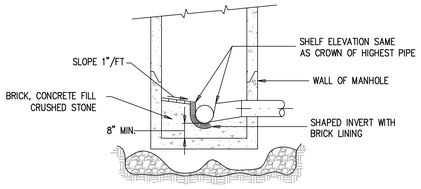
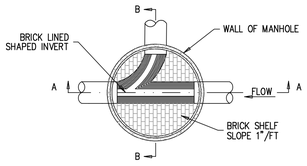
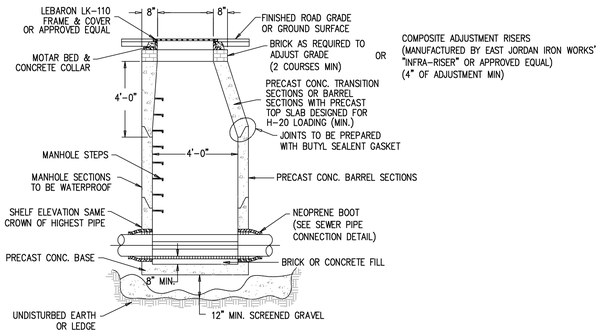


SECTION B–B



PLAN

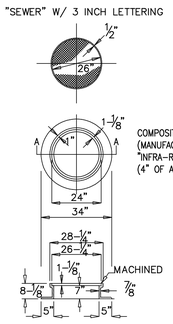


SECTION A–A

PRECAST SEWER MANHOLE

N.T.S.

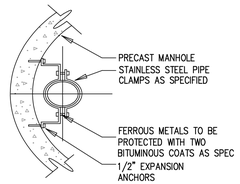
NOTE:
1. LANDING PLATFORMS SHALL BE INSTALLED IN MANHOLES THAT ARE OVER TWENTY FEET (20') DEEP TO THE INVERT.



TYPE – A FRAME
MINIMUM WEIGHT – 265 LBS.
MATERIAL – CAST IRON

FRAME & COVER

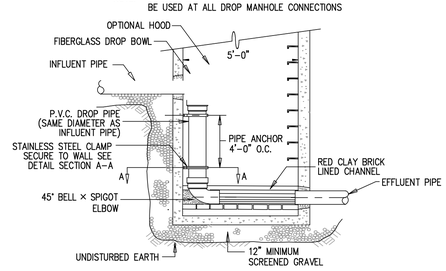
N.T.S.



SECTION A–A

FIBERGLASS INSIDE DROP BOWL
(MANUFACTURED BY RELINER/DURAN, INC. "DROP BOWLS" OR APPROVED EQUAL)

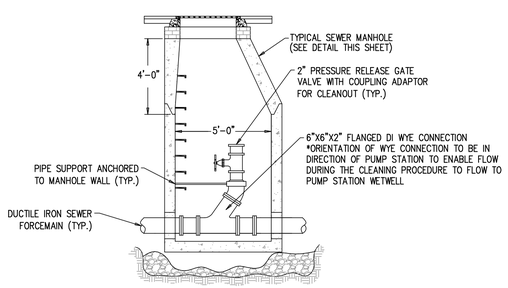
NOTE: MINIMUM 5'– 0" DIAMETER MANHOLES SHALL BE USED AT ALL DROP MANHOLE CONNECTIONS



PLAN

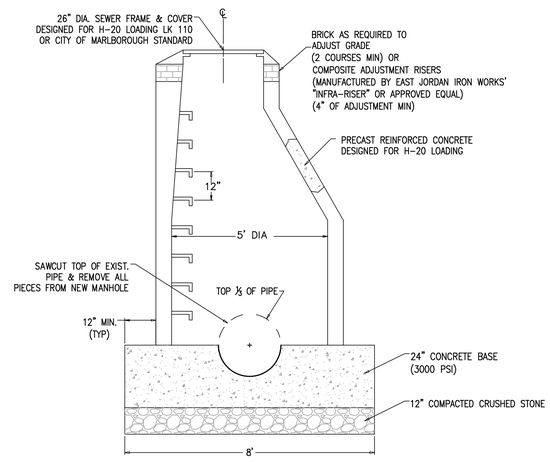
PVC INTERNAL DROP CONNECTION

N.T.S.



SEWER FORCEMAIN
CLEANOUT MANHOLE

N.T.S.



DOGHOUSE SEWER MANHOLE

N.T.S.

SEWER NOTES

THE FOLLOWING DESCRIBES MATERIALS AND METHODS OF INSTALLATION OF SEWER MAINS IN GENERAL. ALL WORK SHALL CONFORM TO THE 1988 STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, ALL SUBSEQUENT SUPPLEMENTAL SPECIFICATIONS IN THE PARTICULAR CONTRACT.

MAIN INSTALLATION

ALL GRAVITY MAINS WILL BE A MINIMUM OF EIGHT INCHES IN DIAMETER; ALL LATERALS, INTERCEPTORS, TRUNKLINES, ETC., WILL BE EITHER POLYVINYL CHLORIDE (PVC) OR CEMENT LINED DUCTILE IRON. THE CLASS OF PIPE WILL ACCOMMODATE THE FIELD CONDITIONS, I.E., PVC PIPE SHALL MEET OR EXCEED THE ASTM D–3034, SDR 35 REQUIREMENTS. PVC PIPE SHALL NOT BE USED FOR PIPES WITH DIAMETERS GREATER THAN 15 INCHES UNLESS EXPRESSLY APPROVED IN WRITING BY THE COMMISSIONER OF PUBLIC WORKS. PVC PIPE SHALL NOT BE USED FOR PIPES WHEN THE DEPTH EXCEEDS 10 FEET. FOR DEPTHS OF SEWERS EXCEEDING 10 FEET CLASS 52 CEMENT LINED DUCTILE IRON SHALL BE USED. WHEN THE COVER IS FIVE FEET OR LESS UNDER A ROADWAY, THE CLASS AND TYPE OF PIPE WILL BE SPECIFIED BY THE DEPARTMENT OF PUBLIC WORKS. THE SLOPE OF THE SEWER SHALL NOT BE LESS THAN 1% OR EXCEED 9%. ALL SIZES OF ALL PIPE WILL BE INSTALLED WITH A MINIMUM SLOPE WHICH YIELDS THE SCOURING VELOCITY FOR THE PARTICULAR DIAMETER PIPE. WARNING RIBBON SHALL BE USED IN THE INSTALLATION OF ANY SEWER MAIN. SAID RIBBON SHALL BE GREEN IN COLOR AND IMPRINTED WITH THE WORDS "CAUTION SEWER LINE BELOW", OR WORDS SIMILAR INTENT, AND SHALL BE METALLIC TO PROVIDE FOR FUTURE LOCATING WITH INDUCTIVE TAPE LOCATORS. DEPTH OF BURIAL SHALL BE 2' ABOVE THE TOP OF SAID PIPE.

MANHOLES

DISTANCE BETWEEN ANY TWO MANHOLES SHALL NOT EXCEED 300 FEET. ANY TWO SEWER LINES ENTERING A MANHOLE OR A STRUCTURE WITH A DIFFERENCE IN ELEVATION OF 18 INCHES AN INSIDE DROP SHALL BE PROVIDED. THE INSIDE DROP IN A MANHOLE SHALL NOT EXCEED 5 FEET IN CHANGE OF ELEVATION. ANY MANHOLE THAT IS REQUIRED TO HAVE AN INSIDE DROP SHALL BE A 5 FOOT INSIDE DIAMETER MANHOLE. MANHOLES SHALL BE PRECAST CONCRETE AND PRECAST SECTIONS WILL BE MADE WATERTIGHT BY O–RING JOINTS OR APPROVED EQUAL. CONNECTIONS TO MANHOLES SHALL BE CORED AND MADE WITH A FLEXIBLE MANHOLE BOOT. THE EXTERIOR OF ALL MANHOLES SHALL BE COMPLETELY COVERED WITH A BITUMINOUS WATERPROOFING. ALL SEWER MANHOLES WILL HAVE A BRICK TABLE CONSTRUCTED IN THEIR BASE TO MEET ALL INCOMING AND OUTGOING PIPES SO THAT THE FLOW IS CHANNELED SMOOTHLY FROM ONE POINT TO ANOTHER. ALL BRICKS USED FOR MANHOLE INVERTS WILL BE A HARD–BURNED SEWER BRICK TO MEET ASTM C32–69 GRADE SS. BRICKWORK OR COMPOSITE ADJUSTMENT RISERS WILL BE USED BETWEEN THE MANHOLE STRUCTURE AND RING AND RING COVER TO GIVE THE DESIRED GRADE. HOWEVER, THE BRICKWORK IN THIS AREA WILL NEVER EXCEED EIGHT INCHES AND THE COMPOSITE ADJUSTMENT RISERS SHALL CONISIT OF NO LESS THAN 4 INCHES. THIS BRICKWORK CAN BE WITH A COMMON BRICK. LANDING PLATFORMS SHALL BE INSTALLED IN MANHOLES THAT ARE OVER TWENTY FEET (20') DEEP TO THE INVERT.

THRUST BLOCKS

THRUST LOCKS WILL BE USED ON ANY FORCE MAIN SECTIONS WHERE CALLED FOR BY THE DEPARTMENT OF PUBLIC WORKS. THE THRUST BLOCK SHALL CONSIST OF A FORMED CONCRETE BACKING AGAINST UNDISTURBED MATERIAL, POURED IN PLACE WITH 3,000 PSI, 1–1/2", 470 CEMENT CONCRETE MASONRY. THE CONTRACTOR IS TO INSTALL A 6MIL POLYETHYLENE BARRIER BETWEEN THE THRUST BLOCK AND DUCTILE IRON AT ALL MECHANICAL JOINTS PRIOR TO POURING CONCRETE.

INSPECTIONS

INSPECTION WILL BE PROVIDED BY THE CITY OF MARLBOROUGH ONLY ON A LIMITED OR PART–TIME BASIS. BEFORE ANY BACKFILLING IS DONE, THE DEPARTMENT OF PUBLIC WORKS' WATER & SEWER DIVISION WILL BE NOTIFIED 24 HOURS IN ADVANCE, A CITY REPRESENTATIVE WILL INSPECT THE COMPLETED WORK. IF THE DEPARTMENT OF PUBLIC WORKS FEELS THAT INSUFFICIENT WORKMANSHIP AND CARE IS BEING TAKEN IN THE INSTALLATION, A PERSON WILL BE ASSIGNED FROM THE DEPARTMENT OF PUBLIC WORKS ON A FULL–TIME BASIS. THE CONTRACTOR OR OWNER WILL BEAR THE COST OF THIS INSPECTOR.

CONNECTIONS

MAIN–TO–MAIN CONNECTIONS WILL ONLY BE MADE BY USE IF A MANHOLE AS SPECIFIED IN THE MARLBOROUGH CITY CODE § 510–19B(2). IN THE CASE OF A TAP OF A SERVICE–TO–MAIN THE USE OF A TAPPING SADDLE AS APPROVED BY THE DEPARTMENT OF PUBLIC WORKS. CHIMNEYS WILL BE EMPLOYED ON THE MAIN WHEREVER A SERVICE IS NEEDED WHEN THE DEPTH OF THE MAIN EXCEEDS EIGHT FEET. THIS SHALL BE EXCEPTED WHEN THE ELEVATION OF THE CONNECTION AT THE BUILDING DOES NOT ALLOW THE USE OF A CHIMNEY. ALL CHIMNEYS WILL BE PRECAST STRUCTURES. ALL WYE–BRANCHES WILL BE PROVIDED WITH THE PROPER END CAPS UNTIL SUCH TIME THE COMPLETED TIE–IN IS MADE. THE CONNECTIONS OF BUILDING SEWERS INTO PUBLIC SEWER SHALL BE MADE AT THE THE WYE OR AT BENCH LEVEL IN A MANHOLE. IF A WYE–BRANCH OR MANHOLE IS UNAVAILABLE, A CONNECTION MAY BE MADE BY TAPPING THE EXISTING SEWER BY AN APPROVED METHOD. THIS MAY CONSIST OF CUTTING OUT A PORTION OF THE SEWER MAIN AND INSTALLING A "WYE" AT THE MAIN AND RECONNECTING THE EXISTING MAIN WITH NEW PIPE AND PROPER COUPLINGS AS APPROVED BY INSPECTOR. NO PERSON SHALL MAKE CONNECTION OF ROOF DRAINS, DOWNSPOUTS, FOUNDATION DRAINS, AREAWAY DRAINS, BASEMENT DRAINS, SUMP PUMPS OR OTHER SOURCES OF SURFACE RUNOFF OR GROUNDWATER TO A BUILDING SEWER OR BUILDING DRAIN WHICH IS DIRECTLY OR INDIRECTLY TO A PUBLIC SEWER. ALL SEWERS SHALL BE TESTED BEFORE ANY CONNECTIONS ARE MADE TO BUILDINGS.

BUILDING SEWERS

THE SIZE AND SLOPE OF THE BUILDING SEWER SHALL BE SUBJECT TO THE APPROVAL OF THE COMMISSIONER BUT IN NO EVENT SHALL THE DIAMETER LESS THAN SIX INCHES. THE SLOPE OF SUCH PIPE SHALL NOT BE LESS THAN 1% OR GREATER THAN 9%. THE BUILDING SEWER SHALL BE LAID AT THE UNIFORM GRADE AND IN A STRAIGHT LINE ALIGNMENT INSOFAR AS POSSIBLE. CHANGES IN DIRECTION SHALL BE MADE ONLY WITH BENDS, SWEEPS, MANHOLES OR PRECAST CLEANOUTS AS APPROVED BY THE COMMISSIONER. CLEANOUTS SHALL BE LOCATED ON THE EXTERIOR SIDE OF THE BUILDING SERVICE AND SHALL BE IN A PLACE THAT IS ACCESSIBLE FOR MAINTENANCE BY THE DEPARTMENT OF PUBLIC WORKS OR OTHERS. WARNING RIBBON SHALL BE USED IN THE INSTALLATION OF ANY SERVICE PIPE. SAID RIBBON SHALL BE GREEN IN COLOR AND IMPRINTED WITH THE WORDS "CAUTION SEWER LINE BELOW", OR WORDS SIMILAR INTENT, AND SHALL BE METALLIC TO PROVIDE FOR FUTURE LOCATING WITH INDUCTIVE TAPE LOCATORS. DEPTH OF BURIAL SHALL BE 2' ABOVE THE TOP OF SAID PIPE. THE SEWERS SHALL BE TESTED BEFORE ANY CONNECTIONS ARE MADE TO BUILDINGS. WHERE APPLICABLE ENTRANCE FEES IN ACCORDANCE WITH THE MARLBOROUGH CITY CODE SECTION 510–4 "BUILDING SEWER CONNECTIONS" SHALL BE PAID PRIOR TO ANY WORK.

SEQUENCE OF TESTING

THE SEQUENCE OF TESTING SHALL BE AS FOLLOWS: CONSTRUCTION COMPLETED AND ALL BACKFILL AND SUPERIMPOSED LOADS IN PLACE, LANDSCAPING OVER AND AROUND SEWER APPURTENANCE IS COMPLETED, MANHOLES COMPLETED, LINES THOROUGHLY CLEANED, VISUAL INSPECTION ("FLASHING"), MANDREL TESTING (ALL APPROVED PIPE TYPES), DETERMINATION OF GROUND WATER TABLE, AIR TESTING OR INFILTRATION TESTING (PIPE, MANHOLE).

TESTING

THE CONTRACTOR SHALL FURNISH A PRESSURE GAUGE, TESTING PLUGS, PUMPS, MANDREL, PIPE CONNECTIONS AND OTHER REQUIRED APPARATUS APPROVED BY THE CITY. THE SEWER LINE AND MANHOLE TESTING SHALL BE ACCOMPLISHED THROUGH THE COMBINATION OF VISUAL INSPECTIONS, DEFLECTION TESTS, LOW–PRESSURE AIR TESTS AND LEAKAGE TESTS METHODS. ACCEPTANCE TESTS SHALL ONLY BE PERFORMED AFTER ALL WORK ADJACENT TO AND OVER THE PIPE HAS BEEN COMPLETED. ALL TESTING SHALL BE PERFORMED IN THE PRESENCE OF THE CITY REPRESENTATIVE AND ANY TESTS PERFORMED IN THE ABSENCE OF THE CITY REPRESENTATIVE SHALL BE CONSIDERED INVALID AND SHALL BE REPEATED AT THE CONTRACTOR'S EXPENSE.

DEFLECTION TEST: A DEFLECTION TEST SHALL BE REQUIRED FOR ALL PLASTIC SEWER PIPING INSTALLED (DUCTILE IRON PIPING WILL BE TESTED AT THE DIRECTION OF THE INSPECTOR). A GO–NO–GO MANDREL SHALL BE PULLED THROUGH THE PIPE A MINIMUM OF 60 DAYS AFTER THE FINAL PLACEMENT OF BACKFILL AND SUPERIMPOSED LOADS. THE DEFLECTION OF THE SEWER PIPE SHALL NOT EXCEED 5% WHEN TESTED WITH A MANDREL SPECIFICALLY DESIGNED FOR THE TYPE AND SIZE OF PIPE INSTALLED. PIPE SEGMENTS FAILING THE MANDREL TEST SHALL BE REMOVED AND REPLACED.

LOW–PRESSURE AIR TEST: ON ALL SANITARY SEWER LINES (PLASTIC AND DUCTILE IRON), INCLUDING PRIVATE SEWER LINES, THE CONTRACTOR SHALL CONDUCT A LINE ACCEPTANCE TEST USING LOW–PRESSURE AIR TESTING. DUCTILE IRON PIPELINES SHALL BE TESTED IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF ASTM C924. PVC PIPELINES SHAL BE TESTED IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF ASTM F1417–98 AND UBPPA UNI–B–6. THE CONTRACTOR SHALL FURNISH ALL LABOR, EQUIPMENT AND ANY APPURTENANT ITEMS TO SATISFACTORILY PERFORM THE VACUUM TEST. ALL TESTING EQUIPMENT SHALL BE APPROVED FOR VACUUM TESTING MANHOLES.

AIR TEST PROCEDURE (DRY CONDITIONS): THE FOLLOWING PROCEDURE SHALL BE USED DURING THE LOW–PRESSURE AIR TESTING OF SEWER MAINS LOCATED ABOVE THE GROUND WATER TABLE; ISOLATE A SECTION OF SEWER BY INFLATING STOPPERS OR OTHER SUITABLE TEST PLUGS/PLUG OR CAP THE ENDS OF ALL BRANCHES, LATERALS, TEES, WYES AND STUBS TO BE INCLUDED IN THE TEST. SECURELY BRACE ALL PLUGS OR CAPS TO PREVENT BLOW–OUT. ONE OF THE PLUGS OR CAPS SHOULD HAVE AN INLET TAP OR OTHER PROVISION FOR CONNECTING A HOSE TO A POTABLE AIR SOURCE. IF NOT PROPERLY SEALED, AIR CAN LEAK THROUGH THE POROUS MATERIAL IN THE PIPE'S ANNULUS. CONNECT THE AIRHOSE TO THE INLET TAP. ADD AIR SLOWLY THAT A PRESSURE OF 5.0 PSIG IS MAINTAINED FOR AT LEAST FIVE MINUTES. THE PRESSURE WILL NORMALLY DROP SLIGHTLY UNTIL EQUILIBRIUM IS OBTAINED; HOWEVER A MINIMUM OF 5.0 PSIG IS REQUIRED. DISCONNECT THE AIR SUPPLY AND DECREASE THE PRESSURE TO 5.0 PSIG BEFORE STARTING THE TEST.

CITY OF MARLBOROUGH
DEPARTMENT OF PUBLIC WORKS
Engineering Division
135 Neil Street
Marlborough, MA 01752
p. (508) 624-6910
f. (508) 624-7699
www.marlborough-ma.gov

REVISIONS

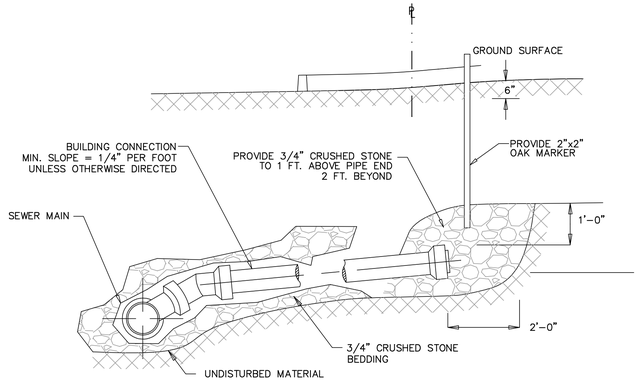
No.	Date	Description
1.		

Drawn By: ENG | Designed By: ENG | Checked By: ENG | Approved By: ENG

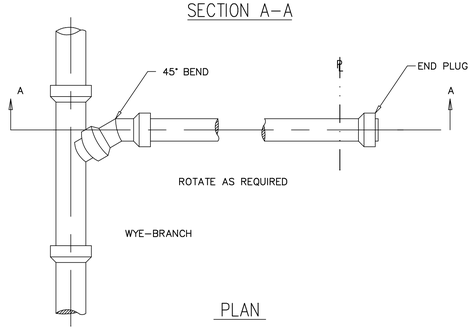
Project Title:

Sheet Title: SEWER DETAILS

Contract No: N/A
Date: 4/29/15
Scale: N.T.S.
Sheet No.: 1



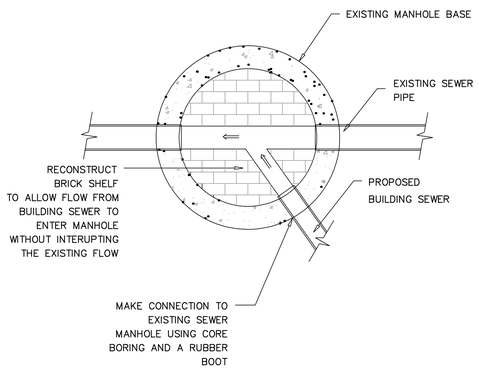
SECTION A-A



PLAN

SEWER SERVICE CONNECTION

N.T.S.



SEWER CONNECTION DETAIL

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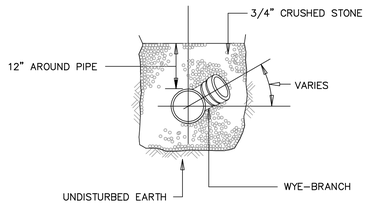

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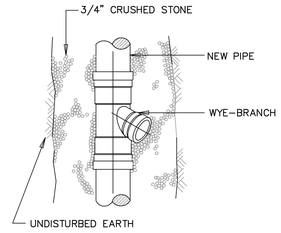

PLAN

WYE-BRANCH

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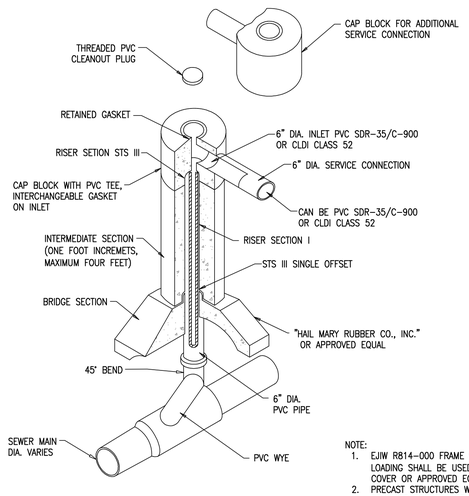


PRECAST SEWER CLEANOUT

N.T.S.

NOTE:
1. EJIW R814-000 FRAME AND COVER HS-20 LOADING SHALL BE USED WITH "SEWER" ON COVER OR APPROVED EQUAL.
2. PRECAST STRUCTURES WILL ONLY BE REQUIRED FOR CHANGE IN ELEVATION OR CHANGE IN DIRECTION NOT FOR RUNS IN EXCESS OF 100'.

SEWER NOTES

TESTING (CONTINUED)

AIR TEST PROCEDURE (WET CONDITIONS): ALL TEST PRESSURES ARE MEASURED AS GAGE PRESSURE, WHICH IS ANY PRESSURE GREATER THAN ATMOSPHERIC. SINCE WATER PRODUCES A PRESSURE OF 5 PSIG FOR EVERY FOOT OF DEPTH OVER THE MAIN, AIR TEST PRESSURE MUST BE INCREASED TO OFFSET THE DEPTH OF GROUND WATER OVER THE SEWER LINE. IN AREAS WHERE THE GROUNDWATER IS KNOWN TO EXIST, THE CONTRACTOR SHALL INSTALL A ONE-HALF INCH DIAMETER CAPPED PVC PIPE NIPPLE, APPROXIMATELY 10" LONG, THROUGH THE MANHOLE WALL ON TOP OF ONE OF THE SEWER LINES ENTERING THE MANHOLE. THIS SHALL BE DONE AT THE TIME THE SEWER LINE IS INSTALLED. IMMEDIATELY PRIOR TO PERFORMING THE LINE ACCEPTANCE TEST, THE GROUND WATER ELEVATION SHALL BE DETERMINED BY REMOVING THE PIPE CAP, BLOWING AIR THROUGH THE PIPE NIPPLE INTO THE GROUND SO AS TO CLEAR IT, AND THEN CONNECTING A CLEAR PLASTIC TUBE TO THE NIPPLE. THE HOSE SHALL BE HELD VERTICALLY AND A MEASUREMENT OF THE HEIGHT IN FEET OF WATER OVER THE INVERT OF THE PIPE SHALL BE TAKEN AFTER THE WATER HAS STOPPED RISING IN THE PLASTIC TUBE. MULTIPLY THE HEIGHT IN FEET ABOVE THE PIPE INVERT TO THE GROUND WATER TABLE BY 0.43 PSIG/FT AND ADD IT TO THE REQUIRED 3.5 PSIG MINIMUM TEST PRESSURE. FOR EXAMPLE, IF THE HEIGHT OF WATER IS 11.5 FT, THEN THE ADDED PRESSURE WILL BE 0.43 PSIG/FT X 11.5 FT OR 4.9 PSIG. THIS INCREASES THE TEST PRESSURE FROM 3.5 PSIG TO 8.4 PSIG AND THE 2.5 PSIG TO 7.4 PSIG, RESPECTIVELY. THE ALLOWABLE DROP OF 1 PSIG FOR THE TIME ALLOWED AS OUTLINED IN TABLE 1 STILL REMAINS. IF HOWEVER, THE GROUND WATER LEVEL IS 2 FT OR MORE ABOVE THE TOP OF THE PIPE AT THE UPSTREAM ENDS, OR IF THE AIR PRESSURE REQUIRED FOR THE TEST CALCULATES OUT TO BE GREATER THAN THE 9 PSIG GAGE, THE AIR TEST METHODS SHOULD NOT BE USED. IN THIS CASE, A VISUAL INSPECTION FOR LEAKAGE WOULD PRODUCE A MORE CONSERVATIVE TEST. BEFORE THE AIR TEST METHOD IS USED, THE GROUND WATER LEVEL SHOULD BE LOWERED BY PUMPING OR DEWATERING.

VACUUM TESTING OF MANHOLES: ALL SANITARY SEWER MANHOLES CONSTRUCTED BY THE CONTRACTOR SHALL BE VACUUM TESTED FOR LEAKAGE IN THE PRESENCE THE CITY REPRESENTATIVE. VACUUM TESTING SHALL BE PERFORMED IN ACCORDANCE WITH ASTM C1244. THE VACUUM TEST REQUIREMENTS WILL NOT APPLY TO ANY EXISTING MANHOLE, OR ANY EXISTING MANHOLE THAT HAS BEEN CONVERTED TO A DROP MANHOLE BY THE CONTRACTOR.
VACUUM TESTING PROCEDURE: ALL LIFTING HOLES SHALL BE PLUGGED WITH AN APPROVED NON-SHRINKING GROUT INSIDE AND OUT. MANHOLE JOINTS SHALL BE GROUTED FROM THE OUTSIDE ONLY. ALL PIPES ENTERING THE MANHOLE SHALL BE PLUGGED. THE CONTRACTOR SHALL SECURELY BRACE THE PLUGS IN ORDER TO KEEP THEM FROM BEING DRAWN INTO THE MANHOLE. THE TEST HEAD SHALL BE PLACED AT THE INSIDE OF THE TOP OF THE CONE SECTION OF THE MANHOLE AND THE SEAL INFLATED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. A VACUUM OF 10 INCHES OF MERCURY SHALL BE DRAWN AND THE VACUUM PUMP SHUT OFF. WITH THE VALVES CLOSED, THE TIME FOR THE VACUUM TO DROP TO 9 INCHES SHALL NOT BE LESS THAN THAT SHOWN IN (TABLE 1) BELOW:

TEST FAILURE

SHOULD A LINE OR MANHOLE FAIL TO PASS ANY OF THE ACCEPTANCE TEST AS OUTLINED, THE CONTRACTOR SHALL AT HIS EXPENSE, DETERMINE THE SOURCE OF THE FAILURE, MAKE ANY REPAIRS AND RE-TEST THE SEGMENT OF PIPING OR MANHOLE IN QUESTION AT NO COST TO THE CITY.

MANDREL EQUIPMENT

EQUIPMENT SYSTEMS USE TO PERFORM MANDREL TESTS SHALL BE SPECIFICALLY DESIGNED FOR THE PIPE MATERIAL BEING TESTED. MANDRELS THAT DO NOT SPECIFICALLY STATE THE SIZE AND TYPE OF PIPING FOR WHICH IT IS APPLICABLE SHALL NOT BE ALLOWED.

AIR/VACUUM TEST EQUIPMENT

EQUIPMENT SYSTEMS USED TO PERFORM LOW-PRESSURE AIR TESTS SHALL BE SPECIFICALLY DESIGNED FOR THIS PURPOSE. SYSTEMS SHALL BE APPROVED BY THE CITY PRIOR TO THE TEST TAKING PLACE. ISOLATION OF PIPE SEGMENTS SHALL BE ACCOMPLISHED THROUGH THE USE OF PLUGS (MECHANICAL OR PNEUMATIC TYPE). PRESSURIZATION OF THE SEWER MAIN SHALL BE ACCOMPLISHED THROUGH THE USE OF AN AIR COMPRESSOR THAT HAS AN OIL FREE AIR SOURCE, SINGULAR CONTROL PANEL, MAIN SHUT-OFF VALVE, PRESSURE-REGULATING VALVE, 9 PSIG PRESSURE RELIEF VALVE, INPUT PRESSURE GAUGE AND A CONTINUOUS MONITORING PRESSURE GAUGE. THE CONTINUOUS MONITORING PRESSURE GAUGE SHALL HAVE A PRESSURE RANGE FROM 0 PSIG TO AT LEAST 10 PSIG WITH MINIMUM DIVISIONS OF .10 PSIG. THE GAUGE FACE SHALL HAVE A MINIMUM OF 4 INCHES IN DIAMETER AND HAVE AN ACCURACY OF ±.04 PSIG.

SUBMITTALS

SHOP DRAWINGS SHALL BE SUBMITTED BY THE CONTRACTOR TO THE ENGINEER FOR ALL PRODUCTS SPECIFIED WITHIN THE BID/CONTRACT DOCUMENTS AND INDICATED OR IMPLIED ON THE DRAWINGS. THE SHOP DRAWINGS SHALL BE SUBMITTED AT LEAST (10) DAYS PRIOR TO SCHEDULED USE OF THE PRODUCT FOR REVIEW BY THE ENGINEER. EACH SHOP DRAWING SHALL INCLUDE THE SPECIFICATIONS OF THE PRODUCT, MATERIAL CONTENT, PHYSICAL AND CHEMICAL PERAMETERS, TESTING RESULTS, DIMENSIONS, QUALIFICATIONS, COLOR CHOICES, SAMPLES (IF SPECIFICALLY REQUIRED), AND DRAWINGS (IF SPECIFICALLY REQUIRED). EXACTLY FOUR (4) COPIES OF SHOP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER OR DESIGNATED REPRESENTATIVE. THE SUBMITTED SHOP DRAWINGS SHALL BE STAMPED AND SIGNED BY THE CONTRACTOR WITH A STATEMENT INDICATING THAT THE CONTRACTOR HAS REVIEWED THE SHOP DRAWINGS AND ACCEPTED THE PRODUCT. UPON RECEIPT OF THE SHOP DRAWINGS, THE ENGINEER WILL REVIEW THE PRODUCT INFORMATION TO DETERMINE ACCEPTABILITY BASED ON THE CONTRACT DOCUMENTS. THE ENGINEER SHALL RETURN AT LEAST TWO (2) COPIES OF THE REVIEWED SHOP DRAWINGS TO THE CONTRACTOR WITH A MEMO DETAILING THE ENGINEER'S REVIEW. IN THE CASE THAT THE SHOP DRAWING IS REJECTED, THE ENGINEER WILL RETURN THREE (3) COPIES TO THE CONTRACTOR WITH A REASONABLE EXPLANATION AS TO WHY THE PRODUCT WAS REJECTED.

DEPTH (FEET)	MANHOLE DIAMETER (INCHES)		
	48	60	72
	SECONDS		
0-8	20	26	33
10	25	33	41
12	30	39	49
14	35	46	57
16	40	52	67
18	45	59	73
20	50	65	81
22	55	72	89
24	59	78	97
26	64	85	105
28	69	91	113
30	74	98	121

TABLE 1
(TIMES SHOWN ARE MINIMUM ELAPSED TIMES, IN SECONDS, FOR A DROP IN VACUUM OF 1 INCH OF MERCURY.)

CITY OF MARLBOROUGH
DEPARTMENT OF PUBLIC WORKS
Engineering Division
135 Neil Street
Marlborough, MA 01752
p. (508) 624-6910
f. (508) 624-7699
www.marlborough-ma.gov

REVISIONS

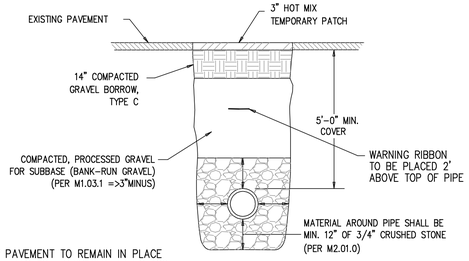
No.	Date	Description
1.		

Drawn By:	Designed By:	Checked By:	Approved By:
ENG	ENG	ENG	ENG

Project Title:

Sheet Title:
SEWER DETAILS

Contract No:	Sheet No.:
N/A	2
Date: 4/29/15	
Scale: N.T.S.	



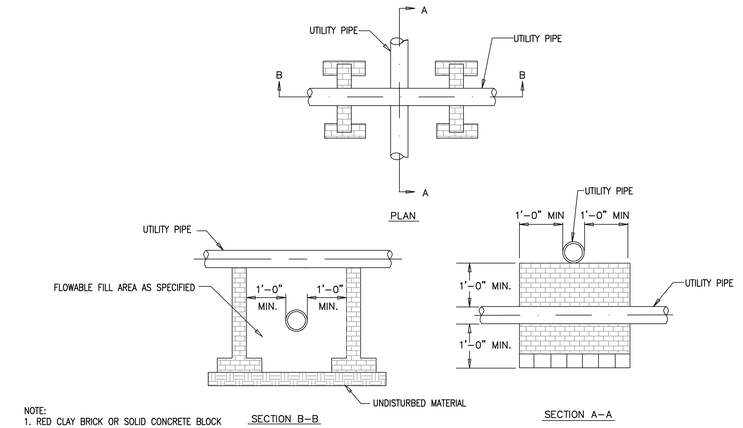
NOTE:
1. TEMPORARY PAVEMENT TO REMAIN IN PLACE FOR A MINIMUM OF 65 DAYS MAXIMUM OF 90 DAYS, TO BE COMPLETELY REMOVED DURING FINAL PAVING.

2. COMPACTION EQUIPMENT AND LIFT THICKNESS SHALL MEET OR EXCEED THE MINIMUM REQUIREMENTS TO OBTAIN THE COMPACTION STANDARDS DESCRIBED IN THE CONSTRUCTION NOTES, UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER. IN PROXIMITY TO STRUCTURES, A JUMPING JACK COMPACTOR SHALL BE REQUIRED.

NOTE:
1.

TYPICAL SEWER TRENCH

N.T.S.

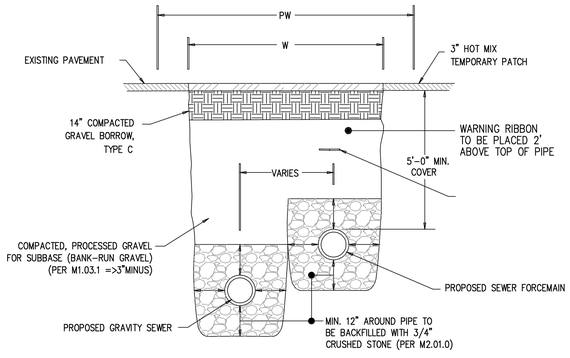


NOTE:
1. RED CLAY BRICK OR SOLID CONCRETE BLOCK SHALL BE USED FOR CONSTRUCTION OF "BRIDGE".

UTILITY CROSSING BRIDGE

N.T.S.

W = MAXIMUM TRENCH WIDTH =
PW = MAXIMUM PAVING LIMITS =



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GRAVITY SEWER AND SEWER FORCEMAIN ROADWAY AND CROSS COUNTRY COMMON TRENCH

N.T.S.

CITY OF MARLBOROUGH
DEPARTMENT OF PUBLIC WORKS
Engineering Division
135 Neil Street
Marlborough, MA 01752
p. (508) 624-6910
f. (508) 624-7699
www.marlborough-ma.gov

REVISIONS

No.	Date	Description
1.		

Drawn By:	Designed By:	Checked By:	Approved By:
ENG	ENG	ENG	ENG

Project Title:

Sheet Title:
SEWER DETAILS

Contract No: N/A	Sheet No.: 3
Date: 4/29/15	
Scale: N.T.S.	