STANDARD DRAWINGS

AND

SPECIFICATIONS

VILLAGE OF MORROW, OHIO

ALL PIPE AND CONDUIT MATERIAL SHALL BE AS SPECIFIED AND APPROVED BY THE VILLAGE ENGINEER.

THE VILLAGE OF MORROW STANDARD DRAWINGS AND SPECIFICATIONS ALONG WITH THE STATE OF OHIO CONSTRUCTION AND MATERIAL SPECIFICATIONS (LATEST EDITION) SHALL GOVERN THE COMPLETION OF THE WORK. INCONSISTENCIES SHALL BE DETERMINED BY THE VILLAGE ENGINEER OR DESIGNATED PROJECT MANAGER. ODOT CONSTRUCTION DETAILS SHALL GOVERN ITEMS NOT INCLUDED IN THE VILLAGE STANDARD DRAWINGS AND SPECIFICATIONS.

APPROVED BY: _____ _____

MAYOR DATE

APPROVED: ORDINANCE

PREPARED BY

JONES WARNER CONSULTANTS, INC.

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FRANKLIN, OHIO 45005
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JANUARY 2011

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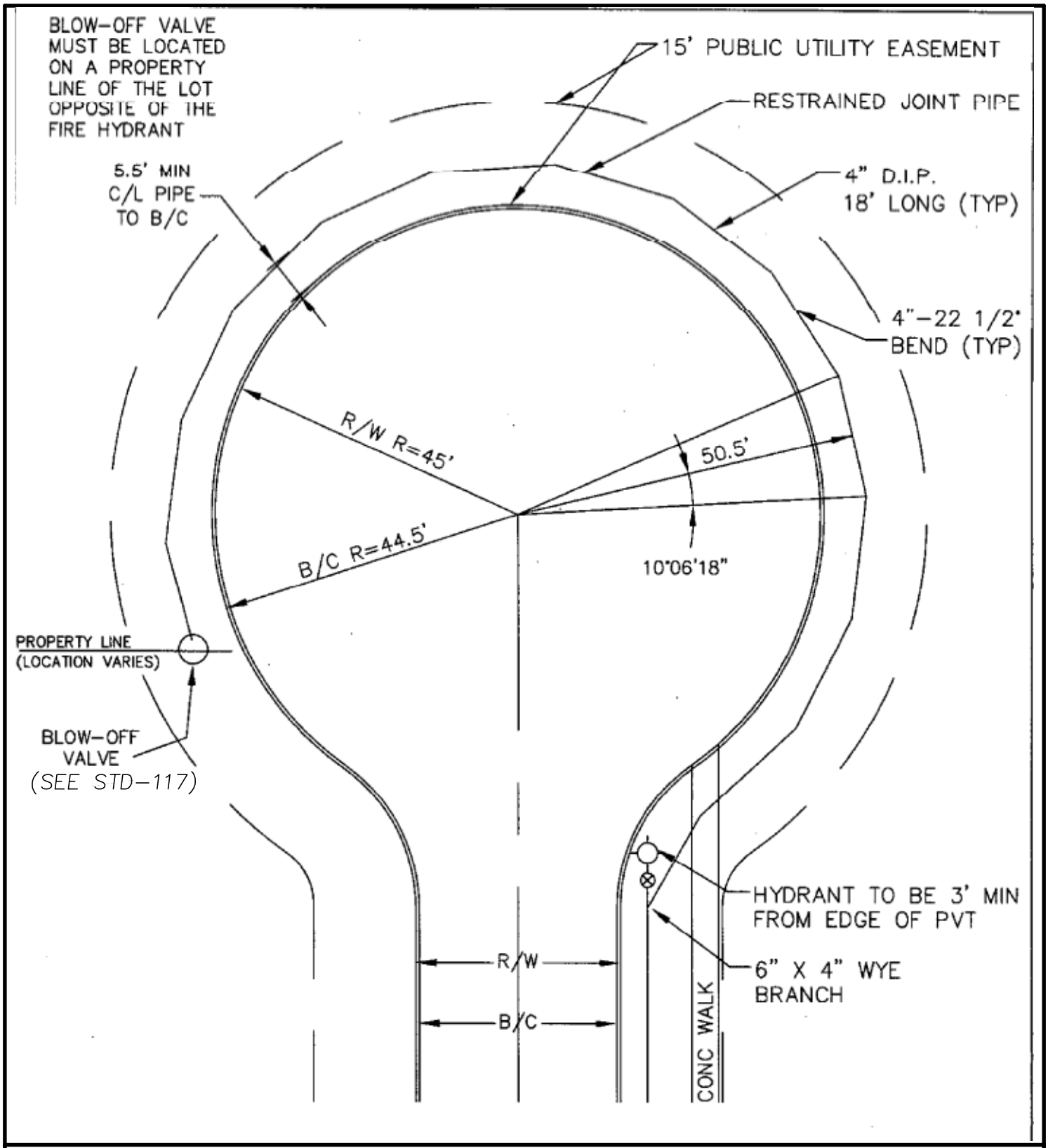


WATERMAIN LAYOUT AT CUL-DE-SAC

VILLAGE OF MORROW, OHIO STANDARD CONSTRUCTION DRAWING	SCALE: AS SHOWN DATE: 1-17-11	STANDARD NUMBER: **STD-100**

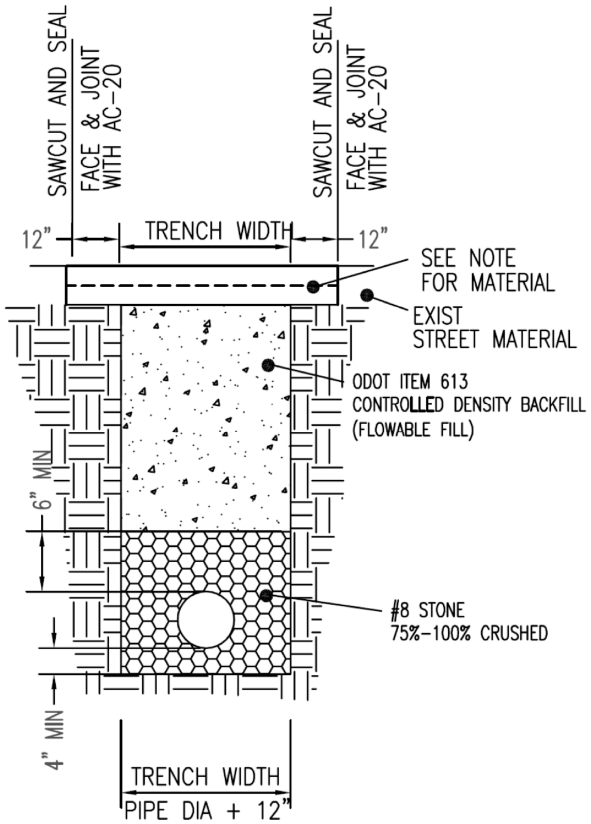
GENERAL NOTES

1. STEEL PLATES SHALL BE PLACED OVER TRENCH WITH CONTROLLED DENSITY FILL FOR A PERIOD OF 24 HOURS PRIOR TO PLACING CONCRETE OR ASPHALT

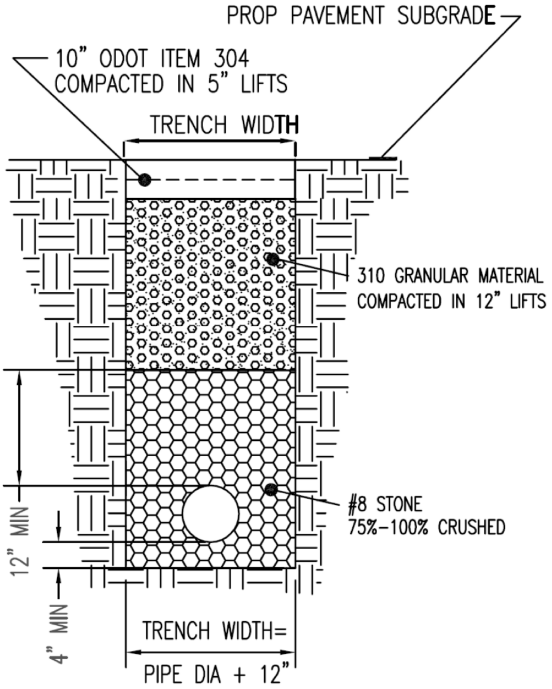
2. CONCRETE STREETS SHALL BE REPLACED WITH A MINIMUM OF 8" CONCRETE or REPLACED WITH THE (EXISTING THICKNESS + 2") CONCRETE, WHICHEVER IS GREATER

3. ASPHALT STREETS SHALL BE REPLACED WITH 1 3/4" ODOT ITEM 402 LEVELING COURSE AND 1 1/4" ODOT ITEM 404 or EXISTING PAVEMENT THICKNESS, WHICHEVER IS GREATER

4. CONTRACTOR SHALL OBTAIN A RIGHT-OF-WAY PERMIT FROM THE VILLAGE PRIOR TO PERFORMING ANY WORK.



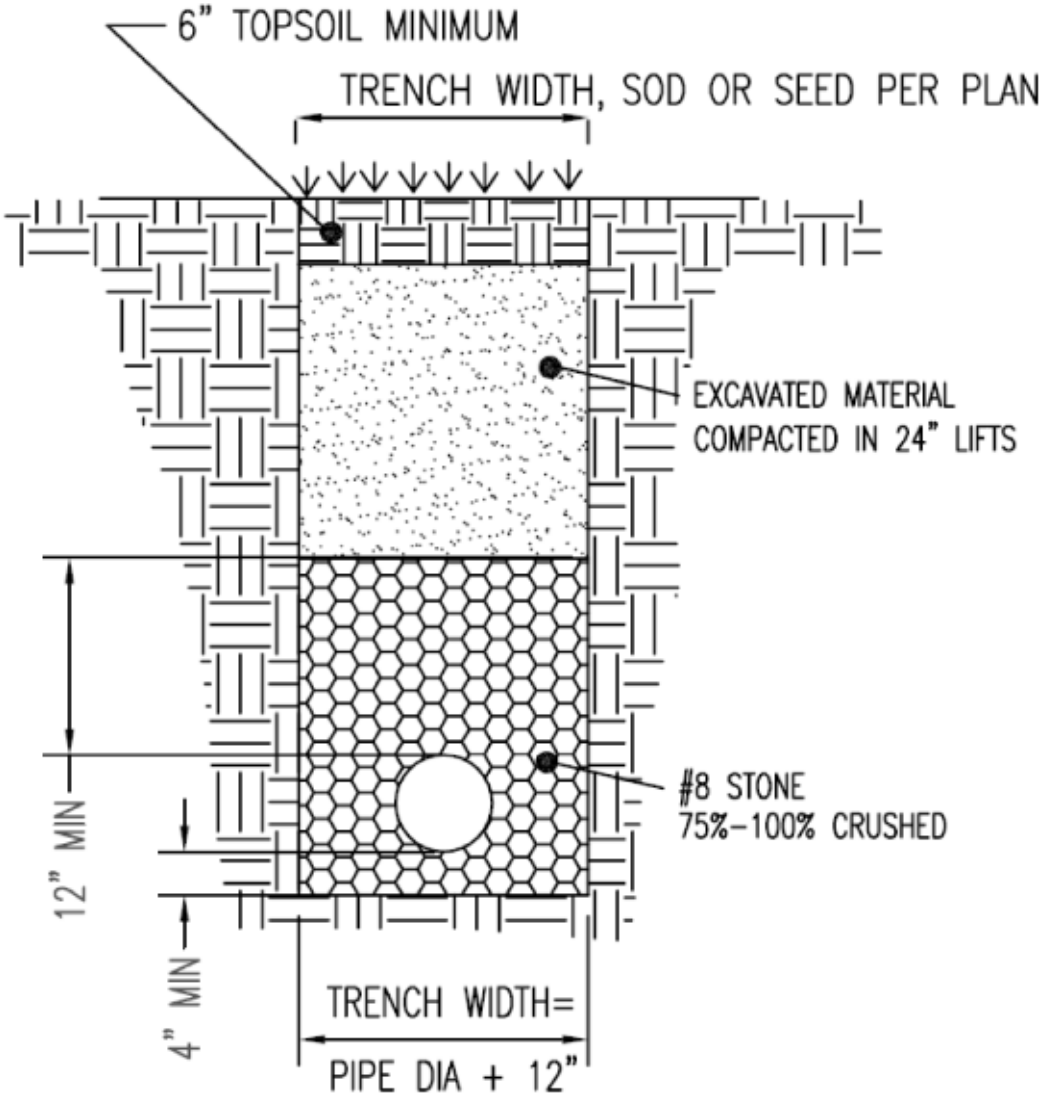
EXISTING STREET CROSSING



INSTALLATION WITHIN PROPOSED ROADWAY

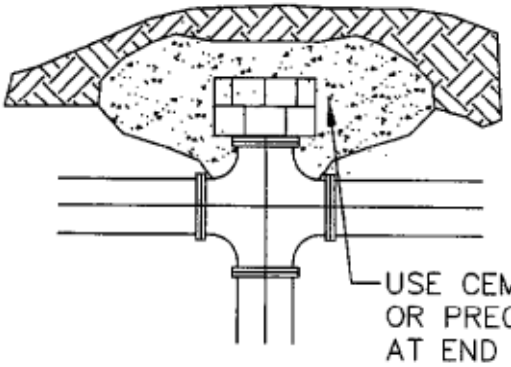
WATER TRENCH IN ROADWAY

VILLAGE OF MORROW, OHIO *STANDARD CONSTRUCTION DRAWING*	SCALE: *AS SHOWN* DATE: *1-17-11*	STANDARD NUMBER: **STD-101**



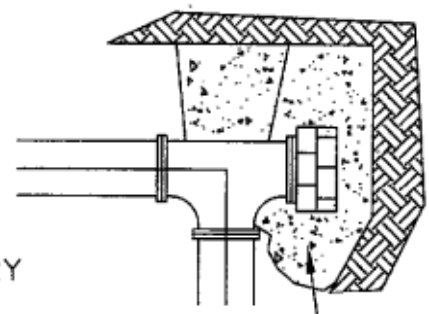
WATER TRENCH OUTSIDE ROADWAY

VILLAGE OF MORROW, OHIO STANDARD CONSTRUCTION DRAWING	SCALE: AS SHOWN DATE: 1-17-11	STANDARD NUMBER: **STD-102**



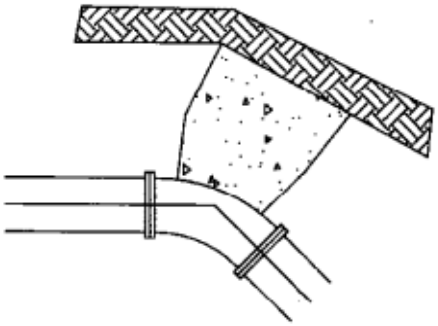
USE CEMENT MASONRY
OR PRECAST BLOCKS
AT END TO BE PLUGGED
(TYP)

CROSS

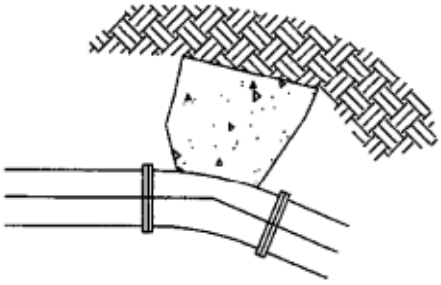


TEE

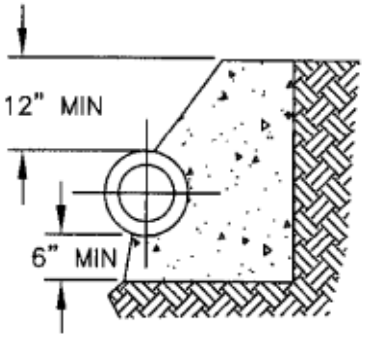
USE CEMENT MASONRY
OR PRECAST BLOCKS
AT END TO BE PLUGGED
(TYP)



45° BEND



22.5° BEND



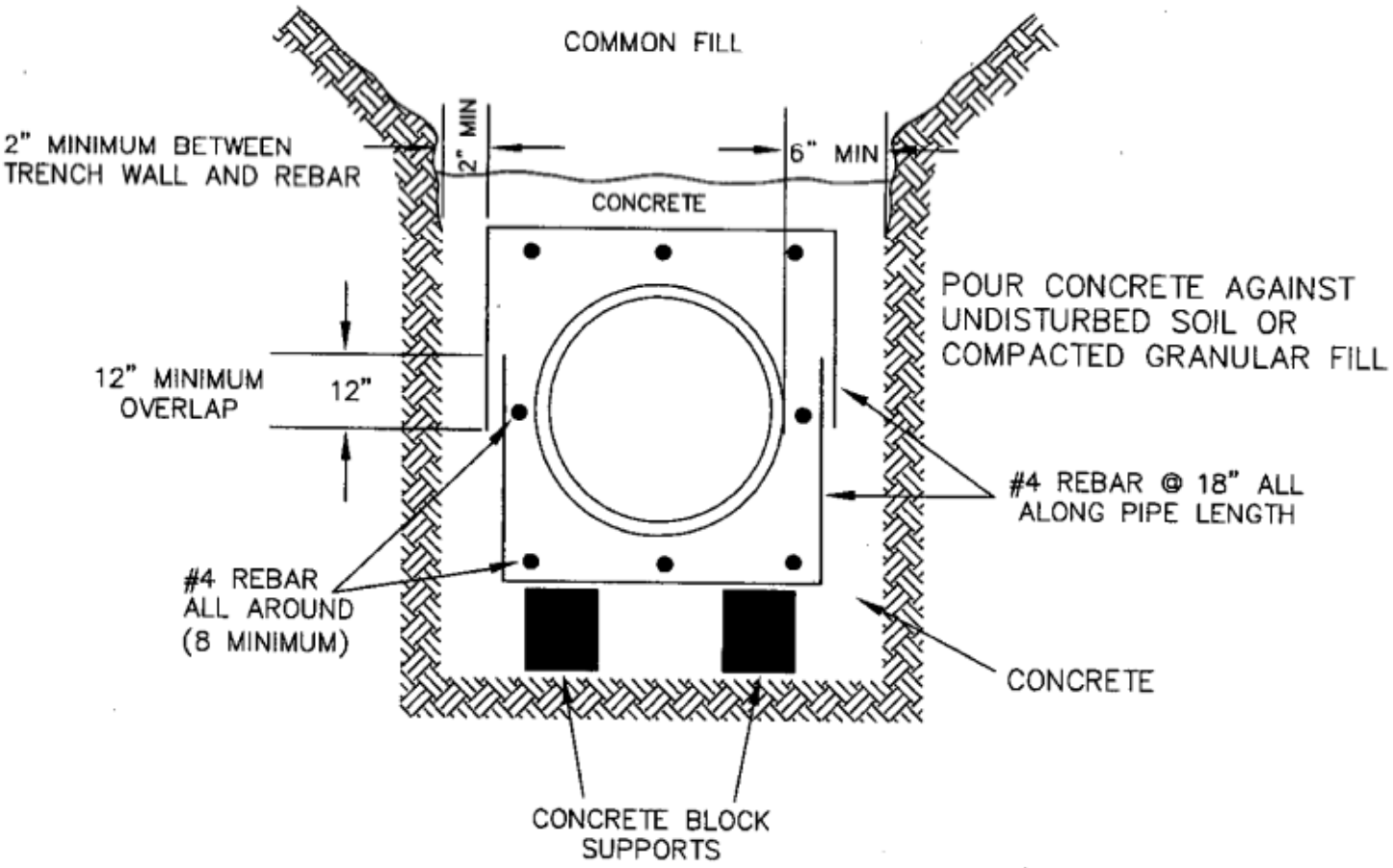
SECTIONAL VIEW

NOTE:

BEARING AREA TO BE DETERMINED BASED ON SOIL TYPE & WORKING PRESSURE.
THRUST BLOCKS TO BE USED AT ALL BENDS 22.5° OR GREATER.
THRUST BLOCKS TO BE POURED AGAINST FIRM UNDISTURBED SOIL. USE CLASS "C" CONCRETE.
90° BENDS SHALL NOT BE PERMITTED.

THRUST BLOCK DETAILS

VILLAGE OF MORROW, OHIO STANDARD CONSTRUCTION DRAWING	SCALE: AS SHOWN DATE: 1-17-11	STANDARD NUMBER: **STD-103**

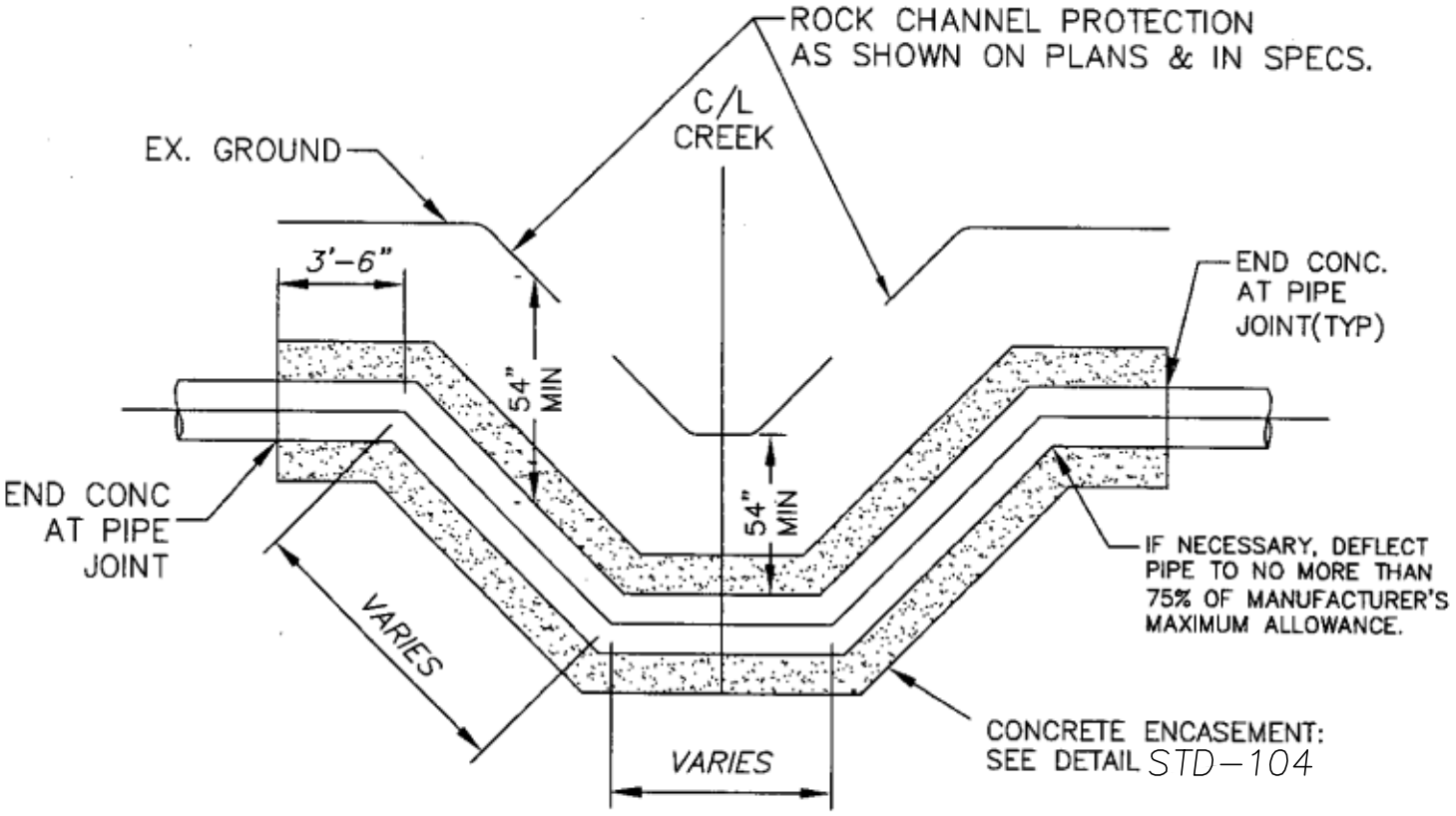


NOTES:

1) CONCRETE SHALL BE 3000 P.S.I. MINIMUM 28 DAYS STRENGTH (4" SLUMP).
2) SUPPORT PIPE AND REBAR CAGE ON CONCRETE BRICKS DURING CONCRETE PLACEMENT.
3) CONCRETE ENCASEMENT SHALL BE TERMINATED AT PIPE JOINTS ONLY.

FULL CONCRETE ENCASEMENT

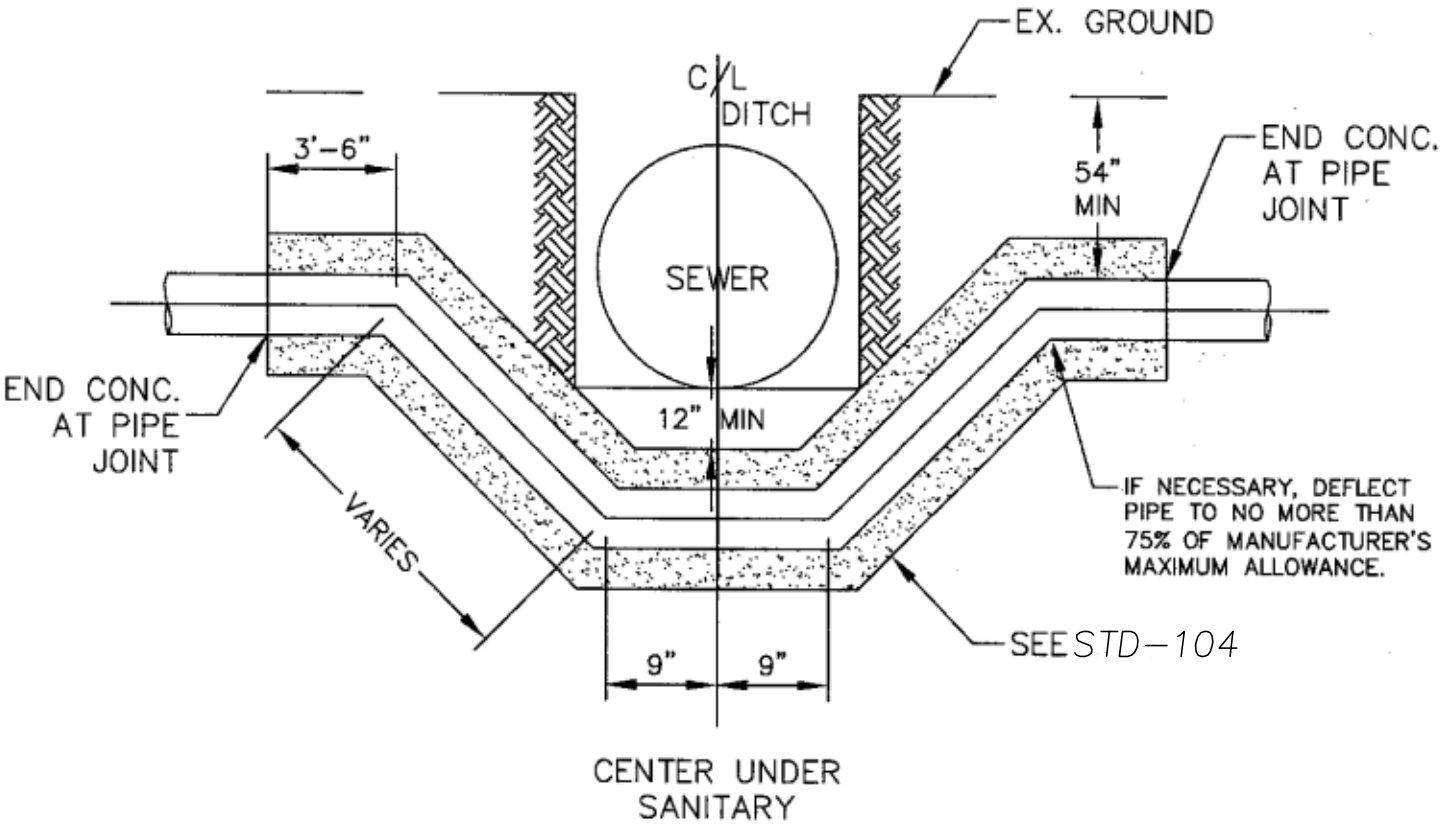
VILLAGE OF MORROW, OHIO *STANDARD CONSTRUCTION DRAWING*	SCALE: *AS SHOWN* DATE: *1-17-11*	STANDARD NUMBER: **STD-104**



NOTE:
ALL PIPE IN CREEK CROSSINGS TO BE RESTRAINED JOINT, PER STANDARD NUMBER STD-121

WATERMAIN ENCASEMENT AT CREEK CROSSING

VILLAGE OF MORROW, OHIO STANDARD CONSTRUCTION DRAWING	SCALE: AS SHOWN DATE: 1-17-11	STANDARD NUMBER: **STD-105**



ALL PIPE IN SEWER CROSSINGS TO BE RESTRAINED JOINT, PER STANDARD NUMBER STD-121

WATERMAIN ENCASEMENT AT SEWER CROSSING

VILLAGE OF MORROW, OHIO STANDARD CONSTRUCTION DRAWING	SCALE: AS SHOWN DATE: 1-17-11	STANDARD NUMBER: **STD-106**

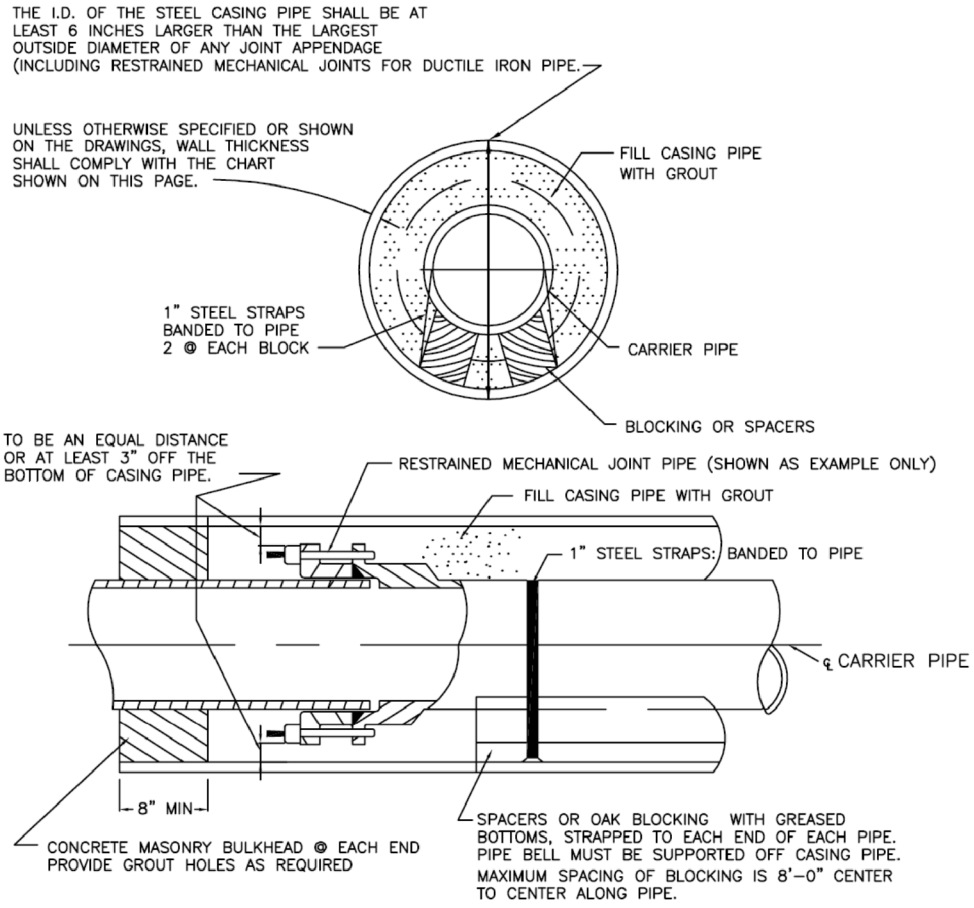
NOTE:
* BASED ON HS20 HIGHWAY LOADINGS WITH A MINIMUM COVER AT 4'6".

STEEL CASING PIPE SHALL HAVE A STEEL YIELD STRENGTH OF 35,000 PSI, MEET ATSM A139 GRADE B REQUIREMENTS

NO HYDROTEST IS REQUIRED

CHART BASED ON RECOMMENDATIONS FROM NATIONAL UTILITY CONTRACTORS ASSOCIATION

REQUIRED CASING PIPE SIZES AND WALL THICKNESSES FOR RAILROAD & HIGHWAY CROSSINGS *			
NOMINAL SIZE	ACTUAL O.D.	RAILROAD CROSSINGS BARE	HIGHWAY * CROSSINGS BARE
8"	8 5/8"	.250	.250
10"	10 3/4"	.250	.250
12"	12 3/4"	.250	.250
14"	14"	.281	.250
16"	16"	.281	.250
18"	18"	.321	.250
20"	20"	.344	.312
24"	24"	.406	.312
30"	30"	.469	.375
36"	36"	.532	.500
42"	42"	.563	.500
48"	48"	.625	.625
54"	54"	.688	.625
60"	60"	.750	.625
66"	66"	.813	.625
72"	72"	.875	.750



STEEL CASING

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

SCALE: AS SHOWN

DATE: 1-17-11

STANDARD NUMBER: **STD-107**

MAKE OF HYDRANTS APPROVED IN MORROW

1. DARLING MODEL B-62-B

NOTE:

1) USE ANCHOR PIPE BETWEEN VALVE AND HYDRANT

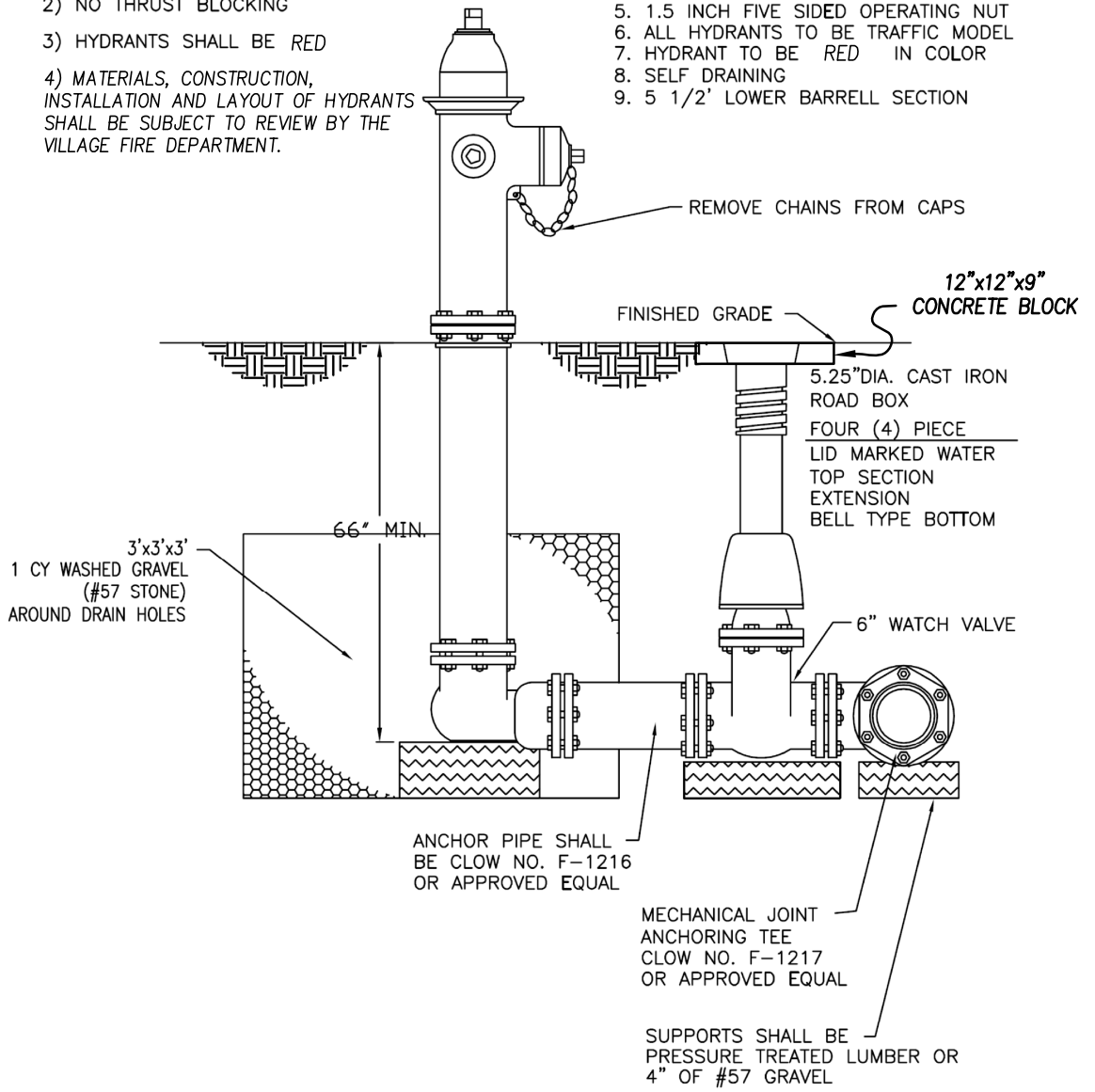
2) NO THRUST BLOCKING

3) HYDRANTS SHALL BE *RED*

4) *MATERIALS, CONSTRUCTION, INSTALLATION AND LAYOUT OF HYDRANTS SHALL BE SUBJECT TO REVIEW BY THE VILLAGE FIRE DEPARTMENT.*

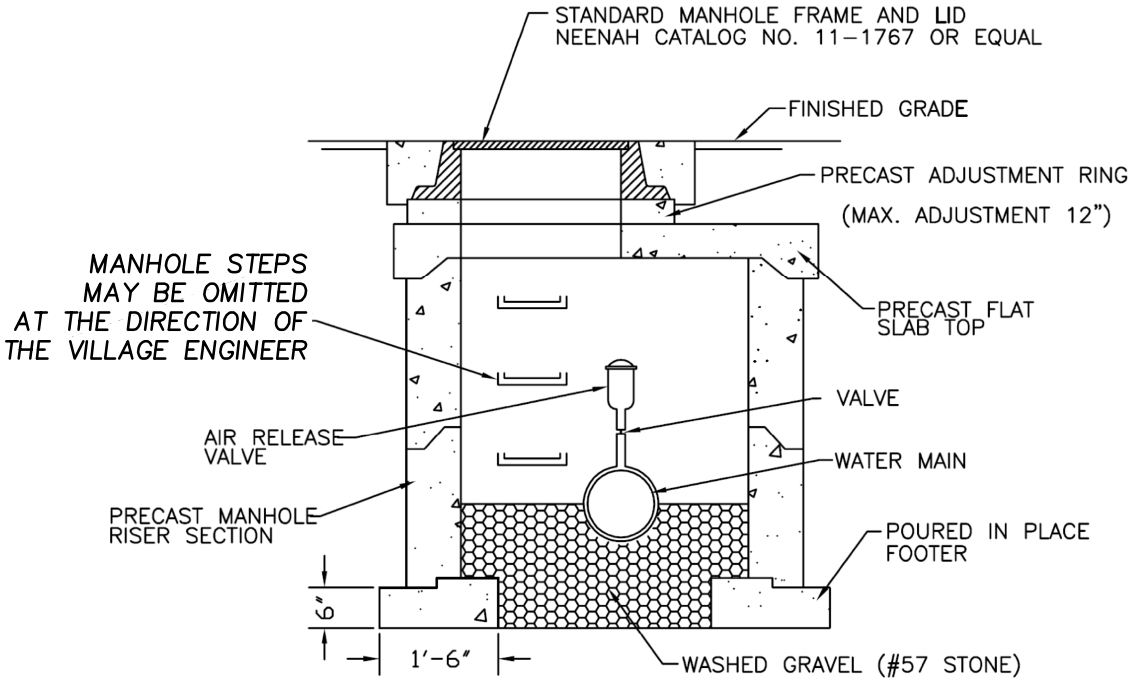
HYDRANT DATA

1. ALL VALVES AND HYDRANTS "RIGHT TO OPEN"
2. 5.25 VALVE OPENING
3. 3 NOZZLES (2)2.5 & (1)5" *STORZ FITTING*
4. ALL THREADS ARE NATIONAL STANDARD
5. 1.5 INCH FIVE SIDED OPERATING NUT
6. ALL HYDRANTS TO BE TRAFFIC MODEL
7. HYDRANT TO BE *RED* IN COLOR
8. SELF DRAINING
9. 5 1/2' LOWER BARRELL SECTION



FIRE HYDRANT ASSEMBLY

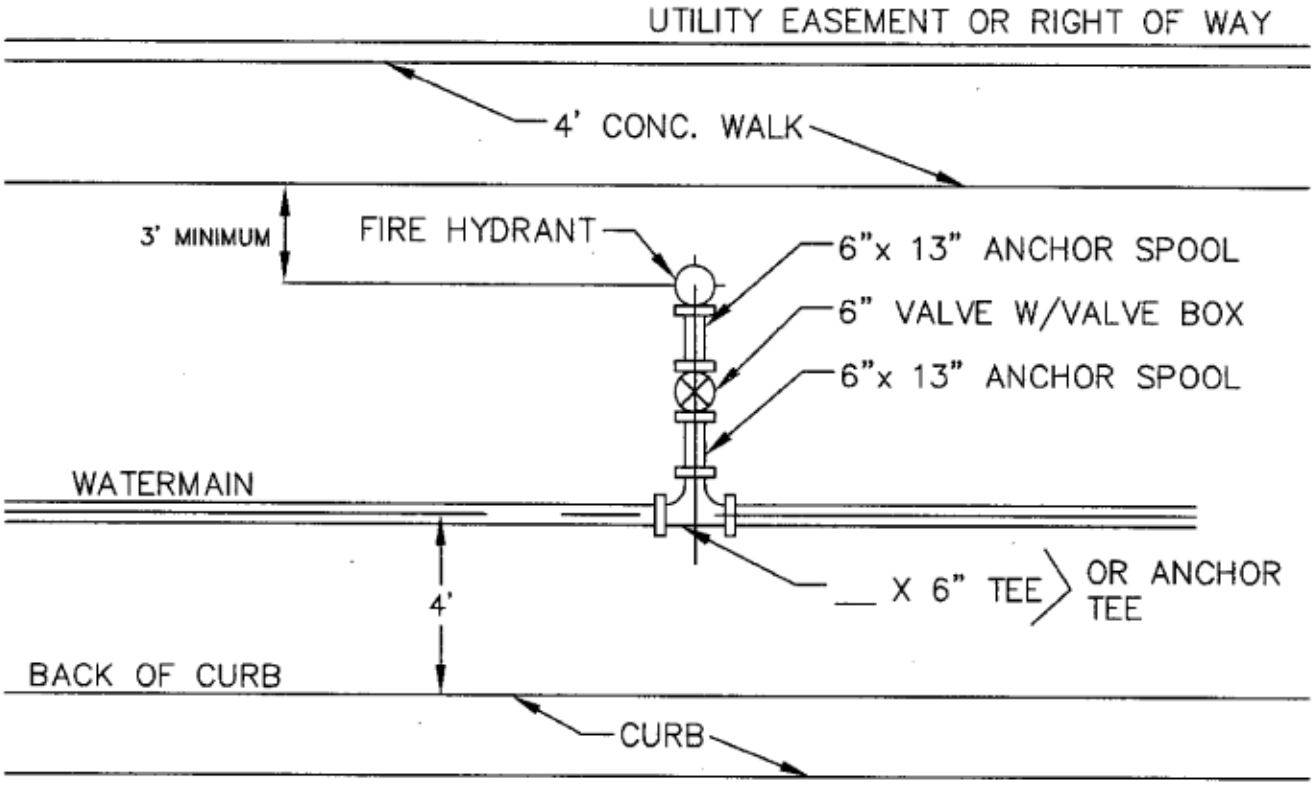
VILLAGE OF MORROW, OHIO STANDARD CONSTRUCTION DRAWING	SCALE: AS SHOWN DATE: 1-17-11	STANDARD NUMBER: STD-108



NOTE: IN WET AREAS SEAL BOTTOM WITH POURED CONCRETE BASE OR PRECAST MANHOLE BASE.

AIR RELEASE VALVE

VILLAGE OF MORROW, OHIO STANDARD CONSTRUCTION DRAWING	SCALE: AS SHOWN DATE: 1-17-11	STANDARD NUMBER: **STD-109**



STREET

NOTES:

HYDRANT, VALVE, BEND & TEE TO BE CLOSE COUPLED (USE RESTRAINED JOINTS).

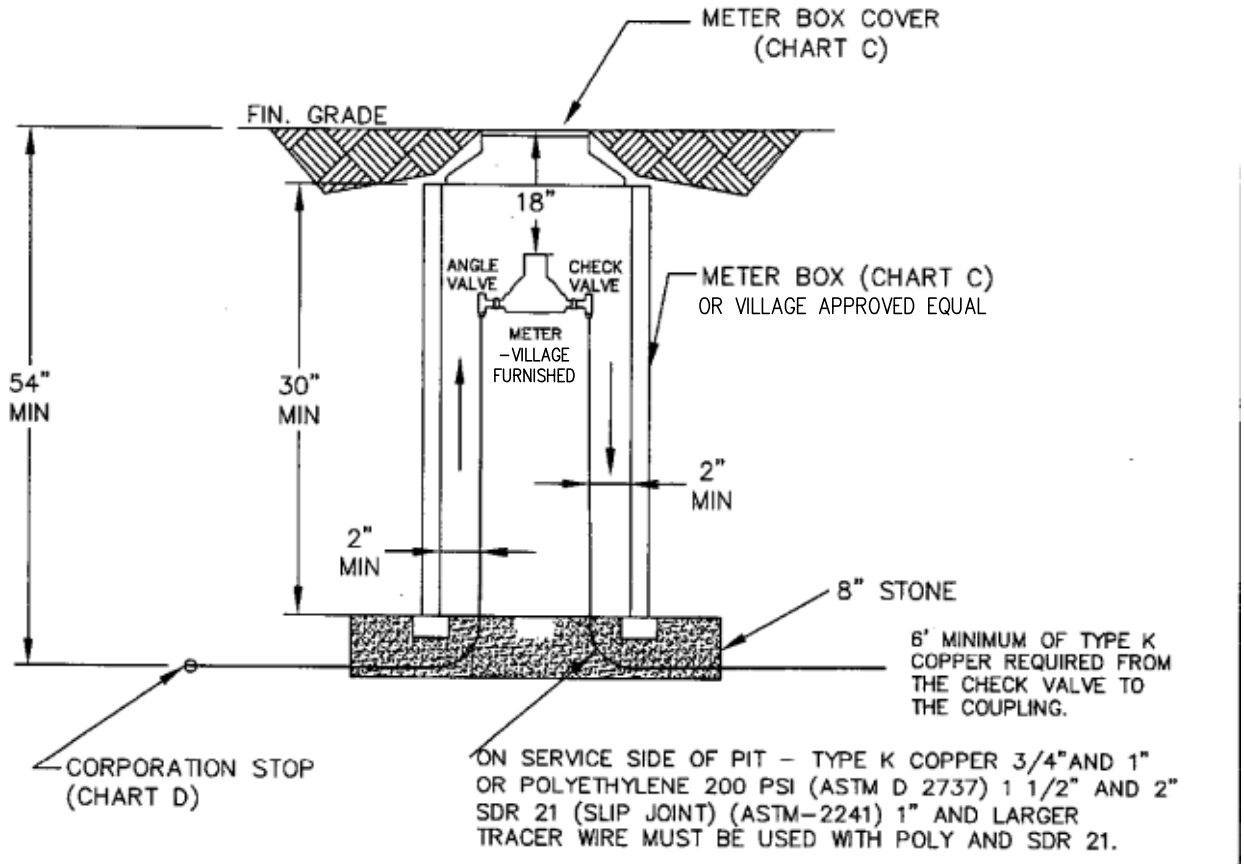
HYDRANT AND VALVE MUST BE A MINIMUM OF 3' FROM ANY PAVED SURFACE.

SEE STD-108

FIRE HYDRANT ARRANGEMENT

VILLAGE OF MORROW, OHIO STANDARD CONSTRUCTION DRAWING	SCALE: AS SHOWN DATE: 1-17-11	STANDARD NUMBER: STD-110

METER SIZE	CHART A ANGLE VALVE	CHART B CHECK VALVE	CHART C METER BOX & COVER	CHART D CORP STOP	CHART E COUPLINGS
3/4"-5/8"	MUELLER P24258-1 FORD BA43-332W McDONALD 4602 B-22	MUELLER P 14269 FORD HA34 323 McDONALD 02-342	METER BOX MS2030S (20" x 30") OR EQUAL COVER FORD C-3T OR EQUAL	MUELLER P 15008 FORD F-1000 McDONALD MAC-PAK COMPRESSION	FORD C44-33 MUELLER P 15403 McDONALD 4758-22
1"	FORD BA43-444W	FORD HA34-444	METER BOX MS2030S (20" x 30") OR EQUAL COVER FORD C-3T OR EQUAL	FORD F-1000	FORD C44-44 MUELLER P 15403 McDONALD 4758-22
DOUBLE 3/4"	FORD UVB43-42W	FORD HA34-323	METER BOX MS2030S (20" x 30") OR EQUAL COVER FORD C-3T OR EQUAL	FORD F-1000	FORD C44-33 MUELLER P 15403 McDONALD 4758-22



NOTE:

1. BACK FLOW PREVENTER TO BE INSTALLED AHEAD OF ANY SPRINKLER BUT NOT IN METER PIT.

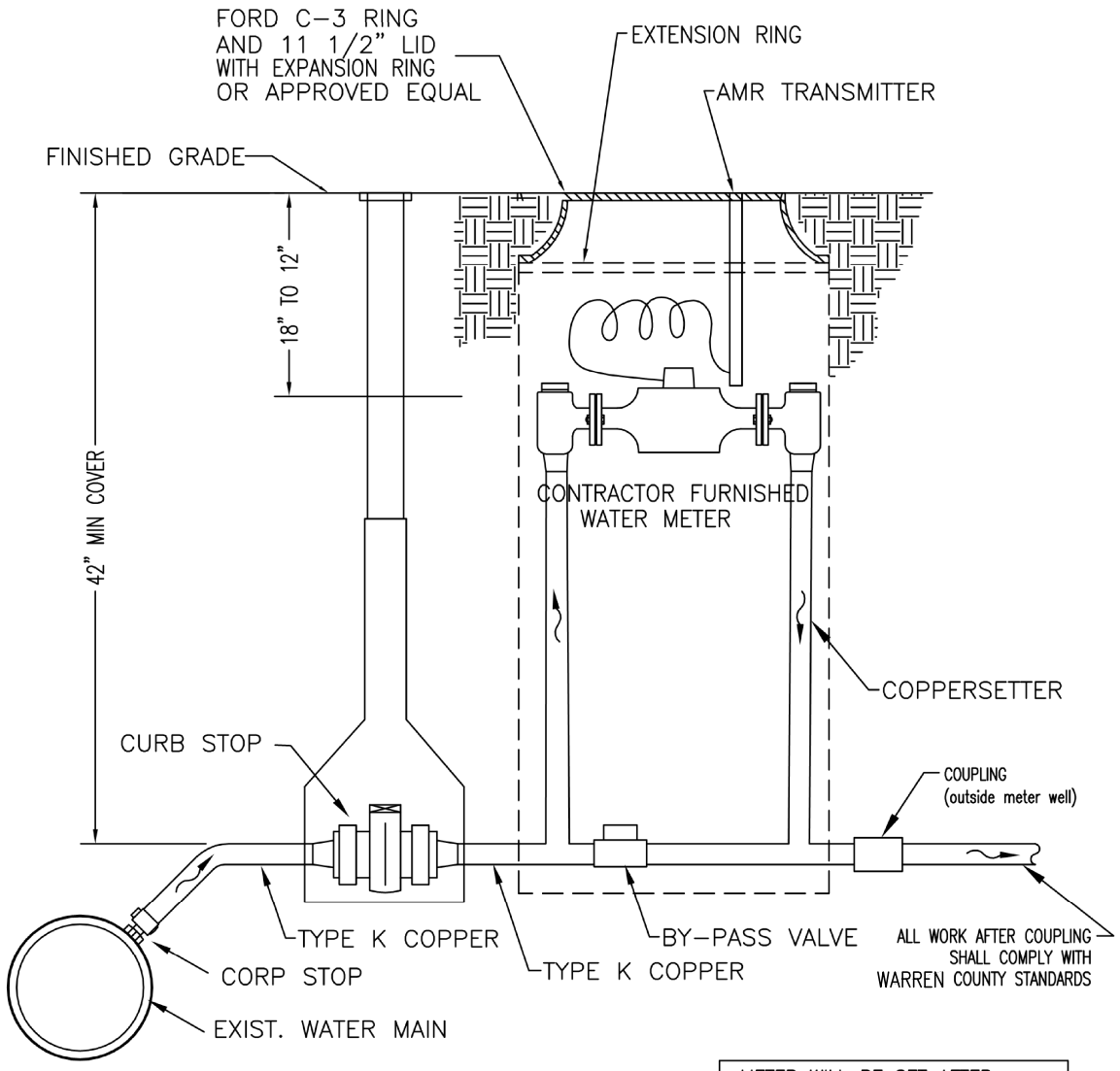
WATER SERVICE ~ 3/4" TO 1"

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

SCALE: AS SHOWN

DATE: 1-17-11

STANDARD NUMBER: **STD-111**



ALL BRASS PARTS LISTED ARE MANUFACTURED BY THE FORD METER BOX COMPANY OR APPROVED EQUAL (NO McDONALD)

METER WILL BE SET AFTER AN ACCOUNT WITH UTILITY BILLING HAS BEEN ESTABLISHED

UNDERGROUND PARTS

CORPORATION STOP FORD F-1000 CC-THREAD

ALL SERVICE LINES TO BE K-COPPER

CURB BOX

2 1/2" DIA. ADJUSTABLE 36"-60"
PLASTIC (SLIP STYLE)
WITH IRON LID MARKED "WATER"

SERVICE SIZE	1 1/2"	2"
CORP STOP:	F1000-6	F1000-7
CURB STOP:	B44-676	B44-777

METER PIT SETUP		
COPPERSETTER:	VV76-27B-44-66G	VV77-27B-44-77G
EXTENSION RING:	#4	#5
"D" ø	30"DIA X 42"	36" DIA X 42"

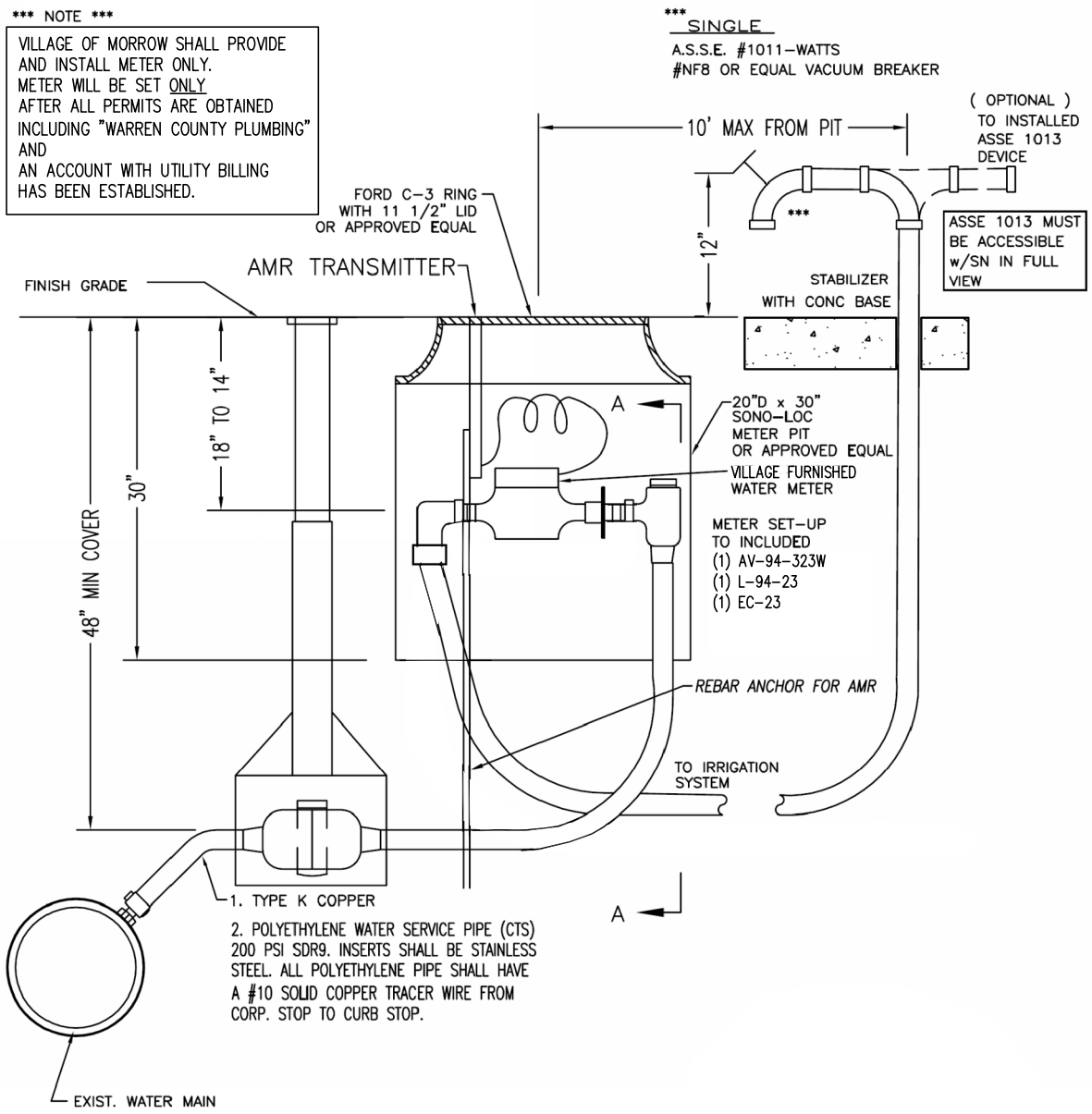
1½" - 2" WATER SERVICE

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

SCALE: AS SHOWN

DATE: 1-17-11

STANDARD NUMBER: **STD-112**



UNDERGROUND PARTS

CORPORATION STOP FORD F–1000 CC–THREAD
CURB STOP FORD B44–333 / MUELLER H–15209
ALL SERVICE LINES TO BE K–COPPER
CURB BOX
2 1/2" DIA. ADJUSTABLE 36"–60"
PLASTIC (SLIP STYLE)
WITH IRON LID MARKED "WATER"

ALL BRASS PARTS LISTED ARE MANUFACTURED BY THE FORD METER BOX COMPANY OR APPROVED EQUAL

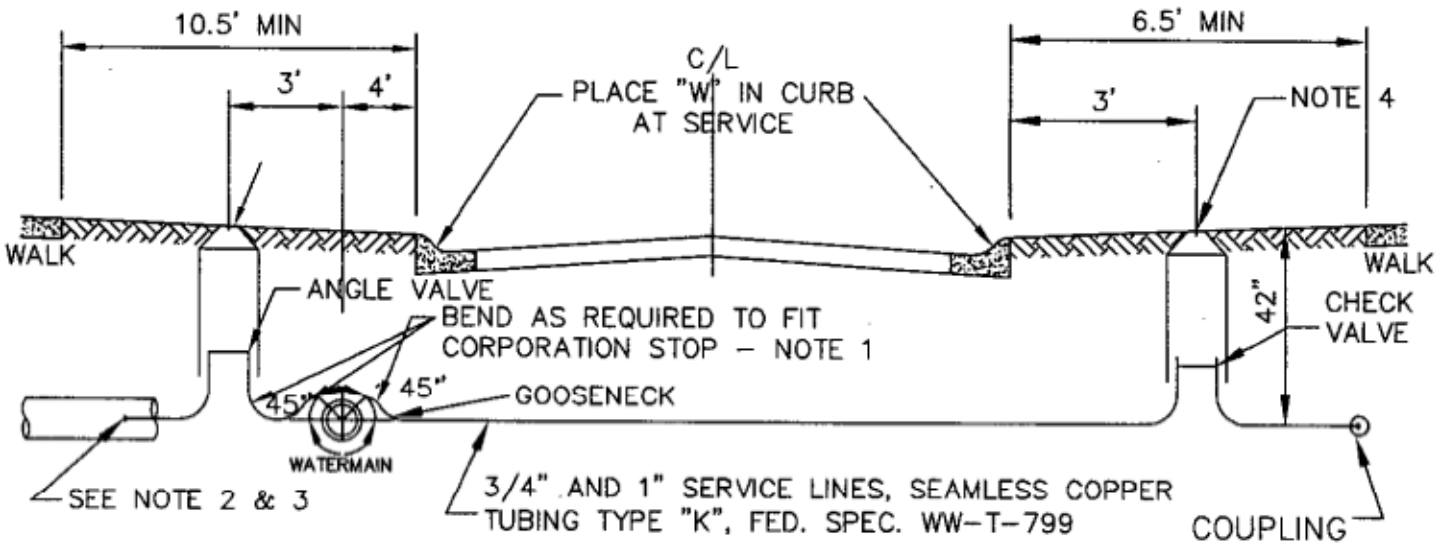
IRRIGATION METER

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

SCALE: AS SHOWN

DATE: 1–17–11

STANDARD NUMBER: **STD-113**



OR

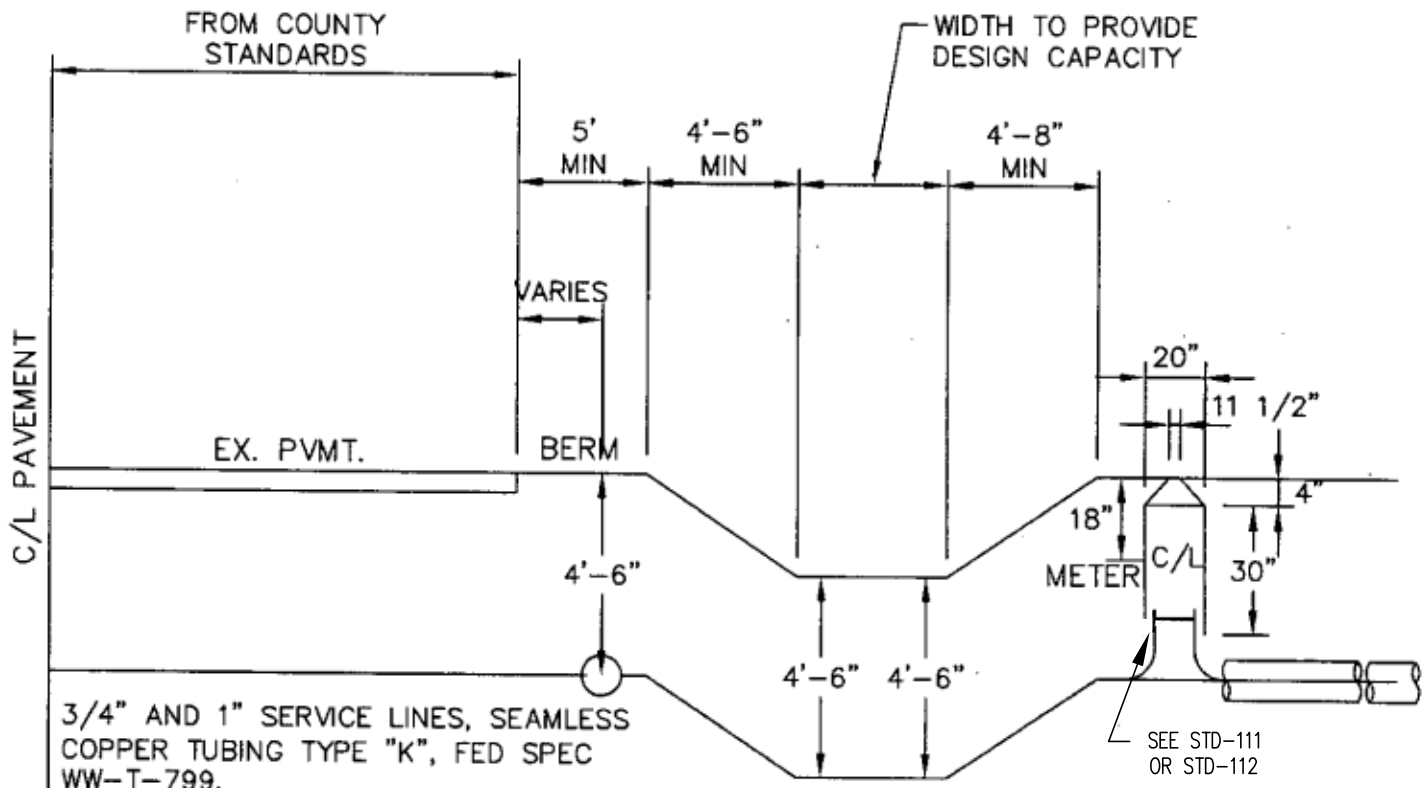
1 1/2" AND 2" SERVICE LINES, SEAMLESS COPPER TUBING TYPE "K", FED. SPEC. W-T-799 OR SEAMLESS POLYETHYLENE 200 PSI WITH TRACER WIRE WITH 6' LEAD INTO THE PIT.

NOTES:

1) CORPORATION STOP TO BE CAST BRASS OR BRONZE. SEE STD-111
2) ON THE SIDE OF THE ROAD WITH THE WATER MAIN PLASTIC TUBING SHALL BE 20'+/- LONG & EXTEND 23' BEHIND CURB TO CLEAR TELEPHONE & ELECTRIC EASEMENTS.
3) CONTRACTOR SHALL PLACE 2"X 4" OR LARGER POSTS, PAINTED BLUE AT BOTH ENDS OF PLASTIC CONDUIT.
4) CONTRACTOR SHALL INSTALL A #6 REBAR 5' LONG VERTICALLY AT ANGLE VALVES.
5) WATER MAIN WITHIN 3' OF BACK OF CURB MUST HAVE GRANULAR BACKFILL.

TYPICAL WATER SYSTEM DETAIL

VILLAGE OF MORROW, OHIO *STANDARD CONSTRUCTION DRAWING*	SCALE: *AS SHOWN* DATE: *1-17-11*	STANDARD NUMBER: **STD-114**



3/4" AND 1" SERVICE LINES, SEAMLESS COPPER TUBING TYPE "K", FED SPEC WW-T-799.

OR

1 1/2" AND 2" SERVICE LINES, SEAMLESS COPPER TUBING TYPE "K", FED. SPEC. W-T-799 OR SEAMLESS POLYETHYLENE 200 PSI WITH TRACER WIRE WITH 6' LEAD INTO THE PIT.

NOTE:

1) CORPORATION STOP TO BE CAST BRASS OR BRONZE. SEE STD-111 OR STD-112.

2) PLASTIC CONDUIT (4" ID) SHALL BE 20'+/- LONG AND EXTEND A MINIMUM OF !2' INTO THE LOTS TO CLEAR UTILITY EASEMENTS.

3) CONTRACTOR SHALL PLACE 2"X 4" OR LARGER POSTS, PAINTED BLUE AT BOTH ENDS OF PLASTIC CONDUIT.

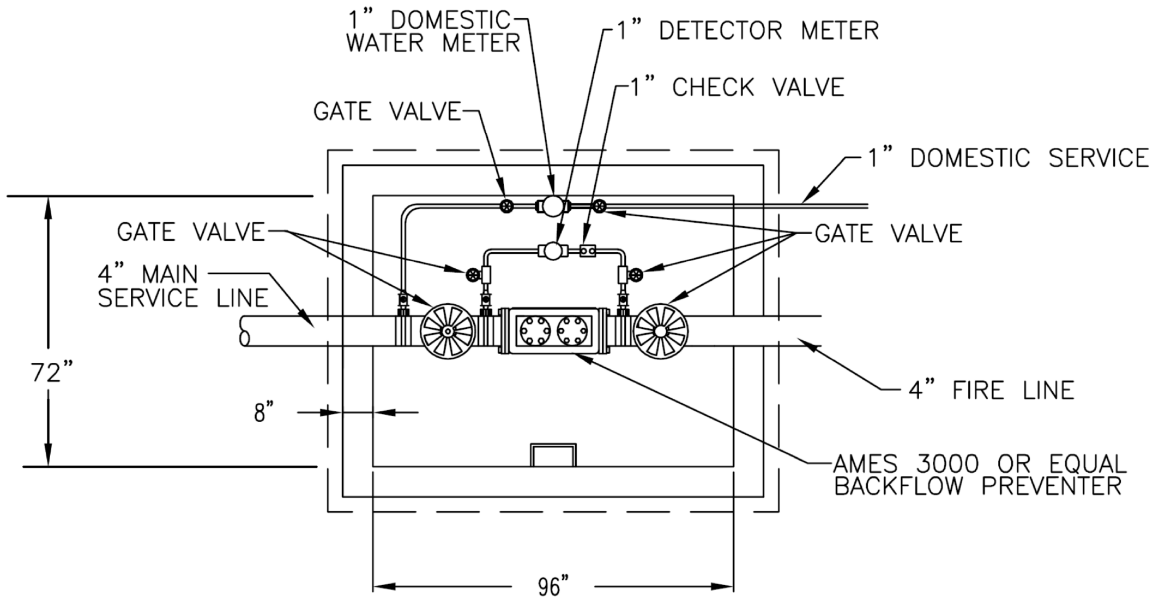
4) CONTRACTOR SHALL INSTALL A #6 REBAR 5' LONG VERTICALLY AT ANGLE VALVES.

5) WATER MAIN WITHIN 3' OF BACK OF CURB MUST HAVE GRANULAR BACKFILL.

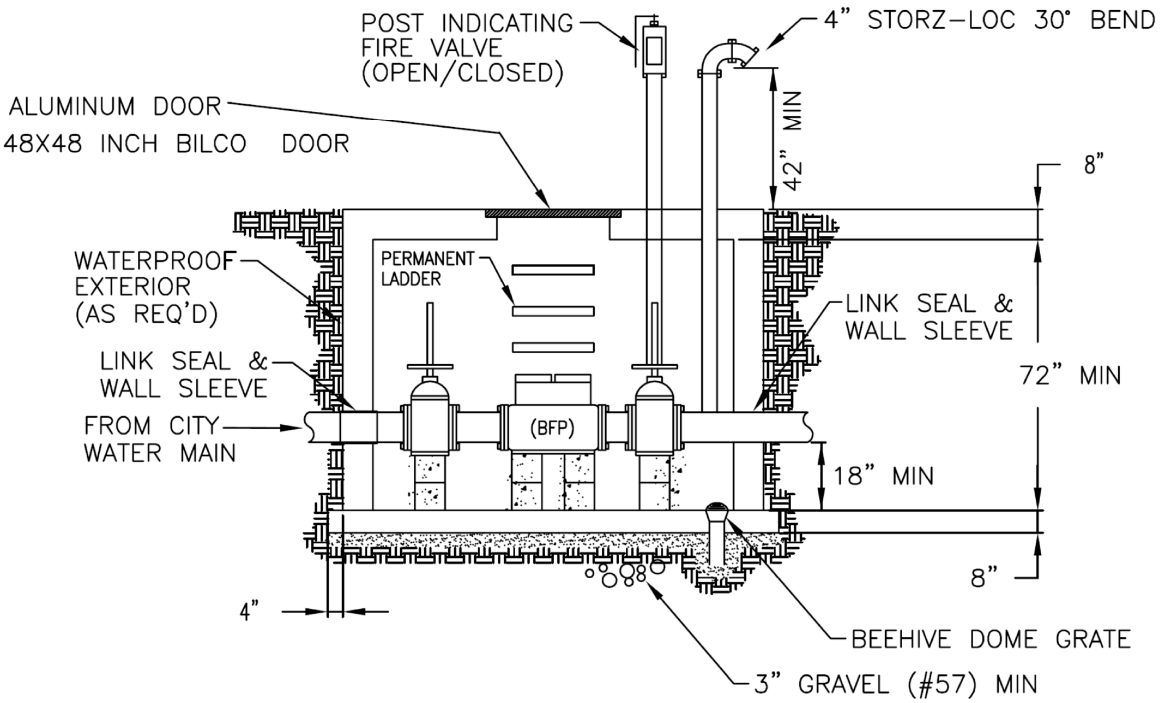
DITCH AND METER LOCATION

VILLAGE OF MORROW, OHIO *STANDARD CONSTRUCTION DRAWING*	SCALE: *AS SHOWN* DATE: *1-17-11*	STANDARD NUMBER: **STD-115**

METER PIT DETAILS



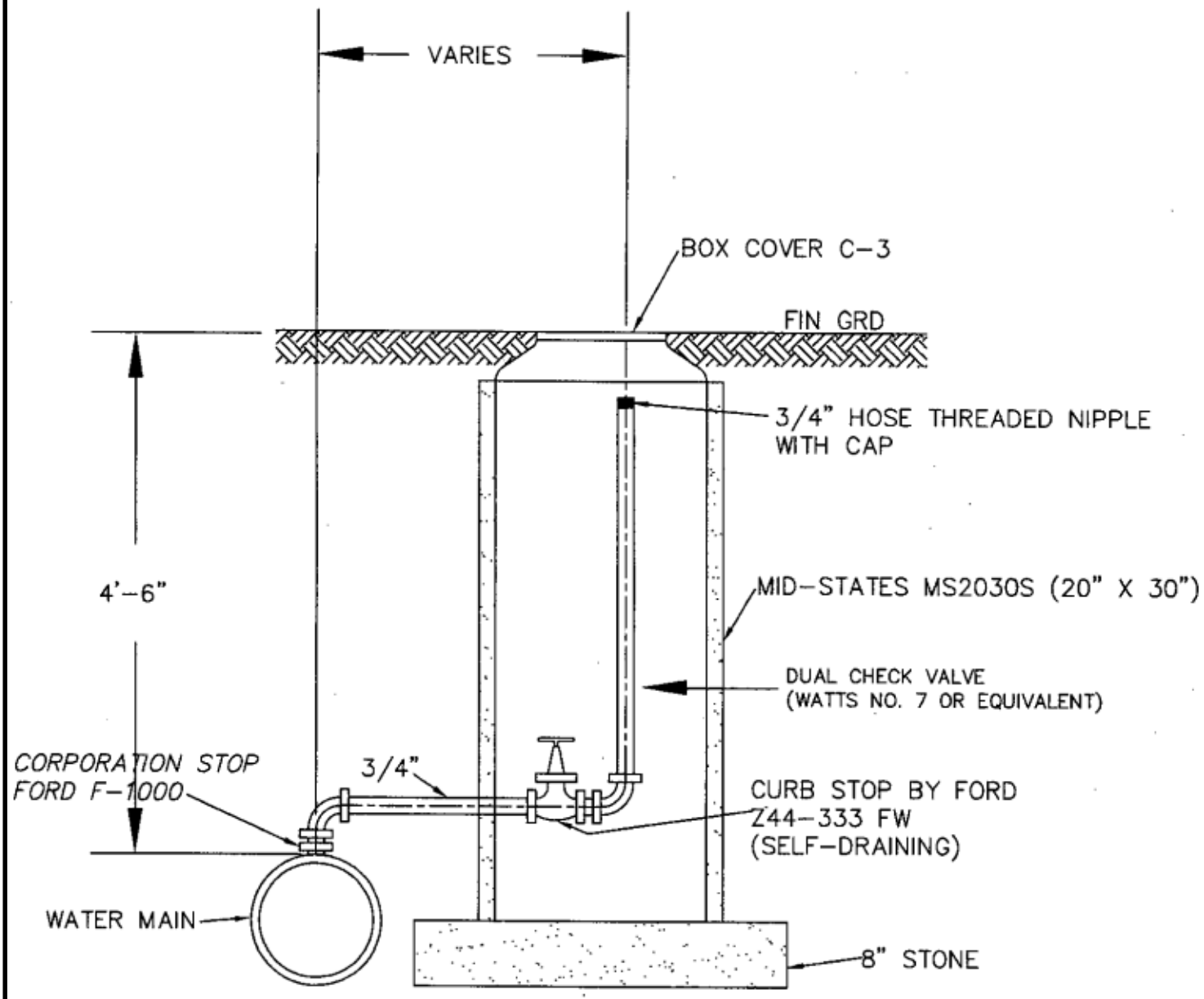
PLAN VIEW



SIDE VIEW

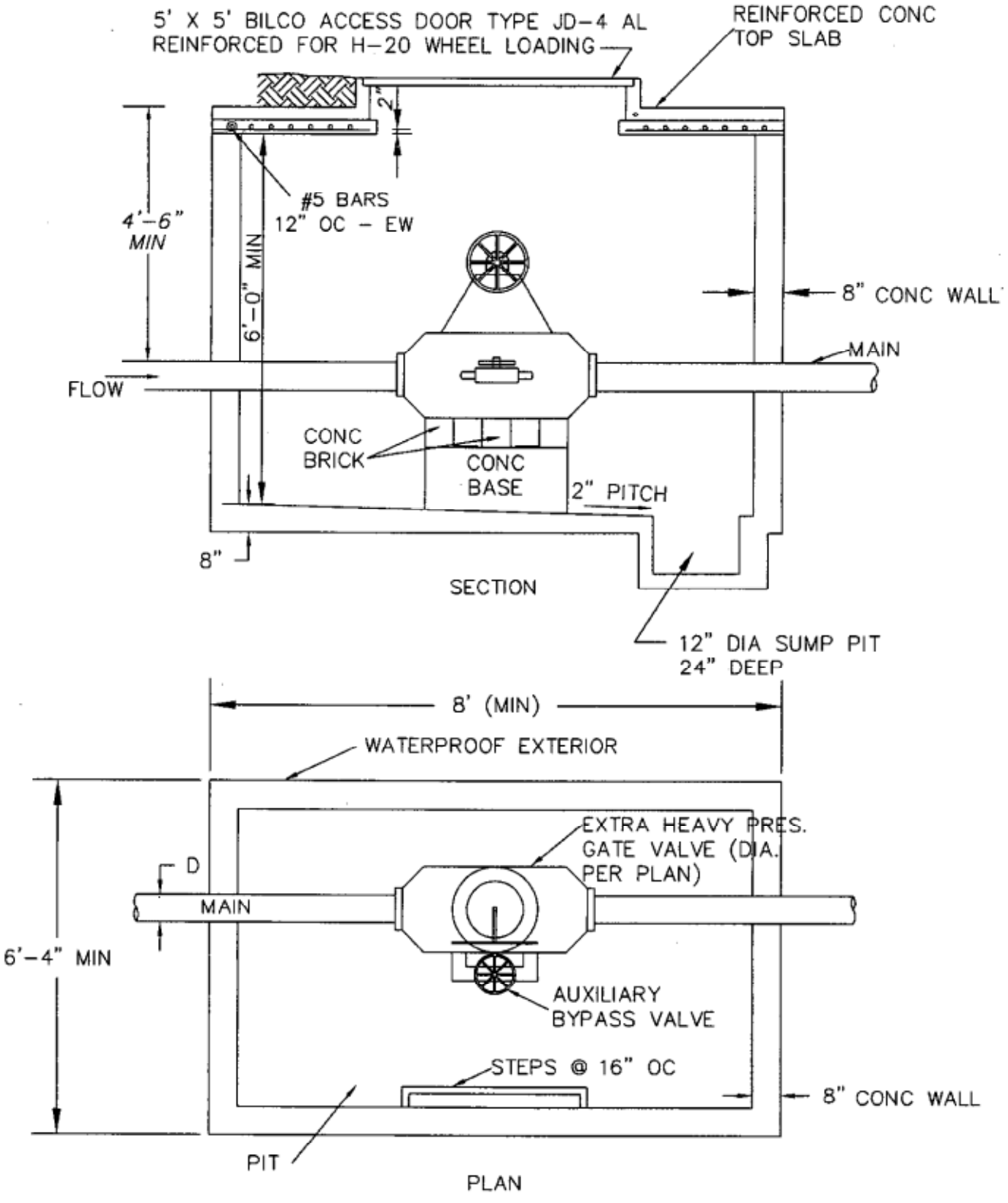
METER PIT

VILLAGE OF MORROW, OHIO STANDARD CONSTRUCTION DRAWING	SCALE: AS SHOWN DATE: 1-17-11	STANDARD NUMBER: **STD-116**



BLOWOFF DETAIL

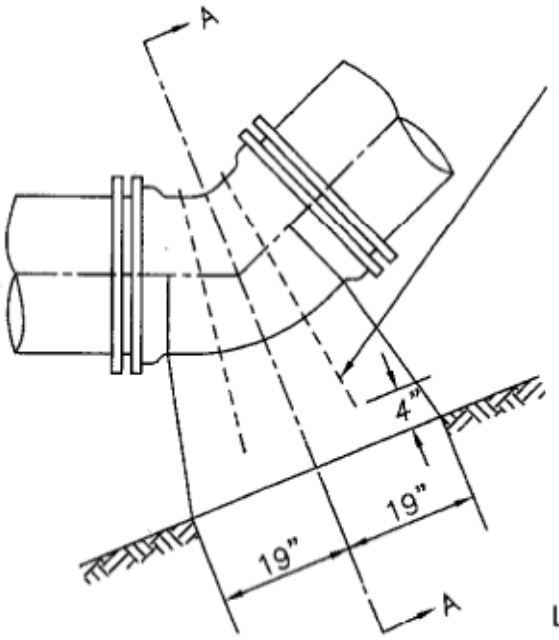
VILLAGE OF MORROW, OHIO STANDARD CONSTRUCTION DRAWING	SCALE: AS SHOWN DATE: 1-17-11	STANDARD NUMBER: STD-117



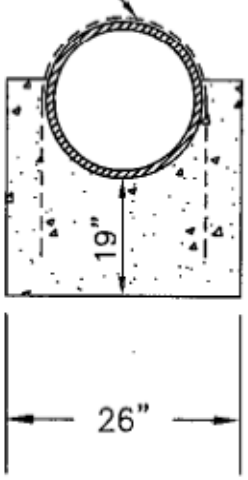
VALVE PIT

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

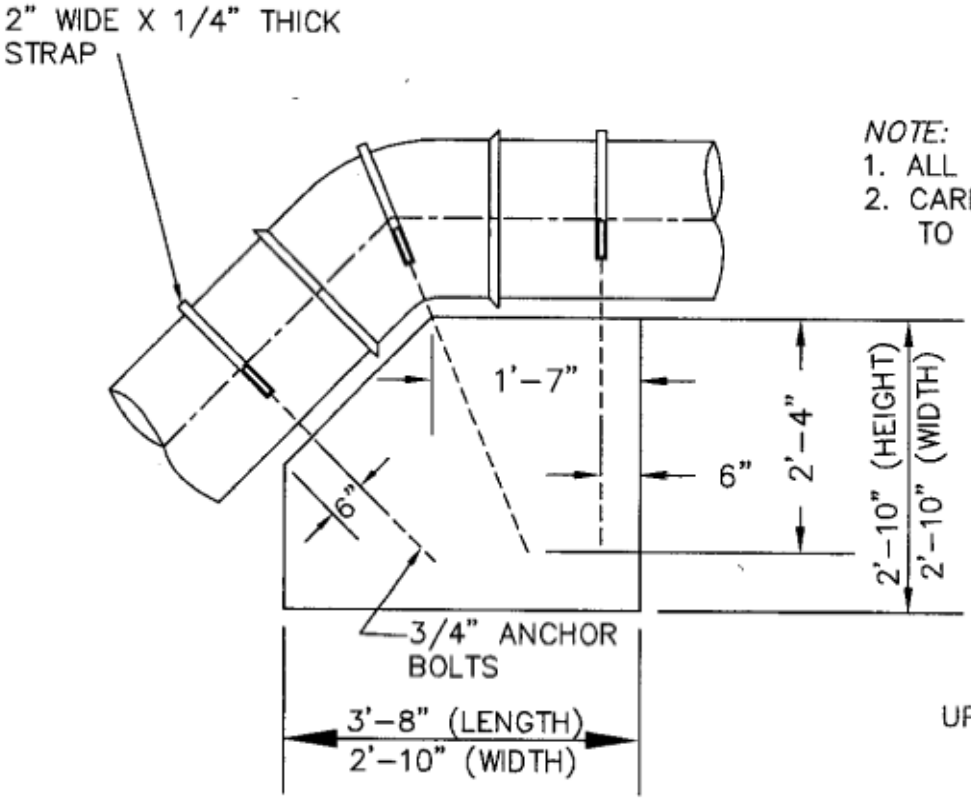
SCALE:	STANDARD NUMBER:
AS SHOWN	STD-118
DATE: 1-17-11	



LOWER VERTICAL



SECTION A–A



UPPER VERTICAL

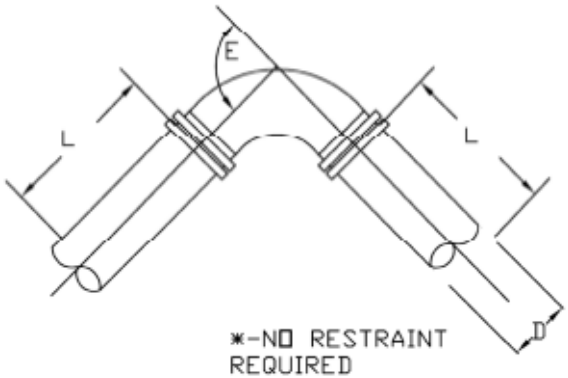
NOTE:
1. ALL CONCRETE 4200#
2. CARRY ALL BEARING SURFACES TO FIRM BEARING.

ANCHORS & BUTTRESSES FOR VERTICAL BENDS

VILLAGE OF MORROW, OHIO *STANDARD CONSTRUCTION DRAWING*	SCALE: *AS SHOWN* DATE: *1–17–11*	STANDARD NUMBER: **STD-119**

REQUIRED RESTRAINED JOINTS FOR BENDS

E-DEGREE OF DEFLECTION



*-NO RESTRAINT REQUIRED

L-REQUIRED LENGTH OF RESTRAINED JOINTS

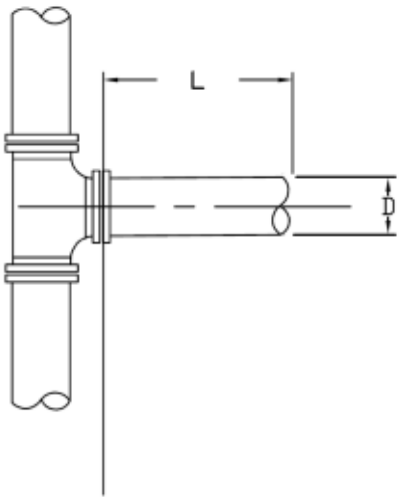
D-INSIDE DIAMETER OF PIPE

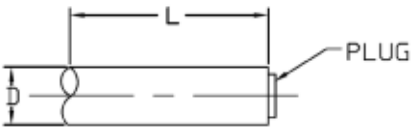
D-DIAMETER OF PIPE

E-DEGREE OF DEFLECTION	4"	6"	8"	10"	12"	16"	20"	24"
11 ¼°	1	2	2	2	3	5	5	6
22½°	2	3	4	5	6	8	10	12
45°	4	8	12	14	20	30	36	45
90°	25	34	50	60	70	100	125	145

L- REQUIRED LENGTH OF RESTRAINED JOINTS IN FEET

REQUIRED RESTRAINED JOINTS FOR DEAD END VALVES, PLUGS, CAPS AND TEES





DIAMETER OF PIPE IN INCHES

D	4"	6"	8"	10"	12"	16"	20"	24"
L	25	34	50	60	70	100	125	145

LENGTH OF RESTRAINED JOINTS IN FEET

REQUIRED RESTRAINED JOINTS

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

SCALE: AS SHOWN

DATE: 1-17-11

STANDARD NUMBER: **STD-120**

WATER

1. ALL WATER MAINS SHALL HAVE A MINIMUM COVER OF 4'-6".

1.A. ALL WATER SERVICE LATERALS SHALL HAVE A MINIMUM COVER OF 42".

2. ALL WATER MAINS SHALL BE DUCTILE IRON CONFORMING WITH AWWA SPEC. C-151 CLASS 52 IN SIZES 4"-16" AND PSI CLASS 350 FOR 20" AND ABOVE.

3. ALL WATER VALVES MUST OPEN LEFT. ALL VALVE BOX LIDS MUST BE *NEENAH NF-19130002, OR EQUAL.*

4. A CONCRETE SLAB MUST BE PROVIDED AT FINAL GRADE AROUND ALL MAIN VALVE BOXES. THE SLABS MUST BE EIGHTEEN INCHES (18") SQUARE /CIRCLE AND NINE INCHES (9") THICK. PRE-CAST SLABS SHALL NOT BE ALLOWED.

5. WATER AND SEWER LINES SHALL HAVE A MINIMUM OF TEN FEET (10') HORIZONTAL SEPARATION AND/ OR TWO FEET (2') VERTICAL SEPARATION.

6. NO GATE VALVE, METER PIT, BLOW OFF OR CORPORATION STOP SHALL BE LOCATED UNDER OR WITHIN THREE FEET (3') OF DRIVEWAYS, ROADWAYS OR SIDEWALKS.

7. NO DRIVEWAY SHALL BE INSTALLED WITHIN FIVE FEET (5') OF A FIRE HYDRANT.

8. A MINIMUM OF THREE FEET (3') IS REQUIRED BETWEEN CORPORATION STOPS. NO TAP SHALL BE MADE WITHIN THREE (3') OF A BELL.

9. THE LOCATION OF WATER SERVICE LATERALS MUST BE STAMPED IN THE CURB AT THE TIME THE CURB IS PLACED TO PERMANENTLY INDICATE THE LOCATION OF SAID LATERALS.

10. THE LOCATION OF ALL WATER SERVICE LATERALS MUST BE PROVIDED ON THE AS-BUILT PLANS.

11. CONTRACTOR SHALL SUBMIT AS-BUILT PLANS OF SANITARY AND WATER LATERALS TO THE OWNER.

12. ALL WATER MAINS CROSSING UNDER STORM DRAINS SHALL BE BACK-FILLED WITH GRANULAR MATERIAL, O.D.O.T. ITEM 310.02, BETWEEN MAINS AND DRAINS.

WATER GENERAL NOTES

VILLAGE OF MORROW, OHIO *STANDARD CONSTRUCTION DRAWING*	SCALE: *AS SHOWN* DATE: *1-17-11*	STANDARD NUMBER: **STD-121**

WATER

13. EACH SERVICE LATERAL MUST BE A CONTINUOUS PIECE OF PIPE FROM THE CORP STOP TO THE METER. COUPLINGS SHALL NOT BE ALLOWED. TYPE K CPPPER SHALL BE USED FOR 3/4" AND 1" SERVICES. POLYETHYLENE 200 PSI (COPPER TUBE SIZE) MAY BE USED FOR 1 1/2" AND 2" SERVICES. TRACER WIRE MUST BE USED WITH POLY AND SDR 21.

14. SERVICE LINES 1" AND LARGER MUST BE EITHER TYPE K COPPER, POLY 200 PSI (ASTM D-2737) OR SDR 21 (SLIP JOINT) (ASTM-2241). TRACER WIRE MUST BE TAPED EVENLY EVERY 3' ON POLY AND SDR 21 FROM THE METER PIT INTO THE STRUCTURE BEING SERVED (A 3' LEAD IS REQUIRED INSIDE THE PIT).

14.A. 1 1/2" AND 2" SERVICE LINES FROM THE CORP STOP TO THE METER PIT MUST BE TYPE K COPPER OR POLYETHYLENE 200 PSI. POLY MUST HAVE A TRACER WIRE. *SEE STD-112.*

15. FIRE HYDRANTS MUST BE PROVIDED AT THE ENTRANCE TO ALL SUBDIVISIONS AND AT ALL STREET INTERSECTIONS.

16. YARD HYDRANT-MURDOCK BFHE-10 3/4", WITH BFH FEATURES AND VACUUM BREAKER PERMANENTLY ATTACHED TO OUTLET, WITH DOUBLE BALL CHECK VALVE ON DRAIN.

17. A BACKFLOW PREVENTION DEVICE MUST BE INSTALLED ON ALL WATER SERVICE LATERALS BY THE PROPERTY OWNER IMMEDIATELY UPON ENTRY TO THE STRUCTURE TO BE SERVED, PRIOR TO ANY POINT OF CONNECTION OR USAGE. THE FOLLOWING DEVICES SHALL BE REQUIRED:

i) FOR RESIDENTIAL DWELLING UNITS (3 FAMILY OR LESS), A DOUBLE CHECK VALVE COMPLYING WITH A.S.S.E. NO. 1024 MUST BE PROVIDED (WATTS REGULATOR COMPANY MODEL NO. 7 OR EQUAL).

ii) FOR ALL OTHER USERS, A REDUCED PRESSURE PRINCIPAL PRESSURE REDUCING VALVE (TRIPLE CHECK VALVE) COMPLYING WITH A.S.S.E. NO. 1013 MUST BE PROVIDED (WATTS REGULATOR COMPANY MODEL NO. 909 OR EQUAL).

18. SWAB PIPE WITH 50 PPM CHLORINE SOLUTION BEFORE INSTALLATION.

19. ALL NEW WATER MAINS SHALL BE PRESSURE TESTED FOR 2 HOURS AT 1.5 TIMES THE OPERATING PRESSURE OR AT 150 PSI, WHICHEVER IS GREATER. ALLOWABLE LEAKAGE SHALL BE PER TABLE 6A OF AWWA C-600.

20. DEDUCT METERS SHALL NOT BE ALLOWED.

21. NO IRRIGATION CONNECTIONS SHALL BE ALLOWED IN THE METER PIT.

22. BACK FLOW PREVENTER TO BE INSTALLED AHEAD OF ANY SPRINKLER BUT NOT IN METER PIT.

23. ALL MATERIALS USED SHALL BE AMERICAN MADE.

WATER GENERAL NOTES

VILLAGE OF MORROW, OHIO *STANDARD CONSTRUCTION DRAWING*	SCALE: *AS SHOWN* DATE: *1-17-11*	STANDARD NUMBER: **STD-121A**

PROCEDURE FOR CONNECTION TO EXISTING WATER SYSTEM

1. MUST NOTIFY THE VILLAGE OF MORROW WATER DEPARTMENT THREE (3) DAYS IN ADVANCE OF ANY SHUT DOWN. THE VILLAGE WILL ISSUE THE SHUT DOWN NOTIFICATION AND/OR BOIL ADVISORY TO AFFECTED CUSTOMERS PER OHIO EPA REQUIREMENTS IF DETERMINED NECESSARY BY THE VILLAGE.

2. EXPOSE EXISTING MAIN AT PROPOSED CONNECTION POINT. NO WET TAP SHALL BE MADE WITHIN THREE (3) FEET OF A BELL OR PIPE CONNECTION.

3. VILLAGE PERSONNEL TO OPERATE CLOSING OF APPROPRIATE VALVES TO ISOLATE LINE TO BE TAPPED.

4. INSTALL PROPER TAPPING SLEEVE AND TAPPING VALVE. THE TAPPING SLEEVE AND VALVE SHALL BE TESTED AT 200 PSI FOR A PERIOD OF AT LEAST 5 MINUTES. THE PIPE SLUG MUST BE REMOVED AND INSPECTED BY VILLAGE PERSONNEL.

5. IF THE TAPPING SLEEVE AND VALVE WILL BE UNDER FUTURE PAVEMENT, THE BURIED VALVE MUST BE LEFT OPEN AND A NEW VALVE SET OUT OF PAVEMENT.

6. FIELD CUT EXISTING MAIN AS NECESSARY TO ACCOMMODATE TEE AND CLOSE COUPLED VALVES AT EACH END OF TEE. CARE IS TO BE TAKEN SO AS NOT TO GET DIRT IN EXISTING MAIN.

7. THOROUGHLY CLEAN AND DISINFECT PIPE AND APPURTENANCES TO BE INSTALLED.

8. INSTALL TEE AND VALVES – DRESSER COUPLINGS CAN BE USED IF NECESSARY. PROPOSED MAIN VALVE IS TO BE CAPPED AND SHUT OFF. EXISTING MAIN IS THEN TO BE RETURNED TO SERVICE BY VILLAGE PERSONNEL.

9. CONSTRUCTION OF PROPOSED MAIN IS TO BE COMPLETED WITHIN A JOINT OF CONNECTION TO TEE AND VALVES INSTALLED ABOVE.

10. ENTIRE LINE IS TO BE PRESSURE TESTED AND DISINFECTED TO VILLAGE STANDARDS.

11. ENTIRE LENGTH OF PIPE IS TO BE THOROUGHLY CLEANED AND DISINFECTED PRIOR TO INSTALLATION.

12. NEW MAIN IS TO BE PUT INTO SERVICE BY VILLAGE PERSONNEL.

PROCEDURE FOR CONNECTION TO EXISTING WATER SYSTEM

VILLAGE OF MORROW, OHIO *STANDARD CONSTRUCTION DRAWING*	SCALE: *AS SHOWN* DATE: *1–17–11*	STANDARD NUMBER: **STD-122**

PROCEDURE FOR RELOCATING OR LOWERING SERVICE LATERAL
AND RELOCATING OR BRINGING TO GRADE METER PITS

1. ALL AFFECTED USERS MUST BE NOTIFIED FORTY-EIGHT (48) HOURS IN ADVANCE AS TO THE TIME AND DURATION OF THE SHUTOFF. ANY DISCONTINUANCE OF SERVICE MUST BE COORDINATED THROUGH THE VILLAGE PRIOR TO ANY SHUT DOWN.

2. ALL WORK MUST BE PERFORMED ACCORDING TO ALL VILLAGE OF MORROW SPECIFICATIONS, PARTICULARLY STD-111, STD-112 AND STD-114.

3. EACH SERVICE LATERAL MUST BE A CONTINUOUS PIECE OF PIPE FROM THE CORP STOP TO THE METER. COUPLINGS SHALL NOT BE PERMITTED. TYPE K COPPER SHALL BE USED FOR 3/4" AND 1" SERVICES. POLYETHYLENE 200 PSI MAY BE USED FOR 1 1/2" AND 2" SERVICES.

4. METER PITS MUST BE ADJUSTED TO GRADE USING RING RISERS OR PIT RISERS. METERS MUST BE ADJUSTED WITH METER RESETTERS (FORD V42).

5. ALL PROCEDURES MUST BE DISCUSSED AT A PRECONSTRUCTION MEETING PRIOR TO THE INITIATION OF CONSTRUCTION.

PROCEDURE FOR RELOCATING OR LOWERING SERVICE LATERAL

VILLAGE OF MORROW, OHIO *STANDARD CONSTRUCTION DRAWING*	SCALE: *AS SHOWN* DATE: *1-17-11*	STANDARD NUMBER: **STD-123**

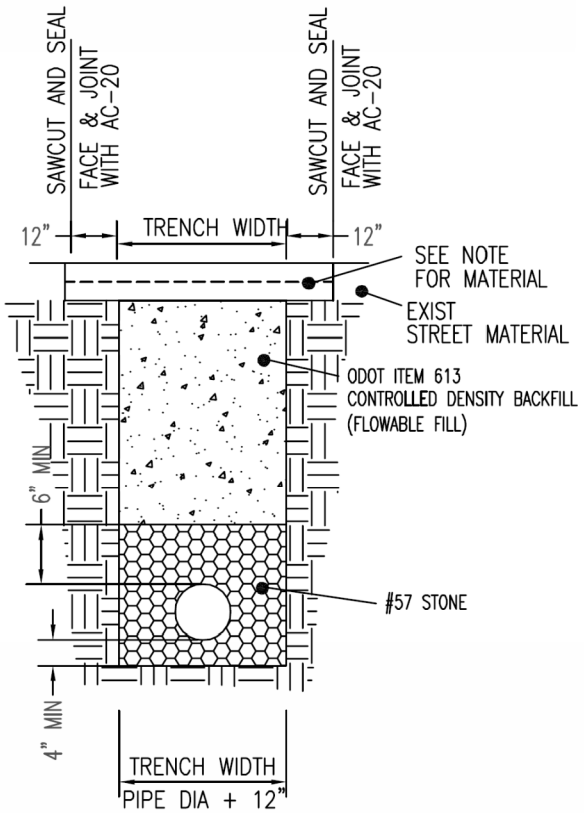
GENERAL NOTES

1. STEEL PLATES SHALL BE PLACED OVER TRENCH WITH CONTROLLED DENSITY FILL FOR A PERIOD OF 24 HOURS PRIOR TO PLACING CONCRETE OR ASPHALT

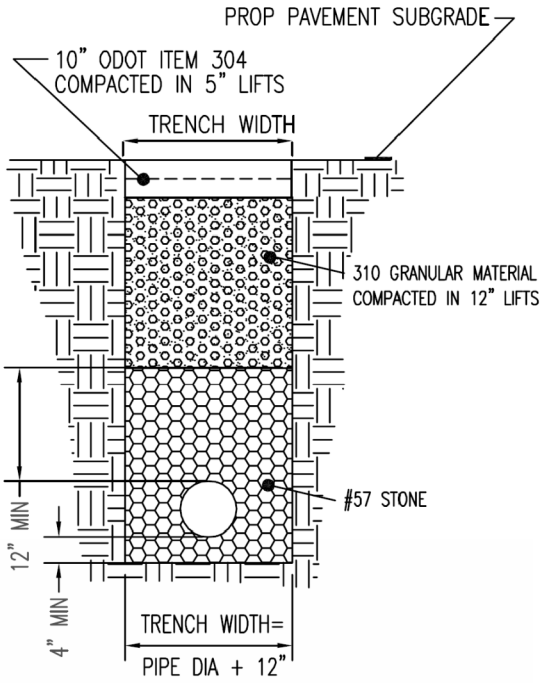
2. CONCRETE STREETS SHALL BE REPLACED WITH A MINIMUM OF 8" CONCRETE or REPLACED WITH THE (EXISTING THICKNESS + 2") CONCRETE, WHICHEVER IS GREATER

3. ASPHALT STREETS SHALL BE REPLACED WITH 1 3/4" ODOT ITEM 448 LEVELING COURSE AND 1 1/4" ODOT ITEM 448 or EXISTING PAVEMENT THICKNESS, WHICHEVER IS GREATER

4. CONTRACTOR SHALL OBTAIN A RIGHT-OF-WAY PERMIT FROM THE VILLAGE PRIOR TO PERFORMING ANY WORK.



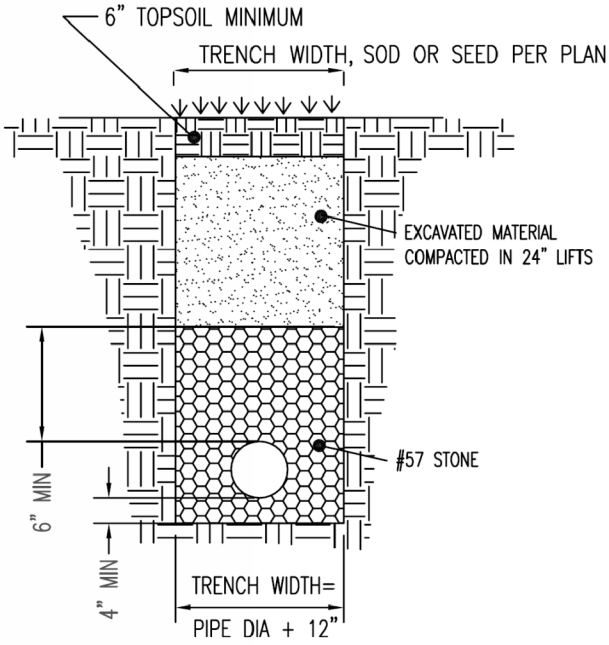
EXISTING STREET CROSSING



INSTALLATION WITHIN PROPOSED ROADWAY

ROADWAY TRENCH

VILLAGE OF MORROW, OHIO *STANDARD CONSTRUCTION DRAWING*	SCALE: *AS SHOWN* DATE: *1-17-11*	STANDARD NUMBER: **STD-300**



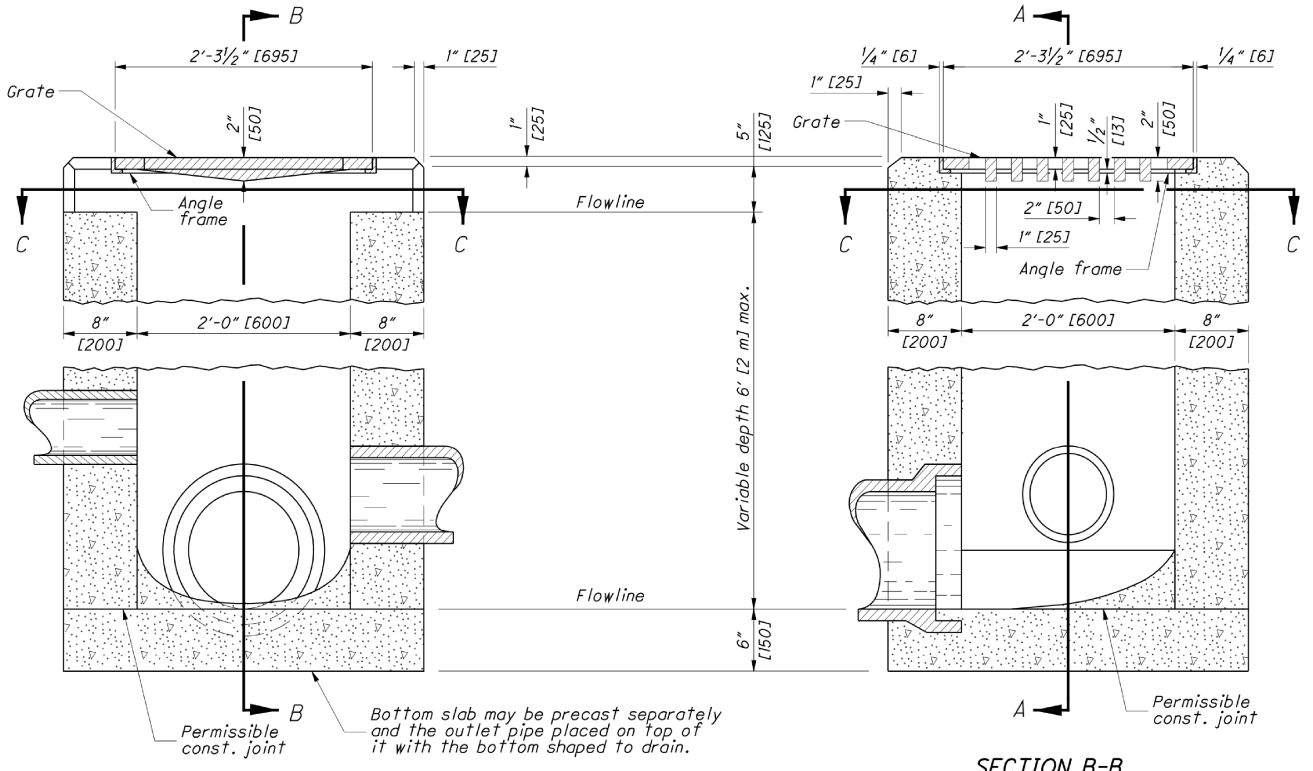
NON-ROADWAY TRENCH

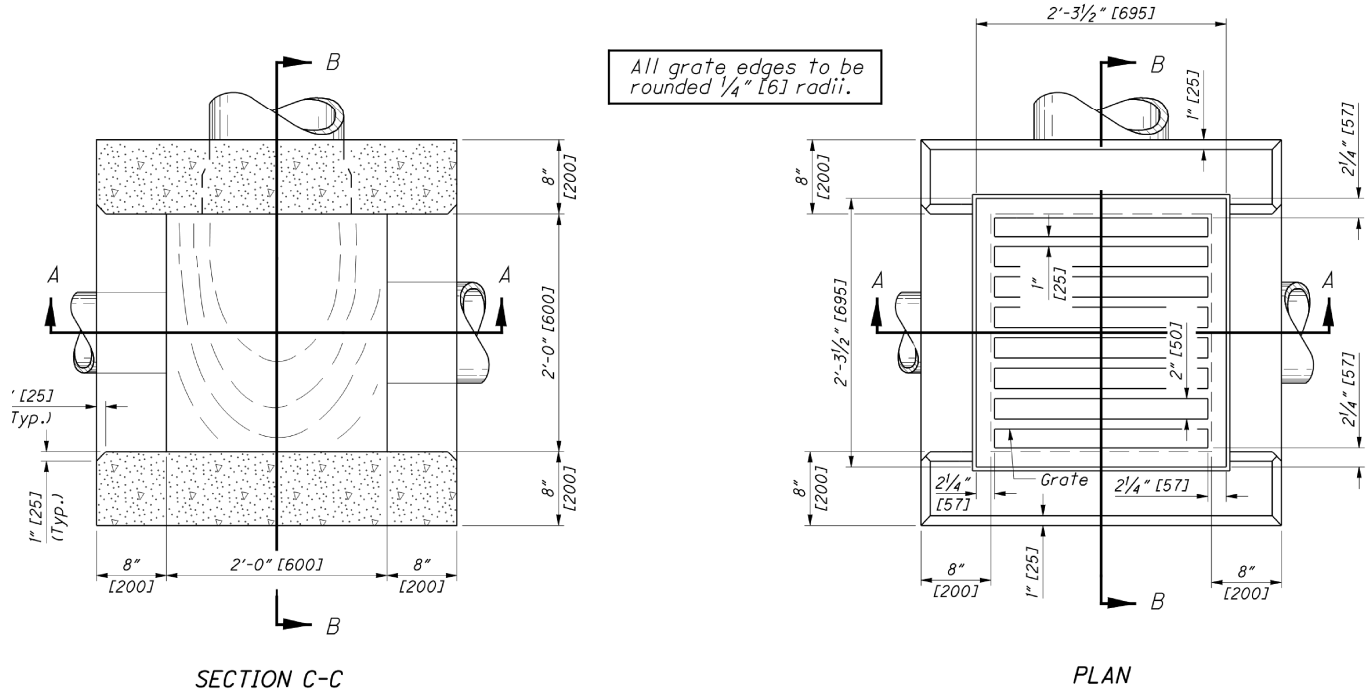
VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

SCALE: AS SHOWN

DATE: 1-17-11

STANDARD NUMBER: STD-301





CATCH BASIN No. 2-2A

CATCH BASIN No. 2-2A

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

SCALE:	STANDARD NUMBER:
AS SHOWN	STD-302
DATE: 1-17-11	

NOTES

GENERAL: Catch Basins 2-2A and 2-2B are not intended for traffic bearing applications.

CATCHBASINS 2-2A &B: This sheet depicts Catch Basin 2-2A. See Sheet 2 of 2 for Catch Basin 2-2B.

GRATE AND FRAME: The design shall be essentially the same and equally as strong as the one shown (see Construction Information table), or meet the requirements of CMS 711.14. Grate openings and dimensions shall not differ from those shown here unless otherwise shown in the plans.

As of January 1, 2003, the following text shall be cast into the top of the grate:

"DUMP NO WASTE" and **"DRAINS TO WATERWAY"**

Text shall be printed in bold, capital letters with a minimum height of ½". "WATERWAY" may be substituted with "STREAM", "RIVER", "LAKE", etc. Actual placement and logo may vary per manufacturer.

WALLS: Brick or cast-in-place walls have a nominal thickness of 8" [200]. Precast walls shall have a minimum thickness of 6" [150] and be reinforced sufficiently to permit shipping and handling without damage. Brick shall not be used above the flow line of the side opening for Type 2-2A.

CONCRETE: Cast-in-place concrete is to be Class C. All precast concrete shall meet the requirements of CMS 706.13 and marked with the catch basin number.

PRECAST BASE: If a precast base is used, it shall be set deep enough so that the top can be placed on the base to provide the grate elevation specified in the plans. Layers of brick shall not be used to adjust the top elevation.

LOCATION AND ELEVATION: When given on the plans, location is the top center of the grate and the elevation is the flow line of the side inlet.

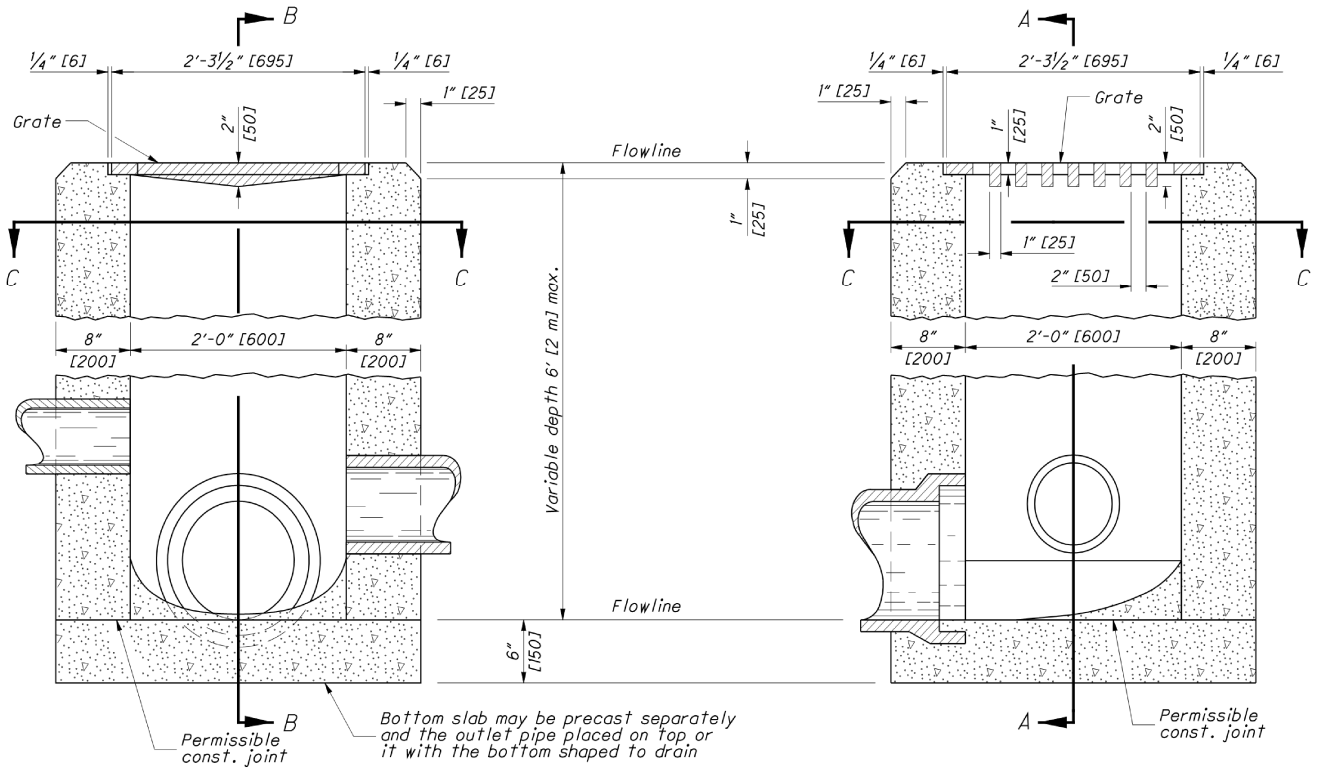
MINIMUM DEPTH: The minimum depth of CB No. 2-2A shall be the outside diameter (O.D.) of the outlet pipe plus 7" [175].

OPENINGS: Any pipe openings greater than 4" [100] from the outside of the pipe to the structure require the Engineer's approval. Fill any voids per CMS 604.

2-2A SIDE INLETS: Inlets shall be provided on both sides of the No. 2-2A catch basin in sags and on upstream side only where the ditch has a continuous down grade past the catch basin. CB 2-2A's shall not be used within the Clear Zone. The flow line should be 4" to 6" [100 to 150] below normal ditch returning to normal 10' to 15' [3 m to 5 m] each side of the inlet.

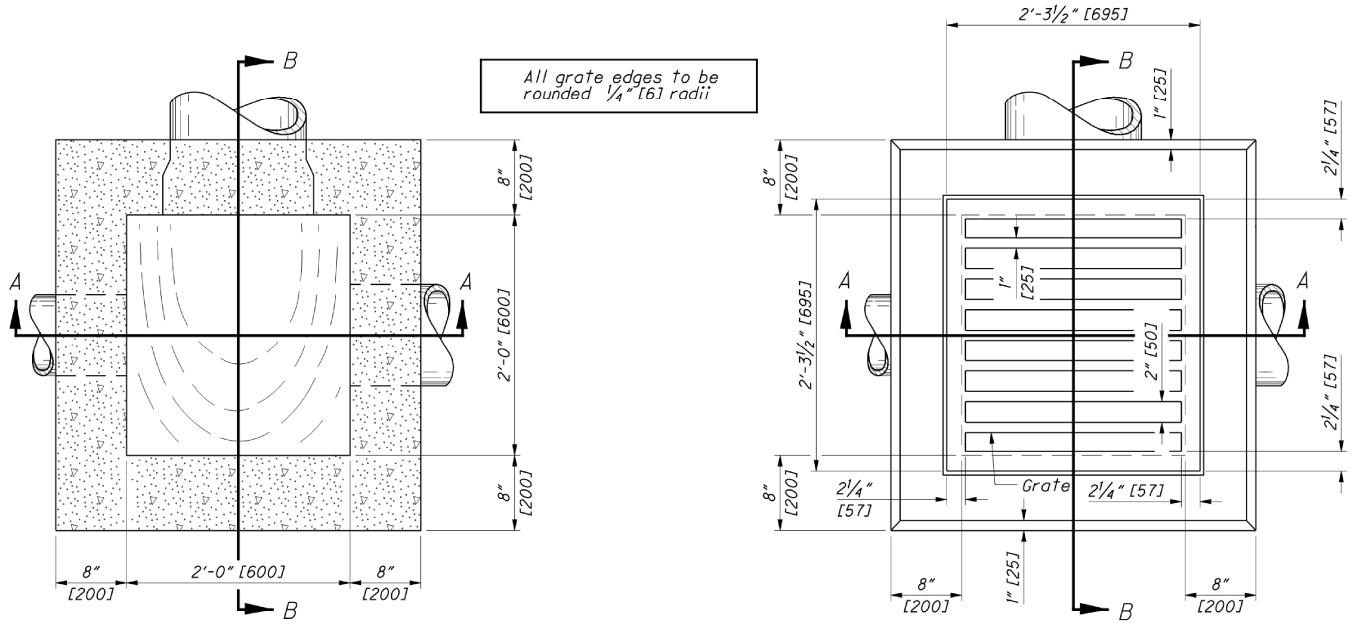
CATCH BASIN No. 2-2A

VILLAGE OF MORROW, OHIO STANDARD CONSTRUCTION DRAWING	SCALE: AS SHOWN DATE: 1-17-11	STANDARD NUMBER: **STD-302A**



SECTION A-A

SECTION B-B



SECTION C-C

PLAN

CATCH BASIN No. 2-2B

CATCH BASIN No. 2-2B

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

SCALE: AS SHOWN

DATE: 1-17-11

STANDARD NUMBER: **STD-303**

NOTES

CATCH BASINS 2-2A & B: This sheet depicts Catch Basin 2-2B. See Sheet 1 of 2 for Catch Basin 2-2A.

GRATE: The design shall be essentially the same and equally as strong as the one shown (see Construction Information table), or meet the requirements of CMS 711.14. Grate openings and dimensions shall not differ from those shown here unless otherwise shown in the plans.

If necessary, bicycle safe grates shall be specified in the plans. Bicycle safe grates shall be Neenah No. R-4859-C or East Jordan No. 5110 Type M3 or approved equals.

As of January 1, 2003, the following text shall be cast into the top of the grate:

"DRAINS TO WATERWAY" and **"DUMP NO WASTE"**

Text shall be printed in bold, capital letters with a minimum height of ½". "WATERWAY" may be substituted with "STREAM", "RIVER", "LAKE", etc. Actual placement and logo may vary per manufacturer.

WALLS: Brick or cast-in-place walls have a nominal thickness of 8" [200]. Precast walls shall have a minimum thickness of 6" [150] and be reinforced sufficiently to permit shipping and handling without damage.

CONCRETE: Cast-in-place concrete is to be Class C. All precast concrete shall meet the requirements of CMS 706.13 and marked with the catch basin number.

PRECAST BASE: If a precast base is used, it shall be set deep enough so that the top can be placed on the base to provide the grate elevation specified in the plans. Layers of brick shall not be used to adjust the top elevation.

LOCATION AND ELEVATION: When given on the plans, location and elevation are at the top center of the grate. When side openings are provided, the elevation shall be at the flow line of the side inlet.

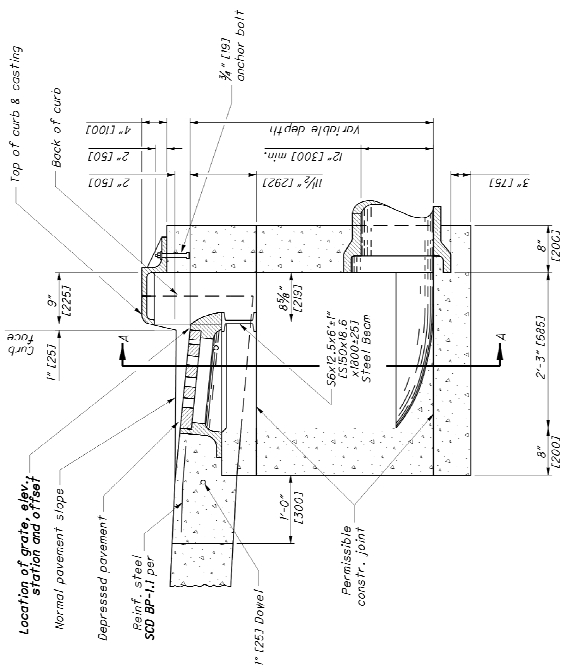
MINIMUM DEPTH: The minimum depth of CB No. 2-2B shall be the outside diameter (O.D.) of the outlet pipe plus 4" [100].

2-2B GRATE ELEVATION: Grate elevation is to be placed 4" to 6" [100 to 150] below normal ditch returning to normal 10' to 15' [3 m to 5 m] each side of inlet.

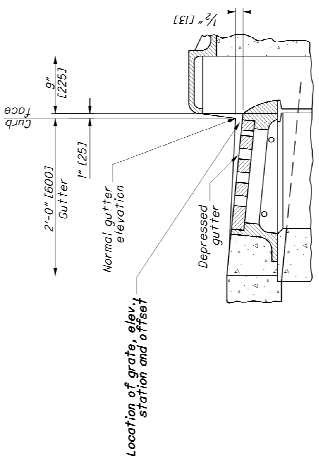
OPENINGS: Any pipe openings greater than 4" [100] from the outside of the pipe to the structure require the Engineer's approval. Fill all voids per CMS 604.

CATCH BASIN No. 2-2B

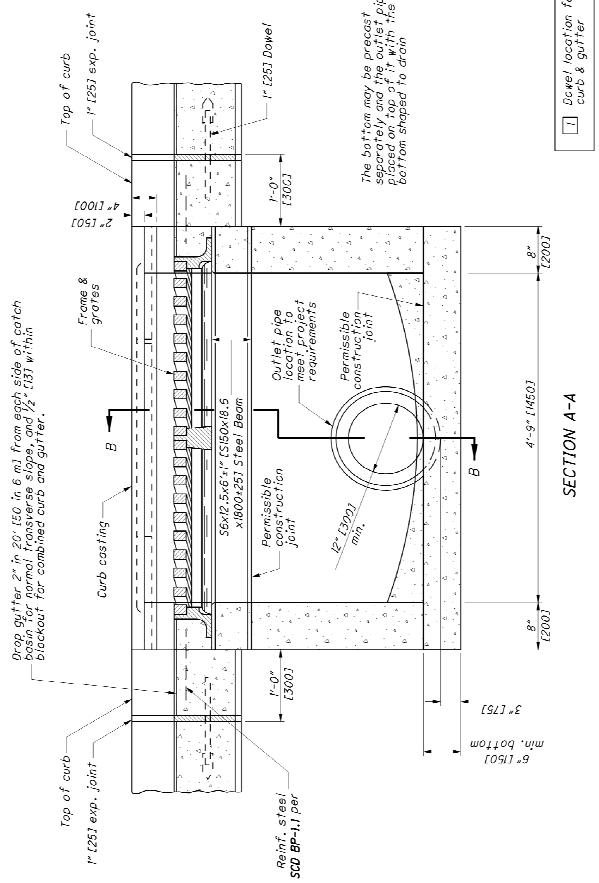
VILLAGE OF MORROW, OHIO STANDARD CONSTRUCTION DRAWING	SCALE: AS SHOWN DATE: 1-17-11	STANDARD NUMBER: **STD-303A**



SECTION B-B
WITH CURB
(2" [50] DEPRESSION)

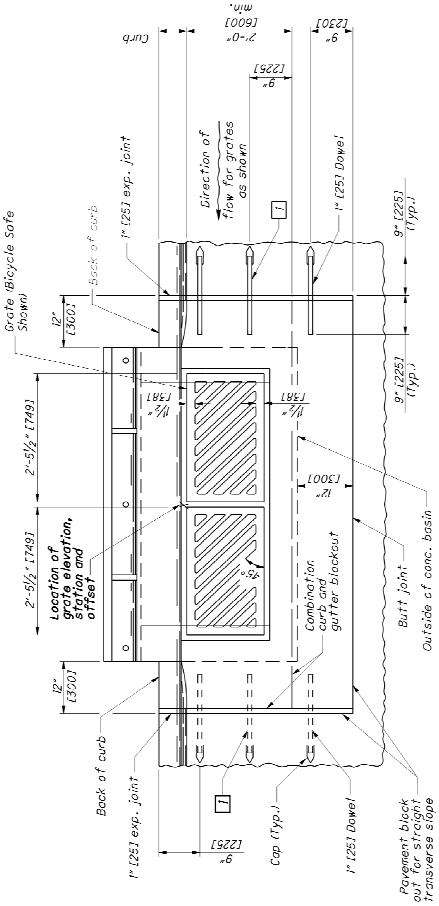


SECTION B-B
WITH CURB & GUTTER
(½" [13] DEPRESSION)



SECTION A-A

1 Dowel location for curb & gutter



PLAN OF CATCH BASIN AND PAVEMENT JOINTS

CATCH BASIN No. 3

CATCH BASIN NO. 3

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

SCALE: AS SHOWN

DATE: 1-17-11

STANDARD NUMBER:

STD-304

NOTES

GRATES: Two required. For details, see **SCD CB-2.2.** Grate "Y" shall be provided unless the plans specifically require the diagonal grate. If the diagonal grate is specified, it shall be placed so that the diagonal bars direct drainage flow toward the curb.

CASTINGS: The design shall be essentially the same and equally as strong as shown.
Minimum weight [mass]:

Curb Casting . . . . . 305 lbs. [138 kg]
Two Grates . . . . . 254 lbs. [115 kg],
Frame . . . . . 590 lbs. [267 kg], and
Two Grate "Y" . . . . 210 lbs. [95 kg].

Lighter weight frames and grates that meet the requirements of CMS 711.14 may also be provided. Grate openings and dimensions shall not differ from those shown, unless otherwise shown in the plans.

The following text shall be cast into the top of the curb casting:

"DUMP NO WASTE" and **"DRAINS TO WATERWAY"**

Text shall be printed in bold, capital letters with a minimum height of ¾". See example on Plan & Section. "WATERWAY" may be substituted with "STREAM", "RIVER", "LAKE", etc. Actual placement and logo may vary per manufacturer.

BEARING AREAS: The frame and grate shall be so fitted and finished as to provide a firm and even seat. No projections shall exist on bearing areas and the grate shall seat in its frame without rocking.

WALLS: When used in place of concrete, brick side walls shall be 8" [200] nominal thickness.

PRECAST CONSTRUCTION: Permitted, except for the apron. Concrete shall meet requirements of CMS 706.13. Precast walls shall have a minimum thickness of 6" [150] and reinforcing shall be sufficient to permit shipping and placement without damage. The wall thickness reduction shall be from the outside.

MINIMUM DEPTH: The minimum depth is per the cover requirements for that pipe type.

OPENINGS: Any pipe openings greater than 4" [100] from the outside of the pipe to the structure require the Engineer's approval. Fill all voids per CMS 604.

DOWELS: Four 1"x18" [25x450] dowels are required for concrete pavement or gutter blockout. See **SCD BP-2.2** for dowel details.

BLOCKOUT: Blockouts shall be paved with Class C concrete in PCC pavement or gutter, and paid for as part of the pavement or gutter with no deduction in pavement, curb or gutter quantities because of the castings. A Class C concrete apron, the size of the 2'-0" [600] gutter blockout, shall be cast-in-place in asphalt pavement (no dowels required) with the cost included in the catch basin bid price. No deduction to be made in curb quantities.

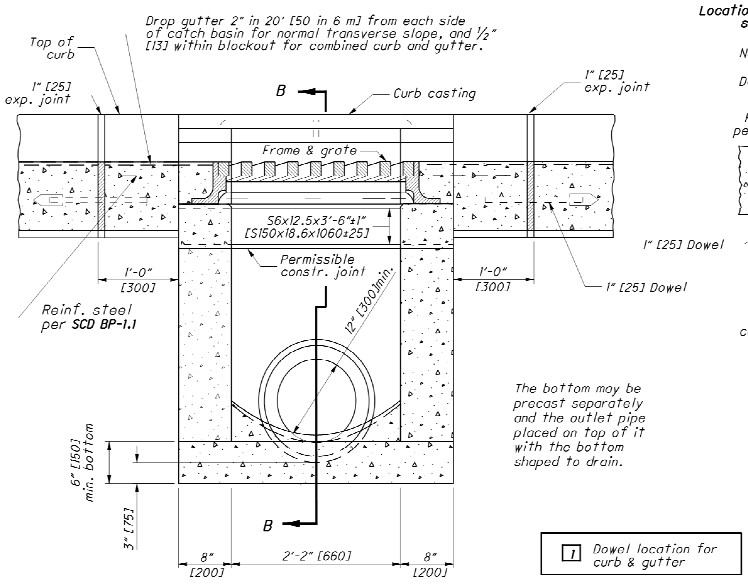
CATCH BASIN NO. 3

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

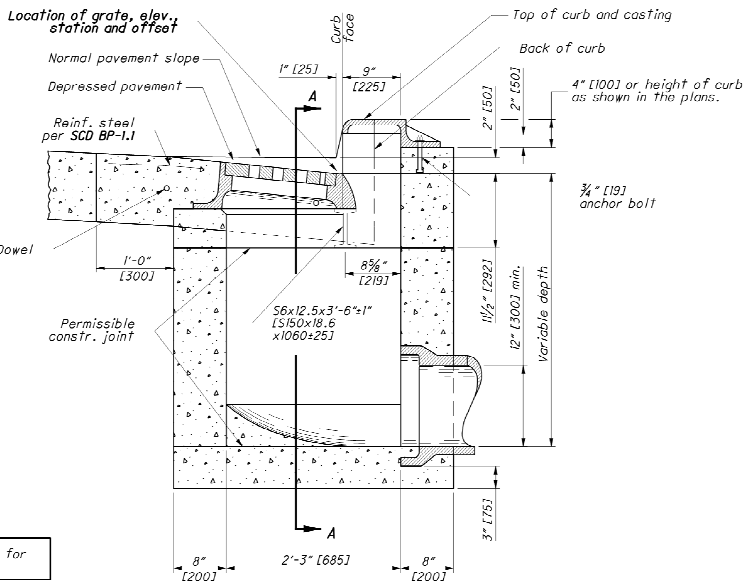
SCALE: AS SHOWN

DATE: 1-17-11

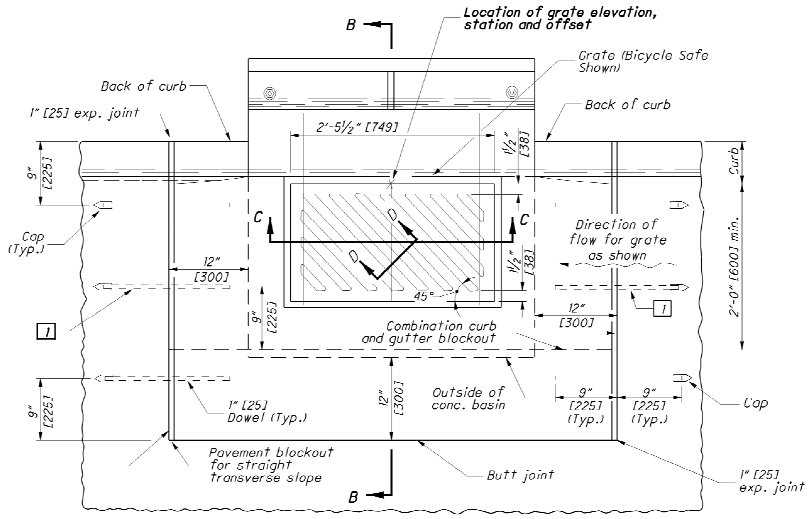
STANDARD NUMBER: **STD-304A**



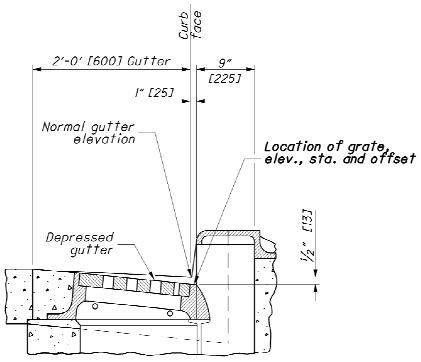
SECTION A-A



SECTION B-B
WITH CURB
(2" [50] DEPRESSION)



PLAN OF CATCH BASIN AND PAVEMENT JOINTS
(For SECTIONS C-C and D-D, see Sht. 2/2)



SECTION B-B
WITH CURB & GUTTER
(½" [13] DEPRESSION)

CATCH BASIN No. 3A

CATCH BASIN No. 3A

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

SCALE: AS SHOWN

DATE: 1-17-11

STANDARD NUMBER: **STD-305**

NOTES

GRATE: The Grate "V" shall be provided unless the plans specifically require the diagonal grate. If the diagonal grate is specified, it shall be placed so that the diagonal bars direct drainage flow toward the curb. (See Sht. 2/2.)

CASTINGS: The design shall be essentially the same and equally as strong as those shown. Minimum weight [mass]:

Curb Casting . . . . . 170 lbs. [77 kg]
Standard Grate . . . . 127 lbs. [57 kg],
Frame . . . . . 320 lbs. [145 kg], and
Grate "V" . . . . . 105 lbs. [47 kg].

Lighter weight frames and grates that meet the requirements of CMS 711.14 may also be provided. Grate openings and dimensions shall not differ from those shown unless otherwise shown in the plans.

The following text shall be cast into the top of the curb casting:

"DUMP NO WASTE" and **"DRAINS TO WATERWAY"**

Text shall be printed in bold, capital letters with a minimum height of ¾". See example on Plan (Sht. 2/2). "WATERWAY" may be substitufed with "STREAM", "RIVER","LAKE", etc. Actual placement and logo may vary per manufacturer.

BEARING AREAS: The frame and grate shall be so fitted and finished as to provide a firm and even seat. No projections shall exist on bearing areas of either casting, and the grate shall seat in its frame without rocking.

WALLS: When used in place of concrete, brick side walls shall be 8" [200] nominal thickness.

PRECAST CONSTRUCTION: Permitted, except for the apron. Concrete shall meet the requirements of CMS 706.13. Precast walls shall have a minimum thickness of 6" [150] and reinforcing shall be sufficient to permit shipping and placement without damage. The wall thickness reduction shall be from the outside.

MINIMUM DEPTH: The minimum depth is per the cover requirements for that pipe type.

OPENINGS: Any pipe openings greater than 4" [100] from the outside of the pipe to the structure require the Engineer's approval. Fill all voids per CMS 604.

DOWELS: Four 1"x18" [25x450] dowels are required for concrete pavement or gutter blockout. See **SCD BP-2.2** for dowel details.

BLOCKOUT: Blockouts shall be paved with Class C concrete in PCC pavement or gutter and paid for as a part of the pavement or gutter with no deduction in pavement, curb or gutter quantities because of the castings. A Class C concrete apron the size of the 2'-0" [600] gutter shall be cast-in-place in asphalt pavement (no dowels required) with the cost included in the catch basin bid price. No deduction to be made in curb quantities.

PAYMENT: All materials and labor, including excavation and backfilling, shall be paid for under **Item 604 - Catch Basin, No. 3A.**

CATCH BASIN No. 3A

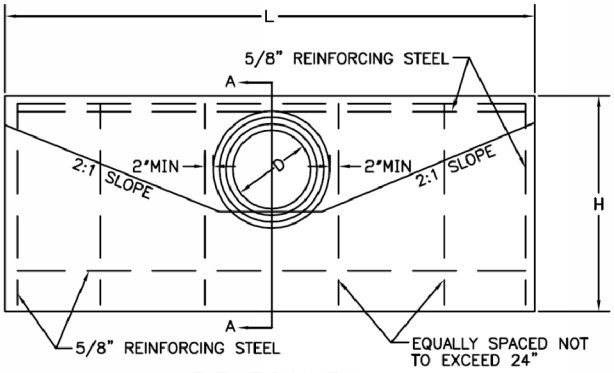
VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

SCALE: AS SHOWN

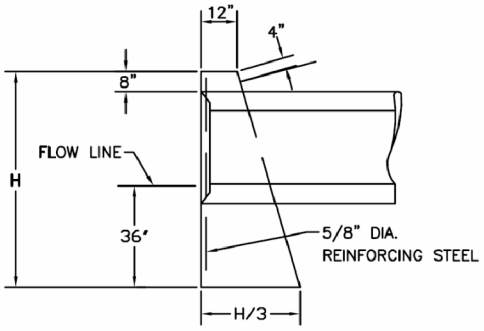
DATE: 1-17-11

STANDARD NUMBER:

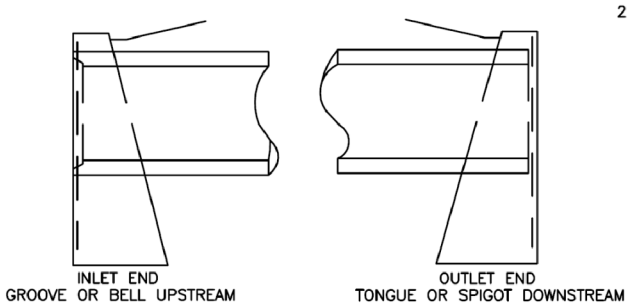
STD-305A



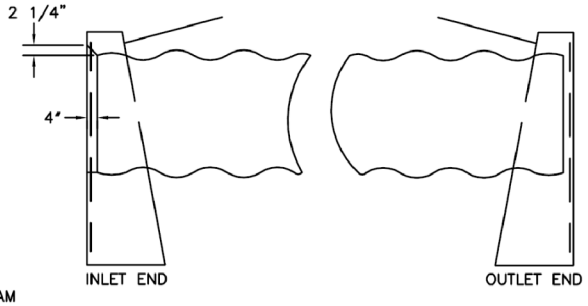
ELEVATION VIEW



SECTION A–A



RIGID PIPE



CORRUGATED PIPE

END TREATMENT AT HEADWALL

ALL INLET AND OUTLET CHANNELS ARE TO BE PROTECTED FROM EROSION USING SILT FENCE, CHECK DAMS AND/OR RIP/RAP AS SHOWN ON THE APPROVED PLANS OR AS DIRECTED BY THE *VILLAGE*.

L CIRCULAR SECTIONS = 5D + 4T
L ELLIPTICAL OR PIPE–ARCH = 4R + 4T + S
H CIRCULAR SECTIONS = D + T + 44"
H ELLIPTICAL OR PIPE–ARCH = R + T + 44"
D = DIAMETER OF PIPE
R = RISE OF PIPE
S = SPAN OF PIPE
T = THICKNESS OF BARREL
L = LENGTH OF HEADWALL
H = HEIGHT OF HEADWALL

DIMENSIONS			QUANTITIES ONE HEADWALL	
DIAMETER	H	L	CONCRETE CU. YDS.	REINFOR–CING STEEL LBS.
15"	5'–2"	7'–0"	1.7	41
18"	5'–5"	8'–4"	2.2	57
21"	5'–8"	9'–8"	2.8	62
24"	5'–11"	11'–0"	3.3	69
30"	6'–5"	13'–8"	4.7	92
36"	7'–0"	16'–4"	6.5	105

NOTES

TYPE "A" HEADWALL HEADWALL WHERE REQUIRED WILL BE PROVIDED FOR NONSKEWED CULVERTS HAVING A DIAMETER OR RISE OF 36 INCHES OR LESS.

CONCRETE SHALL BE CLASS "C". (4000 psi)

REINFORCING STEEL BARS SHALL BE 5/8 INCH DIAMETER.

DIMENSIONS AND QUANTITIES ARE SHOWN FOR CIRCULAR SECTIONS ONLY. IT WILL BE NECESSARY TO DETERMINE DIMENSIONS FOR THE TYPE "A" HEADWALL REQUIRED FOR REINFORCED ELLIPTICAL CONCRETE PIPE OR CORRUGATED METAL PIPE ARCHES IN ACCORDANCE WITH THE EQUATIONS LISTED ON THIS DRAWING.

CHAMFER ALL EXPOSED CORNERS 3/4 INCH.

WHERE THE SOIL BORINGS INDICATE A BEARING CAPACITY OF LESS THAN 2600 POUNDS PER SQUARE FOOT, IT WILL BE NECESSARY TO INCREASE THE WIDTH OF THE BASE.

THE MINIMUM COVER FOR REINFORCING STEEL SHALL BE 2 INCHES.

HEADWALL, TYPE A

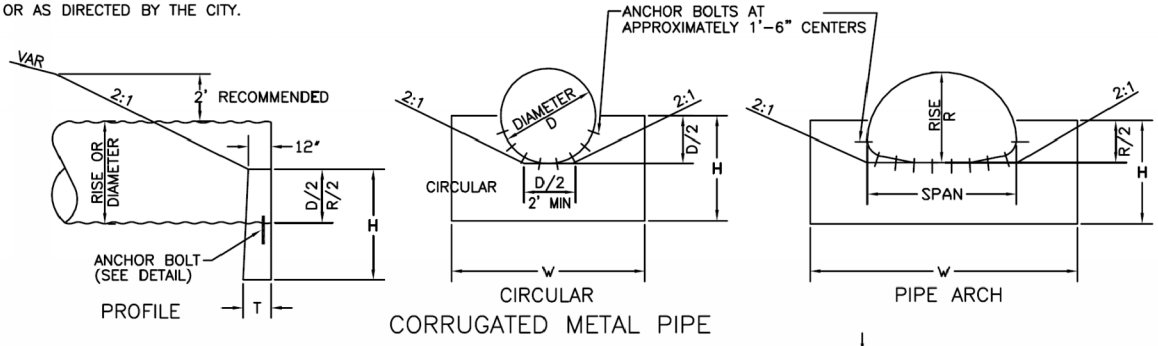
VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

SCALE: *AS SHOWN*

DATE: *1–17–11*

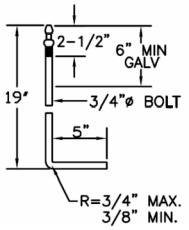
STANDARD NUMBER: **STD-306**

ALL INLET AND OUTLET CHANNELS ARE TO BE OROCTED USING SILT FENCE, CHECK DAMS AND/OR RIP/RAP AS SHOWN ON THE APPROVED PLANS OR AS DIRECTED BY THE CITY.



CORRUGATED METAL PIPE

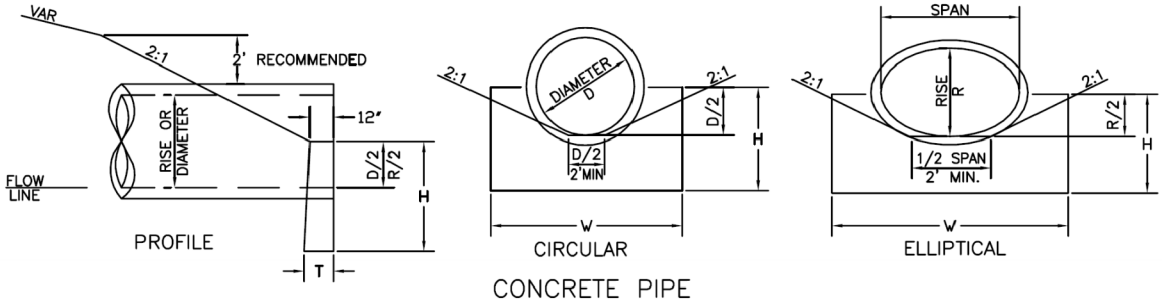
HEADWALL FOR CORRUGATED METAL PIPE										
CIRCULAR					PIPE ARCH					
D	W	H	T	CONC CU. YDS	SPAN	RISE	W	H	T	CONC CU. YDS
12"	2'-0"	3'-0"	12"	.21						
15"	2'-6"	3'-2"	12"	.27	17"	13"	3'-0"	3'-0"	12"	.31
18"	3'-0"	3'-3"	12"	.33	21"	15"	3'-6"	3'-0"	12"	.35
21"	3'-6"	3'-4"	12"	.39	24"	18"	4'-0"	3'-2"	12"	.43
24"	4'-0"	3'-6"	12"	.46	28"	20"	4'-6"	3'-3"	12"	.48
27"	4'-6"	3'-8"	12"	.53						
30"	5'-0"	3'-9"	12"	.60	35"	24"	5'-6"	3'-5"	12"	.61
33"	5'-6"	3'-10"	12"	.68						
36"	6'-0"	4'-0"	12"	.76	42"	29"	6'-6"	3'-7"	12"	.73
39"	6'-6"	4'-2"	12"	.84						
42"	7'-0"	4'-3"	12"	.92	49"	33"	7'-8"	3'-9"	12"	.90
48"	8'-0"	4'-6"	12"	1.10	57"	38"	9'-0"	4'-0"	12"	1.10
54"	9'-3"	4'-9"	12"	1.33						
60"	10'-6"	5'-6"	12"	1.78	64"	43"	10'-0"	4'-4"	12"	1.31
66"	11'-9"	5'-9"	12"	2.06						
72"	13'-0"	6'-0"	12"	2.37	71"	47"	11'-0"	4'-8"	12"	1.54
78"	14'-3"	6'-3"	14"	2.94	77"	52"	11'-8"	5'-3"	12"	1.84
84"	15'-6"	6'-6"	14"	3.30	83"	57"	12'-4"	5'-5"	15"	2.46



ANCHOR BOLT

NOTE: ANCHOR BOLTS FOR ANCHORING UPSTREAM END OF METAL PIPES SHALL MEET ASTM A307. THE TOP 6" MIN OF BOLT SHALL BE GALVANIZED ACCORDING TO ASTM A153.

NUTS SHALL MEET ASTM A325 AND A153 UNLESS OTHERWISE SPECIFIED. ANCHOR BOLTS SHALL BE USED ONLY ON PIPES WITH A SPAN OR RISE GREATER THAN 24 INCHES.



CONCRETE PIPE

HEADWALL FOR CONCRETE PIPE										
CIRCULAR					ELLIPTICAL					
D	W	H	T	CONC CU. YDS	SPAN	RISE	W	H	T	CONC CU. YDS
12"	2'-0"	3'-0"	12"	.20						
15"	2'-6"	3'-2"	12"	.25						
18"	3'-0"	3'-3"	12"	.31	23"	14"	3'-0"	3'-2"	12"	.29
21"	3'-6"	3'-4"	12"	.37	30"					
24"	4'-0"	3'-6"	12"	.43		19"	3'-7"	3'-4"	12"	.35
27"	4'-6"	3'-8"	12"	.49	34"	22"	3'-11"	3'-5"	12"	.38
30"	5'-0"	3'-9"	12"	.56	38"	24"	4'-6"	3'-6"	12"	.44
33"	5'-6"	3'-10"	12"	.62	42"	27"	4'-8"	3'-7"	12"	.45
36"	6'-0"	4'-0"	12"	.69	45"	29"	5'-2"	3'-8"	12"	.49
39"	6'-6"	4'-2"	12"	.77	49"	32"	5'-5"	3'-10"	12"	.52
42"	7'-0"	4'-3"	12"	.84	53"	34"	5'-11"	4'-0"	14"	.66
48"	8'-0"	4'-6"	14"	1.09	60"	38"	6'-10"	4'-2"	14"	.82
54"	9'-3"	4'-9"	14"	1.32	68"	43"	8'-0"	4'-4"	16"	1.01
60"	10'-6"	5'-6"	16"	1.93	76"	48"	9'-2"	5'-0"	16"	1.34
66"	11'-9"	5'-8"	18"	2.42	83"	53"	10'-4"	5'-2"	18"	1.65
72"	13'-0"	6'-0"	18"	2.77	91"	58"	11'-6"	5'-5"	18"	1.97
78"	14'-3"	6'-3"	20"	3.37	98"	63"	12'-7"	5'-7"	20"	2.38
84"	15'-6"	6'-6"	22"	4.05	106"	68"	13'-9"	5'-10"	20"	2.69

NOTES

TYPE "A" HEADWALL HEADWALL WHERE REQUIRED WILL BE PROVIDED FOR NONSKEWED CULVERTS HAVING A DIAMETER OR RISE OF 36 INCHES OR LESS.

CONCRETE SHALL BE CLASS "C". (4000 psi)

REINFORCING STEEL BARS SHALL BE 5/8 INCH DIAMETER.

DIMENSIONS AND QUANTITIES ARE SHOWN FOR CIRCULAR SECTIONS ONLY. IT WILL BE NECESSARY TO DETERMINE DIMENSIONS FOR THE TYPE "A" HEADWALL REQUIRED FOR REINFORCED ELLIPTICAL CONCRETE PIPE OR CORRUGATED METAL PIPE ARCHES IN ACCORDANCE WITH THE EQUATIONS LISTED ON THIS DRAWING.

CHAMFER ALL EXPOSED CORNERS 3/4 INCH.

WHERE THE SOIL BORINGS INDICATE A BEARING CAPACITY OF LESS THAN 2600 POUNDS PER SQUARE FOOT, IT WILL BE NECESSARY TO INCREASE THE WIDTH OF THE BASE.

THE MINIMUM COVER FOR REINFORCING STEEL SHALL BE 2 INCHES.

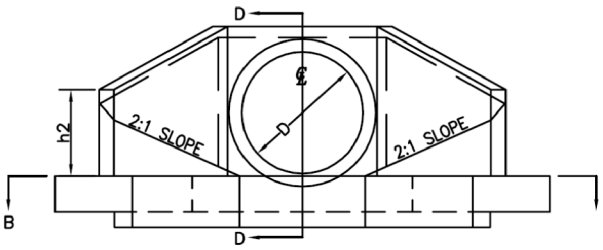
HEADWALL, TYPE B

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

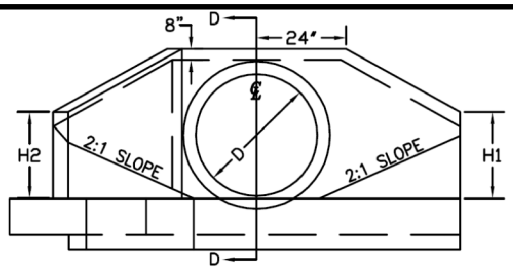
SCALE: AS SHOWN

DATE: 1-17-11

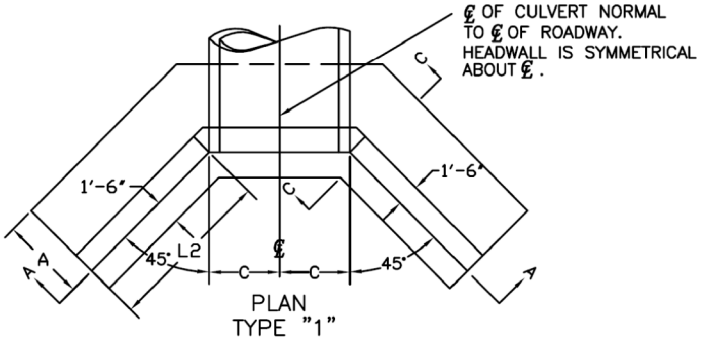
STANDARD NUMBER: STD-307



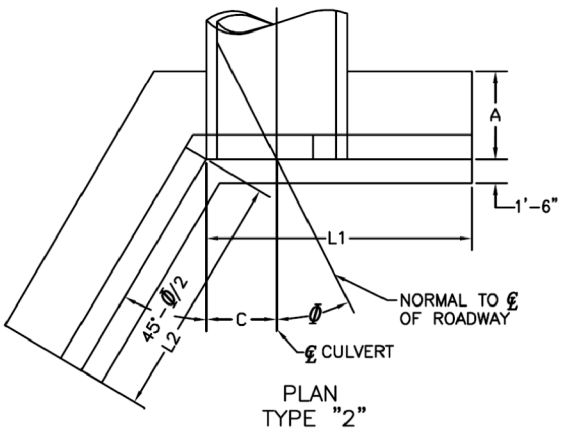
ELEVATION



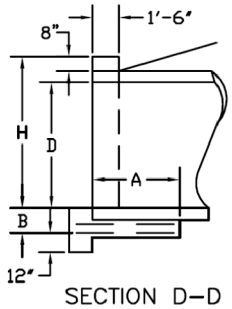
ELEVATION



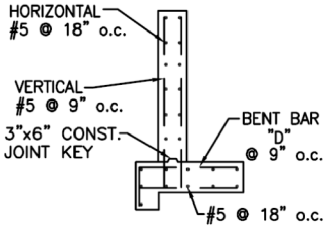
PLAN
TYPE "1"



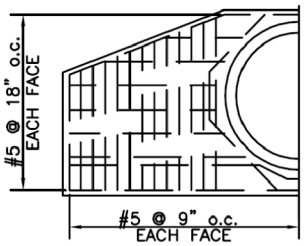
PLAN
TYPE "2"



SECTION D–D



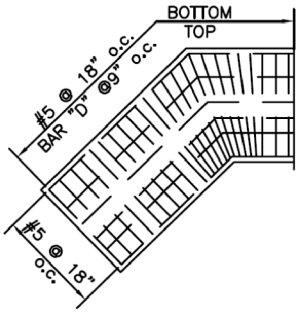
SECTION C–C



HALF–SECTION A–A

NOTES

1) TYPE C HEADWALL WHERE REQUIRED WILL BE PROVIDED FOR SKEWED AND NONSKEWED CULVERTS HAVING A DIAMETER OR RISE OF 42 TO 84 INCHES.
2) TYPE 1 IS USED WHEN THE SKEW ANGLE IS 10 DEGREES OR LESS AND TYPE 2 WHEN THE SKEW ANGLE IS 11 DEGREES OF GREATER.
3) ALL CONCRETE SHALL BE CLASS "C".
4) ALL REINFORCING STEEL BARS SHALL BE 5/8" ROUND.
5) DIMENSIONS AND QUANTITIES ARE SHOWN FOR CIRCULAR SECTIONS ONLY WHEN USED WITH REINFORCED ELLIPTICAL CONCRETE PIPE OR CORRUGATED METAL ARCHES IT WILL BE NECESSARY TO DETERMINE SUCH DIMENSIONS AND QUANTITIES WHICH SHALL GENERALLY CONFORM WITH THOSE LISTED FOR THE NEAREST SIZE CIRCULAR PIPE. THE DIMENSIONS ESTABLISHED BY VERTICAL DIAMETER SHALL APPLY TO SPAN.
6) CHAMFER ALL EXPOSED CORNERS 3/4 OF AN INCH.
7) WHERE SOIL BORINGS INDICATE A BEARING CAPACITY OF LESS THAN 2600 POUNDS PER SQUARE FOOT IT WILL BE NECESSARY TO INCREASE THE WIDTH OF THE FOOTING.
8) THE MINIMUM COVER FOR REINFORCING STEEL SHALL BE 2 INCHES.



HALF–SECTION B–B

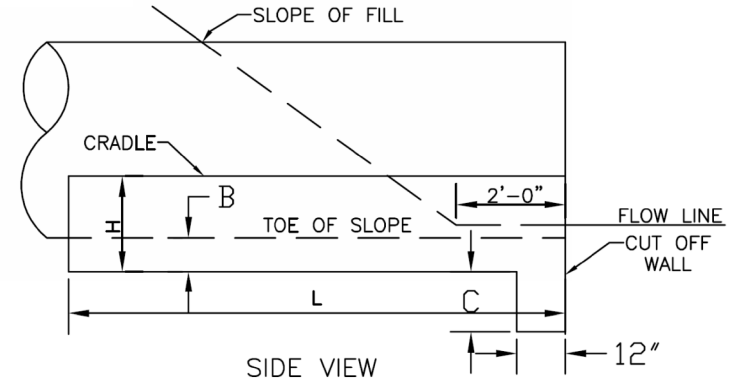
HEADWALL, TYPE C

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

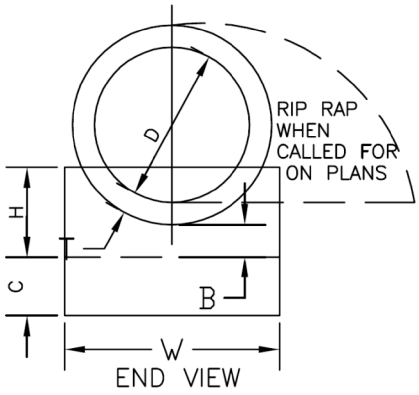
SCALE: AS SHOWN

DATE: 1–17–11

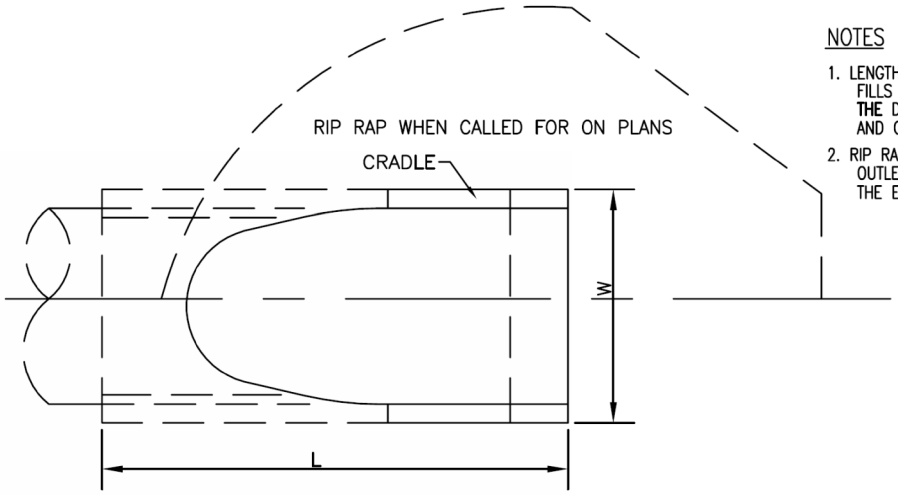
STANDARD NUMBER: **STD-308**



SIDE VIEW



END VIEW

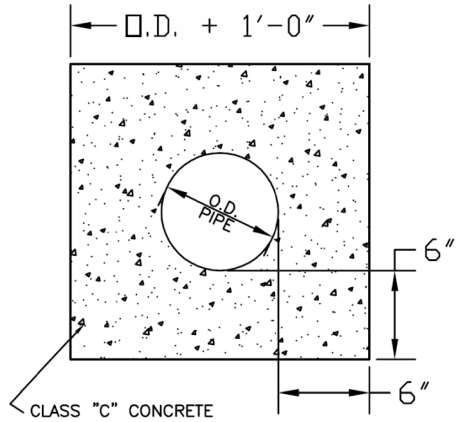


PLAN VIEW

NOTES

1. LENGTH OF CRADLE TO BE 10'-0" FOR FILLS UP TO 15'-0" DEEP AND EQUAL TO THE DEPTH OF FILL FOR DEPTHS 15'-0" AND OVER.
2. RIP RAP MAY BE PLACED AT INLET AND OUTLET OF CULVERT AS DETERMINED BY THE ENGINEER.

PIPE CRADLE



CONCRETE ENCASEMENT DETAIL

CONCRETE QUANTITIES

(IN) DIA.	CY/LF
4	0.07
6	0.08
8	0.10
10	0.11
12	0.13
14	0.14
16	0.16
18	0.18
20	0.20
24	0.25

NOTE: O.D. OF PIPE SHOWN IS THAT OF PIPE BARREL ONLY.

CRADLE DIMENSIONS AND QUANTITIES

D	B	C	H	W	CUBIC YARDS CLASS "C" CONCRETE	
					TWO CUT-OFF WALLS	PER LIN. FT. OF CRADLE
12"	6"	14"	0'11"	11'0"	o.2	o.0476
15"	6"	1'4"	1'0"	2'1"	o.2	o.0580
18"	6"	1'4"	1'2"	2'5"	o.2	o.0801
24"	8"	1'3"	1'4"	2'11"	o.3	o.0924
27"	8"	1'3"	1'5"	3'3"	o.3	o.0144
30"	8"	1'3"	1'6"	3'6"	o.3	o.1181
33"	8"	1'3"	1'7"	3'10"	o.3	o.1325
36"	8"	1'3"	1'8"	4'1"	o.4	o.1462
39"	8"	1'3"	1'9"	4'4"	o.4	o.1606
42"	8"	2'2"	1'11"	4'8"	o.7	o.1768
48"	8"	2'2"	2'1"	5'3"	o.8	o.2110
54"	8"	1'11"	2'4"	5'11"	o.9	o.2972
60"	8"	1'11"	2'9"	6'6"	o.9	o.3398
66"	10"	1'9"	3'0"	7'3"	o.9	o.4468
72"	10"	1'8"	3'2"	7'10"	o.10	o.4980
84"	10"	1'7"	3'6"	8'11"	o.11	o.6126

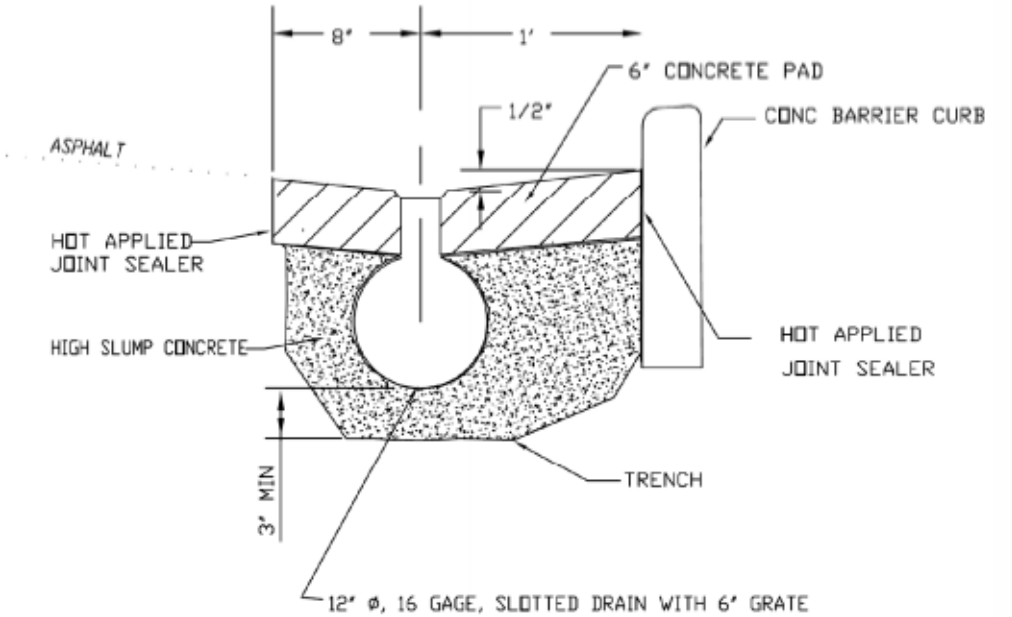
PIPE CRADLE AND CONCRETE ENCASEMENT

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

SCALE: AS SHOWN

DATE: 1-17-11

STANDARD NUMBER: STD-309



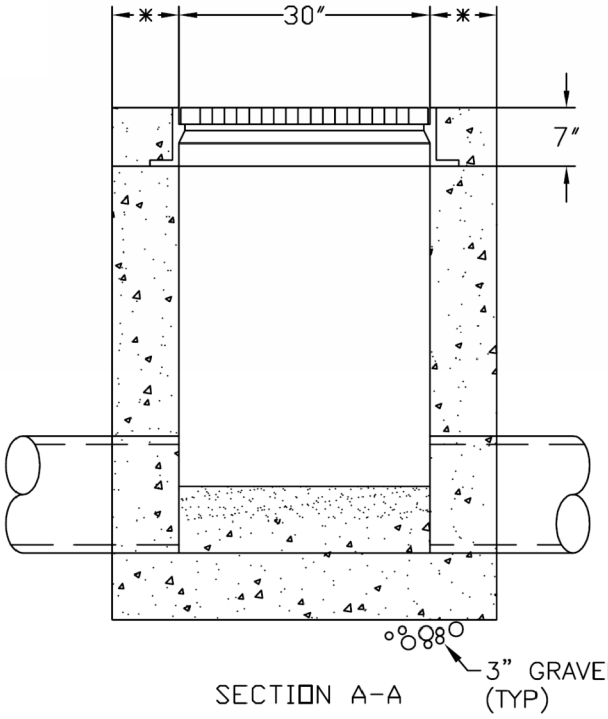
SLOTTED DRAIN
NOT TO SCALE

SLOTTED DRAIN

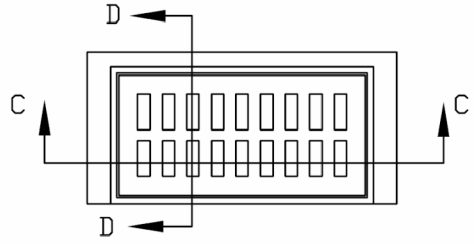
VILLAGE OF MORROW, OHIO STANDARD CONSTRUCTION DRAWING	SCALE: AS SHOWN DATE: 1-17-11	STANDARD NUMBER: **STD-310**

* - 8" IF POURED IN PLACE
6" IF PRECAST

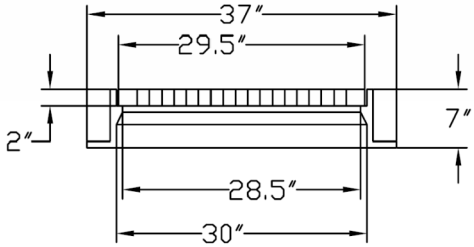
CASTING SHALL BE NEENAH R-3408-L, R-3408-AL OR EQUAL
VILLAGE ENGINEER SHALL DETERMINE IN EACH CASE THE POSITION OF THE GRATE (TRANSVERSE OR LONGITUDINAL)
ALL CASTINGS MUST BE OF THE BICYCLE FRIENDLY TYPE.



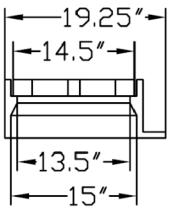
SECTION A-A



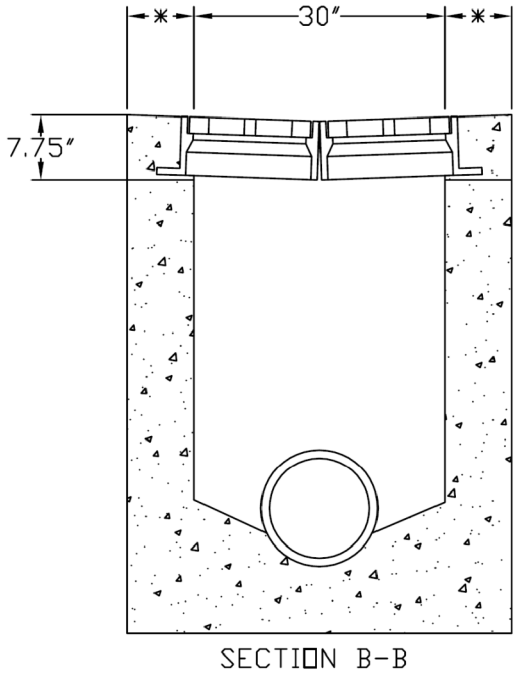
GRATING PLAN VIEW



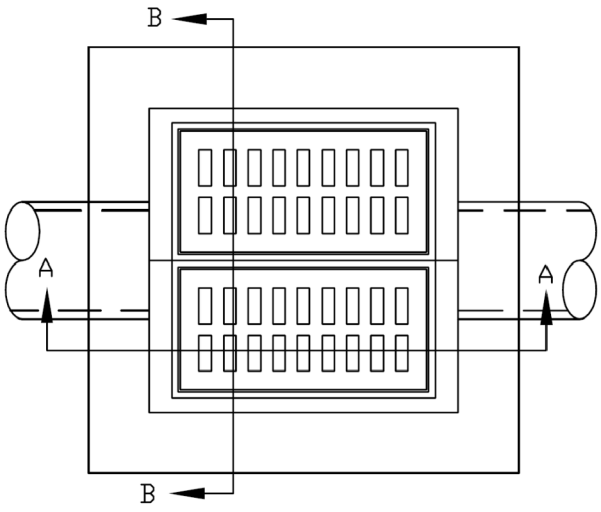
SECTION C-C



SECTION D-D



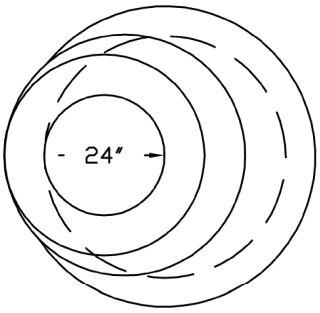
SECTION B-B



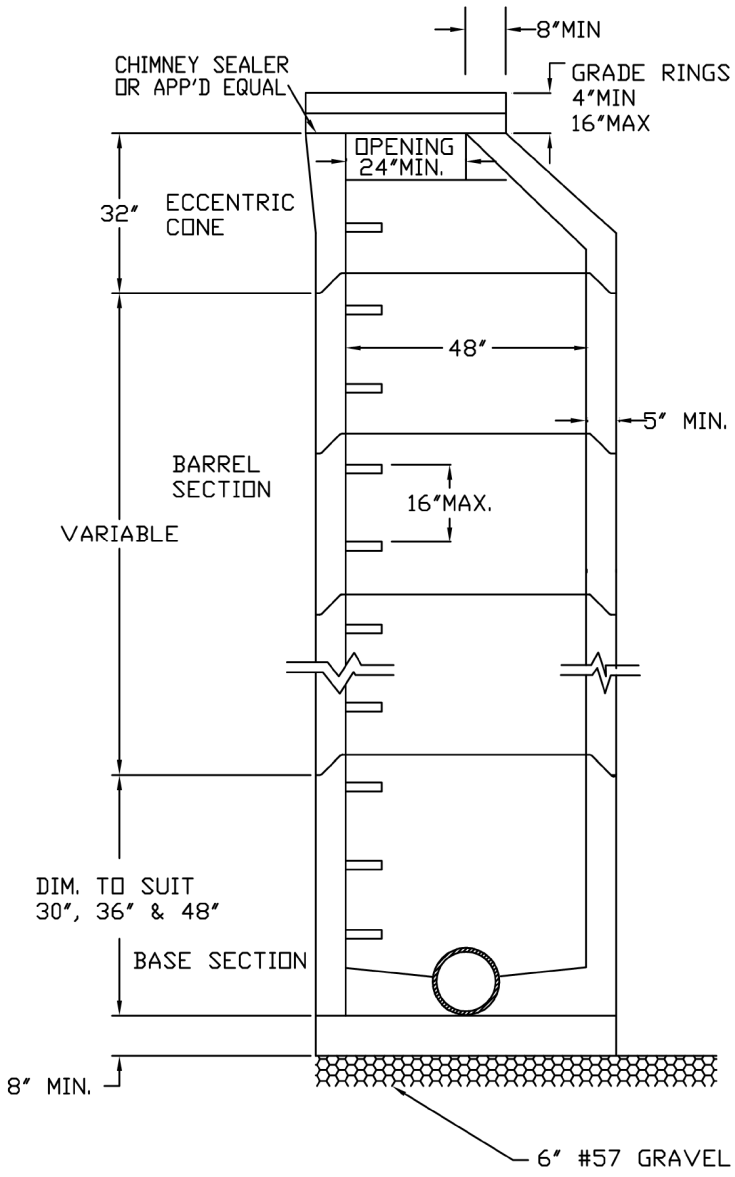
PLAIN VIEW

DRIP DRAIN

VILLAGE OF MORROW, OHIO STANDARD CONSTRUCTION DRAWING	SCALE: AS SHOWN DATE: 1-17-11	STANDARD NUMBER: **STD-311**



TOP VIEW
ECCENTRIC CONE



NOTES

All storm manholes shall be precast with an eccentric cone. Steps shall be a maximum of 16" apart and made of metal coated with fiberglass or aluminum alloy. To adjust to grade concrete rings "donuts"can be used, maximum grade adjustment shall be 16". Greater adjustment requires barrel sections to be changed. Poured floors shall be a minimum of 8" thick 4000 PSI (reinforced) with a minimum of 6" #57 stone under manhole. Soft ground (wet) shall be bridged with #2 stone as directed by the *VILLAGE*.

Seals shall be:

1. Kor-N-Seal
2. Dura-Seal
3. Press Wedge II
4. Concrete collars

Manhole section joints shall use "O" ring type seal.

Mastic shall be used on shelf of manhole in wet areas.

Casting shall be: Neenah R-1767 4-hole lid, East Jordan 1600 Type C lid (2 hole)

STORM MANHOLE

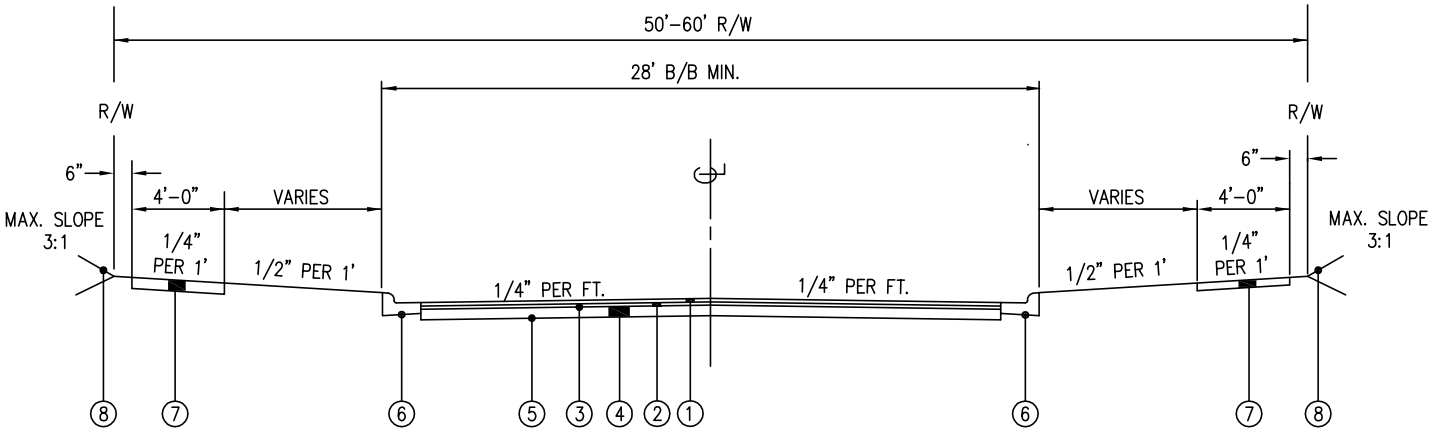
VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

SCALE: *AS SHOWN*

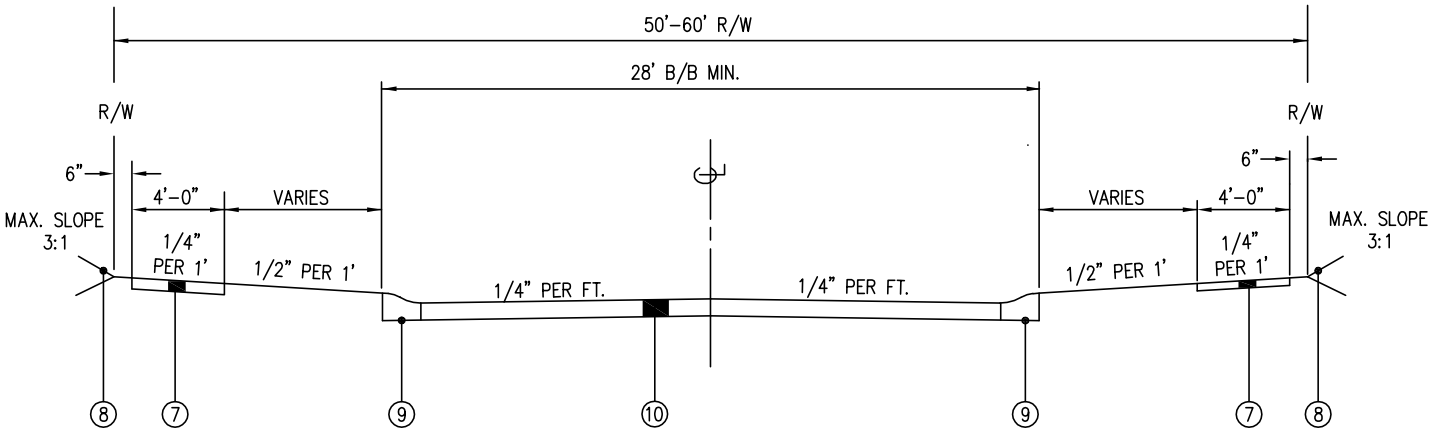
DATE: *10-8-10*

STANDARD NUMBER:

STD-312



ASPHALT CONCRETE PAVEMENT



CONCRETE PAVEMENT

① ITEM 448, TYPE 1 – 1" ASPHALT CONCRETE SURFACE COURSE

② ITEM 448, TYPE 1 – 1 1/2" ASPHALT CONCRETE LEVELING COURSE

③ ITEM 407 – TACK COAT (0.10 GAL./SQ. YD)

④ ITEM 301 – 5" BITUMINOUS AGGREGATE BASE

⑤ ITEM 203 – COMPACTED SUBGRADE: PROOF ROLLED

⑥ ITEM 609 – COMBINED CURB & GUTTER

⑦ ITEM 608 – CONCRETE SIDEWALK, 4" THICK

⑧ ITEM 659 – SEEDING AND MULCHING

⑨ ITEM 609 – INTEGRAL CONCRETE CURB AND GUTTER

⑩ ITEM 450 – CONCRETE PAVEMENT

	R/W	B TO B CURB	% GRADE MAX
LOCAL	50'	28'	12
MINOR ARTERIAL	60'	38'	6
MAJOR ARTERIAL	80'	48'	4

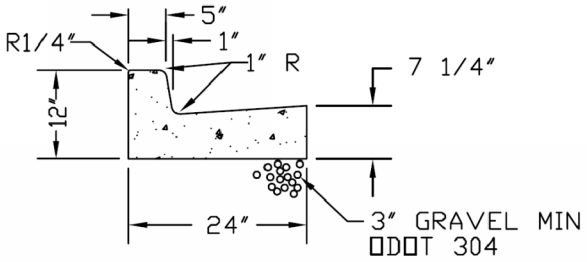
TYPICAL STREET SECTIONS

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

SCALE: AS SHOWN

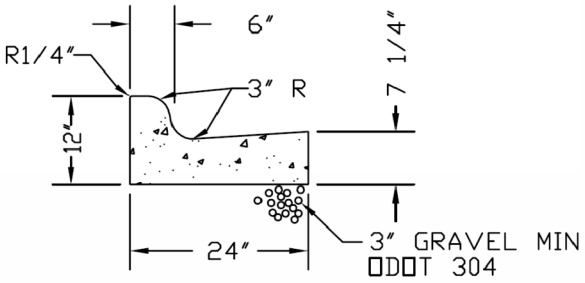
DATE: 1-17-11

STANDARD NUMBER: **STD-400**



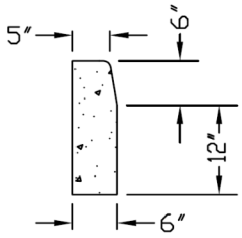
1″ RADIUS CURB & GUTTER

TYPE "C"



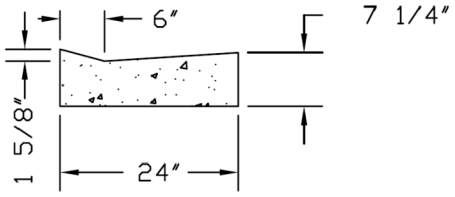
3″ RADIUS CURB & GUTTER

TYPE "C"



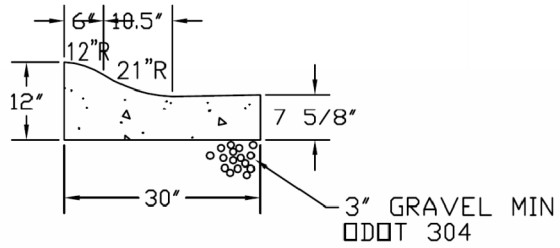
BARRIER CURB

TYPE "B"



DROP CURB FOR DRIVE

TYPE "D"

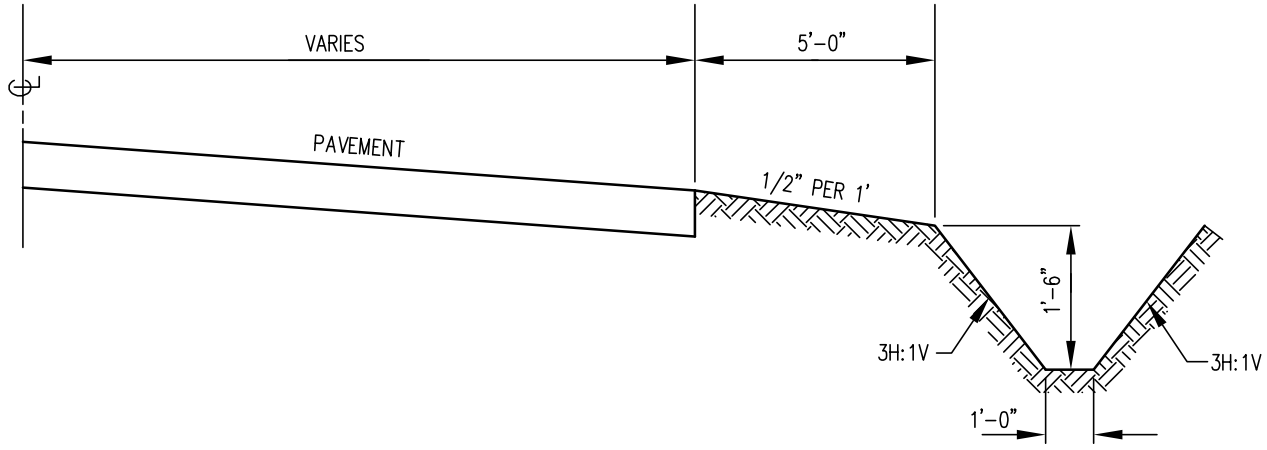


ROLL CURB & GUTTER

TYPE "R"

CURB AND GUTTER DETAILS

VILLAGE OF MORROW, OHIO STANDARD CONSTRUCTION DRAWING	SCALE: AS SHOWN DATE: 1-17-11	STANDARD NUMBER: STD-401



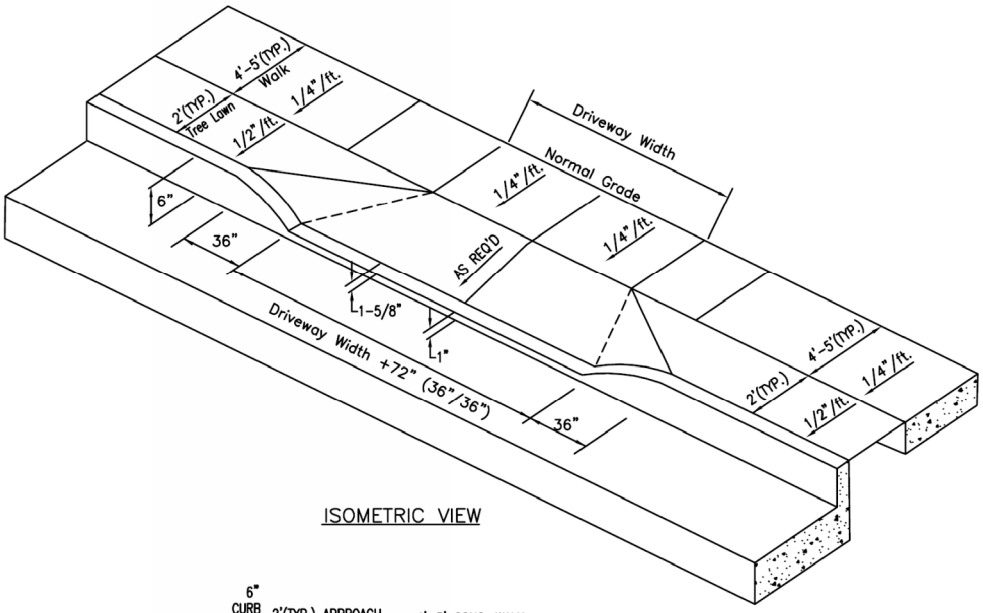
ROAD DITCH AND BERM DETAIL

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

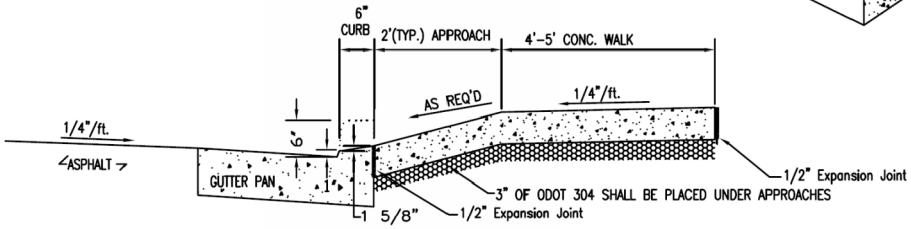
SCALE: AS SHOWN

DATE: 1-17-11

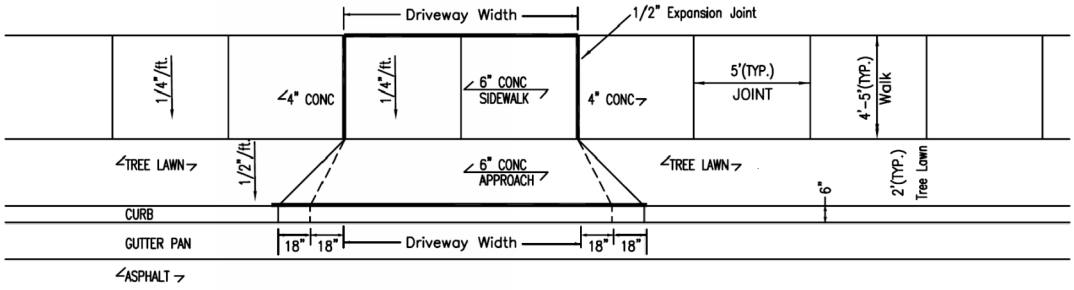
STANDARD NUMBER: STD-402



ISOMETRIC VIEW



DRIVEWAY PROFILE



DRIVEWAY PLAN

GRADE CONTROLS

1. 12% MAXIMUM SAG GRADE BREAK. SAG VERTICAL CURVE WITH K=0.8 MAY BE USED.
2. 8% MAXIMUM CREST GRADE BREAK. CREST VERTICAL CURVE WITH K=0.6 MAY BE USED.

NOTES

1. DRIVE APPROACHES SHALL BE CLASS "C" CAST IN PLACE CONCRETE
2. MAXIMUM JOINT SPACING SHALL BE 12' LONGITUDINALLY AND TRANSVERSELY
3. ALL RESIDENTIAL DRIVES SHALL BE A MINIMUM OF 6" THICK
4. ALL COMMERCIAL DRIVES SHALL BE A MINIMUM OF 8" THICK
5. RESIDENTIAL DRIVE MAXIMUM WIDTH = 20' (BACK OF WALK)
6. COMMERCIAL DRIVE MAXIMUM WIDTH = 30' (BACK OF WALK)
7. EXPANSION MATERIAL SHALL BE 1/2" PREMOLDED
8. 3" OF ODOT 304 SHALL BE PLACED UNDER APPROACHES
9. PROVIDE BROOM FINISH AND EDGING TO ALL EXPOSED SURFACES
10. WHERE ASPHALT CONCRETE PAVEMENT HAS BEEN DISTURBED, THE ASPHALT SHALL BE REPLACED AS DIRECTED BY THE ENGINEER

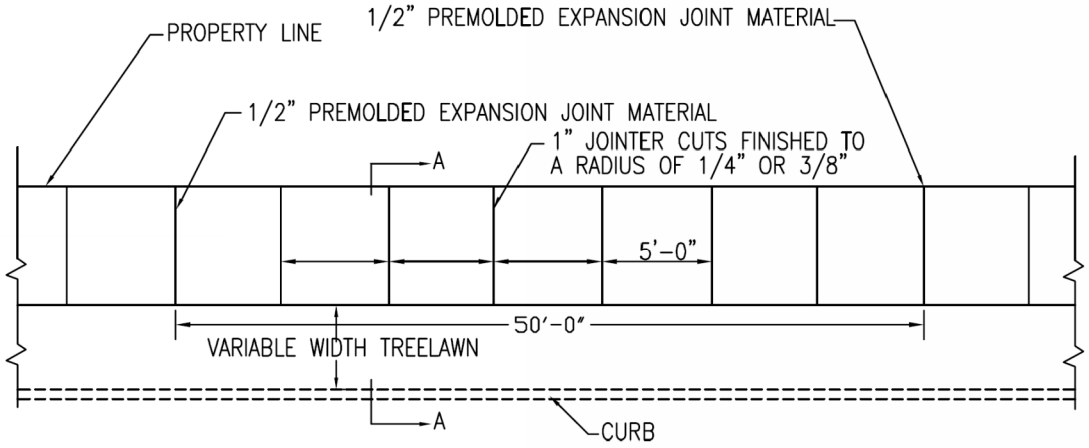
RESIDENTIAL / COMMERCIAL DRIVE

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

SCALE: AS SHOWN

DATE: 1-17-11

STANDARD NUMBER: **STD-403**

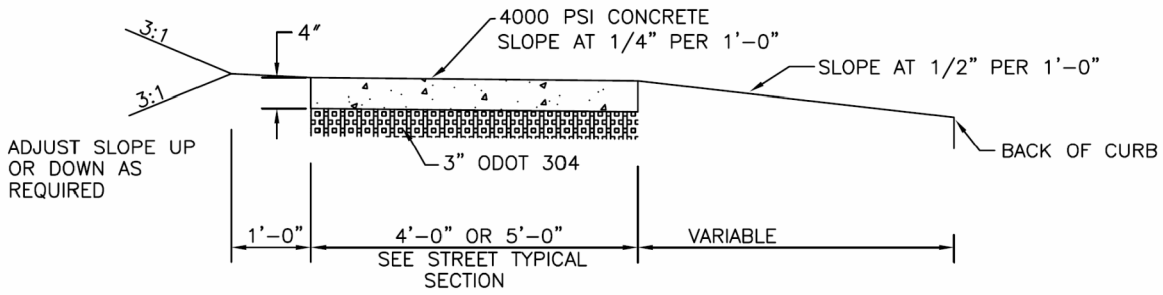


PLAN VIEW

NOTES

1. PROVIDE BROOM FINISH TO ALL EXPOSED SURFACES.
2. CONCRETE SHALL BE 4000 PSI MIN.
3. PROVIDE A MINIMUM OF 2" EDGING AROUND ALL EXPOSED SURFACES.
4. A MINIMUM OF 3" OF COMPACTED GRAVEL (ODOT 304) SHALL BE PLACED UNDER ALL SIDEWALKS.
5. 1/2" EXPANSION JOINT MATERIAL SHALL BE USED EVERY 50 FEET OF WALK, BETWEEN NEW AND EXISTING SIDEWALK AND CURB, AND BETWEEN DIFFERENT CONCRETE THICKNESS.

NOTE: WALK THICKNESS SHALL BE 4" MIN.
WALK THICKNESS AT RESIDENTIAL DRIVES SHALL BE 6"
WALK THICKNESS AT COMMERCIAL DRIVES SHALL BE 8"



SECTION A–A

CONCRETE SIDEWALK DETAILS

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

SCALE: AS SHOWN

DATE: 1-17-11

STANDARD NUMBER: **STD-404**

SIDEWALK RATING FORM

Street or Route _____ Date _____

Location and Length of Section Rated _____

Direction: N S E W

Sidewalk Type:

Exposed Aggregate _____
Broom Finish _____
Width _____

Pedestrian Traffic:

Low _____
Moderate _____
High _____

(***A rating of "O" indicates there is no defect***)

Cracks: (includes expansion joint failures but not scratch joints) _____
Hairline = (2) Between .25 inches and .50 inches = (6)
.50 inches or greater = (10)

Heaving: _____
Less than .5 inches = (5) Between .5 inch and 1 inch = (10) Between 1 inch and 1.5 inches = (15) 1.5 inches or greater = (20)

Missing Sections: _____
Crushed: (0–10) Spalling/Raveling: (0–10)

Excess Slope: _____ **Backfilling**: (5) _____
Greater than 1 inch per foot (10)

Deficient Draining: (0–10) _____ **Overall Walking Quality/Comfort**: (0 – 10) _____

Condition Rating: (100 – Sum of Defects): _____

Estimated Sidewalk Footage Needing Repair: _____

Other Considerations

_____ Handicap Ramps – Number Needed
_____ Roots Causing Heaving or Humps
_____ Low Signs – less than 7 feet to bottom of sign
_____ Guy Wires in Walking Area – Width of Sidewalk to 8 feet
_____ Grass/Weeds in Joints or Cracks
_____ Overhanging Branches or Limbs – less than 8 feet clearance from sidewalk
_____ Sewer Manholes, Water Valve Boxes or Meters Needing Adjustment
_____ Pole or Wall Mounted Utility Boxes

Comments:_____

_____

_____

SIDEWALK RATING FORM

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

SCALE: AS SHOWN
DATE: 1–17–11

STANDARD NUMBER: **STD-405**

Sidewalk Inspection Criteria

The following is the criteria the Village of Morrow uses to determine if a sidewalk is deficient and is need of repair or replacement.

If a section of sidewalk meets any of the following criteria it will be marked with a white letter denoting the sidewalk deficiency. Sidewalk slabs marked with a white letter will be the responsibility of the property owner to repair or replace.

Sections of sidewalk marked with a white "O" will be replaced or repaired at the Village of Morrow's expense if it is determined that a public infrastructure (sewer and water mains, sewer manholes, catch basins, ... etc.) or a tree in the right of way has caused the damage.

Stub Toe - S

- The vertical misalignment along any part of the seam between two slabs, or between sections of a cracked slab, of 1/2" or more, or deemed hazardous by engineering judgment

Cracked Slabs - C

- Slabs fragmented by cracks into 4 or more sections and/or where any one of the gaps is greater than 2" and prohibits the sidewalk from functioning as designed

SIDEWALK RATING FORM

VILLAGE OF MORROW, OHIO STANDARD CONSTRUCTION DRAWING	SCALE: AS SHOWN DATE: 1-17-11	STANDARD NUMBER: **STD-405A**

Traverse Slope - T

- Any individual slab or portion of a slab shall not slope either toward the street or the adjoining property at a ratio of more than 5/8"per foot (1:20)

Longitudinal Slope (Sunken or Raised Sections) - L

- Any sidewalk panels that have lifted to a peak or sunken such that the slab or portion of a slab deviates from the average line of the sidewalk surface level at a ratio of more than 1" per foot

Gaps - G

- Opening in between sidewalk slabs greater than 2" in width, or those caused by the absence of a fragmented section of sidewalk exceeding 2" in width

Spalling (Pitted) Slabs - P

- Slabs whose surface is granular or if a chunk of the sidewalk surface greater than 2" in width has broken out, and the result is a hole ½" or deeper

SIDEWALK RATING FORM

VILLAGE OF MORROW, OHIO STANDARD CONSTRUCTION DRAWING	SCALE: AS SHOWN DATE: 1-17-11	STANDARD NUMBER: **STD-405B**

Public Utility Damage - O

- Any deficiencies in a slab or part of a slab that are deemed to be caused by public infrastructure (sewer and water mains, sewer manholes, catch basins, ... etc.).
- Damage deemed to be caused by public infrastructure will be the responsibility of the Village of Morrow.

Tree Root Damage - O

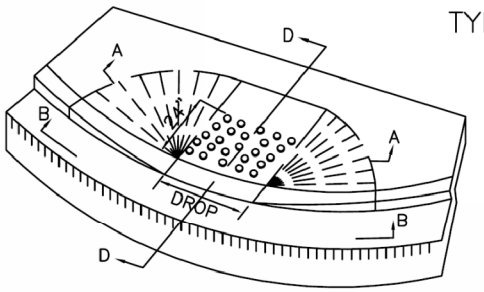
- Any deficiencies in a slab or part of a slab that are deemed to be caused by tree roots from a tree in the village right of way.
- Damage deemed to be caused by tree roots from street trees in the right of way will be the responsibility of the Village of Morrow..

- To avoid cutting tree roots or removing trees, the slab replacement may require a change in the sidewalk alignment.
- Every effort will be made to preserve trees.
- The Village of Morrow, Ohio will be consulted regarding the useful life of some street trees in the right of way.
- Street trees in the right of way that are deemed unhealthy or potentially hazardous by The Village of Morrow, Ohio may be removed and replaced with a new tree suitable for the location.
- Damaged sidewalks caused by trees outside the right of way shall be the property owner's responsibility to repair or replace.
- The removal and replacement of any trees outside the right of way shall be at the property owners discretion and cost.

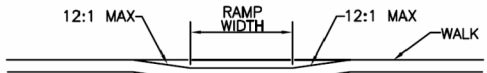
SIDEWALK RATING FORM

VILLAGE OF MORROW, OHIO STANDARD CONSTRUCTION DRAWING	SCALE: AS SHOWN DATE: 1-17-11	STANDARD NUMBER: **STD-405C**

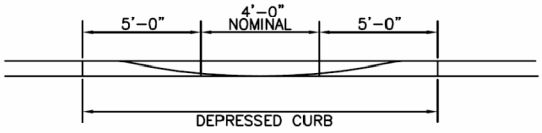
TYPE "1"



DOMED AREA EQUALS THE FULL WIDTH OF THE CURB RAMP BY 24" MEASURED FROM THE BACK OF CURB

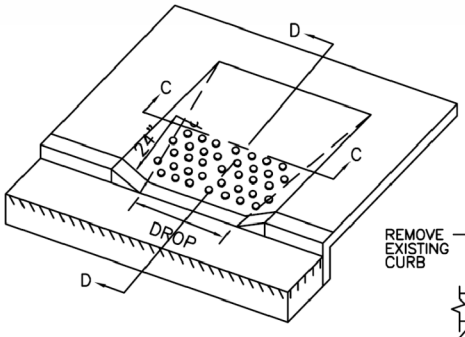


SECTION A–A

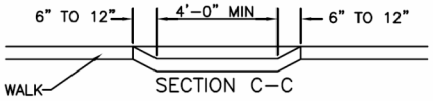


SECTION B–B

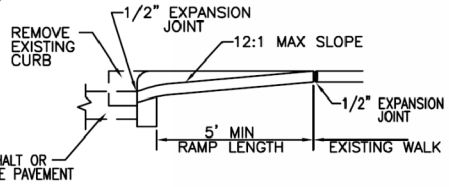
TYPE "2"



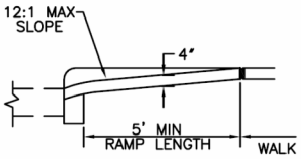
DOMED AREA EQUALS THE FULL WIDTH OF THE CURB RAMP BY 24" MEASURED FROM THE BACK OF CURB



SECTION C–C



SECTION D–D
IN EXISTING WALK



SECTION D–D

NOTES

ALL RAMPS SHALL HAVE TRUNCATED DOMES IN ACCORDANCE WITH ADA REQUIREMENTS. ARMOR–TILE OR EQUIVALENT AS DETERMINED BY VILLAGE ENGINEER.

JOINTS SHALL BE PROVIDED IN THE CURB RAMP AS EXTENSIONS OF WALK JOINTS AND CONSISTENT WITH REQUIREMENTS FOR NEW CONCRETE WALK. A 1/2" EXPANSION JOINT FILLER SHOULD BE PROVIDED AROUND THE EDGE OF RAMPS BUILT IN EXISTING CONCRETE WALK. 3" OF COMPACTED GRAVEL (ODOT 304) SHALL BE PLACED UNDER ALL CURB RAMPS.

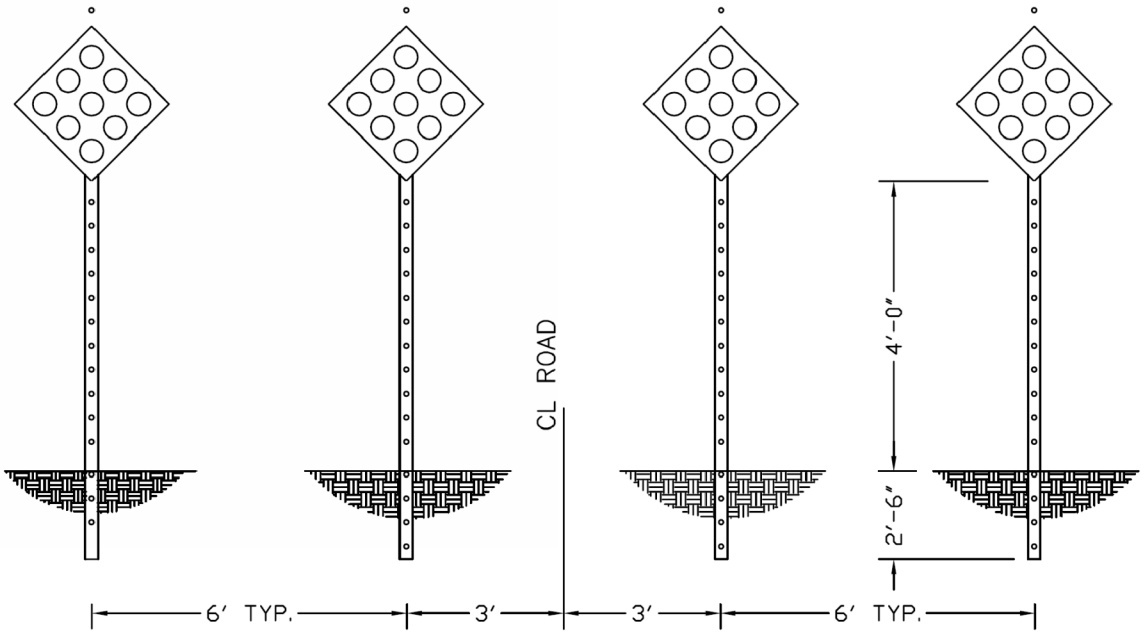
ANY COMBINATION OF SIDE SLOPES ON OPPOSITE SIDES OF A RAMP MAY BE USED TO BEST FIT THE SITE CONDITIONS. THE MINIMUM RAMP LENGTH IS 5' FROM BACK OF A 6" CURB AND MAY BE INCREASED WHERE FEASIBLE TO OBTAIN A FLATTER RAMP SLOPE OR TO BETTER BLEND WITH THE WALK CONFIGURATION.

WALK THICKNESS IN THE RAMP SLOPES SHALL BE 4" MINIMUM OR THICKER AS NECESSARY TO MATCH ADJACENT WALK THICKNESS.

CURB RAMPS

VILLAGE OF MORROW, OHIO *STANDARD CONSTRUCTION DRAWING*	SCALE: *AS SHOWN* DATE: *1–17–11*	STANDARD NUMBER: **STD-406**

1. SIGN: TO BE ENGINEER GRADE MATERIAL
2. SIGN POST: 2 – 2# POST, 7'–0" IN LENGTH (U–CHANNEL POST)
3. SIGN: OHIO UNIFORM TRAFFIC CONTROL DEVICES, X–4 A



NEWMAN SIGN
1–800–437–9770

S.A.B.I.
1–800–837–2245

VULCAN SIGNS
1–800–633–6845

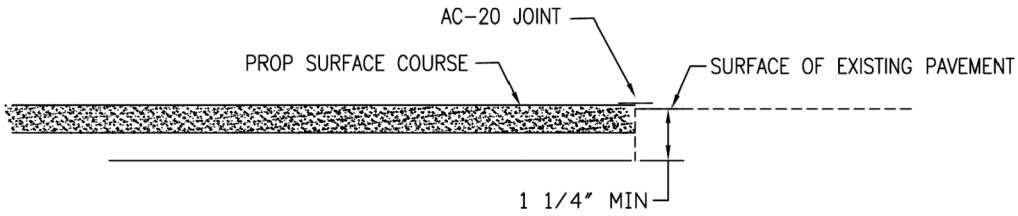
END OF STREET MARKER SIGN

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

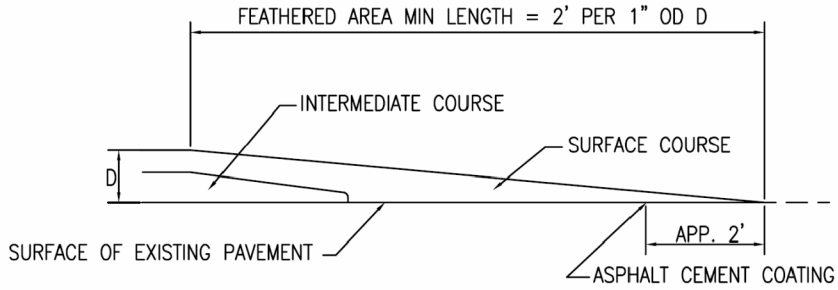
SCALE: AS SHOWN

DATE: 1–17–11

STANDARD NUMBER: STD-407



BUTT JOINT DETAIL

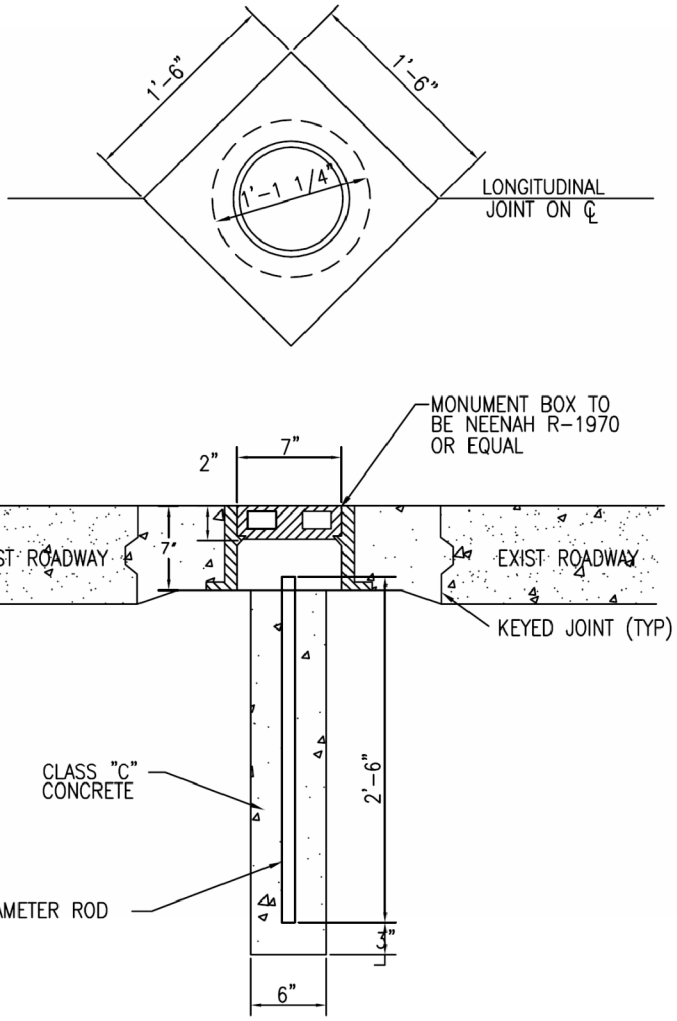


FEATHERING DETAIL (REQUIRES VILLAGE ENGINEER'S APPROVAL)

ROADWAY JOINT DETAILS

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

SCALE:	STANDARD NUMBER:
AS SHOWN	STD-408
DATE: 1-17-11	



ROADWAY MONUMENT DETAILS

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

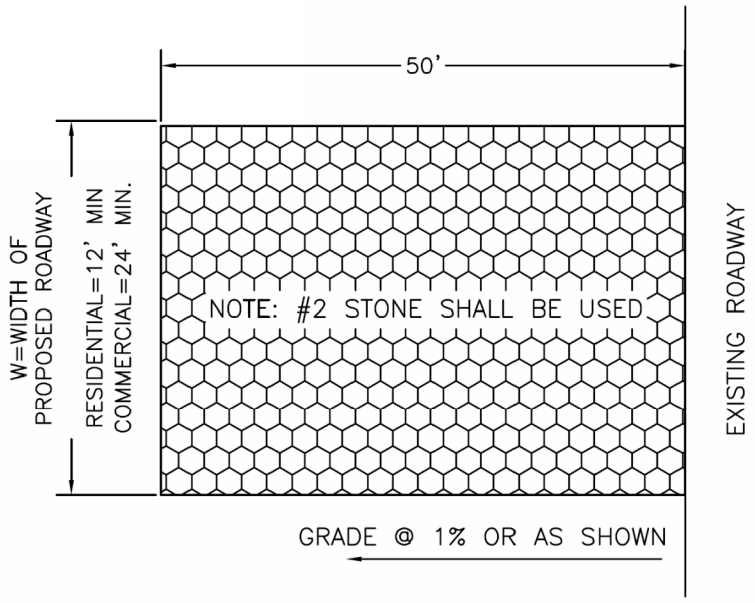
SCALE: AS SHOWN

DATE: 1-17-11

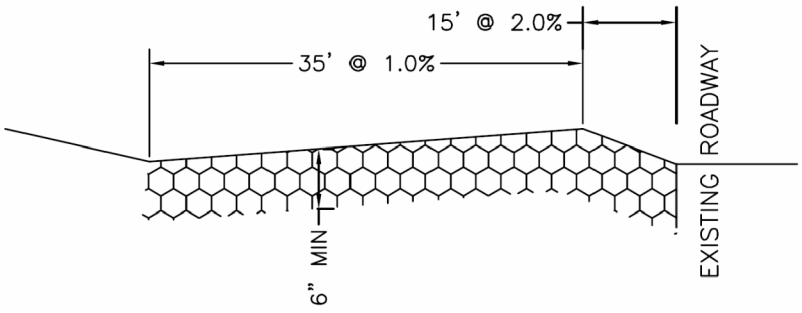
STANDARD NUMBER: **STD-409**

1 THE TEMPORARY CONSTRUCTION ENTRANCE SHALL BE INSTALLED FIRST TO ALLOW PROPER ENTRANCE AND EXIT TO WORK SITE

2. ADJOINING PAVED ROADWAYS MUST BE KEPT CLEAN AT ALL TIMES



PLAN



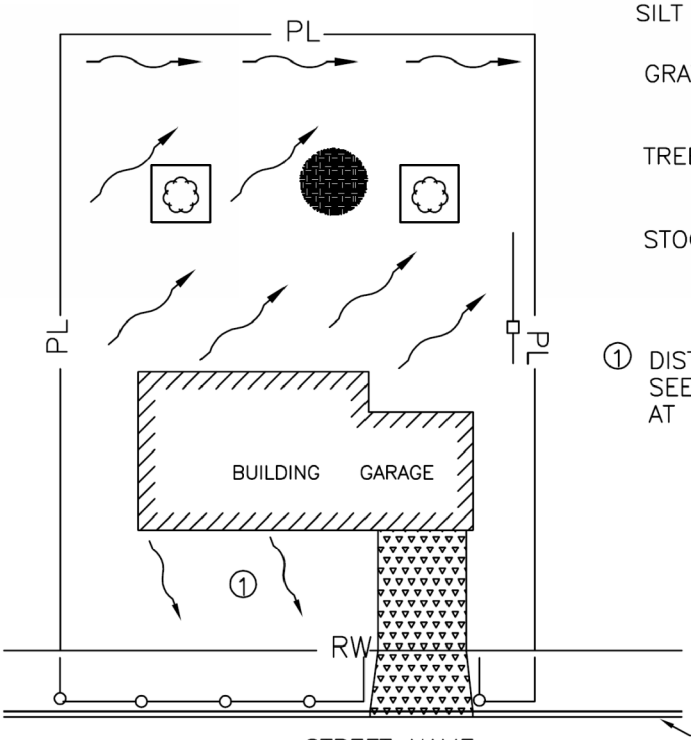
PROFILE

ROADWAY MONUMENT DETAILS

VILLAGE OF MORROW, OHIO STANDARD CONSTRUCTION DRAWING	SCALE: AS SHOWN DATE: 1-17-11	STANDARD NUMBER: STD-500

TYPICAL EROSION CONTROL PLAN
FOR SITES OF ONE ACRE OR LESS

BACKYARD DRAINAGE SHOULD BE DIRECTED
TO CONCENTRATED FLOW IN DRAINAGE SWALE
AND DISCHARGED THROUGH SILT FENCE OFFSITE



PROPERTY LINE
RIGHT–OF–WAY
DRAINAGE SWALE
EXISTING DRAINAGE
STRAW BALES
SILT FENCE
GRAVEL
TREE PRESERVATION
STOCKPILED TOPSOIL

① DISTURBED AREAS TO BE TOPSOILED SEEDED AND MULCHED BY OWNER AT COMPLETION OF CONSTRUCTION

NOTE:
SILT FENCE TO BE INSTALLED BEHIND
ANY EXIST SIDEWALK AND/OR AT CURB

WARNING!
EXTRA MEASURES MAY BE NEEDED
IF YOUR SITE
- –IS WITHIN 300 FEET OF A STREAM OR WETLAND
- –IS WITHIN 1000 FEET OF A LAKE
- –IS STEEP (SLOPE OF 12% OR MORE)
- –RECEIVES RUNOFF FROM 10,000 SQ FT OR MORE OF ADJACENT LAND
- –HAS MORE THAN AN ACRE

TYPICAL LAWN SEED MIXTURE
FOR EROSION CONTROL

GRASS	SUNNY/PARTIALLY SHADED SITES
TURF TYPE TALL FESCUE	5lbs
PERENNIAL	1lbs
	SEEDING RATE
SEEDING RATE	6lbs 1000 SQ.FT.

TYPICAL EROSION CONTROL FOR SMALL SITES

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

SCALE: AS SHOWN

DATE: 1–17–11

STANDARD NUMBER: STD-501

SEDIMENT AND EROSION CONTROL FOR COMPLIANCE WITH OEPA'S INDIVIDUAL LOT PERMIT FOR CONSTRUCTION

PRESERVING EXISTING VEGETATION
WHENEVER POSSIBLE, PRESERVE EXISTING TREES, SHRUBS, AND OTHER VEGETATION.
TO PREVENT ROOT DAMAGE, DO NOT GRADE, PLACE SOIL PILES, OR PARK VEHICLES NEAR TREES MARKED FOR PRESERVATION.

SILT FENCE & STRAW BALES
* PUT UP BEFORE ANY OTHER WORK IS DONE.
* INSTALL ON DOWNSLOPE SIDE(S) OF SITE WITH ENDS EXTENDED UP SIDESLOPES A SHORT DISTANCE.
* PLACE PARALLEL TO THE CONTOUR OF THE LAND TO ALLOW WATER TO POND BEHIND FENCE.
* ENTRENCH 6 INCHES DEEP.
* STRAW BALES SHALL BE USED ONLY IN MAJOR DITCH LINES WITH THE APPROVAL OF THE CITY ENGINEER. ALL OTHER LOCATIONS REQUIRE SILT FENCE.
* STAKE (2 STAKES PER BALE OR 1 STAKE EVERY 3 FEET FOR SILT FENCE).
* LEAVE NO GAPS BETWEEN BALES OR SECTIONS OF SILT FENCE.
* INSPECT AND REPAIR ONCE A WEEK AND AFTER EVERY ½ INCH RAIN. REMOVE SEDIMENT IF DEPOSITS REACH HALF THE FENCE OR STRAW BALE HEIGHT.
* MAINTAIN UNTIL A LAWN IS ESTABLISHED.

SOIL PILES
* LOCATED AWAY FROM ANY DOWNSLOPE STREET, DRIVEWAY, STREAM, LAKE, WETLAND, DITCH OR DRAINAGE WAY.
* TEMPORARY SEED SUCH AS ANNUAL RYE IS RECOMMENDED FOR TOPSOIL PILES.
* SURROUND WITH STRAW BALES OR SILT FENCE.

GRAVEL DRIVE
* INSTALL A SINGLE ACCESS DRIVE USING 2" AGGREGATE.
* USE TO PREVENT TRACKING DIRT ONTO THE ROAD BY ALL VEHICLES.
* MAINTAIN THROUGHOUT CONSTRUCTION UNTIL DRIVEWAY IS PAVED.
* PARK ALL CONSTRUCTION VEHICLES ON THE STREET AND OFF OF THE SITE.

SEDIMENT CLEANUP
* BY THE END OF EACH WORK DAY, SWEEP OR SCRAPE UP SOIL TRACKED ONTO THE ROAD AND IN THE GUTTERS.
* BY THE END OF THE NEXT WORK DAY AFTER A STORM, CLEAN UP SOIL WASHED OFFSET, AND CHECK STRAW BALES AND SILT FENCE FOR DAMAGE OR SEDIMENT BUILDUP.

DOWNSPOUT EXTENDERS
* NOT REQUIRED, BUT HIGHLY RECOMMENDED.
* INSTALL AS SOON AS GUTTERS AND DOWNSPOUTS ARE COMPLETED.
* ROUTE WATER TO A GRASSED AREA.
* MAINTAIN UNTIL A LAWN IS ESTABLISHED.

REVEGETATION
DISTURBED SOILS SHALL BE STABILIZED AS QUICK AS PRACTICABLE WITH TEMPORARY VEGETATION AND/OR MULCHING TO PROTECT EXPOSED CRITICAL AREAS DURING DEVELOPMENT. TEMPORARY MULCH IS TO BE APPLIED AT THE RATE OF 2–3 BALES OF STRAW PER 1000 SQ. FT.

SEEDING AND MULCHING
* SPREAD 4 TO 6 INCHES OF TOPSOIL.
* FERTILIZER ACCORDING TO SOIL TEST (OR APPLY 10 LB. / 1000 SQ. FT. OF 20–10–10 OR 10–10–10 FERTILIZER)
* SEED WITH AN APPROPRIATE MIX FOR THE SITE.
* RAKE LIGHTLY TO COVER SEED WITH ¼" OF SOIL. ROLL LIGHTLY.
* MULCH WITH STRAW (2–3 BALES PER 1000 SQ. FT.) FROM MARCH 15 TO AUGUST 31.
* ANCHOR MULCH BE PUNCHING 2 INCHES INTO THE SOIL WITH A DULL, WEIGHTED DISK OR BY USING NETTING OR OTHER MEASURES ON STEEP SLOPES AND WINDY AREAS.
* WATERING REQUIREMENTS SHALL BE IN ACCORDANCE WITH SUPPLIERS' RECOMMENDATIONS AND/OR UNTIL LAWN IS WELL ESTABLISHED.

SODDING
* SPREAD 4 TO 6 INCHES OF TOPSOIL.
* FERTILIZER ACCORDING TO SOIL TEST (OR APPLY 10 LB./1000 SQ. FT. OF 20–10–10 OR 10–10–10 FERTILIZER).
* INSTALL SOD IN ACCORDANCE WITH SUPPLIERS' RECOMMENDATION.
* WATERING REQUIREMENTS SHALL BE IN ACCORDANCE WITH SUPPLIERS' RECOMMENDATIONS AND/OR UNTIL LAWN IS WELL ESTABLISHED.

IF CONSTRUCTION IS COMPLETED AFTER AUGUST 31, SEEDING OR SODDING MAY BE DELAYED. APPLY MULCH AND TEMPORARY SEED (SUCH AS RYE OR WINTER WHEAT) FROM SEPTEMBER 1 TO MARCH 15.
STRAW BALES OR SILT FENCES MUST BE MAINTAINED UNTIL FINAL SEEDING IS COMPLETED IN SPRING. MARCH 15 TO MAY 31.

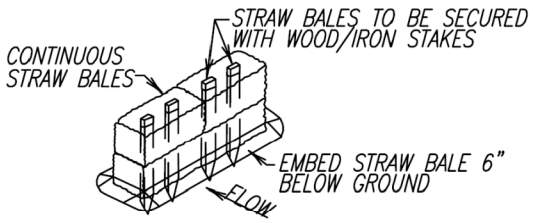
EROSION CONTROL OEPA SPECIFICATIONS

VILLAGE OF MORROW, OHIO
STANDARD CONSTRUCTION DRAWING

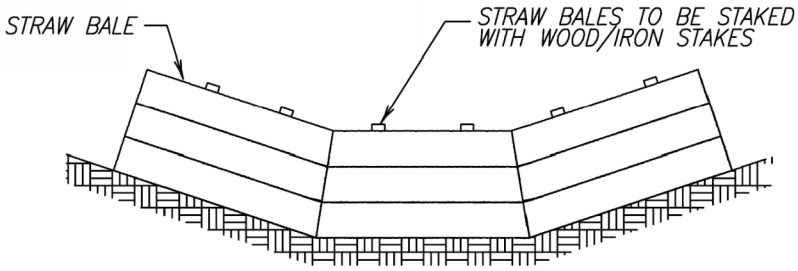
SCALE: AS SHOWN

DATE: 1–17–11

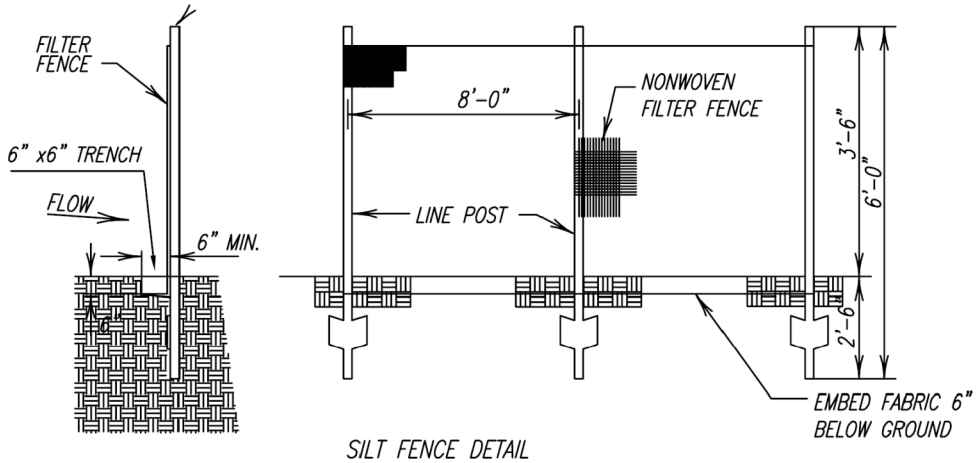
STANDARD NUMBER: **STD-502**



STRAW BALE DETAIL



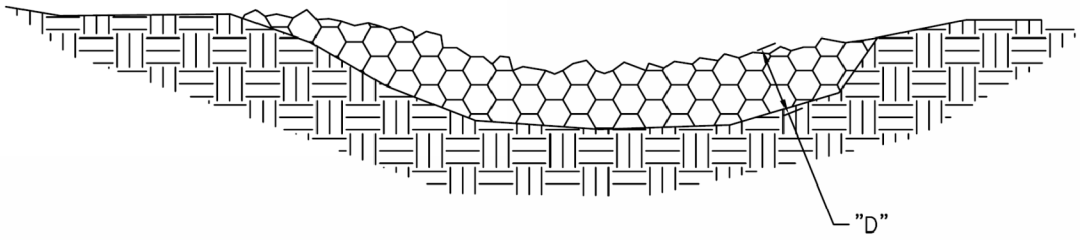
STRAW BALE DITCH EROSION CONTROL DETAIL



SILT FENCE DETAIL

SILT FENCE AND DITCH PROTECTIONS

VILLAGE OF MORROW, OHIO STANDARD CONSTRUCTION DRAWING	SCALE: AS SHOWN DATE: 1-17-11	STANDARD NUMBER: **STD-503**



DEPTH "D" MEASURED
PERPENDICULAR TO SLOPE
SHALL BE SPECIFIED BY THE ENGINEER

ALL ROCK CHANNEL PROTECTION MAY BE PLACED
WITH OR WITHOUT A 6" BED
OF #3 OR #4 CRUSHED GRAVEL

NOTE:

SLOPE AND ROCK CHANNEL PROTECTION SHALL CONFORM TO ODOT ITEM 601 (current edition). ROCK AND AGGREGATE MATERIAL SHALL CONFORM TO ODOT ITEM 703.19 (current edition).

TYPE OF ROCK USED SHALL BE APPROVED BY THE ENGINEER PRIOR TO PLACEMENT

ROCK CHANNEL PROTECTION

VILLAGE OF MORROW, OHIO *STANDARD CONSTRUCTION DRAWING*	SCALE: *AS SHOWN* DATE: *1-17-11*	STANDARD NUMBER: **STD-504**

VILLAGE OF MORROW

MATERIAL SPECIFICATIONS

OCTOBER 2010

TABLE OF CONTENTS

1.0 C-900 PVC WATER MAINS

1.1 C-900 Water Main - This specification covers the manufacturer's requirements for C-900 PVC municipal pipe. The pipe shall meet or exceed the industry standards set forth by the American Water Works Association and the American National Standards Institute.

1.2 Materials - All C-900 PVC pipe shall be made from Class 12454-A or Class 12454-B virgin compounds as defined in ASTM D-1784, with an established hydrostatic-design-basis rating of 4,000 PSI for water at 73.4 F.

1.3 Pipe and Gasket - C-900 PVC pipe shall have a cast iron outside diameter and shall be suitable for use as a pressure conduit. All pipe shall be Pressure Class 150 DR18 unless otherwise specified on the plans and approved by the Village Engineer. Provisions must be made for expansion and contraction at each joint with an elastomeric sealing ring. Laying length shall be 20-feet ±. The joint shall be in compliance with the requirements of ASTM D-3139.

1.4 Marking - C-900 PVC pipe shall be marked as prescribed by AWWA standards; i.e., nominal pipe size, dimension ratio (DR), AWWA pressure class, manufacturer's name and code, and seal of testing agency that certified the suitability of the pipe material for potable water service.

1.5 Approvals - All C-900 PVC pipe used in Morrow must be listed by Underwriters Laboratories and comply with all applicable AWWA requirements.

1.6 Exposure to Sunlight - PVC pipe shall be covered to prevent prolonged exposure to sunlight (ultraviolet rays).

1.7 Extreme Cold - No installation of PVC pipe shall be permitted when air temperature is below 10 degrees Fahrenheit.

2.0 Ductile Iron Pipe Water Main

2.1 Ductile Iron - Ductile iron pipe shall conform to the American National Standards Institute Specification for "Ductile Iron Pipe Centrifugally Cast in Metal Molds for Water or Other Liquids," ANSI A21.51 (AWWA C151).

Unless otherwise indicated on the plans, all pipe 6-inch through 12-inch diameter shall be Pressure Class 350 with the following thickness:

6-inch	0.18-inch (Hydrant connections only)
8-inch	0.20-inch
10-inch	0.22-inch
12-inch	0.24-inch

For larger diameter pipe, pressure class and pipe wall thickness shall be per Table 12, AWWA C150, for Earth Load plus Truck Load, using Laying Condition Type 2 for specifying pipe. Alternately, Special Thickness Class 52 may be used unless otherwise noted on the plans.

2.2 Joints - Mechanical joints, bell and spigot joints, and flanged joints for ductile iron pipe in sizes from 3-inches through 48-inches in diameter shall conform to all of the dimensions, shapes, and requirements of "Ductile and Gray Iron Fittings, 3-inch through 48-inch for Water and Other Liquids," ANSI A21.10 (AWWA C110). The mechanical joint shall also conform in all respects to "Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings," ANSI A21.11 (AWWA C111).

Push-on joints shall be a single rubber gasket joint designed to be assembled by the positioning of a continuous, molded, rubber ring gasket in an annular recess in the pipe, and forcing of the plain end of the entering pipe into the socket thereby compressing the gasket radically to the pipe to form a positive seal. The gasket and the annual recess shall be so designed and shaped that the gasket is locked in place against displacement as the joint is assembled. The push-on type joint shall conform to the requirements of ANSI A21.10 (AWWA C110) and ANSI A21.11 (AWWA C111) where applicable.

Where ductile iron pipe with bell and socket type joints are specified, they shall be of the mechanical gland or expansion and contraction with a positive stop against disengagement of the joint. Up to 15 degrees angular deflection shall be accommodated without leakage and without decrease in full diameter of pipe.

2.3 Fittings - Cast iron or ductile iron fittings in sizes 3-inches through 48-inches for mechanical joints, bell and spigot joints, and flange joints shall conform to all the requirements of "Ductile and Gray Iron Fittings, 3-inches Through 48-inches for Water and Other Liquids," ANSI A21.10 (AWWA C110 and AWWA C153), and to the requirements of "Rubber Gasket Joints for Ductile and Cast Iron Pressure Pipe and Fittings," ANSI A21.11 (AWWA C111) for mechanical joints and push-on type joints.

The fittings for use on ductile iron pipe may be either gray iron or ductile iron. The fittings larger than 12-inches shall have a minimum pressure rating of 150 psi unless otherwise shown on the approved construction drawings.

2.4 Coatings for Ductile Iron Pipe and Fittings - The ductile iron pipe and cast iron or ductile iron fittings shall be furnished with cement mortar lining in accordance with "Cement Mortar Lining for Ductile Iron Pipe and Fittings for Water," ANSI Specification A21.4 (AWWA C104). The lining will be 1/16-inch thick for pipe sizes 4-inches through 12-inches in diameter and 3/32-inch thick for size 14-inches through 24-inches in diameter. A bituminous seal coat shall be applied to the lining surface immediately following the lining operation to prevent loss of moisture and assure proper curing of the cement mortar. The outside of the iron pipe shall be furnished with a protective bituminous coating.

3.0 Anchoring Assemblies and Joint Restraint

3.1 Anchoring Assemblies and Restraint - Anchor tees and anchor pipe will be required for all fire hydrants and hydrant valves. Joint restraint assemblies will be required for setting other valves, tees, dead ends, plugs, caps, and bends as shown on the construction drawings. Acceptable Joint restraint assemblies are Meg-a-lug type and Bell Joint Restrainers. Mechanical joint restraint, for ductile iron pipe shall be the Series 1100 Megalug restraint as produced by EBAA Iron, Inc. or approved equal. The restraint shall be incorporated into the design of the follower gland. The restraining mechanism shall consist of individually actuated wedges that increase their resistance to pull-out as pressure or external forces increase. The device shall be capable of full mechanical joint deflection during assembly and the flexibility of the joint shall be maintained after burial. The joint restraint ring and its wedging components shall be made of grade 60-42-10 ductile iron conforming to ASTM A536. The wedges shall be ductile iron heat treated to a minimum hardness of 370 BHN. Dimensions of the gland shall be such that it can be used with the standardized mechanical joint bell conforming to ANSI/AWWA C111/A21.11 and ANSI/AWWA C153/A21.53 of the latest revision. Torque limiting twist-off nuts shall be used to insure proper actuation of the restraining wedges. They shall have a rated working pressure of 350 psi in sizes sixteen inch and smaller and 250 psi in sizes eighteen inch through forty-eight inch. The devices shall be listed by Underwriters Laboratories up through the twenty-four inch size and approved by FM up through the twelve-inch size.

Mechanical joint restraint, for PVC pipe, shall be incorporated into the design of the follower gland. The restraint mechanism shall consist of a plurality of individually-actuated gripping surfaces to maximize restraint capability. Glands shall be manufactured of ductile iron conforming to ASTM A536. The gland shall be such that it can replace the standardized mechanical joint gland and can be used with the standardized mechanical joint bell conforming to ANSI/AWWA C111/A21.11 and ANSI/AWWA C153/A21.53 of latest revision. Twist off nuts, sized same as tee-head bolts, shall be used to insure proper actuating of restraining devices. The restraining gland shall have a pressure rating equal to that of the pipe on which it is used. The restraining glands shall be listed by UL, and be approved by Factory Mutual. The restraint shall be the EBAA Iron Series 2000PV or approved equal.

Restraint Harness for Ductile Iron Pipe push on bells size 4” and greater shall be made of ductile iron components. All ductile iron shall conform to ASTM A536. A split ring shall be used behind the bell and restraining ring shall have actuated wedges provide increased resistance to pull-out as pressure of external forces increase. The connecting tie rods that join the two rings shall be made of low alloy steel that conforms to ANSI/AWWA C111/A21.11. The assembly shall have a rated pressure of 350 psi for size sixteen inch and smaller and a rated pressure of 250 psi in sizes eighteen inch through thirty-six inch. The restraint shall be the Series 1700 Megalug Restraint Harness as produced by EBAA Iron, Inc or approved equal.

Restraint for existing Ductile Iron Pipe push on bells shall be made of ductile iron components conforming to ASTM A536. The split rings shall incorporate individually actuated gripping surfaces on the pipe ring opposite of the bell. A sufficient number of bolts shall be used to connect the bell ring and the pipe ring. The combination shall have a minimum working pressure

rating of 350 psi for sizes eight inches and less, 300 psi for sizes ten inches through 16 inches, and 200 psi sizes 18 inches through 36 inches. The restraint shall be the Series 1100HD Restraint for Existing Push-on Joints for Ductile Iron Pipe as manufactured by EBAA Iron, Inc or approved Equal.

Restraint Harness for C900 PVC pipe bells size 4" – 12" shall be made of ductile iron components. All ductile iron shall conform to ASTM A536. A split ring shall be used behind the bell and a serrated restraint ring shall be used to grip the pipe. A sufficient number of bolts shall be used to connect the bell ring and the pipe ring. The combination shall have a minimum working pressure rating of 150 psi. The restraint shall be the Series 1600 as produced by the EBAA Iron, Inc.

Restrained flange adapters shall be made of ductile iron conforming to ASTM A536 and have flange bolt circles that are compatible with ANSI/AWWA C115/A21.15. Restraint for the flange adapter shall consist of a plurality of individually actuated gripping wedges to maximize restraint capability. Torque limiting actuating screws shall be used to insure proper initial set of the gripping wedges. The flange adapters shall be capable of deflection during assembly or permit lengths of pipe to be field cut to allow a minimum 0.6 in. gap between the end of the pipe and the mating flange without affecting the integrity of the seal. For PVC pipe, the flange adapters will have a pressure rating equal to the pipe. For Ductile Iron Pipe, the flange adapter shall have a safety factor of 2:1 minimum. The flange adapter shall be the Series 2100 Megaflange adapter as produced by EBAA Iron, Inc. or approved equal.

4.0 Pressure Service Lines

4.1 General - The materials for pressure service lines shall meet the following specifications. All service lines shall use compression-type fittings (no flare). No McDonald Fittings

4.2 Service Pipe - Pressure service pipe shall be copper pipe and shall conform to the dimensions, weights, and tolerances stated in "Copper Water Tube," for Type "K," Table No. II, ASTM B88. The copper service line shall be ¾-inch through 2-inches in diameter.

4.3 PE Polyethylene Resin Water Service Pipe (CTS) – Pressure service polyethylene pipe shall conform to ASTM D 2737. The material shall comply with ANSI/NSF Standard 61 and meets the requirements of AWWA C 901. ¾ INCH THROUGH 2 INCH Pipe shall be CTS (copper tube size) 200 PSI PE 3408 SDR 9. All installed Polyethylene resin water services shall have a #10 solid copper coated tracer wire taped to and installed with this type water service. (Tracer tube type pipe is accepted). Pipe shall be bedded per Village of Morrow standard for buried pipelines and conduits. (STD Drawing #101 and 102) All inserts shall be stainless steel.

4.4 Service Saddle - Shall be used on PVC pipe and be epoxy-coated with wide stainless steel straps and bolts. The service saddle shall be the equal of Smith - Blair Inc. type 315 or Romac Ind. Inc. style #101n or #202n. Equals must be approved by the Village of Morrow Engineer or Engineer's Representative.

4.5 Corporation Stops - Corporation stops shall be of cast bronze construction with ground key stops of Ford Meter Box Co. F-1000 or approved equal.

4.6 Service Stops - Service stops shall be of cast bronze or cast brass construction designed to receive copper pipe on each side. They shall be of the solid tee head type with"Teflon" coat plus top and bottom "O" rings for positive pressure sealing without mechanical means. The stops shall be the equal of Ford Meter Box Company, ¾-inch B44-333, 1-inch B44-444, 1 ½-inch B44-666, or 2-inch B44-777.

4.7 Service Boxes - Service boxes shall be plastic, slip style, with a 2 ½-inch shaft diameter or approved equal. The lid shall be made of iron marked "Water" and secured with a brass or bronze bolt inlaid level with the lid surface. The box shall be equipped with a foot piece to straddle the service stop (telescoping type).

5.0 Storm Sewers

5.1 HDPE (High Density Polyethylene) for Storm Sewers - HDPE storm pipe in diameters 12-inches and larger shall have smooth interior and exterior corrugations. Pipe 12-inches through 36-inches diameter shall meet all requirements of AASHTO M294 Type S. 42-inch and 48-inch diameter pipe shall conform to AASHTO MP6-95. 54-inch and 60-inch diameter pipe shall have minimum pipe stiffness of 16 and 14 psi respectively, and shall meet all other requirements of AASHTO M294. Manning's "N" value shall not exceed 0.010. Pipe shall have a minimum cover of 24 inches.

5.2 Joints - Joints shall be bell-and-spigot incorporating a gasket, making joint silt-tight. The pipe manufacturer shall install gaskets.

5.3 Material Properties - Pipe material shall meet the requirements of ASTM D3350, minimum cell classification 335420C; or ASTM D1248 Type III, Class C, Category 4, Grade P33.

5.4 Reinforced Concrete Pipe - Reinforced concrete pipe shall conform in all respects to the requirements of "Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe," ASTM C76. Wall "B" thickness designs shall be supplied. Table V of ASTM C76 shall be modified as specified in ODOT ITEM 706.02. Class for the reinforced concrete pipe shall be as shown on the construction drawings

5.5 Joints - The joints for reinforced concrete pipe shall conform to "Joints for Circular Concrete and Culvert Pipe Using Flexible, Watertight, Rubber Gaskets," ASTM C443. The rubber gaskets shall be circular in cross section. Lubricants and/or adhesive required for assembling the completed joint shall be supplied in sufficient quantities for the project.

5.6 Castings: All catch basin castings shall have and environmental logo cast on top.

Curb Type	Neenah	East Jordan

1. Chair Back	R-3295	7030
2. Barrier	R-3295	7030
3. Roll	R-3290A	7034
4. Drive Approach	R-3290A	7034

NOTE: All Castings available in double unit

6.0 Trench Material

6.1 Pipe Bedding - All pipe shall have bedding including service lines. The pipe bedding shall be as follows:

1. Water Main and Services - No. 8 washed gravel, 75% to 100% crushed, and shall be a minimum of 4-inches under pipe to a minimum of 12-inches over pipe.

2. Sanitary Sewer Main and Laterals - No. 8 washed gravel, 75% to 100% crushed, and shall be a minimum of 4-inches under pipe to a minimum of 12-inches over.

3. Storm Sewer - Shall be No. 57 washed gravel, a minimum of 4-inches under pipe to a minimum of 6-inches over pipe. The remainder of the backfill in the right-of way to subbase grade shall be the equivalent of ODOT ITEM 603 unless otherwise approved by the Village Engineer.

6.2 Gravel Backfill - Gravel backfill, where required, shall consist of durable particles graded from fine to coarse. It shall conform to the ODOT ITEM 603, Grading A Specifications (Old ODOT Item 310.02). It shall not contain lumps or frozen material. All such materials shall be subject to approval by the Village Engineer.

7.0 Concrete Encasement, Cradle

7.1 Strength - The concrete used for encasement and cradle shall have a minimum 28 day compressive strength of 4,000 psi.

7.2 Reinforcing Steel - The submitted construction drawings shall show the locations, lengths, sizes, and numbers of reinforcing bars required. The reinforcing steel shall conform in all respects to "Deformed Steel Bars," A15 "Billet Steel Bars," A16 "Rail Steel Bars," and A160 "Axle Steel Bars," ASTM Specifications A305.

8.0 Restoration

8.1 Topsoil - Imported topsoil shall meet the requirements of ODOT ITEM 653.02 Minimum of - 6 inches deep.

8.2 Street General - The street restoration materials shall meet the following specifications:

1. Base Course - The base course shall be the equal of ODOT ITEM 304.02 as specified in the construction drawings.

2. Bituminous Surface Treatment - This type of surface restoration **shall be approved by the Village Engineer prior to application.** It shall include the application of a prime coat, a seal coat, and cover aggregate. These materials shall meet the following ODOT Specifications:

    A. 408 Prime Coat - MC-70 or RT-2 at 0.5 gallons per square yard, as per specified by ODOT ITEM 408
    B. Seal Coat - MC-3000, RT-8, CBAE-2, MS or MS-2 at 0.5 gallons per square yard
    C. Cover Aggregate - shall meet the requirements of ODOT ITEM 408.03

3. Asphaltic Concrete - Asphaltic concrete shall conform in all respects to the requirements of ODOT Item 404 (448 type I). The asphaltic concrete shall be plant mixed, delivered, spread, and compacted according to ODOT ITEM 401.

4. Joint Sealing - Joints between new surface restoration and existing asphaltic concrete must be sealed with AC-20, or the same bituminous material used in the mixture of the asphaltic concrete. Also, all edges are to be sealed between asphalt & gutter around all manholes and valve boxes after asphalt has been placed. (AC-20)

8.3 Sod - Sod shall be well-rooted Kentucky Blue Grass (poa pratensis) containing a growth of not more than 30 percent of other grasses and clovers, and free from all noxious weeds. The sod shall be covered with grass recently mowed to a length of not more than 3-inches.

8.4 Seeding and Mulching - All seeding and mulching shall meet ODOT ITEM 659.

8.5 Fertilizer - Fertilizer shall be N-P-K 12-12-12 mixture.

8.6 Concrete - Concrete for replacing concrete street pavements, concrete driveways, concrete curbs, and concrete sidewalks shall have a minimum 28 day compressive strength of 4,000 psi.

VILLAGE OF MORROW

CONSTRUCTION SPECIFICATIONS

OCTOBER 2010

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1.0 Excavation

1.1 General Excavation - Excavation shall be limited to rights-of-way, easements, or lands controlled by the owner or Village. **Erosion and sediment control must be installed prior to start of earthwork.**

1.2 Open Excavation - All excavations within public right-of-way limits shall be completely closed at all times when there is a delay in the progress of the work. The Contractor shall provide suitable lights, signs, and barricades to adequately warn the public. The lights shall be illuminated sunset to sunrise.

1.3 Sheeting and Shoring - The Contractor shall furnish, put in place, and maintain such piling, sheeting, bracing, etc., as required by OSHA.

1.4 Removal of Water -All excavation must be kept dry for laying pipe or for placing concrete. The Contractor shall provide, at all times during the construction, adequate equipment for the removal of water and like wastes from all excavations. The disposal of the water and wastes shall be in such a manner as not to interfere with the proper construction of pipelines or masonry.

The Contractor shall not dispose of ground and/or surface water into newly constructed sanitary sewers or existing sanitary sewers. Connection of newly constructed sanitary sewers to existing sanitary system shall not be made until authorized by the Village Engineer.

1.5 Rock Excavation - Contractor must secure written permission from the Village Engineer 48 hours prior to blasting operations. The Contractor shall exercise all possible care in any blasting to avoid injury to persons and adjacent property. The rock shall be well covered and sufficient warning shall be given to all persons in the vicinity of the work before blasting. Proper care shall be exercised to avoid injury to water pipes or other structures either below or above ground. Caps or other exploders shall not be kept in the same place in which dynamite or other explosives are stored. All federal, state, or local regulations covering the use of explosives shall be strictly observed; and in addition, the Contractor shall conform to any further regulations, which the Village may deem necessary in this respect. The Contractor shall remove all rock that is shattered below grade due to a too deep drill hole, a too heavy charge of explosives, or for any other reasons and refill the excavation to the required grade with compacted gravel. Excavated rock must be disposed of by the Contractor and shall not be used for backfill.

1.6 Unsuitable Foundation - If the Village determines that the material at or below the normal grade of the bottom of the pipelines or structures is unsuitable for foundation, it shall be removed to such depths and widths as the Village may direct or be replaced by the Contractor with such material as the Village may direct at the owner's expense.

1.7 Unauthorized Excavation - Any excavation not authorized by the Village beyond the limits required for the proper construction shall be backfilled by the Contractor with materials approved by the Village, at the Contractor's expense.

1.8 Removal of Excavated Material - For trenches located within roadway rights-of-way, the excavated material shall be disposed of directly by the equipment excavating the trench into appropriate type carriers which will transport the excavated material from the site of the construction. The street surface will be brushed and cleaned during the construction period so that excess material is immediately removed as it drops from the construction trucks and equipment. The Contractor shall exercise extreme care to protect an existing street surface and base adjacent to the open trench excavation from failures due to the loads of the construction trucks and equipment. The contractor shall repair/replace any damage caused by, or as a result of, the removal or excavation. It will be the Contractor's responsibility to dispose of all the excavated material unless the plans or the specifications show or direct otherwise.

1.9 Storage of Excavated Material - When excavated material is to be used as trench backfill, the excavated material shall be placed so that free access may be had at any time to all parts of the work. The excavated material should be neatly piled to cause as little inconvenience to the general public as possible.

2.0 Installing Casing Pipe

2.1 General - Casing pipe shall be installed by the boring method, the jacking method, or by tunneling as shown on the construction drawings. The Developer/Contractor will obtain permits for any railroad, state, or federal highway crossings. The Developer/Contractor shall coordinate scheduling of construction of crossings with railroads and highway departments and shall pay any charges established therefore for work accomplished by these outside agencies. Special construction requirements defined by railroads and highway departments will be shown on the construction drawings and shall be adhered to by the Contractor. Installation of casing pipe shall not commence without the written permission of the Village. The annular space between the casing pipe and the contained carrier pipe shall be filled with grout or with granular materials unless specified otherwise on the construction drawings. Each end of the casing pipe shall be sealed with a bulkhead.

2.2 Installation by Boring - Steel pipe shall be installed by the boring method utilizing an auger-type boring machine or a machine of such design meeting the individual requirements of the railroad, state, or federal highway system being crossed. The Contractor shall provide an approach pit completely sheeted and of sufficient size to operate the boring equipment and to receive 12-foot lengths of pipe. The operation of the boring equipment shall be subject to continuous checking by the Contractor to ensure proper alignment of the cover pipe as installed.

2.3 Installation by Jacking - The Contractor will provide an approach pit for the jacking operation, excavated so the jacking face is a minimum of 3-feet above the pipe. This open face should be shored securely to prevent displacement of the embankment. The pit shall include a backstop of sufficient size to take the thrust of the jack. The guide rails that support the pipe as it enters the bore shall be accurately placed to line and grade. The entire approach pit shall be sheeted. Hydraulic or mechanical jacks may be used in this operation. The number of jacks and capacity of the jacks shall be adequate to complete the operation. A jacking head shall be used to transfer the pressure from the jacks and the jacking frame to the pipe. If an auger is used, the

pipe shall be jacked simultaneously with the auguring. The Contractor shall check the construction work at frequent intervals to insure proper line and grade of the installation.

3.0 Restoration

3.1 General Restoration - The Contractor shall provide for protection of existing streets and structures; the maintenance of streets, driveways, sidewalks, curbs, gutters, reseeding, and resodding; removal of trees; restoration of agricultural land; and the maintenance of the construction area to its original condition at the completion of the work.

The Contractor shall continuously carry on with the final restoration of the construction area after the backfilling is completed and directed by the Village. He shall proceed to restore to its original condition areas that were damaged, disturbed, or occupied by the Contractor in connection with any phase of the work.

Pavements, trees, shrubbery, fences, poles, or other property and surface structures which have been damaged, removed, or disturbed by the Contractor (whether deliberately or through failure to employ usual and reasonable safeguards) shall be replaced at the expense of the Contractor.

The completed restoration of the streets, drives, curbs, and sidewalks within public rights-of-way must meet with the approval of the Village Engineer, the State of Ohio Department of Transportation, Warren County Engineering Department, and the Township Trustees, whichever has jurisdiction over said rights-of-way. The Contractor shall, insofar as is reasonably possible, maintain streets and driveways open

3.2 Street Restoration - The Contractor shall restore all Village streets damaged during the construction. Repairs shall meet all the street construction requirements set forth in this manual or as determined by the Village Engineer or Engineer's Representative.

3.3 Concrete Sidewalks and Curbs - The Contractor shall restore all sidewalks and curbs to their original shape and dimensions if damaged during construction. Concrete for curbs and walks shall have a minimum 28-day compressive strength of 4,000 psi and be air-entrained. Individual sections of sidewalk damaged during construction shall be replaced full width and between adjacent lateral construction joints or dummy joints. Concrete shall be removed by sawing at the nearest joint or dummy joint. Minimum thickness of concrete shall be as follows:

Sidewalk – Residential & Commercial -	4"
Sidewalk through Residential Approach -	6"
Sidewalk through Commercial Approach -	8"

Sidewalks shall be placed on a well-compacted 3-inch thick base of materials corresponding to ODOT ITEM 304, Grade A. Curbing

3.4 Trees and Shrubs - Trees and shrubs located on privately owned land which interfere with the construction operation may be removed by the Contractor only within the limits of the

temporary construction easements obtained by the owner; however, care shall be exercised to prevent damage to or removal of trees and shrubs which do not actually interfere with the Contractor's operations. If trees are necessarily removed, the tree stumps shall also be taken out of the ground.

Trees or shrubs, which may not be disturbed, shall be indicated on the construction drawings. Repair, removal, and replacement of any such designated trees or shrubs shall be at the Contractor's expense.

Trees and shrubs outside of the temporary construction easement shall not be trimmed, removed, or otherwise disturbed by the Contractor except with the express written permission of the owner of the property. Obtaining such written permission shall be the responsibility of the Contractor and the Contractor shall cover any expense involved.

Any trees or shrubs that are damaged by the Contractor's operations shall be removed or satisfactorily repaired by the Contractor under the direction of the Village Engineer or his representative.

All branches, trunks, stumps, and brush removed during the construction operations shall be hauled from the project site and disposed of by the Contractor. Burning/ burying of these items is strictly prohibited

3.5 Grass Plots - All grass lawns disturbed during construction shall be reseeded or resodded as directed by the Village Engineer or Engineer's Representative.

3.6 Seeding - Seeded areas shall be fertilized after topsoil has been placed in the backfilled trench. Dry fertilizer shall be applied at the rate of 20 pounds per 1,000-square feet and thoroughly raked into the soil at a depth of not less than 1-inch. Liquid fertilizer shall be applied in the manner recommended by the supplier of the fertilizer. The soil shall then be hand-raked to a finely divided planting surface and uniformly sown with clean lawn grass seed at the rate of 3 pounds per 1,000-square feet. The completed seed area shall be covered with a mulching material. The topsoil shall be placed a minimum depth of 4-inches in a backfilled trench where seeding is required.

4.0 Pressure Pipe

4.1 General - Trenches for buried pressure pipelines shall be so excavated that the pipes and appurtenances may be installed and joined to the alignments and grades required

4.2 Trench Depth - The depth of pressure pipeline trenches shall be a minimum of 54 inches to top of pipe, plus the outside diameter of the pipelines measured from the existing street grade or the proposed street grade, plus a minimum of 4 inches of bedding. Unless otherwise approved by the Village Engineer. At no time shall depth be greater than 7-feet from final grade. After excavation, the trench shall be filled with a minimum of 4-inch bedding (granular #8 75-100% crushed gravel) material to ensure a uniform and continuous bearing on the barrel between

bellholes. Twelve-inches of bedding material shall be used as pipe cover. (#8 gravel 75-100% crushed).

When rock is present in the trench bottom, the trench shall be excavated to a minimum depth 6-inches below the outer-most dimension of the pipeline. Excavated rock shall be disposed of by the Contractor and not used for backfilling. Granular bedding of 6-inch depth shall be placed under pipe using #8 gravel 75-100% crushed with a minimum of 12-inches over pipe.

4.3 Installing Pressure Pipelines - The specifications for the installation of pressure pipelines are intended to conform with AWWA Specification C600 "Installation of Ductile-Iron Water Mains and Their Appurtenances" and C-605 "Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water," the same as if they were totally incorporated herein except where these specifications direct otherwise.

Pressure pipelines shall be laid and maintained to the required lines and grades with fittings and valves set at the required locations, spigots centered in bells, and all valves and hydrant stems plumb. All pipe and fittings shall be carefully examined for cracks and other defects while suspended above the trench immediately prior to installation in final position. Spigot ends shall be examined with particular care. Defective pipe or fittings shall be removed from the job site immediately.

Precautions shall be taken to prevent foreign material from entering the pipe while it is being placed in the line. If the pipe laying crew cannot put the pipe into the trench and in place without getting earthen material into it, the Village may require that prior to lowering the pipe into the trench, a heavy, tightly woven canvas bag of suitable size be placed over each end and left there until the connection is to be made to the adjacent pipe. During pipe laying operations, no debris, tools, clothing, or other materials shall be placed within the barrel of the pipe.

As each length of pipe is placed on the trench, the spigot end shall be centered accurately in the bell and the pipe forced home and brought to correct line and grade. Precautions shall be taken to prevent dirt from entering the annular joint space.

At times when pipe laying is not in progress, the open ends of pipe shall be closed by a watertight plug or other means approved by the Village. If groundwater rises in the trench, such a seal shall remain in place until the trench is pumped completely dry and is therefore ready for continued pipe laying operations.

The cutting of pipe for the insertion of valves, fittings, or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe or lining so as to leave a smooth end cut at right angles to the main axis of the pipe.

Pipe shall be laid with bell ends facing in the direction of laying unless directed otherwise by the Village. Where pipe is laid on a grade of 10 percent or greater, the laying shall start at the bottom and shall proceed upwards with bell ends of the pipes upgrade.

A 10-gauge minimum, coated solid strand copper wire shall be placed in the PVC pipe trench and run throughout the length of the installation.

4.4 Deflection of Ductile Iron Pipe - Whenever the construction drawings require the deflection of ductile iron mechanical joint or push-on joint pipe in order to form a long, radius curve, the amount of the deflection shall not exceed the maximum limits specified in Table 4 (Push-on Joint) or Table 5 (Mechanical Joint) in AWWA C600.

4.5 Bending of PVC Pipe - Whenever deflection or bending of PVC pipe is required, the maximum bending radius shall be as specified in AWWA C605, Table 1 and Section 5.6.

4.6 Reinforced Concrete Pressure Pipe - The bottom of the excavated trench shall be checked for alignment and grade with a "grade square." The "grade square" shall also be used to measure the amount of joint offset for grade and line changes when pipe is deflected after joining two sections of the material.

4.7 Installation - Both the bell or hub and spigot ends of the pipe shall be thoroughly cleaned of all dirt, dust, and foreign matter. The Contractor shall use rags; a wire brush, emery cloth, or a file to clean and smooth the pipe ends of the joint assembly.

Lubricating compound shall be of the type recommended by the pipe manufacturer. The compound shall be maintained at a workable consistency even during cold weather.

At such time as the pipe is lowered halfway into the trench, the spigot rings should be lubricated. Care should be taken to lubricate the complete depth of the gasket groove. A lubricated gasket shall then be stretched around the spigot end of the pipe and seated in the gasket groove. The gasket and the inside of the bell ring shall be covered thoroughly with lubricating compound.

The section of the pipe shall be lowered in a horizontal manner exactly on alignment opposite the bell or hub end of the pipe in place. The spigot end of the pipe shall be guided into the bell end of the pipe and in such a manner that dirt does not touch the lubricated spigot ring.

Joint stoppers 5/8-inch thick shall be inserted into the joint on opposite sides of the inside of the pipe for pipe diameters in excess of 20-inches. The placement of the gaskets shall be checked with a feeler gauge. The joint shall be taken apart and the gasket checked for imperfections if irregularities are noted with this gauge. If necessary, the gasket will be replaced. If the gauge indicates no irregularity, the joint stopper shall be removed and the pipe shoved home with construction equipment or pull jacks.

An external feeler gauge will be used to check the gasket from the outside for 16-inch, 18-inch, and 20-inch diameter pipe. The pipe must be removed and the gasket inspected as outlined above if any irregularity is noted.

A joint deflection shall be made between the two sections of the pipe after they have been joined and checked in the manner described if such a deflection is required on the construction

drawings. The joints shall be cracked no more than the amount specified. The alignment of the pipe shall then be checked.

4.8 Pipe Fittings - Pipeline fittings, plugs, and caps of the required size and type shall be furnished and installed at the location shown on the construction drawings or as directed by the Village. It shall be the responsibility of the Contractor to furnish and install all proper size fittings for both horizontal and vertical deflections which are required to construct the pressure main to the line and grade shown on the construction drawings or as established in the field by the Village. The fittings, plugs, and caps shall be set and joined to the pipe in the manner heretofore specified for installation.

4.9 Backfilling - The construction drawings shall indicate trenches, which shall be completely backfilled with gravel. In this case, the excavated material from the trench shall be disposed of directly from the equipment excavating the trench into appropriate type carriers for removal from the construction site. Where gravel trench backfill is indicated on the construction drawings, all of the material used to backfill and the balance of the backfill shall be of the gravel type material as specified by the Village Engineer.

4.10 Bedding - All water and sanitary sewer pipe bedding shall be #8 gravel 75% to 100% crushed, 4-inches to 6-inches under and 12-inches over top of pipe.

PVC storm sewer pipe shall be bedded with a minimum of 4 inches of washed #57 gravel under the pipe and a minimum of 6 inches of washed #57 gravel over the pipe.

All R.C.P and ductile iron storm sewer pipe shall be bedded in washed #57 gravel to spring line in clean soil conditions with six-inches under and six-inches over in all other soil conditions, as determined by the Village Engineer or Engineer's Representative.

4.11 Initial Backfill - The trench shall be backfilled by approved mechanical methods from the centerline of the pipe to a height of 1-foot above the top of the pipe. The materials used shall be the equal of those specified for bedding. The Contractor shall use special care in placing this portion of the backfill so as to avoid injuring or displacement of the pipeline. Mechanized equipment such as bulldozers, front-end loaders, etc., shall, under no condition, be used to push excavated material directly into the open trench as backfill between the bottom of the trench and a point 1-foot above the top of the pipe.

4.12 Balance of Backfill - Where gravel trench backfill is specified, the backfill material from 1-foot above the pipe to the street or shoulder grade (or subgrade of pavement) shall consist of gravel that shall be compacted above bedding with mechanical or vibrator equipment in no greater than 12-inch lifts. Jetting may also be used with the approval of the Village Engineer. The Contractor shall furnish the necessary tank trucks, water pumps, and all equipment required to settle the gravel backfill by the jetting method

Where backfill with excavated materials is indicated on the construction drawings, the Contractor may backfill the trench from 1-foot above the top of the pipe to the top of the trench with excavated material, provided that such material consists of loam, clay, sand, gravel, or other

materials that, in the opinion of the Village, are suitable for backfilling. Care shall be taken to carry the backfill up evenly in the trench. Backfill shall be neatly rounded over the top of the trench to a sufficient height to allow for settlement to grade after consolidation. If settlement below grade occurs, the Contractor shall be responsible and backfill immediately.

5.0 Joint Restraint/Anchorage

5.1 General - The Contractor shall use Joint Restraint/anchor all dead end valves, plugs, caps, tees, and bends in excess of 10-degrees by use of ductile iron or PVC C900 approved meg-a-lugs and pipe joint retainers using the proper amount of pipe joint restrainers as required by Standard Drawings. The Contractor shall use anchor tees and anchor pipe for hydrants.

The length of pipe with restrained joints called for in the standard drawings shall be considered as a minimum for the stated test pressure with trenches backfilled and compacted over the pipe.

The pipeline is tested at a high pressure and/or without the stated minimum compacted pipe cover, additional restrained joints will be required and shall be furnished and installed by the Contractor at no cost to the Village. No pipe shall be tested at a high pressure without being backfilled with approved compacted material.

6.0 Pressure Service Lines ¾-inch through 2-inches

6.1 General - Installation of a water service line shall begin with a service saddle epoxy coated with wide stainless steel straps and bolt if water main is PVC. If ductile iron main, the corporation can be installed directly into the main. From the corporation F-1000 (Ford or approved equal), the K-copper shall be installed as one continuous line to terminate a minimum of 2-feet behind curb in center of lot away from drive approaches and sidewalks in front of property to be served. The letter "W" shall be stamped into top of curb where water service crosses. The service line shall be terminated with a curb stop and plastic (non-treaded) curb box:

Ford Meter Box Co. ¾-inch B44-333 or approved equal
1-inch B44-444 or approved equal
1 ½-inch B44-666 or approved equal
2-inch B44-777 or approved equal

In new developments the Contractor shall install a 4-inch by 4-inch treated wooden pole at the termination point of the service line. The pole shall be installed on a vertical plane extending from the service stop to a point 12-inches above ground installation. If wooden pole is removed or broken before job completion, the Contractor shall replace at their own expense. The water service line shall be tested for leakage and disinfected in conjunction with water main and fire hydrants.

6.2 Meter Wells - Meter wells shall be installed between curb and sidewalk where green space is provided. If no green space is provided meter well shall be as close to back of walk as possible. The meter well lid shall be flush with the finish grade.

7.0 Installing Fire Hydrants

7.1 Scope of Work - The Contractor shall furnish all labor, tools, materials, and equipment necessary to furnish and install new fire hydrants at the locations shown on the drawings or as directed by the Village.

The item shall include all excavation, furnishing and installing the new fire hydrant complete with proper jointing, restraint, backfill, and all other incidental work necessary to complete this item of work. Hydrant shall be red in color. **A final coat of paint shall be field applied before final acceptance**.

7.2 Installation - Unless otherwise shown on the plans or directed by the Engineer, fire hydrants shall be located 2-feet behind the back of curb line or 5-feet from edge of paved areas on non-curb streets. They shall be of proper length to suit the depth of cover over the water line at the locations shown on the plans. The Contractor shall provide the necessary extensions to obtain the proper bury.

The trench for the fire hydrant shall be so excavated that when the hydrant is installed, it shall rest on undisturbed soil and the hydrant shall be set plumb with the center of the pumper nozzle outlet approximately 18-inches from ground line. Hydrants shall be set in accordance with grade line that is approximately 2-inches below the bottom of the break flange on the hydrant standpipe.

7.3 Backfilling - Fire hydrant backfilling shall consist of 1 cubic yard of #57 washed gravel around weep holes for hydrant drainage crushed stone or gravel, power tamped in layers not to exceed 18-inches in depth. This granular backfill shall extend from the bottom of the pit or trench to subgrade of road and curb, then the appropriate surface installed (Asphalt- Curb- Topsoil and Seed).

8.0 Disinfection and Testing

8.1 Disinfection - All new water mains and repaired sections or extensions to existing water mains shall be chlorinated before being placed in service so that a chlorine residual of not less than 50 ppm remains in the water in the test section after 24 hours standing in the pipe. The procedures for disinfecting the water mains and the chemicals to be used shall be in accordance with the current requirements of AWWA C651 and Ohio EPA

Water from the existing distribution system shall be controlled so as to flow slowly into the newly laid pipeline during the application of chlorine.

Following chlorination, all treated water shall be thoroughly flushed from the newly laid pipeline at its extremities until the replacement water throughout its length shall, upon test, be proved comparable in quality to the water serving the public from the existing water supply system and approved by the public health authority having jurisdiction. This satisfactory quality of water

delivered by the new main should continue for a period of at least two full days (two samples, one each 24 hours) as demonstrated by laboratory examination of samples taken from a tap located and installed in such a way as to prevent outside contamination. Samples shall not be taken from an unsterilized hose or from a fire hydrant because such samples will seldom meet bacteriological standards. All samples shall be taken by the Village for delivery to Warren County Laboratory. The results shall be reported to the Village**, all laboratory examination fees shall be paid by the Contractor**.

Should the initial treatment fail to result in the condition specified, the following original chlorination procedure shall be repeated until satisfactory results are obtained. The disinfection procedure shall precede the pressure testing of water mains.

8.2 Testing - The Contractor shall subject the completed pressure pipeline to a leakage test. The test shall be performed on all newly laid pipe in lengths not to exceed 2,000-feet. The length of the test section shall exceed the specified maximum only with explicit approval of the Village. The test may be conducted after the trench has been backfilled but must be completed before replacement of pavements and final restoration. All testing shall be done in the presence of the Village.

8.3 Leakage Test - The Contractor shall furnish the pump, pipe connection, temporary testing plugs and caps, and all necessary apparatus including pressure gauges, meters, and a supply of approved water. The Contractor shall make all necessary taps into the pressure pipelines. The Contractor shall be responsible for all labor and equipment necessary to conduct the tests including excavating and backfilling the test fittings at the location selected by the Village.

The completed pipeline shall be slowly filled with water. All air shall be expelled from the pipe at high points by means of test plugs in valve bonnets, fire hydrants, or through corporation stops installed by the Contractor for this purpose. After all air has been expelled, the opening shall be closed and the test pressure applied by means of a test pump connected to the pipe in a manner satisfactory to the Village.

Test pressure for leakage shall be 150 percent of the normal operating pressure at the lowest point in the section of line under test as corrected to the elevation of the test gauge. The duration of each leakage test shall be two hours. **Test pressure shall be not less than 150 psi**.

The exposed piping and/or surface of the backfilled trench shall be carefully inspected during the test for any signs of leakage. Any cracked or defective pipe, fittings, valves, hydrants, etc., discovered in consequence of the leakage tests shall be removed and replaced by the Contractor with sound material and the test repeated until satisfactory results are obtained. The Contractor is responsible for the location, excavation, and backfilling of a pressure pipeline trench at no cost to the Village, in addition to replacing the defective material if the leakage test is conducted on a backfilled pressure pipeline. The Contractor shall maintain the specified hydrostatic pressure at all times during the leakage test through his test pump.

Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe or any valved section thereof, to maintain the specified leakage test pressure after the air has

been expelled, the pipe has been filled with water, and the pressure initially applied. No pipe installation will be accepted if the amount of leakage is greater than that specified in **Table 6**, Allowable Leakage, AWWA C600 (Ductile Iron), and **Table 3**, Allowable Leakage, AWWA C605 (PVC).

TABLE

Table 6 - Hydrostatic testing allowance per 1,000 ft of pipeline* - *gph*‡

Avg Test Pressure psi	Nominal Pipe Diameter – in.														
	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48
450	0.48	0.64	0.95	1.27	1.59	1.91	2.23	2.55	2.87	3.18	3.82	4.78	5.73	6.69	7.64
400	0.45	0.60	0.90	1.20	1.50	1.80	2.10	2.40	2.70	3.00	3.60	4.50	5.41	6.31	7.21
350	0.42	0.56	0.84	1.12	1.40	1.69	1.97	2.25	2.53	2.81	3.37	4.21	5.06	5.90	6.74
300	0.39	0.52	0.78	1.04	1.30	1.56	1.82	2.08	2.34	2.60	3.12	3.90	4.68	5.46	6.24
275	0.37	0.50	0.75	1.00	1.24	1.49	1.74	1.99	2.24	2.49	2.99	3.73	4.48	5.23	5.98
250	0.36	0.47	0.71	0.95	1.19	1.42	1.66	1.90	2.14	2.37	2.85	3.56	4.27	4.99	5.70
225	0.34	0.45	0.68	0.90	1.13	1.35	1.58	1.80	2.03	2.25	2.70	3.38	4.05	4.73	5.41
200	0.32	0.43	0.64	0.85	1.06	1.28	1.48	1.70	1.91	2.12	2.55	3.19	3.82	4.46	5.09
175	0.30	0.40	0.59	0.80	0.99	1.19	1.39	1.59	1.79	1.98	2.38	2.98	3.58	4.17	4.77
150	0.28	0.37	0.55	0.74	0.92	1.10	1.29	1.47	1.66	1.84	2.21	2.76	3.31	3.86	4.41
125	0.25	0.34	0.50	0.67	0.84	1.01	1.18	1.34	1.51	1.68	2.01	2.52	3.02	3.53	4.03
100	0.23	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	1.50	1.80	2.25	2.70	3.15	3.60

*If the pipeline under test contains sections of various diameters, the testing allowance will be the sum of the testing allowance for each size.
‡Calculated on the basis of Eq. 1.

Table 3 - Allowable leakage per 50 joints of PVC pipe*-*gph*‡

Avg Test Pressure psi	Nominal Pipe Diameter, in.											
	4	6	8	10	12	14	16	18	20	24	30	36
300	0.47	0.70	0.94	1.17	1.40	1.64	1.87	2.11	2.34	2.81	3.51	4.21
275	0.45	0.67	0.90	1.12	1.34	1.57	1.79	2.02	2.24	2.69	3.36	4.03
250	0.43	0.64	0.85	1.07	1.28	1.50	1.71	1.92	2.14	2.56	3.21	3.85
225	0.41	0.61	0.81	1.01	1.22	1.42	1.62	1.82	2.03	2.43	3.04	3.65
200	0.38	0.57	0.76	0.96	1.15	1.34	1.53	1.72	1.91	2.29	2.87	3.44
175	0.36	0.54	0.72	0.89	1.07	1.25	1.43	1.61	1.79	2.15	2.68	3.22
150	0.33	0.50	0.66	0.83	0.99	1.16	1.32	1.49	1.66	1.99	2.48	2.98
125	0.30	0.45	0.60	0.76	0.91	1.06	1.21	1.36	1.51	1.81	2.27	2.72
100	0.27	0.41	0.54	0.68	0.81	0.95	1.08	1.22	1.35	1.62	2.03	2.43
75	0.23	0.35	0.47	0.59	0.70	0.82	0.94	1.05	1.17	1.40	1.76	2.11
50	0.19	0.29	0.38	0.48	0.57	0.67	0.76	0.86	0.96	1.15	1.43	1.72

*If the pipeline under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size.
‡ To obtain leakage in litres per hour, multiply the values in the table by 3.72.

9.0 Gravity Pipelines

9.1 Trench Excavation - All Erosion and Sedimentation Controls shall be in place prior to start of trench excavation.

9.2 General - Trenches for underground gravity pipelines shall be excavated so that the pipes and appurtenances can be installed to the alignments and grades required.

9.3 Trench Depth - The trench shall be excavated to a minimum depth of 4-inches below the outer-most dimension of the pipe barrel or pipe bell to be installed therein.

Rock, if present in the trench bottom, shall be excavated to a minimum depth of 6-inches below the outer-most dimensions of the pipeline.

The trench for lateral service gravity pipelines shall be excavated to a minimum depth of 4-inches below the outer-most dimension of the pipe barrel or pipe bell to be installed therein.

Rock, if present in the lateral service gravity pipeline trench bottom, shall be excavated to a minimum depth 6-inches below the outer-most dimensions of the pipeline.

9.4 Compaction - All trench material shall be compacted, 12-inch lifts maximum.

9.5 Gravity Pipe Installation - The gravity pipelines shall be laid in a finished trench commencing at the low point with the spigot ends pointing in the direction of the flow. All gravity pipe, including service laterals, shall be placed on a dry, stable bedding material shaped to receive the barrel support for the full length of the pipe and form a straight gravity pipeline with a uniform grade true to the established line and grade. If the open end of the pipe section is low, the individual pipe must be removed and the bed prepared to the proper grade.

Line and grade for gravity pipeline shall be established by the Contractor using laser equipment, the preferred method. Each manhole location shall be marked with a hub designating line. A grade stake shall be offset from each manhole location. Grade stake shall be placed at points about 25-feet and 125-feet from each manhole and at additional intervals as required by length and grade of the sewer span.

9.6 Pipe Bedding - A cradle of pipe bedding shall be furnished for all gravity pipelines. The bedding material shall be thoroughly compacted by hand tamping and shall be placed in such a manner to completely support the pipeline in its entire length. There shall be a minimum of 4-inches of bedding between the outer-most dimension of the pipe and the bottom of the excavation in areas for normal excavation. There shall be a minimum of 6-inches of bedding between the outer-most dimensions of the pipe and the bottom of the excavation in areas of rock excavation.

As soon as possible after the joint is made, the balance of the bedding material shall be placed up to the spring line of the pipe to offset conditions that might tend to move the pipe off from line or

grade. Disturbing the pipe in any manner after the joints have been made shall not be permitted. The balance of the bedding material shall be thoroughly compacted by hand tamping.

The pipe bedding shall extend laterally to the outer-most limits of the trench.

Pipe Bedding Chart:

Water Main and Services - 75% to 100% crushed #8 gravel
Sanitary Sewer Main and Laterals - 75% to 100% crushed #8 gravel
Storm Sewer - Storm sewer pipe shall be bedded in washed #57 gravel.
Ductile and RCP storm pipe bedding shall be washed #57 gravel.

9.7 Initial Backfilling - The backfill material from the top of the cradle of bedding material to a point 1-foot above the upper-most top of the pipe shall be the specified bedding material for main line pipe.

The Contractor shall use special care in placing this portion of the backfill so as to avoid injuring or movement of pipe. The initial backfill material shall be thoroughly compacted by hand tamping and shall extend laterally to the outer-most limits of the trench.

9.8 Balance of Backfill - The construction drawings show where the balance of the backfill shall be gravel material. This shall be suitably compacted by jetting with water after the trench is backfilled. The Contractor shall furnish the necessary water and equipment to properly settle the gravel backfill by the jetting method. Backfill may also be compacted above bedding with mechanical and vibratory equipment in 12-inch lifts.

Where the construction drawings do not indicate gravel trench backfill, the Contractor shall backfill the balance of the trench from a point 1-foot above the top of the pipe with 310 granular material per ODOT 1994 Construction Manual. Care shall be taken to carry backfill up evenly in the trench

Trenches shall not lay open for periods greater than 24 hours after installation of the main line.

10.0 Storm Sewers

10.1 Catch Basins - All catch basins are to be precast concrete structures unless otherwise approved by the Village. Precast units shall have a minimum wall thickness of 6-inches. Pre-cast basins shall be placed on a gravel bed having a minimum thickness of 3-inches (75mm). This bedding shall be compacted and provide uniform support for the entire area of the base. Catch basins' size and casting shall be approved by the Village before purchase. All catch basins large enough for access and deeper than 6-feet shall have manhole type steps installed.

All openings in the structures shall be thoroughly grouted inside and out with cement mortar or other suitable material after placing of pipe. Special care shall be exercised to prevent the

entrance of earth or debris into the pipe connecting the catch basin. All such earth or debris resulting from construction operations shall be removed from the pipe by the Contractor.

10.2 Storm Sewer Pipe - Shall be either reinforced concrete (RCP) or HDPE corrugated outside, smooth walled inside. Sizing of pipe shall be taken from Village approved construction drawings. All pipe shall be bedded in #57 granular material. The bedding under the storm pipe shall be a minimum of 4-inches (75 mm) and provide uniform support the entire length of the pipe. All storm pipe shall have a minimum gravel fill around and over the top of storm pipe of 6-inches (150 mm). All joints shall be such that the ends are fully entered and the inner surfaces are reasonably flush and even. The joint shall then be sealed, as per the pipe manufacturer's recommendation.

All Storm Pipe in paved areas will be RCP and all storm pipe buried less than 24-inch (cover) will be RCP.

10.3 Repairs to PVC Storm Pipe - A manufacturer's band or clamp must be utilized for repair to punctured or ripped storm pipe as well as other methods deemed necessary by the Village Inspector.

10.4 Ready Mix Concrete - All concrete used in storm manholes shall be 4000 PSI 28 day strength.