALL IN PERENNIAL, EPHEMERAL, OR INTERMITTENT STREAMS.
4. CONFIGURE TUBES AROUND EXISTING SITE FEATURES TO MINIMIZE SITE DISTURBANCE AND MAXIMIZE CAPTURE AREA OF STORMWATER RUN-OFF.



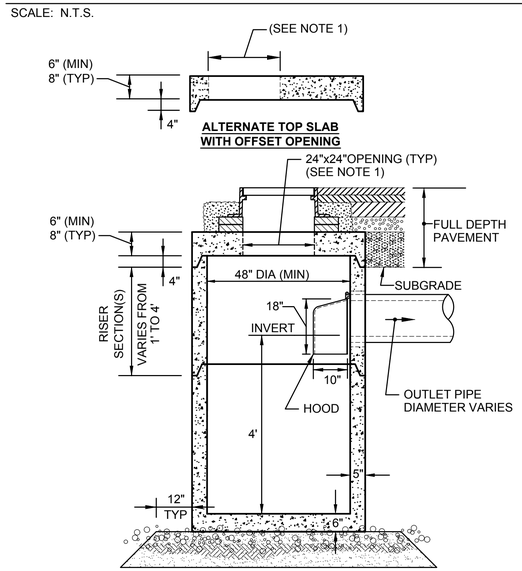
SINGLE COMPOST FILTER TUBE DETAIL

SCALE: N.T.S.



TREE PROTECTION OF EXISTING TREE(S)

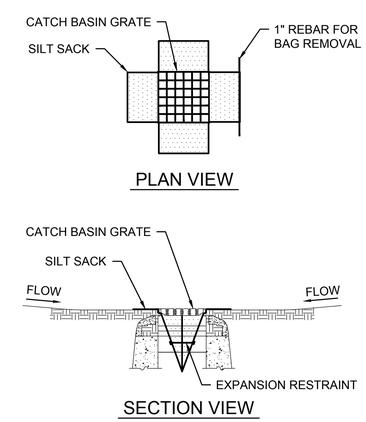
SCALE: N.T.S.



NOTES:
1. TOP SLAB FOR CBCI SHALL HAVE 24"x 27" RECTANGULAR OPENING.
2. 6" MINIMUM SPACE FROM TOP OF KNOCKOUT TO BOTTOM OF ROOF SLAB JOINT REQUIRED WHEN USING HOODS.
3. ALL SECTIONS SHALL BE RATED FOR HS-20 LOADING.

DEEP SUMP CATCH BASIN WITH HOOD

SCALE: NTS

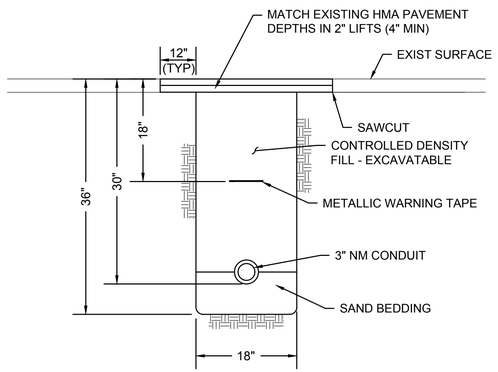


NOTES:
1. INSTALL SILT SACK IN EXISTING CATCH BASINS, BEFORE COMMENCING WORK, AND IN NEW CATCH BASINS IMMEDIATELY AFTER INSTALLATION OF STRUCTURE. MAINTAIN UNTIL BINDER COURSE PAVING IS COMPLETE OR A PERMANENT STAND OF GRASS HAS BEEN ESTABLISHED.
2. GRATE TO BE PLACED OVER SILT SACK.
3. SILT SACK SHALL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

INLET PROTECTION - SILT SACK IN CATCH BASIN

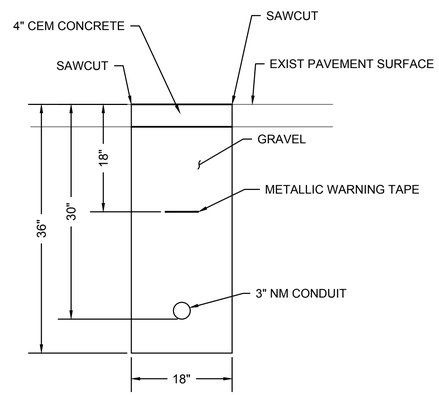
SCALE: N.T.S.

08363.40-DET.DWG Plotted on 31-Aug-2017 11:55 AM



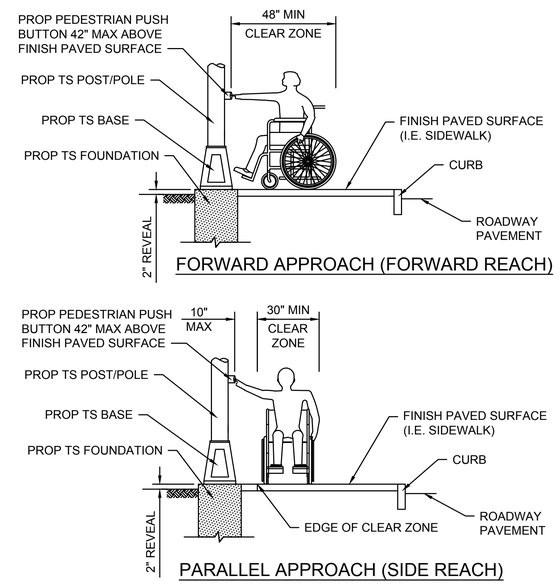
CONDUIT CROSSING ROADWAY/DRIVEWAY

SCALE: N.T.S.



CONDUIT IN SIDEWALK

SCALE: N.T.S.



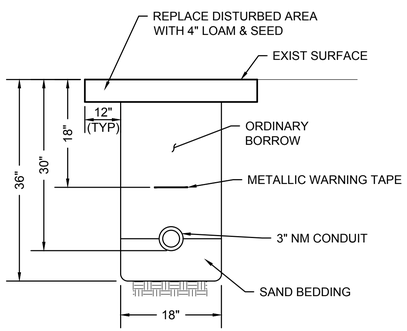
NOTE:
A CLEAR GROUND SPACE SHALL CONSIST OF A STABLE AND FIRM AREA, COMPLYING WITH 521 CMR 6.5 (FORWARD REACH) OR 521 CMR 6.6 (SIDE REACH) AND SHALL BE PROVIDED AT EACH OF THE PEDESTRIAN PUSH BUTTONS.

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.

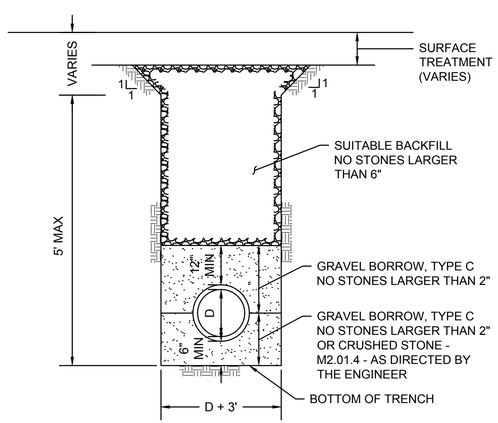
PEDESTRIAN PUSH BUTTON CLEAR ZONE

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



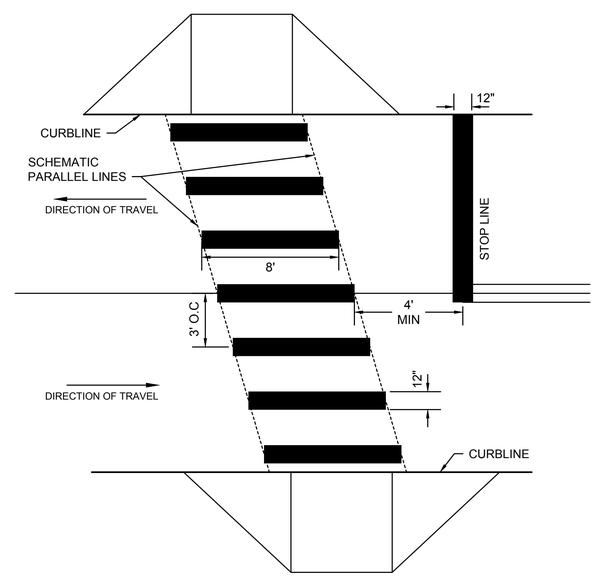
CONDUIT IN GRASS

SCALE: N.T.S.



TRENCH DETAIL

SCALE: N.T.S. DWG: TRENCH-05 DATE: MARCH 2013



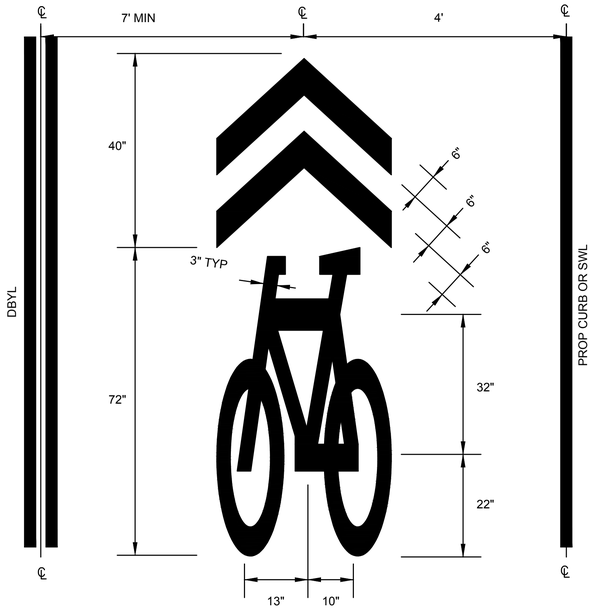
NOTES:

1. ALL EXISTING CROSSWALK MARKINGS SHALL BE FULLY ERADICATED BY APPROVED METHOD PRIOR TO THE APPLICATION OF PROPOSED MARKINGS.
2. ALL 12" THERMOPLASTIC LINES SHALL BE APPLIED IN ONE APPLICATION, NO COMBINATION OF LINES (TWO - 6" LINES) WILL BE ACCEPTED.
3. LAYOUT OF CROSSWALKS SHALL BE ORIENTATED IN THE DIRECTION OF TRAVEL AND LOCATED OUTSIDE OF THE WHEEL PATH OF VEHICLES. LAYOUT SHALL BE APPROVED BY WOBURN DPW PRIOR TO APPLICATION OF THERMOPLASTIC.
4. ALL CROSSWALKS INSTALLED SHALL CONFORM TO THE RELEVANT PROVISIONS OF THE MASSACHUSETTS HIGHWAY DEPARTMENT "STANDARD SPECIFICATION FOR HIGHWAY AND BRIDGES" DATED 1988, SECTION 860 FOR REFLECTORIZED LINE (THERMO-PLASTIC) & MATERIAL M7.01.20, LATEST REVISIONS.

CONTINENTAL-STYLE CROSSWALK - 12" WIDE LINES

SCALE: N.T.S. DWG: PM-27 DATE: MAY 2017

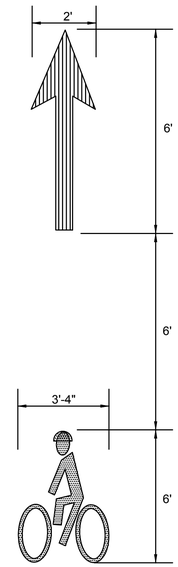
08363.40-DET.DWG Plotted on 31-Aug-2017 11:55 AM



NOTES:
1. SEE MUTCD FIGURE 9C-9 FOR MORE INFORMATION.
2. SHARED LANE MARKINGS SHALL BE REFLECTORIZED PREFORMED THERMOPLASTIC.

SHARROW PAVEMENT MARKING LAYOUT

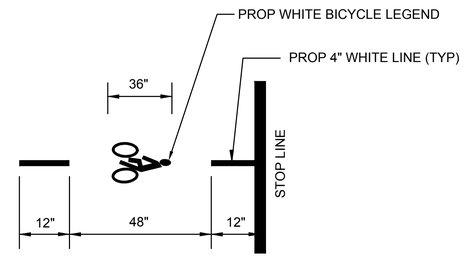
SCALE: N.T.S. DWG: PM-14 DATE: MARCH 2015



NOTES:
1. SEE MUTCD FIGURE 9C-6 FOR MORE INFORMATION.
2. BIKE LANE MARKINGS SHALL BE REFLECTORIZED PREFORMED THERMOPLASTIC.

BIKE LANE PAVEMENT MARKINGS

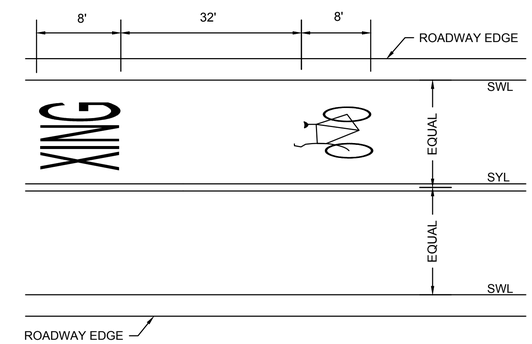
SCALE: N.T.S. DWG: PM-11 DATE: NOV 2015



NOTES:
1. BICYCLE LEGEND SHALL CONFORM TO THE 2004 EDITION OF STANDARD HIGHWAY SIGNS AND SCALED APPROPRIATELY TO OBTAIN REQUIRED HEIGHT OF MARKINGS.
2. BIKE MARKINGS SHALL BE REFLECTORIZED PREFORMED THERMOPLASTIC.
3. SEE TRAFFIC PLANS FOR LEGEND PLACEMENT.

BICYCLE LEGEND DETAIL

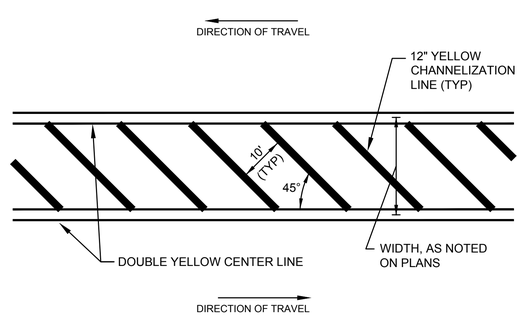
SCALE: N.T.S.



NOTES:
1. PAVEMENT MARKINGS AS PER MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
2. PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC.

ROADWAY MARKINGS

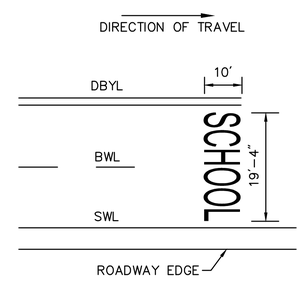
SCALE: N.T.S.



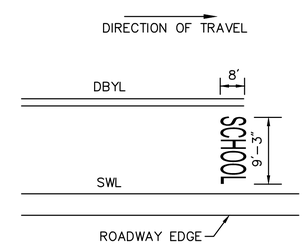
NOTES:
1. ALL 12" LINES SHALL BE APPLIED IN ONE APPLICATION, NO COMBINATION OF LINES (e.g. TWO - 6" LINES) WILL BE ACCEPTED.

CHANNELIZED MARKINGS - MEDIAN FOR ROADWAYS 40MPH OR LESS

SCALE: NTS DWG: PM-13 DATE: OCT 2015



LOCATION:
STA: 9+60, RT
STA: 16+32, RT



LOCATION:
STA: 202+10, RT
STA: 209+50, LT

NOTES:
1. PROP MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC.
2. PROP MARKINGS SHALL BE CENTERED WITHIN THE APPROACH LANE(S) AS SHOWN ON THE PLANS
3. PAVEMENT MARKINGS AS PER MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).

SCHOOL ZONE PAVEMENT MARKING DETAIL

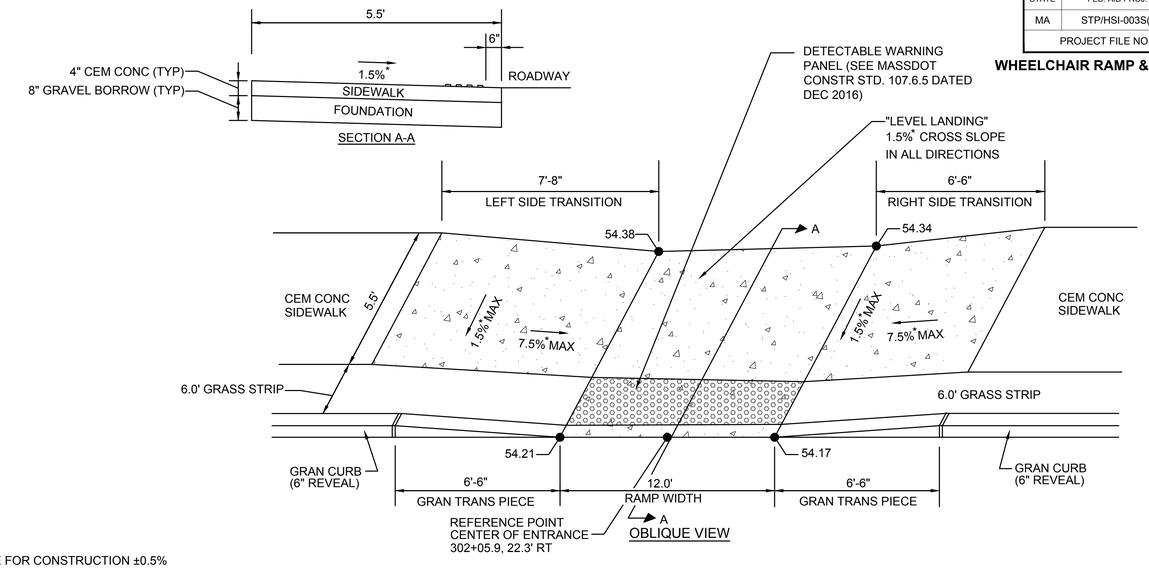
SCALE: N.T.S.

WOBURN MONTVALE AVENUE			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	55	85
PROJECT FILE NO.	604935		

WHEELCHAIR RAMP & DRIVEWAY DETAILS

WHEELCHAIR RAMP DATA										
NO.	LOCATION (REF. POINT)	SIDEWALK WIDTH	RAMP OPENING	ROADWAY GUTTER	LEFT SIDE			RIGHT SIDE		
					REVEAL	TRANS	OPENING ELEV	REVEAL	TRANS	OPENING ELEV
1	13+42.4 25.7' RT	5.5'	5.0'	0.20%	6"	7'-8"	59.05	6"	9'-0"	59.10
3	203+99.8 27.32' LT	5.5'	5.0'	2.54%	6"	6'-6"	58.23	6"	14'-0"	58.32
4	204+07.1 19.5' RT	7.5'	5.0'	2.45%	6"	14'-0"	58.52	4"	6'-6"**	58.43
5	204+98.1 20.5' LT	8.5'	5.0'	1.51%	6"	7'-8"	59.24	6"	9'-0"**	59.27
6	204+99.6 26.1' RT	7.7'-8.4'	5.0'	0.54%	6"	9'-0"	59.55	5"	6'-6"	59.50
7	14+50.6 29.2' LT	6.0'-7.4'	5.0'	0.70%	5"	6'-6"	59.48	6"	9'-0"	59.51
9	21+07.8 27.8' RT	5.5'	5.0'	-0.79%	6"	7'-8"	59.58	6"	9'-0"**	58.64
11	303+89.7 25.4' LT	5.5'	5.0'	3.59%	6"	7'-8"	58.33	6"	15'-0"	58.41
13	304+00.9 29.8' RT	5.5'	5.0'	0.67%	6"	9'-0"	58.49	6"	7'-8"	58.41
14	22+13.6 33.4' LT	6.0'	5.0'	-1.91%	4"	7'-5"	58.81	4"	6'-6"	58.73
15	22+35.6 26.09' LT	6.0'-7.1'	5.0'	-1.15%	4"	7'-5"	58.42	6"	6'-6"**	58.31
16	22+26.1 34.9' RT	5.0'	5.0'	-0.93%	6"	6'-6"**	58.55	6"	9'-0"	58.62

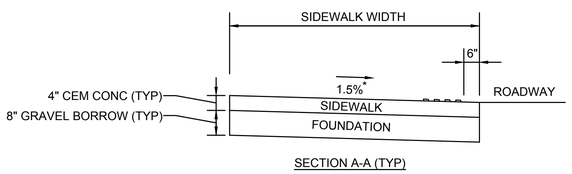
NOTES:
1. ROADWAY GUTTER SLOPES ARE IN THE DIRECTION OF THE BASELINE.
2. **STRAIGHT TRANSITION PIECE.



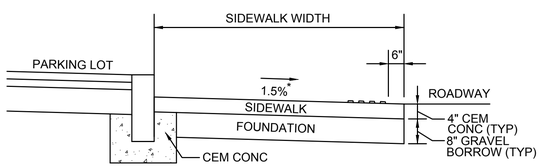
*TOLERANCE FOR CONSTRUCTION ±0.5%

WHEELCHAIR RAMP 32

SCALE: N.T.S.



SECTION A-A (TYP)

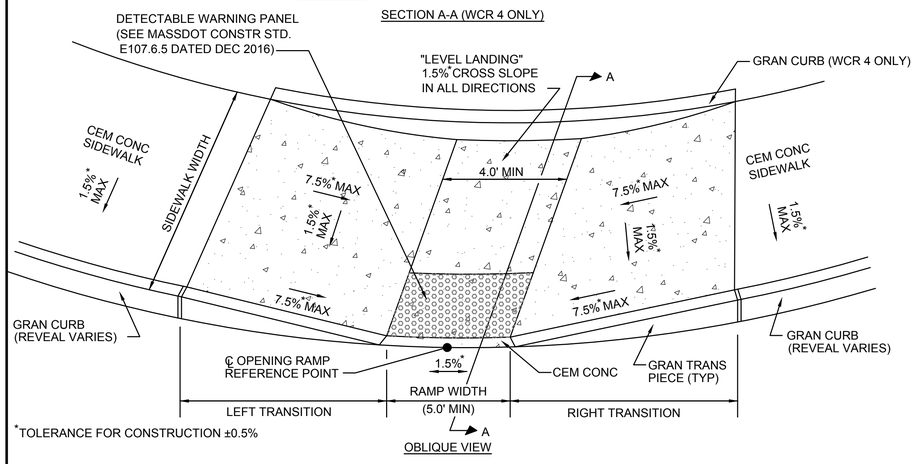


SECTION A-A (WCR 4 ONLY)

LEGEND

= LIMITS OF CEM CONC RAMP

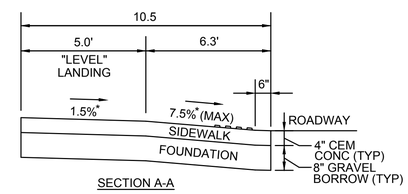
= DETECTABLE WARNING PANEL



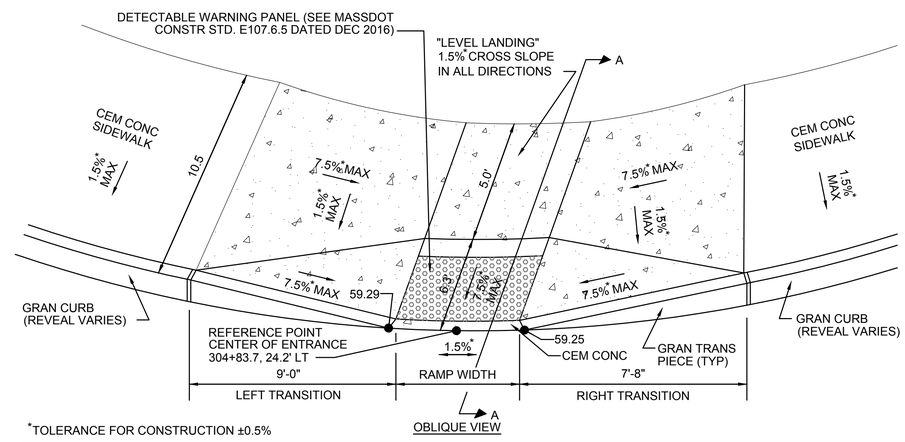
*TOLERANCE FOR CONSTRUCTION ±0.5%

WHEELCHAIR RAMP - LESS THAN 6.5 FEET - CURVED

SCALE: N.T.S.



SECTION A-A



*TOLERANCE FOR CONSTRUCTION ±0.5%

WHEELCHAIR RAMP 12

SCALE: N.T.S.

08363.40-DET-WCR.DWG Plotted on 31-Aug-2017 11:55 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	57	85
PROJECT FILE NO.	604935		

WHEELCHAIR RAMP & DRIVEWAY DETAILS

WHEELCHAIR RAMP DATA											
NO.	LOCATION (REF. POINT)	SIDEWALK WIDTH	RAMP OPENING	LEFT SIDE				RIGHT SIDE			
				ROADWAY GUTTER	REVEAL	TRANS	OPENING ELEV	ROADWAY GUTTER	REVEAL	TRANS	OPENING ELEV
18	23+34.2 38.40' RT	5.0'	3.0'	---	---	---	---	-2.82%	6"	11'-0"	56.45
19	23+71.6 39.03' RT	5.0'	3.0'	-3.62%	6"	6'-6"	55.17	---	---	---	---
20	25+63.6 32.00' RT	5.5'	4.0'	---	---	---	---	-3.30%	6"	14'-0"	47.93
21	25+96.5 30.50' RT	5.5'	4.0'	-2.90%	6"	6'-6"	46.81	---	---	---	---
22	28+67.2 29.21' LT	5.5'	4.0'	-1.18%	6"	9'-0"	40.05	---	---	---	---
23	29+33.6 29.83' LT	5.5'	4.0'	---	---	---	---	1.70%	6"	6'-6"	39.92
24	201+05.9 23.92' RT	6.7' (EXIST)	6.8'	---	---	---	---	-0.30%	6"	7'-8"	53.48
25	201+33.9 24.45' RT	7.0'	4.7'	-1.10%	6"	6'-6"	52.26	---	---	---	---
26	302+86.2 32.98' RT	5.5'	3.0'	---	---	---	---	1.84%	6"	6'-6"	55.23
27	303+15.4 32.65' RT	5.5'	3.0'	2.81%	6"	11'-0"	55.91	---	---	---	---
33	10+70.8 25.22' LT	6.3' (EXIST)	4.0'	-0.64%	6"	13'-6"	58.32	---	---	---	---
34	11+25.0 28.34' LT	6.3'	4.0'	---	---	---	---	-0.73%	6"	8'-0"	58.29

NOTE: ROADWAY GUTTER SLOPES ARE IN THE DIRECTION OF THE BASELINE.

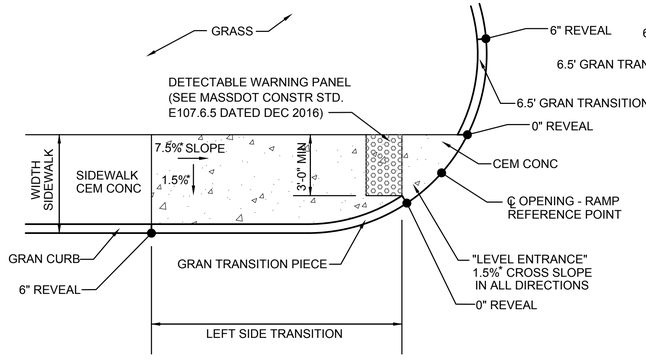
WHEELCHAIR RAMP DATA											
NO.	LOCATION (REF. POINT)	SIDEWALK WIDTH	RAMP OPENING	LEFT SIDE				RIGHT SIDE			
				ROADWAY GUTTER	REVEAL	TRANS	OPENING ELEV	ROADWAY GUTTER	REVEAL	TRANS	OPENING ELEV
28	307+28.1 27.00' LT	8.5'	6.8'	3.59%	6"	6'-6"	61.59	1.10%	6"	9'-0"	61.62
29	307+62.5 27.02' LT	8.2'	6.2'	2.45%	6"	11'-0"	61.94	0.89%	6"	7'-8"	62.08

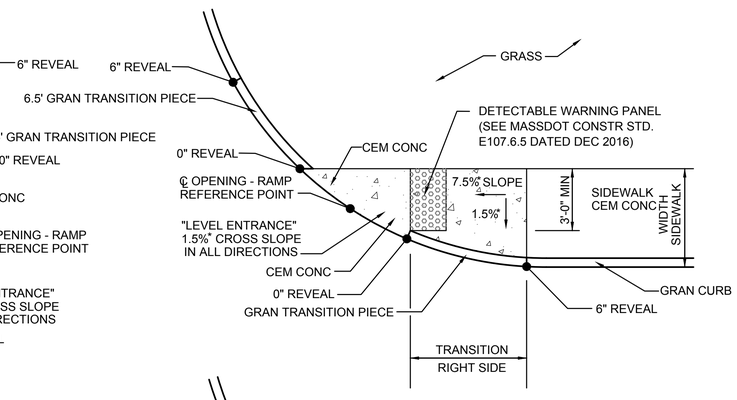
NOTE: ROADWAY GUTTER SLOPES ARE IN THE DIRECTION OF THE BASELINE.

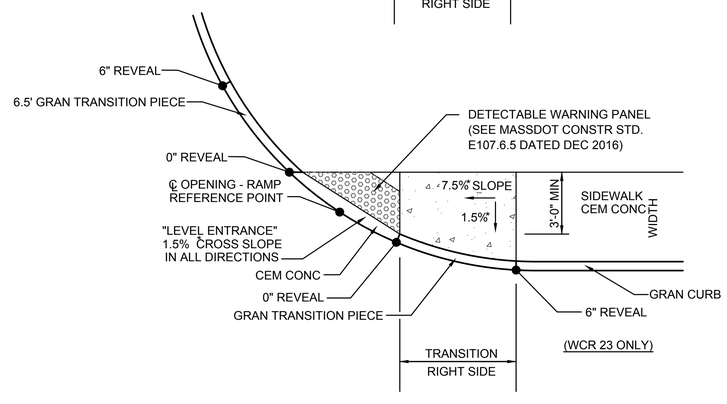
LEGEND

= LIMITS OF CEM CONC RAMP

= DETECTABLE WARNING PANEL





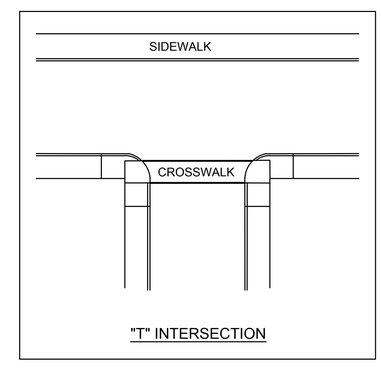


(WCR 23 ONLY)

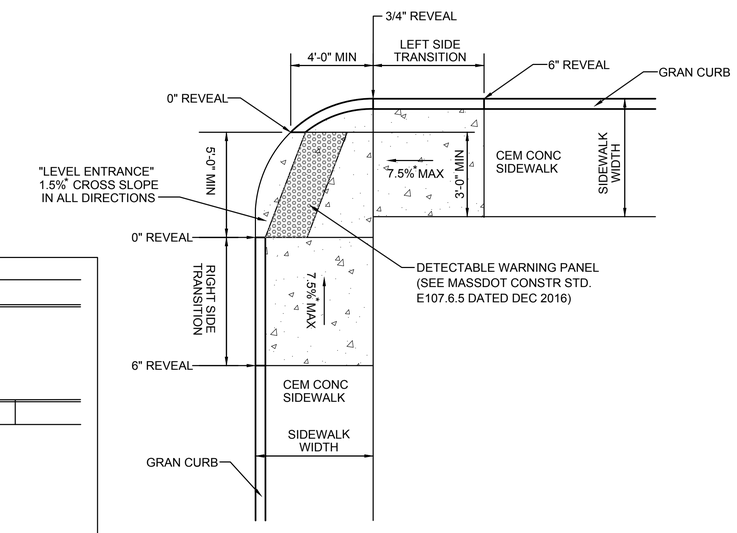
*TOLERANCE FOR CONSTRUCTION ±0.5%

WHEELCHAIR RAMP FOR ONE CONTINUOUS DIRECTION OF PEDESTRIAN TRAVEL

SCALE: N.T.S.



"T" INTERSECTION



*TOLERANCE FOR CONSTRUCTION ±0.5%

"T" INTERSECTION WHEELCHAIR RAMP

SCALE: N.T.S.

08363.40-DET-WCR.DWG Plotted on 31-Aug-2017 11:56 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	56	85
PROJECT FILE NO.	604935		

WHEELCHAIR RAMP & DRIVEWAY DETAILS

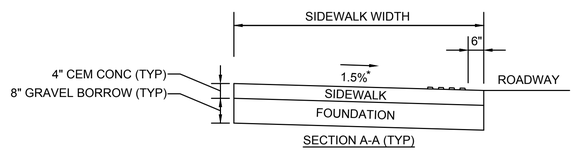
WHEELCHAIR RAMP DATA										
NO.	LOCATION (REF. POINT)	SIDEWALK WIDTH	RAMP OPENING	ROADWAY GUTTER	LEFT SIDE			RIGHT SIDE		
					REVEAL	TRANS	OPENING ELEV	REVEAL	TRANS	OPENING ELEV
2	13+43.2 26.0' LT	5.5'	5.0'	0.62%	6"	6'-6"	58.95	6"	7'-8"	58.98
8	14+49.3 24.5' RT	5.5'	5.0'	0.48%	6"	7'-8"	58.55	6"	6'-6"	58.48
10	21+15.7 25.3' LT	5.5'	5.0'	-0.68%	6"	7'-8"	59.61	6"	6'-6"	59.58
17	22+98.8* 40.5' RT	5.0	5.0'	-2.30%	6"	11'-0"	58.06	6"	6'-6"	57.95
30	201+92.6 19.5' RT	7.0'	12.0'	1.80%	6"	9'-0"	52.35	6"	6'-6"	52.20
31	302+04.3 15.0' LT	5.5'	12.0'	0.54%	6"	6'-6"	54.30	3"	3'-10"	54.36

NOTE: ROADWAY GUTTER SLOPES ARE IN THE DIRECTION OF THE BASELINE.
* LOOKING FROM PARKING LOT.

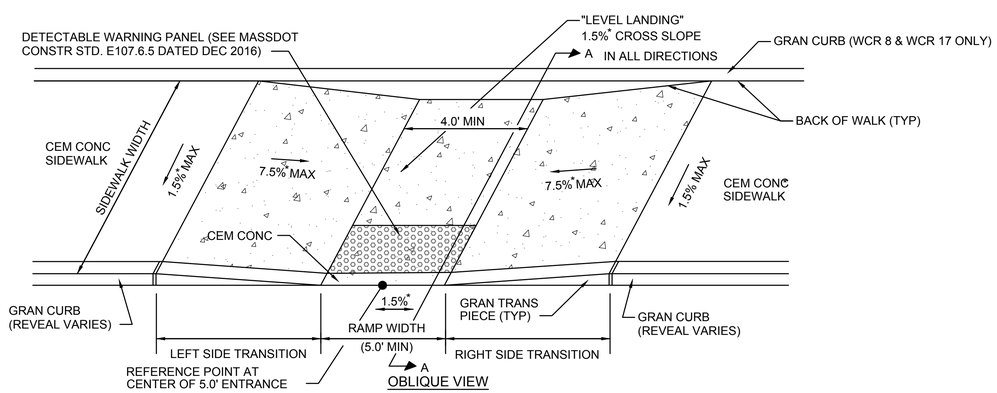
LEGEND

= LIMITS OF CEM CONC RAMP

= DETECTABLE WARNING PANEL

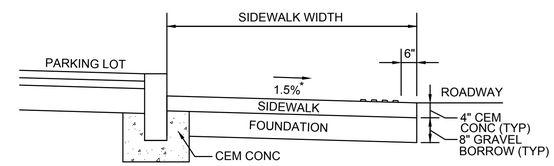


SECTION A-A (TYP)

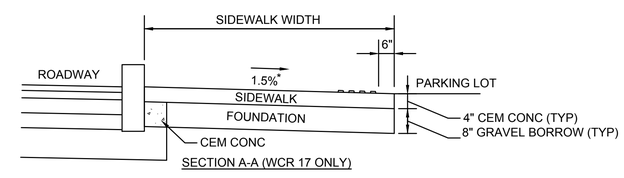


OBLIQUE VIEW

*TOLERANCE FOR CONSTRUCTION ±0.5%



SECTION A-A (WCR 8 ONLY)



SECTION A-A (WCR 17 ONLY)

WHEELCHAIR RAMP - LESS THAN 6.5 FEET - STRAIGHT

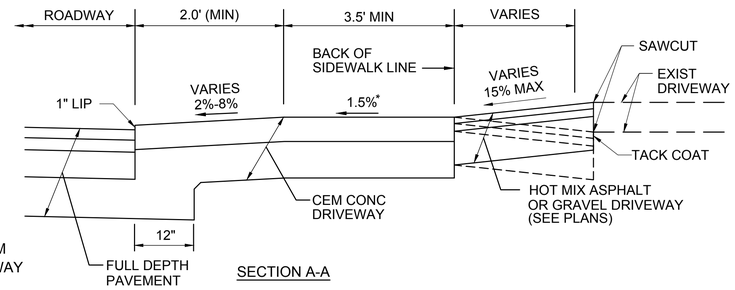
SCALE: N.T.S.

08363.40-DET-WCR.DWG Plotted on 31-Aug-2017 2:12 PM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	58	85
PROJECT FILE NO.	604935		

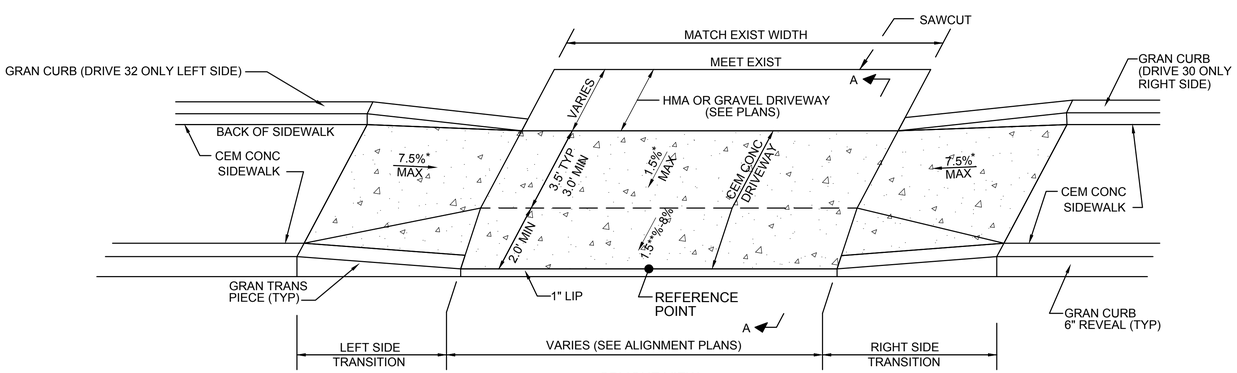
WHEELCHAIR RAMP & DRIVEWAY DETAILS



SECTION A-A

LEGEND

LIMITS OF CEM CONC DRIVEWAY



OBLIQUE VIEW

** 1.5% AT DRIVEWAYS 22, 24, 26 & 30 TO PROVIDE ADA COMPLIANT PASSING WIDTH

*TOLERANCE FOR CONSTRUCTION ±0.5%

TRANSITION CURB FOR DRIVEWAY WITH SIDEWALK

NO.	STATION	ROADWAY GUTTER	SIDEWALK WIDTH	LEFT SIDE		RIGHT SIDE	
				REVEAL	TRANS	REVEAL	TRANS
1	10+15 RT	-0.79% (RT) -0.84% (LT)	5.5'	6"	6'-6"	6"	7'-8"
2	10+83 RT	-0.85% (RT) -0.66% (LT)	5.5'	6"	6'-6"	6"	7'-8"
3	11+24 RT	-0.50% (RT) -0.23% (LT)	5.5'	6"	6'-6"	6"	7'-8"
4	11+97 RT	0.50% (RT) 0.95% (LT)	5.5'	6"	7'-8"	6"	6'-6"
5	14+89 RT	0.40% (RT) 0.40% (LT)	5.5'	6"	7'-8"	6"	6'-6"
6	15+27 RT	0.40% (RT) 0.40% (LT)	5.5'	3"	3'-11"	6"	6'-6"
7	15+54 RT	0.40% (RT) 0.40% (LT)	5.5'	6"	7'-8"	3"	3'-3"
8	16+13 RT	0.40% (RT) 0.40% (LT)	5.5'	3"	3'-11"	6"	6'-6"
9	16+45 LT	0.40% (RT) 0.40% (LT)	5.5'	6"	7'-8"	6"	6'-6"
10	16+51 RT	0.40% (RT) 0.40% (LT)	5.5'	6"	7'-8"	6"	6'-6"
11	16+88 LT	0.63% (RT) 0.40% (LT)	5.5'	6"	6'-6"	6"	7'-8"
12	17+43 LT	0.40% (RT) 0.91% (LT)	5.5'	6"	6'-6"	6"	7'-8"
13	17+70 RT	0.40% (RT) 0.40% (LT)	5.5'	4"	5'-1"	6"	6'-6"
14	18+13 RT	0.30% (RT) 0.11% (LT)	5.5'	6"	7'-8"	4"	4'-4"
15	18+29 LT	0.11% (RT) 0.28% (LT)	5.5'	6"	6'-6"	3"	3'-11"
16	19+17 RT	-0.26% (RT) -0.54% (LT)	5.5'	6"	6'-6"	6"	7'-8"
17	19+48 LT	-0.67% (RT) -0.53% (LT)	5.5'	6"	7'-8"	6"	6'-6"
18	19+87 LT	-0.70% (RT) -0.70% (LT)	5.5'	6"	7'-8"	6"	6'-6"

NOTE: ROADWAY GUTTER SLOPES ARE IN THE DIRECTION OF THE BASELINE.

TRANSITION CURB FOR DRIVEWAY WITH SIDEWALK CONT.

NO.	STATION	ROADWAY GUTTER	SIDEWALK WIDTH	LEFT SIDE		RIGHT SIDE	
				REVEAL	TRANS	REVEAL	TRANS
19	20+25 RT	-0.70% (RT) -0.76% (LT)	5.5'	3"	3'-3"	6"	7'-8"
20	20+56 RT	-0.71% (RT) -0.76% (LT)	5.5'	6"	6'-6"	3"	3'-11"
21	24+49 RT	-3.96% (RT) -3.92% (LT)	5.0'	3"	3'-3"	6"	14'-0"
22	24+11 LT	-4.02% (RT) -4.00% (LT)	5.0'	6"	14'-0"	6"	6'-6"
24	24+93 RT	-3.91% (RT) -3.72% (LT)	5.0'	6"	6'-6"	3"	7'-0"
25	25+28 LT	-3.56% (RT) -3.82% (LT)	5.0'	6"	14'-0"	6"	6'-6"
26	25+76 LT	-3.22% (RT) -3.49% (LT)	5.0'	6"	14'-0"	6"	6'-6"
27	26+32 RT	-2.89% (RT) -2.93% (LT)	5.5'	6"	6'-6"	3"	5'-6"
28	26+57 LT	-3.04% (RT) -3.04% (LT)	5.2'	6"	14'-0"	4"	4'-4"
29	26+98 RT	-2.96% (RT) -2.95% (LT)	5.5'	6"	6'-6"	6"	11'-0"
30	27+06 LT	-3.04% (RT) -3.04% (LT)	5.2'	4"	9'-4"	6"	6'-6"
31	27+77 RT	-2.89% (RT) -2.20% (LT)	5.5'	6"	6'-6"	6"	11'-0"
32	28+04 LT	-1.54% (RT) -2.64% (LT)	5.5'	6"	11'-0"	6"	6'-6"
33	29+11 RT	0.27% (RT) 0.45% (LT)	5.5'	6"	7'-8"	6"	7'-8"

NOTE: ROADWAY GUTTER SLOPES ARE IN THE DIRECTION OF THE BASELINE.

CEM CONC DRIVEWAY

SCALE: N.T.S.

08363.40-DET-WCR.DWG Plotted on 31-Aug-2017 11:56 AM

WOBURN
MONTVALE AVENUE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP/HSI-003S(087)	59	85
PROJECT FILE NO.	604935		

WHEELCHAIR RAMP & DRIVEWAY DETAILS

TRANSITION CURB FOR DRIVEWAY WITH SIDEWALK								
NO.	STATION	ROADWAY GUTTER	SIDEWALK WIDTH	LEFT SIDE		RIGHT SIDE		CURB CORNER TYPE
				REVEAL	TRANS	REVEAL	TRANS	
34	203+72 RT	2.56% (RT) 2.35% (LT)	7.5'	4"	7'-4"	6"	6'-6"	TYPE B
35	301+45 LT	-0.36% (RT) -1.11% (LT)	6.2'/7.6'	6"	9'-0"	6"	6'-6"	TYPE A
36	302+28 LT	1.20% (RT) 0.59% (LT)	5.5'/6.3'	3"	3'-4"	6"	9'-0"	TYPE A
37	302+95 LT	2.52% (RT) 1.97% (LT)	5.5'	6"	6'-6"	6"	11'-0"	TYPE A
38	303+39 LT	3.21% (RT) 2.79% (LT)	5.5'	6"	6'-6"	6"	15'-0"**	TYPE A
40	306+04 LT	0.98% (RT) 1.05% (LT)	9.5'	6"	6'-6"	6"	7'-8"	TYPE B

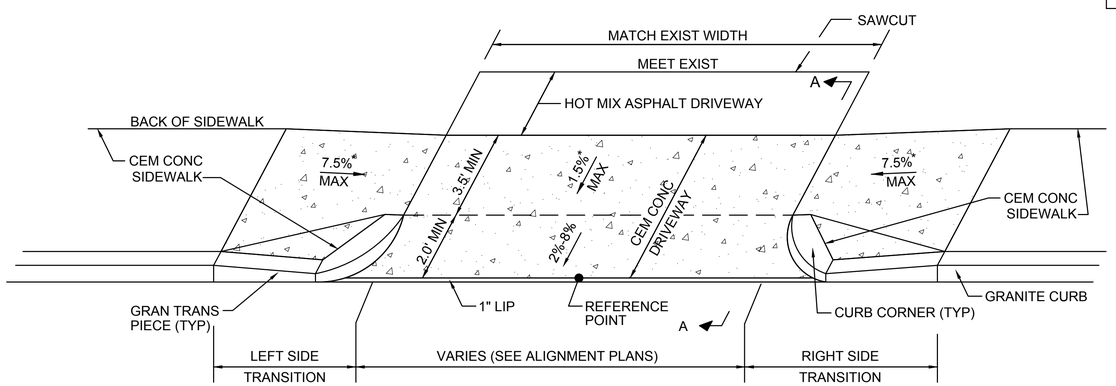
NOTES:
1. ROADWAY GUTTER SLOPES ARE IN THE DIRECTION OF THE BASELINE.
2. **CURVED TRANSITION PIECE.

LEGEND

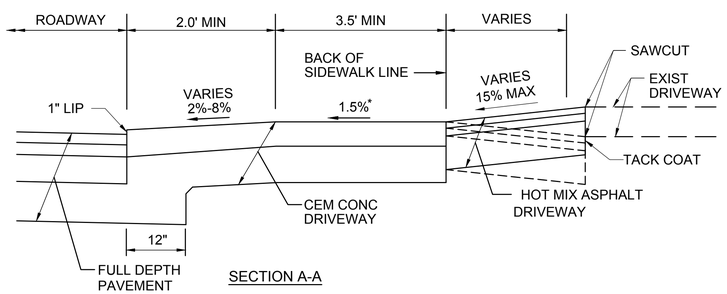
LIMITS OF CEM CONC DRIVEWAY

TRANSITION CURB FOR DRIVEWAY WITH SIDEWALK								
NO.	STATION	ROADWAY GUTTER	SIDEWALK WIDTH	LEFT SIDE		RIGHT SIDE		CURB CORNER TYPE
				REVEAL	TRANS	REVEAL	TRANS	
39	305+13 RT	1.11% (RT) 0.76% (LT)	6.0'	MATCH EXIST	5'-2"	4"	4'-5"	TYPE B

NOTE: ROADWAY GUTTER SLOPES ARE IN THE DIRECTION OF THE BASELINE.



OBLIQUE VIEW

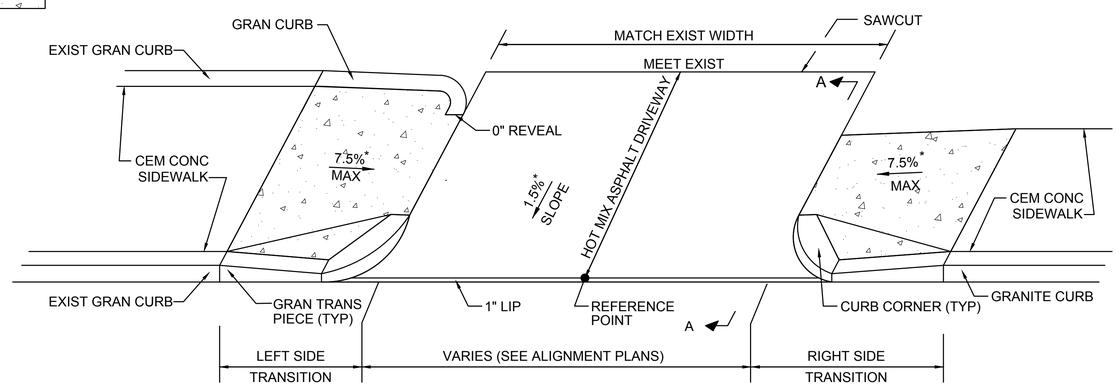


SECTION A-A

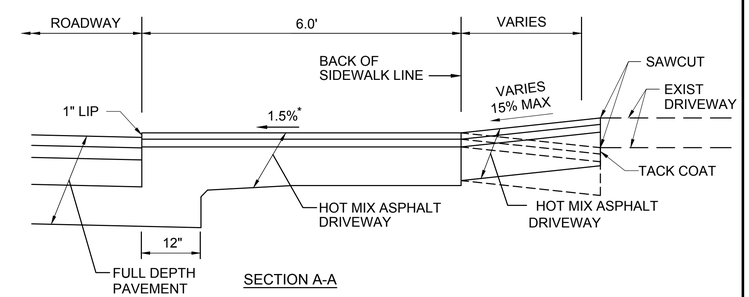
*TOLERANCE FOR CONSTRUCTION ±0.5%

CEM CONC DRIVEWAY WITH SIDEWALK WITH CURB CORNERS

SCALE: N.T.S.



OBLIQUE VIEW



SECTION A-A

*TOLERANCE FOR CONSTRUCTION ±0.5%

HMA DRIVEWAY WITH CEM CONC SIDEWALK AND CURB CORNERS

SCALE: N.T.S.

08363.40-DET-WCR.DWG Plotted on 31-Aug-2017 11:56 AM