

NOTE:

- 1) 1" Or Smaller Service Line Shall Be Direct Tap Unless Approved By Carmel Utilities.
- 2) Corporation Stop Shall Be Brand And Model Approved By Carmel Utilities.

3) Service Line Tap Shall Be Installed With A Min. Horiz. Separation of 24".

4) 2 Inch Taps And Smaller Shall Not Be Installed Within 18 Inches of Mechanical Joints And Bells.

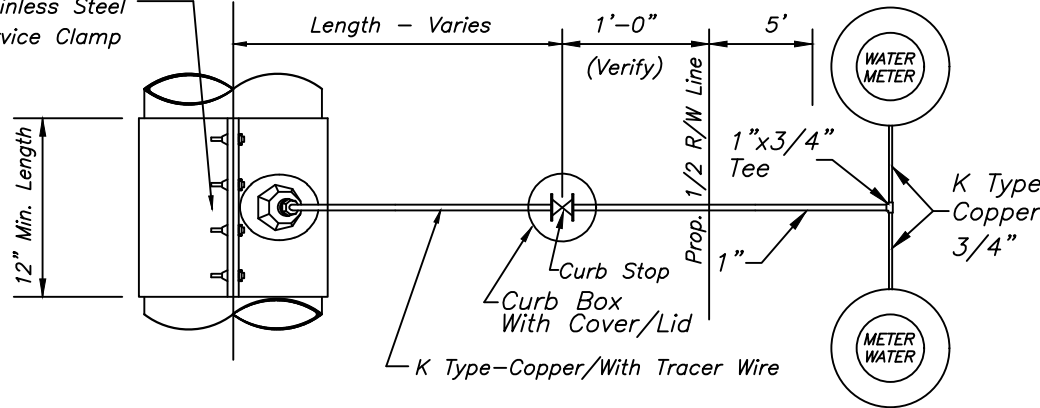
5) No Meter Pits Allowed in Areas Sidewalks, Driveways, Roads, Etc.

6) Granular Backfill Required Around All Meter Pits With 6" Topsoil

7) Short Side Services Require Type K-Copper
 Long Side Services Require Poly SDR9 With Tracer Wire
 (Only with Carmel Utilities Approval)

8) No Service Tap shall be under Any Part of the Drive Way.
 Taps under Drive Ways Shall be Abandoned and Re-Tapped Away from Driveway. Abandoned Tap will be Removed and Repair Clamp Placed.

Tapped Full-Circle Wrap Around Stainless Steel Service Clamp



* Service Clamp Must Be Omitted For Services 1" And Smaller And Direct Taps Made to Ductile Iron Pipe, Class 350 Or Greater. (Verify With Owner For Pressure Class DIP.) All PVC Pipe Requires a Tapped Full Circle Wrap Around Stainless Steel Service Clamp.



3450 W. 131st. Street
 Carmel, IN 46074

Phone: 317-733-2855
 Fax: 317-733-2053

CARMEL WATER
 STANDARD DETAILS

TITLE:

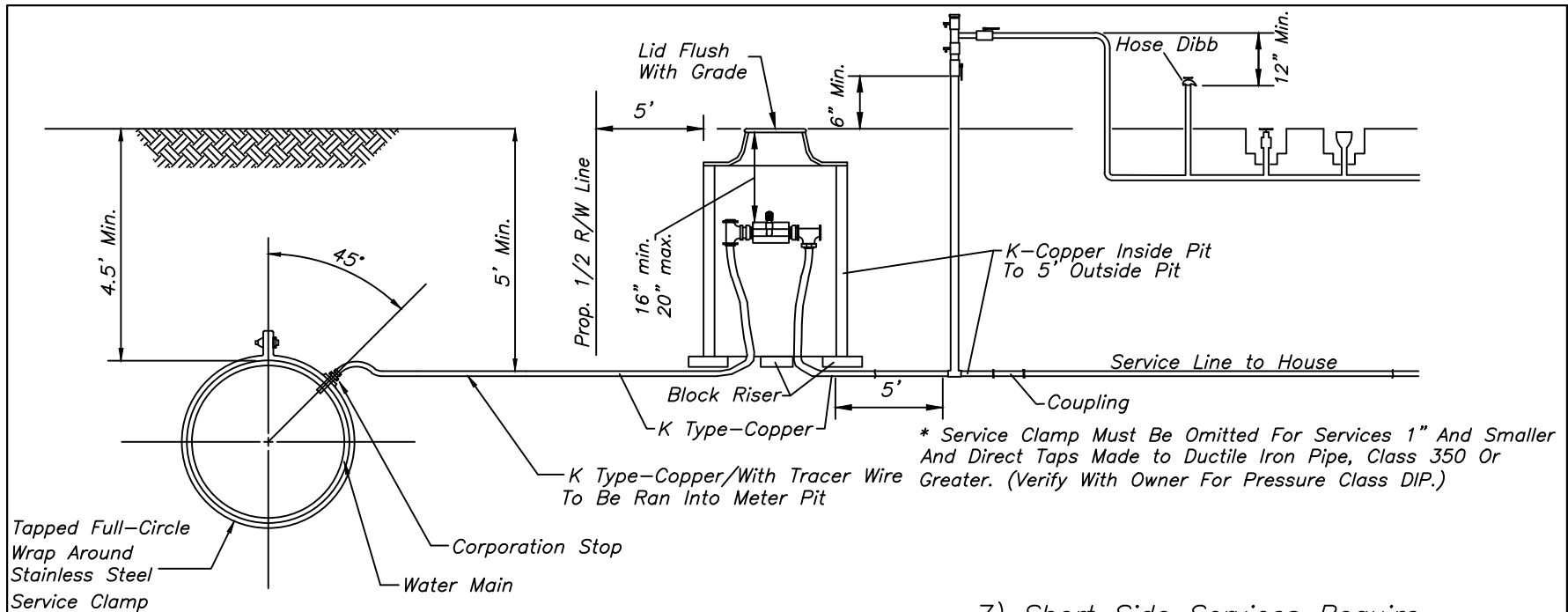
DUAL METER PIT

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-1



NOTE:

- 1) 1" Or Smaller Service Line Shall Be Direct Tap Unless Approved By Carmel Utilities.
- 2) Corporation Stop Shall Be Brand And Model Approved By Carmel Utilities.
- 3) Service Line Tap Shall Be Installed With A Min. Horiz. Separation of 24".
- 4) 2 Inch Taps And Smaller Shall Not Be Installed Within 18 Inches of Mechanical Joints And Bells.
- 5) No Meter Pits Allowed in Areas Sidewalks, Driveways, Roads, Etc.
- 6) Granular Backfill Required Around All Meter Pits With 6" Topsoil
- 7) Short Side Services Require Type K-Copper
Long Side Services Require Poly SDR9 With Tracer Wire
(Only with Carmel Utilities Approval)
- 8) No Service Tap shall be under Any Part of the Drive Way. Taps under Drive Ways Shall be Abandoned and Re-Tapped Away from Driveway. Abandoned Tap will be Removed and Repair Clamp Placed.



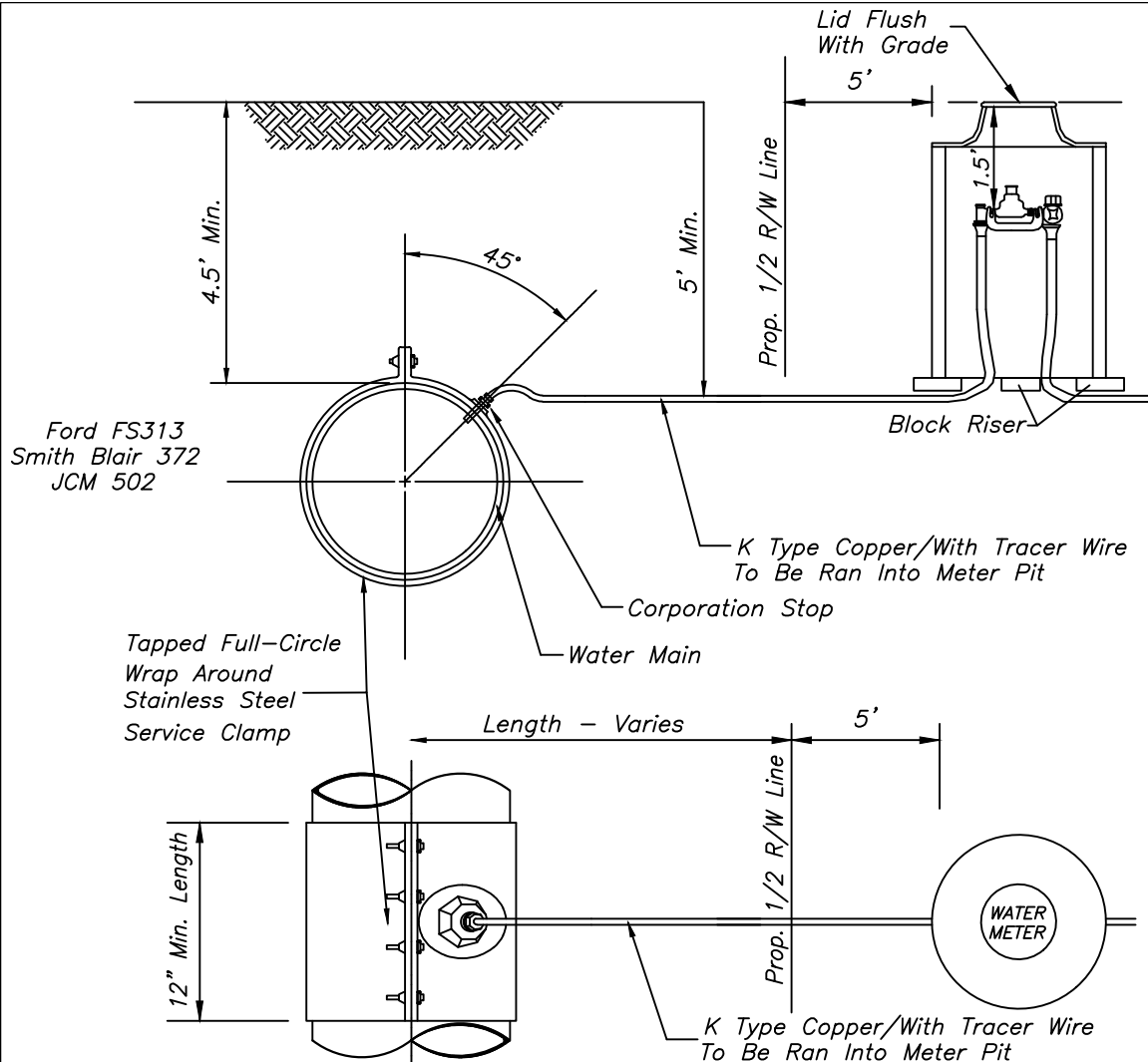
3450 W. 131st. Street
Carmel, IN 46074

Phone: 317-733-2855
Fax: 317-733-2053

CARMEL WATER
STANDARD DETAILS

TITLE:
RESIDENTIAL WATER SERVICE
WITH IRRIGATION HOOKUP

Date: January 2023	Scale: No Scale	Drawn By: Crossroad Engineers	Drawing Name: CW-2
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Ford FS313
Smith Blair 372
JCM 502

* Service Saddle Must Be Omitted For Services 1" And Smaller And Direct Taps Made to Ductile Iron Pipe, Class 350 Or Greater. (Verify With Owner For Pressure Class DIP.)

NOTE:

- 1) 1" Or Smaller Service Line Shall Be Direct Tap Unless Approved By Carmel Utilities.
- 2) Corporation Stop Shall Be Brand And Model Approved By Carmel Utilities.
- 3) Service Line Tap Shall Be Installed With A Min. Horiz. Separation of 24".
- 4) No Meter Pits Allowed in Areas Sidewalks, Driveways, Roads, Etc.
- 5) Granular Backfill Required Around All Meter Pits With 6" Topsoil
- 6) Short Side Services Require Type K-Copper
Long Side Services Require Poly SDR9 With Tracer Wire
(Only with Carmel Utilities Approval)
- 7) No Service Tap shall be Under Any Part of the Drive Way.
Taps under Drive Ways Shall be Abandoned and Re-Tapped Away from Driveway. Abandoned Tap will be Removed and Repair Clamp Placed.



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CARMEL WATER
STANDARD DETAILS

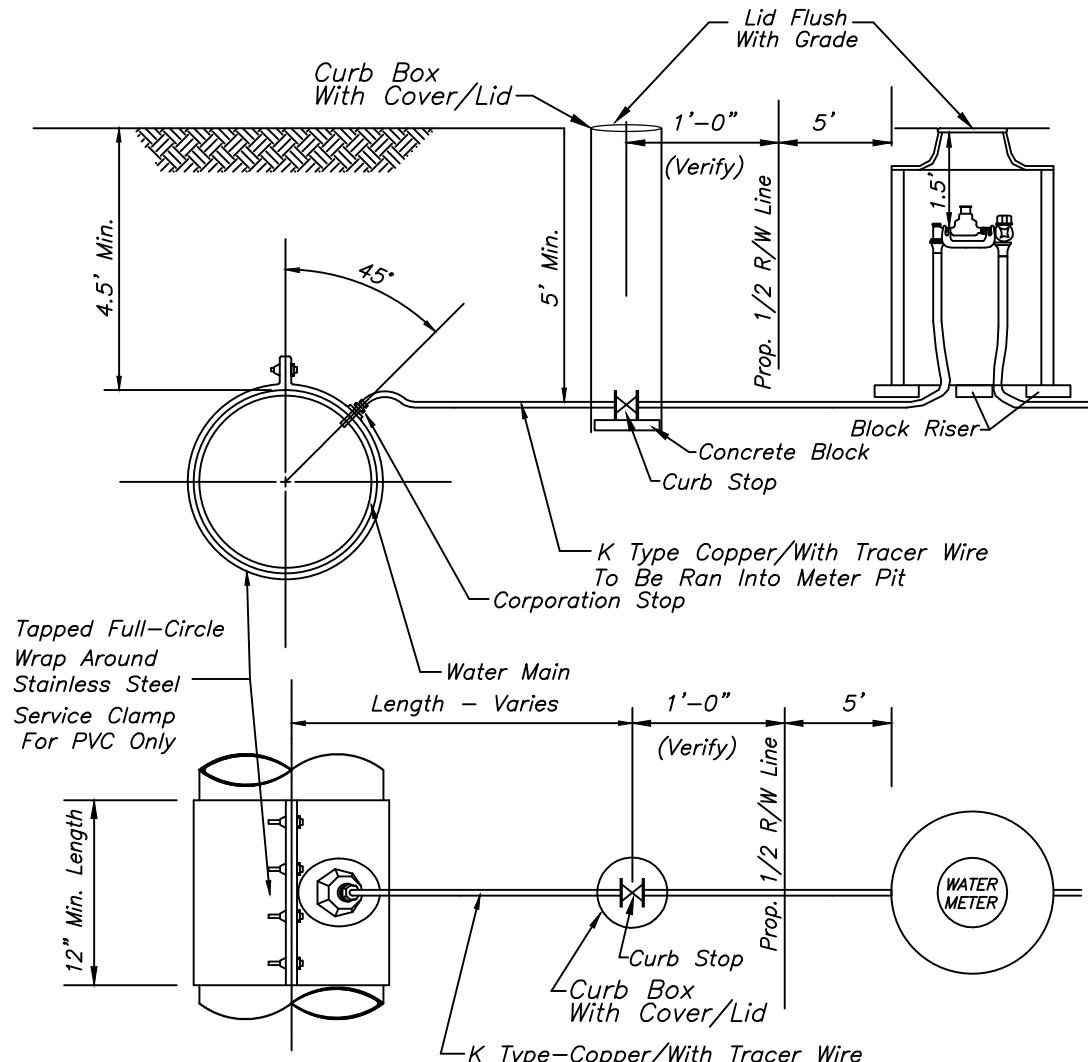
TITLE:
RESIDENTIAL WATER SERVICE
(NO CURB STOP) DETAIL

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

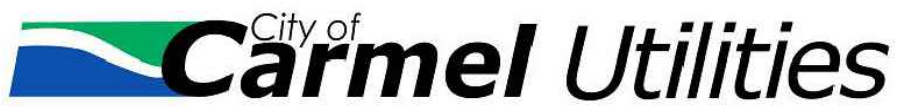
Drawing Name: CW-3



* Service Saddle Must Be Omitted For Services 1" And Smaller And Direct Taps Made to Ductile Iron Pipe, Class 350 Or Greater. (Verify With Owner For Pressure Class DIP.)

NOTE:

- 1) 1" Or Smaller Service Line Shall Be Direct Tap Unless Approved By Carmel Utilities.
- 2) Corporation Stop Shall Be Brand And Model Approved By Carmel Utilities.
- 3) Service Line Tap Shall Be Installed With A Min. Horiz. Separation of 24".
- 4) No Meter Pits Allowed in Areas Sidewalks, Driveways, Roads, Etc.
- 5) Granular Backfill Required Around All Meter Pits With 6" Topsoil
- 6) Short Side Services Require Type K-Copper Long Side Services Require Poly SDR9 With Tracer Wire (Only with Carmel Utilities Approval)
- 7) No Service Tap shall be under Any Part of the Drive Way. Taps under Drive Ways Shall be Abandoned and Re-Tapped Away from Driveway. Abandoned Tap will be Removed and Repair Clamp Placed.



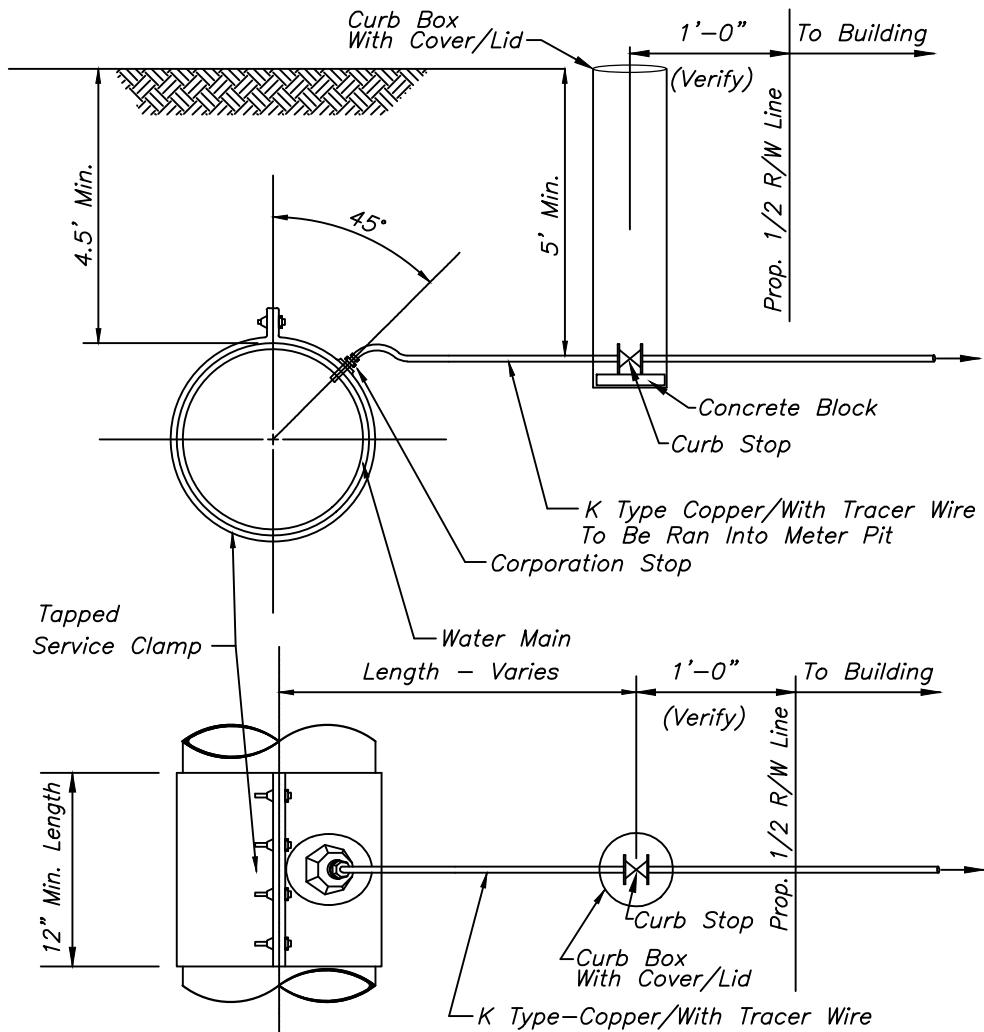
3450 W. 131st. Street
Carmel, IN 46074

Phone: 317-733-2855
Fax: 317-733-2053

CARMEL WATER
STANDARD DETAILS

TITLE:
RESIDENTIAL WATER SERVICE
WITH CURB STOP DETAIL

Date: January 2023	Scale: No Scale	Drawn By: Crossroad Engineers	Drawing Name: CW-4
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NOTE:

- 1) 1" Or Smaller Service Line Shall Be Direct Tap Unless Approved By Carmel Utilities.
- 2) Corporation Stop Shall Be Brand And Model Approved By Carmel Utilities.
- 3) Service Line Tap Shall Be Installed With A Min. Horiz. Separation of 24".
- 4) No Meter Pits Allowed in Areas Sidewalks, Driveways, Roads, Etc.
- 5) Granular Backfill Required Around All Meter Pits With 6" Topsoil
- 6) Short Side and Long Side Services Require Type K-Copper Long Side Services Require Poly SDR9 With Tracer Wire Poly Services with Tracer Wire only Allowed for Long Side Services over 100 LFT and if Approved by Carmel Water
- 7) No Service Tap shall be under Any Part of the Drive Way. Taps under Drive Ways Shall be Abandoned and Re-Tapped Away from Driveway. Abandoned Tap will be Removed and Repair Clamp Placed.
- 8) 5' of Copper Outside of Pit to Connect to Customer Line

* Service Saddle Must Be Omitted For Services 1" And Smaller And Direct Taps Made to Ductile Iron Pipe, Class 350 Or Greater. (Verify With Owner For Pressure Class DIP.)



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Phone: 317-733-2855
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CARMEL WATER
STANDARD DETAILS

TITLE:

COMMERCIAL WATER
SERVICE DETAIL

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-5

METER PIT SPECS 5/8 x 3/4" – 1"

ITEM #	DESCRIPTION	5/8" X 3/4" METERS	1" METERS
1.	SERVICE LINE	K TYPE COPPER	K TYPE COPPER CWU APPROVAL ONLY
2.	YOKE	FORD Y502 MUELLER H5020-203 AY MCDONALD 14-2	FORD Y504 MUELLER H5040-330 AY MCDONALD 14-4
3.	STREET SIDE ANGLE VALVE	FORD AV94-323W AY MCDONALD 4602Y-223/AX02 MUELLER 12463	FORD AV94-444W AY MCDONALD 45602Y-22 1X04 MUELLER 12463
4.	HOUSE SIDE ANGLE CHECK VALVE	FORD HHA94-323 AY MCDONALD 12-3Y233 MUELLER H14245	FORD HA91-444 AY MCDONALD 12-3YE 44 MUELLER H14245
5.	METER PIT	FRATCO HDPE 20"w X 48" d MID STATE-SONILOC 20"w X 48" d	FRATCO HDPE 24"w X 48" d MIDSTATE-SONILOC 24"w X 48" d
6.	METER PIT COVER	FORD X-3-T VESTAL 32262 WITH TOUCH READ	FORD X-43-T VESTAL 32282 WITH TOUCH READ (SPECIFY FOR 2 HOLES)
7.	METER PIT RISER (no more than 2)	1-20X3P 3" 1-20X6P 6"	1-24X3P 3" 1-24X6P 6"

NOTES:

NO METER PIT SHALL BE INSTALLED IN A TRFFIC AREA, SUCH AS A SIDEWALK OR DRIVEWAY.

METER INSIDE PIT SHOULD BE 16-20 INCHES FROM TOP OF THE METER PIT LID.

METER PIT LID SHOULD BE FLUSH WITH GROUND (HOME OWNER SHOULD BE ABLE TO MOW OVER LID)

SHOULD METER PIT NEED RAISED TO GRADE: ONLY THE APPROVED RISER SHOULD BE USED.
NO METER SHOULD BE RAISED MORE THAN 6" WITHOUT CARMEL UTILITIES APROVAL.
USING BRICKS OR CEMENT BLOCKS IS NOT AN APPROVED METHOD OF RAISING A METER PIT.

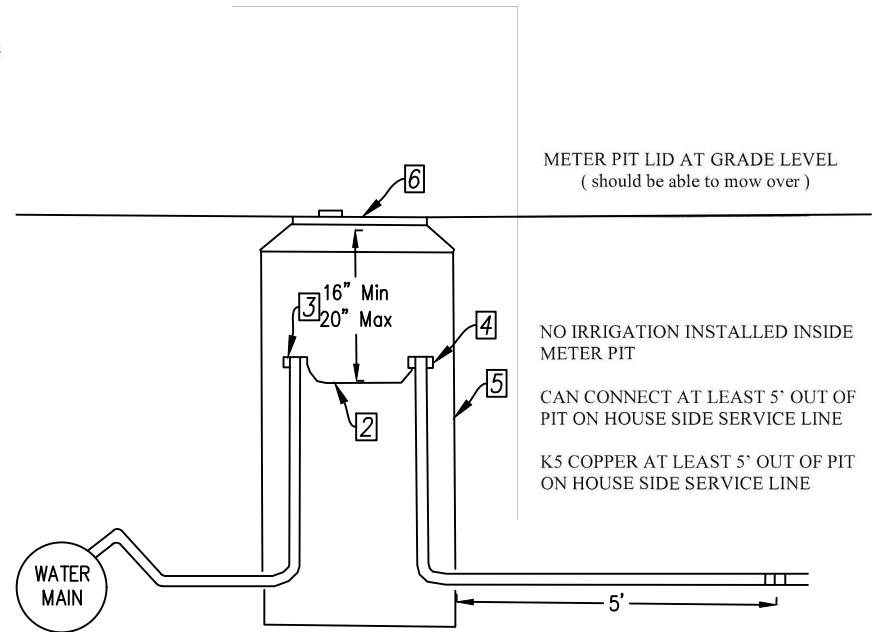
SERVICE LINES REQUIRE COMPRESSION FITTINGS ONLY. NO PACK JOINTS ALLOWED (NO FITTINGS SHOULD BE MADE INSIDE THE METER PIT) **YOU MUST HAVE A CONTINUOUS PIECE OF COPPER FROM METER PIT TO AT LEAST 5' OUTSIDE OF METER PIT. ON THE HOUSE SIDE.**

THEIR SHALL BE NO BURRIED JOINTS OR COUPLINGS. EXCEPT FOR THE CORPORATION STOP ON THE WATER MAIN.

THE METER PIT IS TO BE INSTALLED JUST OFF THE UTILITY EASMEMENT , ON PRIVATE PROPERTY. IN THE MIDDLE OF THE LOT 5' LEFT OR RIGHT OF CENTER. AS CLOSE TO EASEMENT LINE AS POSSIBLE.

THERE WILL BE A RE-INSPECTION FEE FOR EACH ADDITIONAL INSPECTION

CITY of CARMEL WATER DISTRIBUTION
METER PIT DIAGRAM



3450 W. 131st. Street
Carmel, IN 46074

Phone: 317-733-2855
Fax: 317-733-2053

CARMEL WATER
STANDARD DETAILS

TITLE:
1" AND SMALLER
OUTSIDE METER SPECS

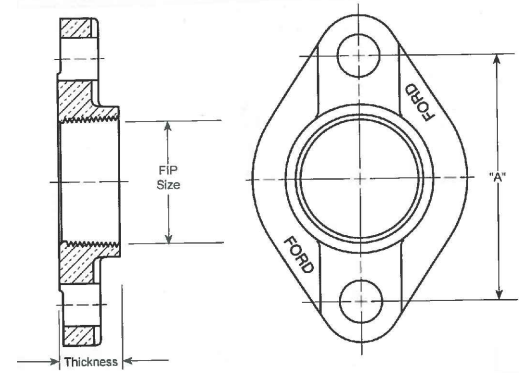
Date:	February 2023	Scale:	No Scale	Drawn By:	Crossroad Engineers	Drawing Name:	CW-6
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CITY of CARMEL WATER DISTRIBUTION

1 1/2" - 2" INSIDE METER SETS

1. All new commercial buildings are required Back flow Devices.
2. All new businesses relocating in existing commercial buildings are required backflow devices within 30 days.
3. Devices shall be of the type approved by Indiana Department of Environmental Management.
4. Depending on the degree of hazard, the Water Distribution Department will decide if you need a Double Check or a Reduced Pressure backflow device.
5. The device must be tested at the time of installation by a State Certified Backflow tester and at the correct intervals for the type of device.
6. Test results are to be sent to: Carmel Utilities 3450 W.131ST ST., Carmel, IN. 46074.
7. Any inside set that is below Ground Level must have a conduit ran to locate our Radio Transmitter at ground level or on an Outside Wall.

- A: Angle Meter Stop (Legend Valve) or Comparable Model T-1001 Full Port Ball Valve 1 1/2"- 2"
- B: Flanged Coupling (Ford) CF-31-66 1 1/2"
(Ford) CF-31-77 2"
- C: Distance for Meters 1 1/2" Meter = 13-1/2"
2" Meter = 17-1/2"



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CARMEL WATER
STANDARD DETAILS

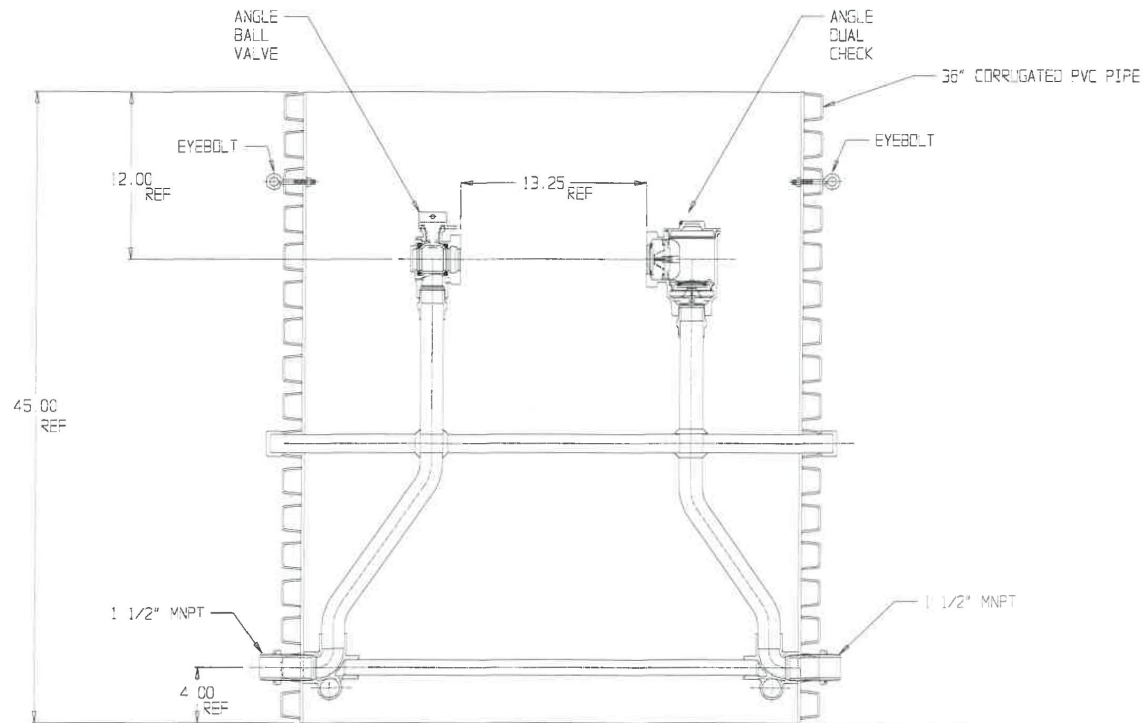
TITLE:
1.5" AND 2" INSIDE
METER SPECS

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-7



SUBMITTAL INFORMATION

- Manufactured in compliance with ANSI/AWWA C800 (latest revision)
- Brass components in contact with potable water conform to ASTM B584, UNS C89833 (latest revision) and identified with "NL"
- Certified to NSF/ANSI 372
- Brass components not in contact with potable water conform to ASTM B62 and ASTM B584, UNS C83600 -85-5-5-5 (latest revision)
- Copper tubing made in compliance with ASTM B75 or B88, UNS C12200 (latest revision)
- Lead free solder joints
- Heavy wall PVC shell
- Large wrench flats provided for proper installation



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Carmel, IN 46074

Phone: 317-733-2855
Fax: 317-733-2053

CARMEL WATER
STANDARD DETAILS

TITLE:

1.5" MNPT X MNPT

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-8

CITY OF CARMEL – WATER DISTRIBUTION DEPARTMENT

SPECIFICATIONS 1 1/2" OUTSIDE METER PIT SET

REVISED 8/2017

- METER PIT COVER.** 20x36 STD METER BOX COVER. VESTAL ADAPTER RING WITH MC1 WITH 7" FRAME FORD MC-36-T MONITOR COVER (ALL WITH HOLE IN LID)
- COPPER SETTERS** FORD: 1 1/2" - SINGLE LID PLASTIC PIT SETTER (PMBHH-688-36-40-NL) MUELLER: 1 1/2" - EZ-VAULT METER SETTERS (500VS3636FFB000652N) AY McDONALD: 1 1/2" - PIT SETTER 780-648 NL
- SERVICE LINE.** ALL 1 1/2" SERVICE LINES MUST BE COPPER OUT OF CURB STOP AT LEAST 2 FEET.
- BALL TYPE CURB STOP.** MUST HAVE COMPRESSION TYPE FITTINGS ON BOTH ENDS AND BE SUPPORTED BY A CONCRETE BLOCK. Mueller- 25155-3, Ford- 1 1/2" B44-666 2" B44-777.
- SERVICE BOX with SERVICE BOX ROD.** DEPTH OF BURY WILL VARY.
- CORPORATION STOP.** CORPORATION STOP SHOULD BE TAPPED DIRECTLY TO THE WATER MAIN AT THE HORIZONTAL POSITION 3 O'CLOCK. 1 1/2" DUCTAL IRON or PLASTIC- repair clamp with Threaded 1 1/2" SMITH-BLAIR # 238 FULL CIRCLE REPAIR CLAMP SINGLE BAND.

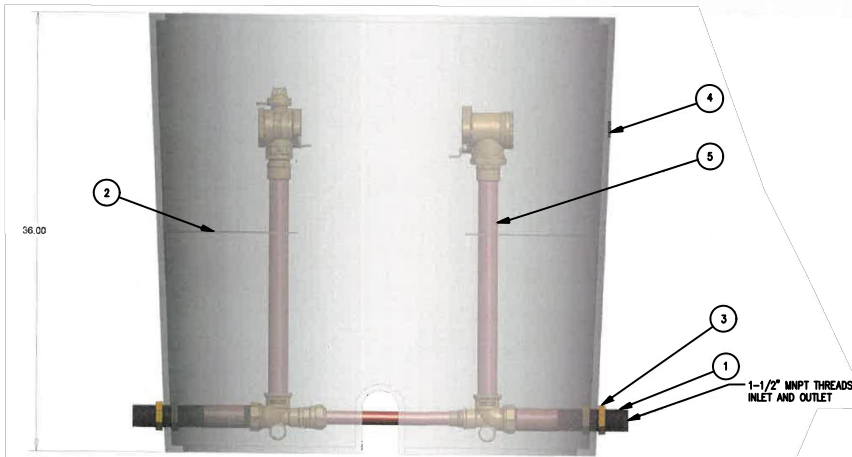
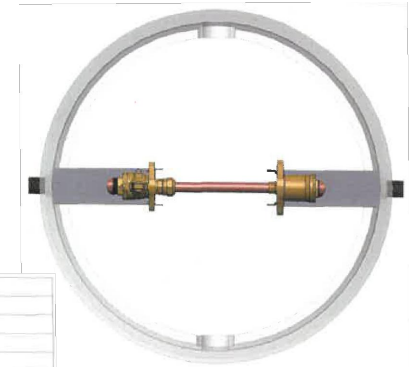
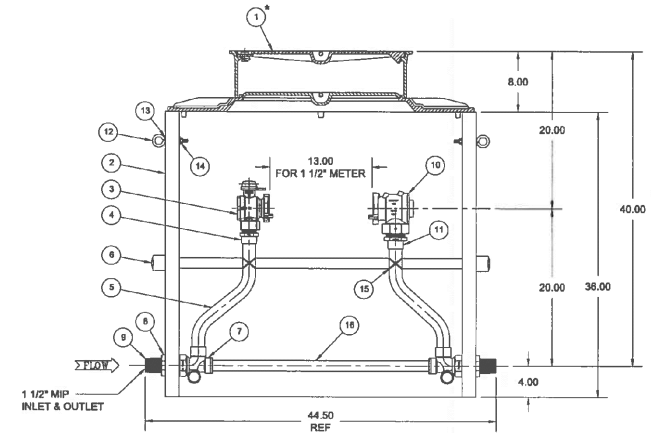
NOTES:

YOU WILL HAVE TO PRE-ORDER THESE PITS THRU YOUR LOCAL DISTRUBITOR (4 TO 6 WEEKS)

- Service lines require compression couplings only.
- No meter pit shall be installed in a traffic area, driveway, or side walk.
- There shall be no buried joints or couplings, except for the corporation stop on the Main and the curb stop valve.
- Care should be taken when establishing final grade. The meter pit cover is Expected to be at grade. Using bricks or blocks to raise the meter pit cover will not be accepted. (METER FROM TOP OF THE LID SHOULD BE NO DEEPER THAN 20")
- Any questions should be directed to the: [Carmel Water Distribution Department](mailto:City of Carmel Water Distribution Department) at 317-733-2855.

ITEM	DESCRIPTION	QTY	MATERIAL	CATALOG NUMBER
1	MONITOR COVER W/ INNER LID	1	CAST GRAY IRON	MC-36-MB
2	36" CORRUGATED PVC PIT	1	PVC	
3	ANGLE BALL VALVE	1	CAST NO-LEAD BRASS	BFA13-666W-MSB-NL
4	SOLDER BUSHING	1	CAST NO-LEAD BRASS	CS8-68-NL
5	1 5/8" OD COPPER TUBE	2	COPPER	
6	1" PVC BRACE BAR & CAPS	1	PVC	
7	TEE	2	CAST NO-LEAD BRASS	CSTEE-6-S
8	LOCK NUT	2	CAST RED BRASS	
9	NIPPLE	2	CAST NO-LEAD BRASS	
10	ANGLE DUAL CHECK VALVE	1	CAST NO-LEAD BRASS	H#FA31-777-MSB-NL
11	SOLDER BUSHING	1	CAST NO-LEAD BRASS	CS8-67-NL
12	EYE BOLT	2	ZINC PLATED STEEL	
13	FLAT WASHER	4	ZINC PLATED STEEL	
14	LOCK NUT	2	ZINC PLATED STEEL	
15	PLASTIC TIES	4	PLASTIC	
16	1 3/8" OD COPPER TUBE	1	COPPER	

* ORDERED SEPARATELY



ITEM	PART NUMBER	QTY	DESCRIPTION
1	534894	2	1-1/2" X 10" BULKHEAD NIPPLE
2	548554	2	STAINLESS STEEL SUPPORT BRACKET
3	790038	4	1-1/2" HEX NUT
4	790244	1	36" x 36" SHELL
5	721B2422-2-N	1	1-1/2" X 24" COPPER METER SETTER



3450 W. 131st. Street
Carmel, IN 46074

Phone: 317-733-2855
Fax: 317-733-2053

CARMEL WATER
STANDARD DETAILS

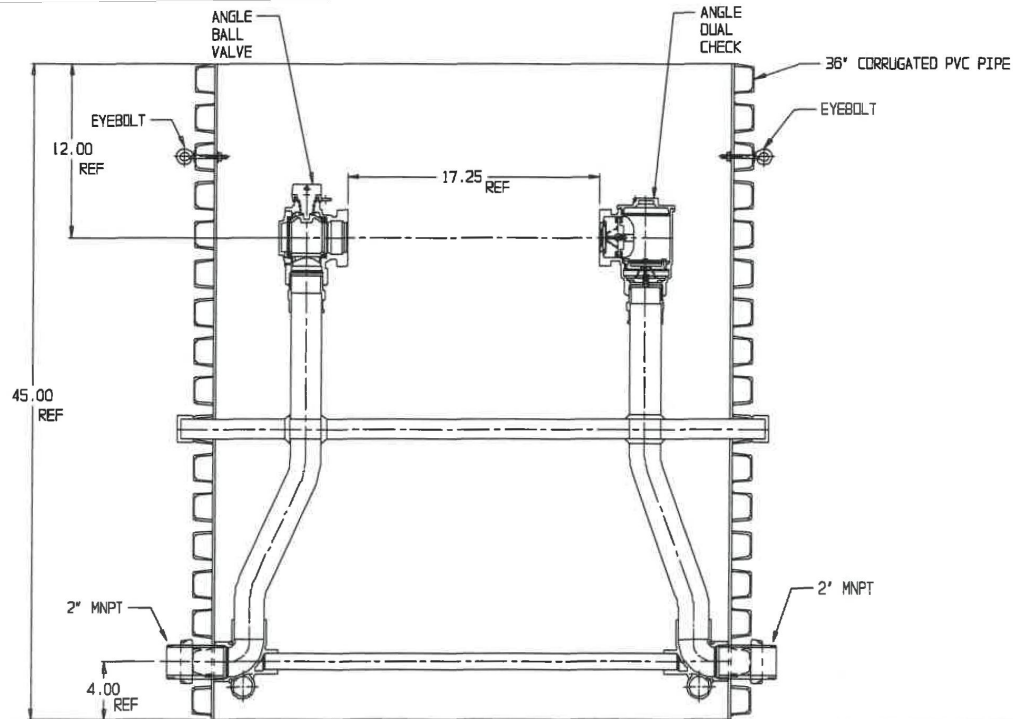
TITLE:
1.5" SPECIFICATIONS
OUTSIDE METER PIT

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-9



SUBMITTAL INFORMATION

- Manufactured in compliance with ANSI/AWWA C800 (latest revision)
- Brass components in contact with potable water conform to ASTM B584, UNS C89833 (latest revision) and identified with "NL"
- Certified to NSF/ANSI 372
- Brass components not in contact with potable water conform to ASTM B62 and ASTM B584, UNS C83600 -85-5-5-5 (latest revision)
- Copper tubing made in compliance with ASTM B75 or B88, UNS C12200 (latest revision)
- Lead free solder joints
- Heavy wall PVC shell
- Large wrench flats provided for proper installation



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Carmel, IN 46074

Phone: 317-733-2855
Fax: 317-733-2053

CARMEL WATER
STANDARD DETAILS

TITLE:

2" MNPT X MNPT

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-10

SPECIFICATIONS 2" OUTSIDE METER PIT SET

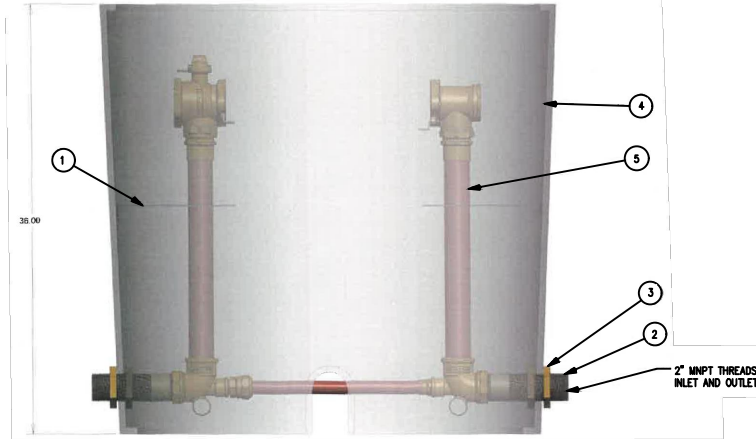
REVISED 8/2017

- METER PIT COVER.** 20x36 STD METER BOX COVER.
VESTAL ADAPTER RING WITH MC1 WITH 7" FRAME
FORD MC-36-T MONITOR COVER
(ALL WITH HOLE IN LID)
- COPPER SETTERS** **FORD: 2"- SINGLE LID PLASTIC PIT SETTER (PMBHH-788-36-40-NL)**
MUELLER: 2"- EZ-VAULT METER SETTERS (550VS3636FFB000653N)
AY McDONALD: 2"- PIT SETTER 780-748 NL
- SERVICE LINE.** ALL 2" SERVICE LINES MUST BE COPPER OUT OF CURB STOP AT LEAST 2 FEET.
- BALL TYPE CURB STOP.** MUST HAVE COMPRESSION TYPE FITTINGS ON BOTH ENDS AND BE SUPPORTED BY A CONCRETE BLOCK.
Mueller- 25155-3, Ford- 11/2" B44-666 2" B44-777.
- SERVICE BOX with SERVICE BOX ROD.** DEPTH OF BURY WILL VARY.
- BALL TYPE CURB STOP.** MUST HAVE COMPRESSION TYPE FITTINGS ON BOTH ENDS AND BE SUPPORTED BY A CONCRETE BLOCK.
Mueller- 25155-3, Ford- 11/2" B44-666 2" B44-777.
- SERVICE BOX with SERVICE BOX ROD.** DEPTH OF BURY WILL VARY.
- CORPORATION STOP.** CORPORATION STOP SHOULD BE TAPPED DIRECTLY TO THE WATER MAIN AT THE HORIZONTAL POSITION 3 O'CLOCK. 1 1/2"- 2" DUCTAL IRON or PLASTIC- repair clamp with Threaded 1 1/2" or 2". SMITH-BLAIR # 238 FULL CIRCLE REPAIR CLAMP SINGLE BAND.

2" DUCTAL IRON or PLASTIC- repair clamp with
2". SMITH-BLAIR # 238 FULL CIRCLE REPAIR CLAMP SINGLE BAND.

YOU WILL HAVE TO PRE-ORDER THESE PITS THRU YOUR LOCAL DISTRUBITOR (4 TO 6 WEEKS)

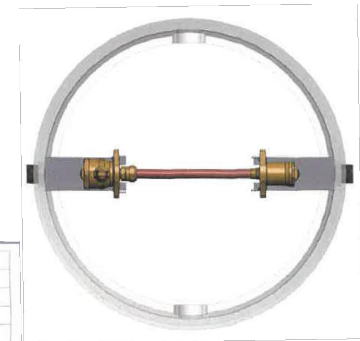
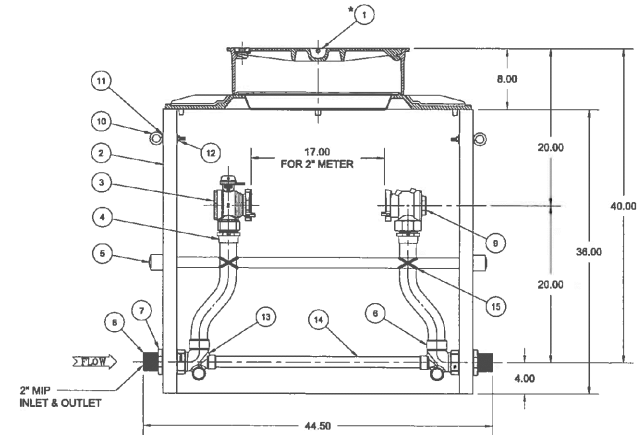
- Service lines require compression couplings only.
- No meter pit shall be installed in a traffic area, driveway, or side walk.
- There shall be no buried joints or couplings, except for the corporation stop on the Main and the curb stop valve.
- Care should be taken when establishing final grade. The meter pit cover is expected to be at grade. Using bricks or blocks to raise the meter pit cover will not be accepted. (METER FROM TOP OF THE LID SHOULD BE NO DEEPER THAN 20")
- Any questions should be directed to the: [Carmel Water Distribution Department at 317-733-2855.](mailto:CustomerService@CarmelWater.com)



ITEM NO.	PART NUMBER	QTY	DESCRIPTION
1	548555	2	STAINLESS STEEL SUPPORT BRACKET
2	548556	2	BULKHEAD NIPPLE
3	790043	4	2" HEX NUT
4	790244	1	36" x 36" SHELL
5	108B2422--2--N	1	2" X 24" COPPER METER SETTER

ITEM	DESCRIPTION	QTY	MATERIAL	CATALOG NUMBER
1	MONITOR COVER W/ INNER LID	1	CAST GRAY IRON	MC-36-MB
2	36" CORRUGATED TILE	1	PVC	
3	FLANGED ANGLE BALL VALVE	1	CAST NO-LEAD BRASS	BFA13-777W-M5B-NL
4	SOLDER BUSHING	2	CAST NO-LEAD BRASS	CS8-77-NL
5	1" BRACE BAR & CAPS	1	PVC	
6	ELL	2	CAST NO-LEAD BRASS	CBTEE-7-S-NL
7	LOCK NUT	2	CAST RED BRASS	LN-7
8	NIPPLE	2	CAST NO-LEAD BRASS	
9	ANGLE DUAL CHECK VALVE	1	CAST NO-LEAD BRASS	HHFA31-777-M5B-NL
10	EYE BOLT	2	ZINC PLATED STEEL	
11	FLAT WASHER	4	ZINC PLATED STEEL	
12	LOCK NUT	2	ZINC PLATED STEEL	
13	2 1/8" OD COPPER TUBE	2	COPPER	
14	1 3/8" OD COPPER TUBE	1	COPPER	
15	PLASTIC TIES	4	PLASTIC	

* ORDERED SEPARATELY



3450 W. 131st. Street
Carmel, IN 46074

Phone: 317-733-2855
Fax: 317-733-2053

CARMEL WATER
STANDARD DETAILS

TITLE:
2" SPECIFICATIONS
OUTSIDE METER PIT

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-11

CITY of CARMEL WATER DISTRIBUTION
3" thru 8" INSIDE TURBINE METER SETS

1. All new commercial buildings are required Back flow Devices.
2. All new businesses relocating in existing commercial buildings are required backflow devices within 30 days.
3. Devices shall be of the type approved by Indiana Department of Environmental Management.
4. Depending on the degree of hazard, the Water Distribution Department will decide if you need a Double Check or a Reduced Pressure backflow device.
5. The device must be tested at the time of installation by a State Certified Backflow tester and at the correct intervals for the type of device.
6. Test results are to be sent to: Carmel Utilities 3450 W.131ST ST., Carmel, IN. 46074.
7. **Any inside set that is below Ground Level must have a conduit ran to locate our Radio Transmitter at ground level**



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Carmel, IN 46074

Phone: 317-733-2855
Fax: 317-733-2053

CARMEL WATER
STANDARD DETAILS

TITLE:

3"–8"INSIDE
METER SETS

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-12

INSTALLATION INSTRUCTIONS

All HP Turbine meters operate more accurately and reliably if installed properly. Turbine meter performance is directly related to the flow conditions of the water stream entering the meter. If the flow conditions are distorted because of upstream fittings or piping changes, a turbine meter's performance can be adversely affected.

Neptune recommends that you install all HP Turbine meters with a Neptune strainer at the meter inlet. The strainer, in addition to protecting the meter from debris in the line, also corrects the velocity profile of the flow to the meter and reduces the effects of upstream piping variations or other obstructions in the line.

When installing Neptune meters with a strainer, a minimum of four (4) pipe diameters of straight run pipe (can include components that are fully open in their normal operating position) is required upstream and downstream of the meter/strainer assembly.

If you do not use a strainer, a length of straight pipe equal to 8 to 10 diameters of the nominal pipe size should be allowed immediately upstream of the meter inlet and 2 to 4 diameters downstream. When installing an HP Turbine meter, please use the following instructions.

RECOMMENDED INSTALLATION

Figure 1.1 shows the recommended installation of an HP Turbine meter. This installation incorporates a Neptune strainer attached to the inlet of the meter and includes a downstream tee to facilitate field testing. This illustration also shows an optional bypass that provides uninterrupted service capability during periods of meter service.

As indicated previously, the Neptune strainer located upstream provides protection against meter damage from debris in the lines and virtually eliminates the effects of variations in upstream piping. Neptune specifically recommends use of a Neptune strainer of the same line size as the meter.

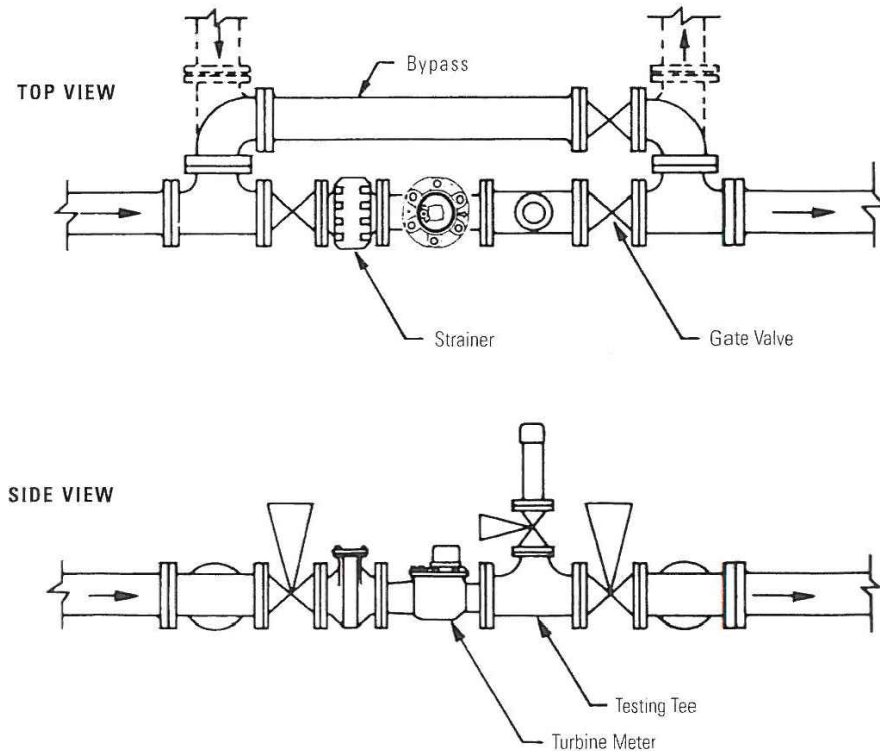


Figure 1.1 Top and Side View of the HP Turbine



3450 W. 131st. Street
Carmel, IN 46074

Phone: 317-733-2855
Fax: 317-733-2053

CARMEL WATER
STANDARD DETAILS

TITLE:
3"-8" INSIDE
METER SETS

Date: January 2023

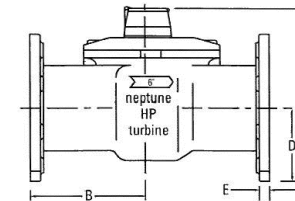
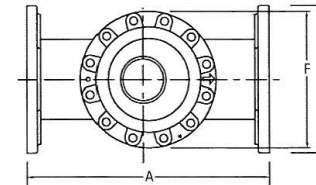
Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-13

OPERATING CHARACTERISTICS

Meter Size	Normal Operating Range @100% Accuracy (±1.5%)	Maximum Intermittent Flow	AWWA Standard
1 1/2"	4 to 160 US gpm 0.91 to 36.3 m ³ /h	200 US gpm 45.4 m ³ /h	N/A
2"	4 to 200 US gpm 0.91 to 45.4 m ³ /h	250 US gpm 56.8 m ³ /h	4 to 160 US gpm 0.91 to 36.3 m ³ /h
3"	5 to 450 US gpm 1.14 to 102.2 m ³ /h	560 US gpm 127.2 m ³ /h	8 to 350 US gpm 1.8 to 79.5 m ³ /h
4"	10 to 1200 US gpm 2.27 to 272.5 m ³ /h	1500 US gpm 340.7 m ³ /h	15 to 630 US gpm 3.4 to 143.0 m ³ /h
6"	20 to 2500 US gpm 4.55 to 567.8 m ³ /h	3100 US gpm 704.1 m ³ /h	30 to 1400 US gpm 6.6 to 317.9 m ³ /h
8"	35 to 4000 US gpm 7.95 to 908.5 m ³ /h	5000 US gpm 1135.6 m ³ /h	50 to 2400 US gpm 11.4 to 545 m ³ /h
10"	50 to 6500 US gpm 11.36 to 1476.3 m ³ /h	8000 US gpm 1817 m ³ /h	75 to 3800 US gpm 17.0 to 863 m ³ /h



DIMENSIONS

Meter Size	A	B	C-STD	C-ProRead™	C-E-Coder®/R900i™	D	E	F	G	Weight
	in (mm)	in (mm)	in (mm)	in (mm)	in (mm)	in (mm)	in (mm)	in (mm)	in (mm)	lbs (kg)
1 1/2"	10 (254)	6 1/2 (165)	7 7/8 (181)	7 9/16 (192)	10 7/8 (276.2)	1 3/4 (44)	3/4 (19)	4 1/2 (114)	5 3/8 (137)	19 (8.6)
2"	10 (254)	6 1/2 (165)	7 5/8 (194)	8 1/16 (204.8)	11 3/8 (288.9)	2 1/8 (54)	13/16 (21)	4 1/2 (114)	5 3/8 (137)	20 (9.1)
3"	12 (305)	6 (152)	10 (254)	10 7/16 (265.1)	13 3/4 (349.3)	3 3/4 (95)	5/8 (16)	6 1/4 (159)	7 1/2 (191)	40 (18.1)
4"	14 (356)	6 1/2 (165)	10 7/8 (276)	11 5/16 (287.3)	14 5/8 (371.4)	4 1/2 (114)	3/4 (19)	8 1/8 (206)	9 (229)	52 (23.6)
6"	18 (457)	8 5/8 (219)	13 (330)	13 7/16 (341.3)	16 3/4 (425.5)	5 1/2 (140)	1 (25)	10 1/4 (260)	11 (279)	115 (52.2)
8"	20 (508)	9 5/8 (244)	15 1/2 (394)	15 15/16 (404.8)	19 1/4 (489)	6 3/4 (171)	1 1/8 (29)	10 1/4 (260)	13 1/2 (343)	195 (88.4)
10"	26 (660)	12 5/8 (321)	15 1/2 (394)	15 15/16 (404.8)	19 1/4 (489)	8 (203)	1 1/4 (32)	10 1/4 (260)	16 (406)	275 (124.7)



3450 W. 131st. Street
Carmel, IN 46074

Phone: 317-733-2855
Fax: 317-733-2053

CARMEL WATER
STANDARD DETAILS

TITLE:

3"-8" INSIDE
METER SETS

Date: January 2023

Scale: No Scale

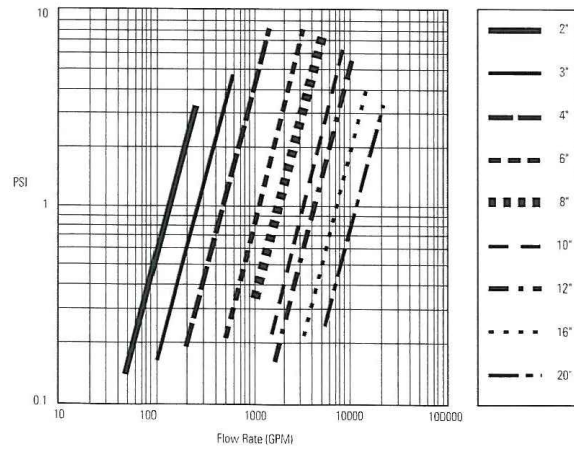
Drawn By: Crossroad Engineers

Drawing Name: CW-14

DIMENSIONS

Meter Size	A in/mm	B in/mm	C in/mm	D in/mm	E in/mm	F in/mm	No. of Holes	Hole Dia. in/mm	Weight lbs/kg
2"	7 178	6 152	5 1/4 133	2 1/8 54	4 1/2 114	3/4 19	2	3/4 19	16 7.3
3"	6 152	8 1/2 216	8 3/4 222	3 3/4 95	6 152	5/8 16	4	3/4 19	32 14.5
4"	7 1/2 191	9 3/4 248	10 1/2 267	4 1/2 114	7 1/2 191	11/16 17	8	3/4 19	42 19.0
6"	9 229	11 3/4 298	11 1/2 292	5 1/2 140	9 1/2 241	7/8 22	8	7/8 22	80 36.3
8"	10 254	14 356	13 1/2 343	6 3/4 171	11 3/4 298	1 1/8 29	8	7/8 22	120 54.5
10"	15 381	18 1/4 464	18 1/4 464	8 203	14 1/4 362	1 3/16 30	12	1 25	160 72.6
12"	16 7/8 429	18 1/2 479	20 1/2 521	9 1/2 241	17 432	13/16 21	12	1 25	180 81.6
16"	25 1/4 641	28 711	20 3/4 527	11 3/4 299	21 1/4 540	1 25	16	1 1/4 29	240 108.8
20"	18 5/8 473	28 711	26 1/8 664	13 3/4 349	25 635	1 1/8 29	20	1 1/4 32	300 136.0

PRESSURE LOSS



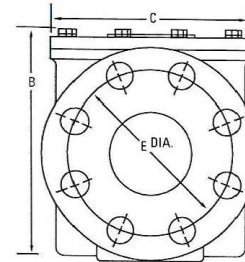
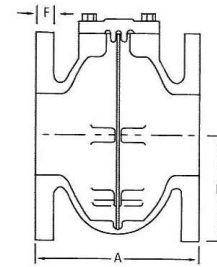
This chart shows typical meter performance. Individual results may vary.

STRAINER PARTS NUMBERS

- 2" 53120-000 No-lead high copper alloy
- 3" 53107-000 No-lead high copper alloy
- 4" 53107-100 No-lead high copper alloy
- 6" 52000-201 No-lead high copper alloy
- 8" 52000-304 No-lead high copper alloy
- 10" 52000-402 No-lead high copper alloy
- 12" 9276-000 Steel
- 16" 9276-100 Steel
- 20" 9276-200 Steel

MAXIMUM OPERATING PRESSURE

- 150 psi



Neptune engages in ongoing research and development to improve and enhance its products. Therefore, Neptune reserves the right to change product or system specifications without notice.



3450 W. 131st. Street
Carmel, IN 46074

Phone: 317-733-2855
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**CARMEL WATER
STANDARD DETAILS**

**TITLE:
3"-8" INSIDE STRAINER
METER SETS**

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-15

RECOMMENDED INSTALLATION

The recommended installation of a TRU/FLO Compound meter is shown in Figure 2.1. This installation incorporates a plate-type strainer attached to the inlet of the meter. This illustration also shows an optical bypass which provides uninterrupted service capability during periods of meter service.

As indicated previously, the upstream plate-type strainer provides protection against meter damage from debris in the lines and virtually eliminates the effects of variations in upstream piping. Use of a Neptune strainer of the same line size as the meter is specifically recommended. This strainer design provides optimum velocity profile correction at minimum additional head loss.



When installing a TRU/FLO Compound meter, normal good piping practice should always be followed. In particular, all gaskets should be centrally located on their flanges with no overlap or interference with the pipe diameter. This is particularly important at the inlet connection to the meter where a gasket protruding into the flow stream will cause unpredictable velocity conditions.

TRU/FLO Compound meters must operate in a completely filled line at all times. The downstream piping must always provide sufficient back pressure to maintain a full line at the meter.

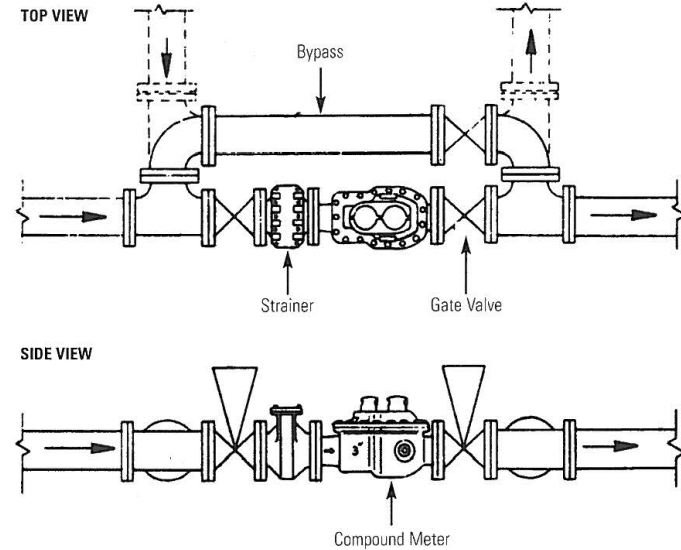


FIGURE 2.1 TRU/FLO COMPOUND TOP AND SIDE VIEW



3450 W. 131st. Street
Carmel, IN 46074

Phone: 317-733-2855
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CARMEL WATER
STANDARD DETAILS

TITLE:

4"–8" INSIDE
METER INSTALLATION

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

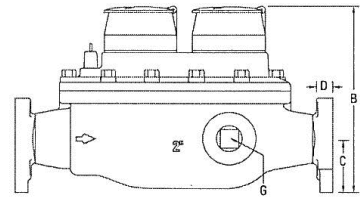
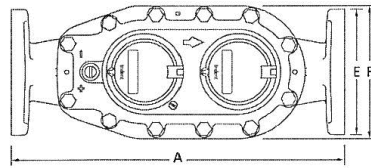
Drawing Name: CW-16

OPERATING CHARACTERISTICS

Meter Size	Normal Operating Range @100% Accuracy (±1.5%)	AWWA Standard	Low Flow @ 95% Accuracy
2"	1/2 to 200 US gpm 0.11 to 45.4 m ³ /h	2 to 160 US gpm 454 to 3634 m ³ /h	1/8 US gpm 0.03 m ³ /h
3"	1/2 to 450 US gpm 0.11 to 102.2 m ³ /h	4 to 320 US gpm 91 to 72.68 m ³ /h	1/8 US gpm 0.03 m ³ /h
4"	1 to 1000 US gpm 0.23 to 227.1 m ³ /h	6 to 500 US gpm 1.36 to 113.56 m ³ /h	1/2 US gpm 0.11 m ³ /h
6"	1 1/2 to 2000 US gpm 0.34 to 454.2 m ³ /h	10 to 1000 US gpm 2.27 to 227.12 m ³ /h	3/4 US gpm 0.17 m ³ /h
6" x 8"	1 1/2 to 2000 US gpm 0.34 to 454.2 m ³ /h	16 to 1600 US gpm 3.63 to 363.4 m ³ /h	3/4 US gpm 0.17 m ³ /h

DIMENSIONS

Meter Size	A	B-Std	B-PRO	B-E-Coder)R9007™	C	D	E	F	G	Flange Type	Weight lbs/kg
2" HP	15 1/4 387	8 5/8 219	9 229	12 1/8 308	2 1/2 64	13/16 21	5 7/8 149	6 152	1 1/2 NPT 38	2" Oval 150 lb	32 14.5
3"	17 432	10 1/2 267	11 279	14 1/4 362	3 3/4 95	5/8 16	7 1/2 191	8 1/2 216	1 1/2 NPT 38	3" ANSI 150 lb	72 32.7
4"	20 508	12 1/2 318	13 330	16 1/4 413	4 1/2 114	11/16 17	9 229	9 1/8 232	2 NPT 51	4" ANSI 150 lb	100 45.4
6"	24 610	15 3/4 400	16 1/4 413	19 1/2 495	5 1/2 140	1 25	11 279	12 3/4 324	2 NPT 51	6" ANSI 150 lb	208 94.3
6"x8"	55 3/8 1407	15 3/4 400	16 1/4 413	19 1/2 495	5 1/2 140	1 25	11 279	12 3/4 324	2 NPT 51	6" ANSI 150 lb	460 208.5



3450 W. 131st. Street
Carmel, IN 46074

Phone: 317-733-2855
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CARMEL WATER
STANDARD DETAILS

TITLE:
4"-8" INSIDE METER
INSTALLATION

Date: January 2023

Scale: No Scale

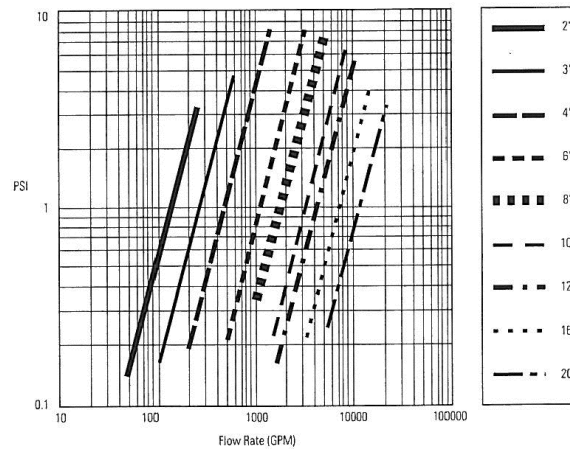
Drawn By: Crossroad Engineers

Drawing Name: CW-17

DIMENSIONS

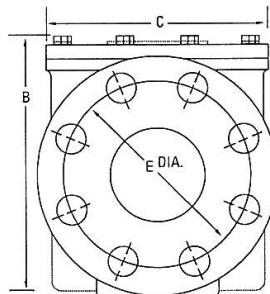
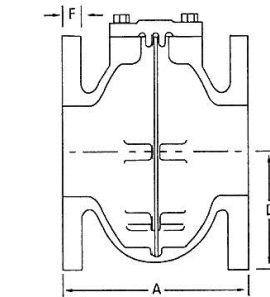
Meter Size	A	B	C	D	E	F	No. of Holes	Hole Dia.	Weight
	in/mm	in/mm	in/mm	in/mm	in/mm	in/mm		in/mm	lbs/kg
2"	7 178	6 152	5 1/4 133	2 1/8 54	4 1/2 114	3/4 19	2	3/4 19	16 7.3
3"	6 152	8 1/2 216	8 3/4 222	3 3/4 95	6 152	5/8 16	4	3/4 19	32 14.5
4"	7 1/2 191	9 3/4 248	10 1/2 267	4 1/2 114	7 1/2 191	11/16 17	8	3/4 19	42 19.0
6"	9 229	11 3/4 298	11 1/2 292	5 1/2 140	9 1/2 241	7/8 22	8	7/8 22	80 36.3
8"	10 254	14 356	13 1/2 343	6 3/4 171	11 3/4 298	1 1/8 29	8	7/8 22	120 54.5
10"	15 381	18 1/4 464	18 1/4 464	8 203	14 1/4 362	1 3/16 30	12	1 25	160 72.6
12"	16 7/8 429	18 7/8 479	20 1/2 521	9 1/2 241	17 432	13/16 21	12	1 25	180 81.6
16"	25 1/4 641	28 711	20 3/4 527	11 3/4 299	21 1/4 540	1 25	16	1 1/4 29	240 108.8
20"	18 5/8 473	28 711	26 1/8 664	13 3/4 349	25 635	1 1/8 29	20	1 1/4 32	300 136.0

PRESSURE LOSS



MAXIMUM OPERATING PRESSURE

• 150 psi



Neptune engages in ongoing research and development to improve and enhance its products. Therefore, Neptune reserves the right to change product or system specifications without notice.



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Carmel, IN 46074

Phone: 317-733-2855
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CARMEL WATER
STANDARD DETAILS

TITLE: 4"–8" INSIDE
STRAINER
INSTALLATION

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-18

OCTAVE® ULTRASONIC METER



Technical Specifications:

Working Pressure - 175 PSI

Liquid Temperature - 32° - 122 °F

Metrological Characteristics - Meets ANSI/AWWA Standard C750-10, ISO 4064 rev. 2005

Configuration - Compact-Display built into unit

Power Source - 2 x D Size Lithium Thionyl Chloride batteries - 10 year warranted life time

Environmental Protection - NEMA 6P+ (IP68+), Ambient operation temp. -13 °F/ +131 °F for the display

Display Units - Multi line 9 digit LCD (Programmable USG, Cubic Feet, Cubic Meters, Acre Feet for volume and GPM, L/Us, or M³/h for rate of flow)

Output - Programmable single/dual open drain digital pulse, dry contact digital pulse, encoder OR externally powered loop 4-20 mA

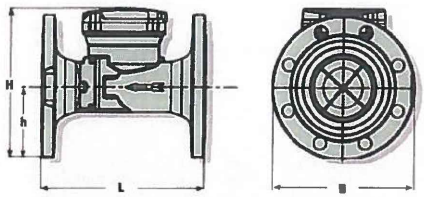
Performance Data

Octave Nominal Size (inch (mm))	1" Transit Section Flow (GPM) (L/s)	Minimum Flow Rate (95% Accuracy) (GPM) (L/s)	Normal Flow Range (95.4% - 104.6% Accuracy) (GPM) (L/s)	2" Or Greater Size Max Flow (GPM) (L/s)	Accuracy Range (± 0.5% Max. Error) (GPM) (L/s)
2" (50 mm)	1/18 (0.06)	1/4 (0.18)	1/2 - 250 (0.32 - 15.77)	250 (15.77)	4 - 200 (25 - 12.62)
3" (80 mm)	1/18 (0.04)	1/2 (0.32)	1 - 500 (0.6 - 31.54)	500 (31.54)	5 - 350 (32 - 22.08)
4" (100 mm)	1/18 (0.04)	3/4 (0.47)	1-1/2 - 1,000 (0.9 - 63.09)	1000 (63.09)	15 - 700 (94 - 44.16)
6" (150 mm)	3/4 (0.47)	2 (1.3)	3 - 1,500 (1.9 - 106.84)	1,500 (106.84)	20 - 1,150 (126 - 72.65)
8" (200 mm)	3/4 (0.47)	4 (2.5)	5 - 2,500 (3.2 - 176.89)	2,500 (176.89)	50 - 2,000 (315 - 128.18)
10" (250 mm)	2.5 (1.6)	8 (5.0)	14 - 5,500 (8.8 - 348.89)	5,500 (348.89)	400 - 4,000 (25.24 - 252.38)
12" (300 mm)	2.5 (1.6)	8 (5.0)	14 - 5,500 (8.8 - 348.89)	5,500 (348.89)	400 - 4,000 (25.24 - 252.38)

1 Starting flow only per meter but the 20 to 25 GPM at 6" is above the 200 flow rate.
2 Continuous Rate Size Flow ranges listed for the Octave are for accurate flow measurement only and do not limit the Octave from measuring the Short-term Outage Flow for its services.

Dimensions

Model	Octave							
Nominal Size	2" SS (50 mm)	2" DI (50 mm)	3" (80 mm)	4" (100 mm)	6" (150 mm)	8" (200 mm)	10" (250 mm)	12" (300 mm)
L - Length	10" (250 mm)	17" (432 mm)	12" (305 mm)	14" (356 mm)	18" (457 mm)	20" (508 mm)	17 3/4" (451 mm)	19 3/4" (502 mm)
B - Width	5 3/4" (148 mm)	5 3/4" (146 mm)	7 1/2" (190 mm)	8" (229 mm)	11" (280 mm)	13 1/2" (343 mm)	18" (468 mm)	19 3/4" (502 mm)
H - Height	8 3/4" (172 mm)	8 3/4" (172 mm)	8 1/2" (216 mm)	9 7/8" (250 mm)	10 7/8" (278 mm)	12 7/8" (327 mm)	16 1/2" (419 mm)	18 3/4" (502 mm)
h - Height	2 1/8" (54 mm)	2 1/8" (54 mm)	3 1/2" (90 mm)	4 1/2" (115 mm)	5 1/8" (130 mm)	6 3/8" (162 mm)	8" (203 mm)	9 7/8" (251 mm)
Weight - Ductile Iron	N/A	24 lbs. (11 kg)	36 lbs. (16 kg)	46.5 lbs. (22 kg)	78 lbs. (34 kg)	108 lbs. (49 kg)	150 lbs. (68 kg)	210 lbs. (95 kg)
Weight - Stainless Steel	15 lbs. (7 kg)	N/A	28 lbs. (13 kg)	40 lbs. (18 kg)	82 lbs. (38 kg)	88 lbs. (40 kg)	N/A	N/A



3450 W. 131st. Street
Carmel, IN 46074

Phone: 317-733-2855
Fax: 317-733-2053

CARMEL WATER
STANDARD DETAILS

TITLE:
OCTAVE ULTRASONIC
METER

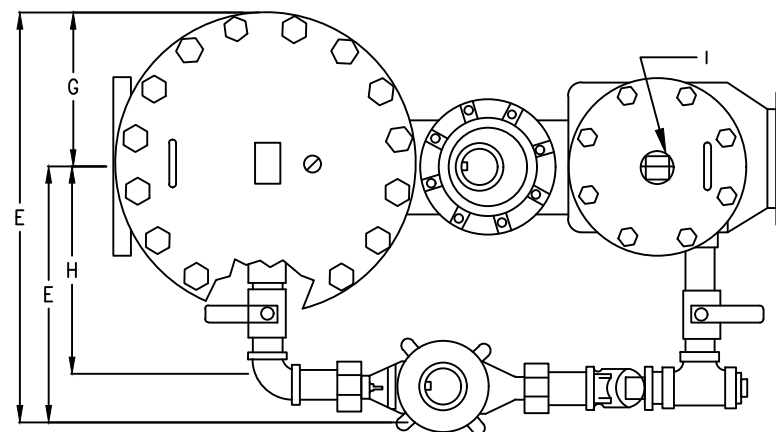
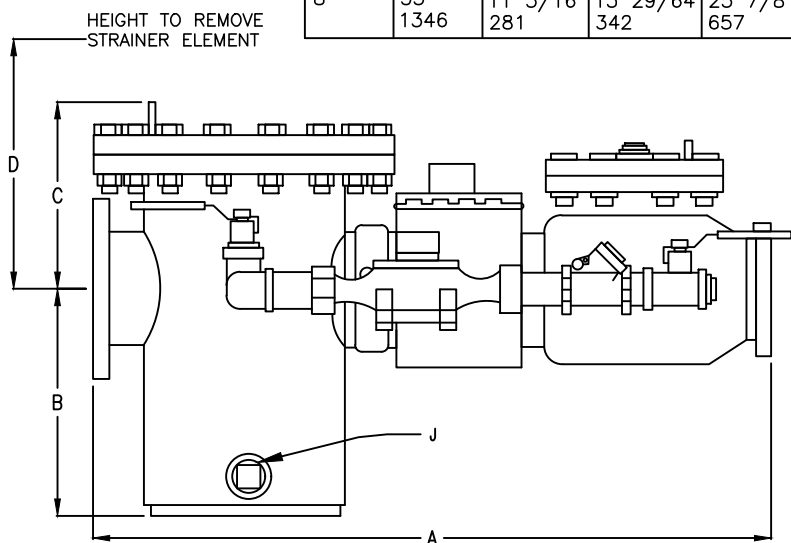
Date:	January 2023	Scale:	No Scale	Drawn By:	Crossroad Engineers	Drawing Name:	CW-19
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OPERATING CHARACTERISTICS

METER SIZE	NORMAL OPERATING RANGE @100% ACCURACY (±1.5%)	AWWA Standard	LOW FLOW @95% Accuracy
4"	3/4 to 1200 US gpm 0.171 to 272.55 m/h	2 to 700 US gpm 0.45 to 159 m/h	3/8 US gpm 0.09 m/h
6"	1 1/2 to 2500 US gpm 0.34 to 567.81 m/h	4 to 1600 US gpm 0.91 to 363 m/h	3/4 US gpm 0.17 m/h
8"	2 to 4000 US gpm 0.45 to 908.5 m/h	7 to 2800 US gpm 1.6 to 636 m/h	1 US gpm 0.23 m/h

DIMENSIONS

METER SIZE	A in/mm	B in/mm	C in/mm	D in/mm	E in/mm	F in/mm	G in/mm	H in/mm	I in/mm	J in/mm	Weight lbs/kg
4"	33 838	10 254	10 3/4 273	17 1/2 445	22 559	15 1/4 387	6 3/4 171	12 305	2 51	2 51	215 98
6"	45 1143	11 1/16 281	11 3/8 289	21 1/4 540	29 737	19 1/2 495	9 1/2 241	16 406	2 51	3 76	570 258
8"	53 1346	11 3/16 281	13 29/64 342	25 7/8 657	34 1/2 870	21 3/4 552	12 1/2 318	17 432	3 76	3 76	765 347



3450 W. 131st. Street
Carmel, IN 46074

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Fax: 317-733-2053

CARMEL WATER
STANDARD DETAILS

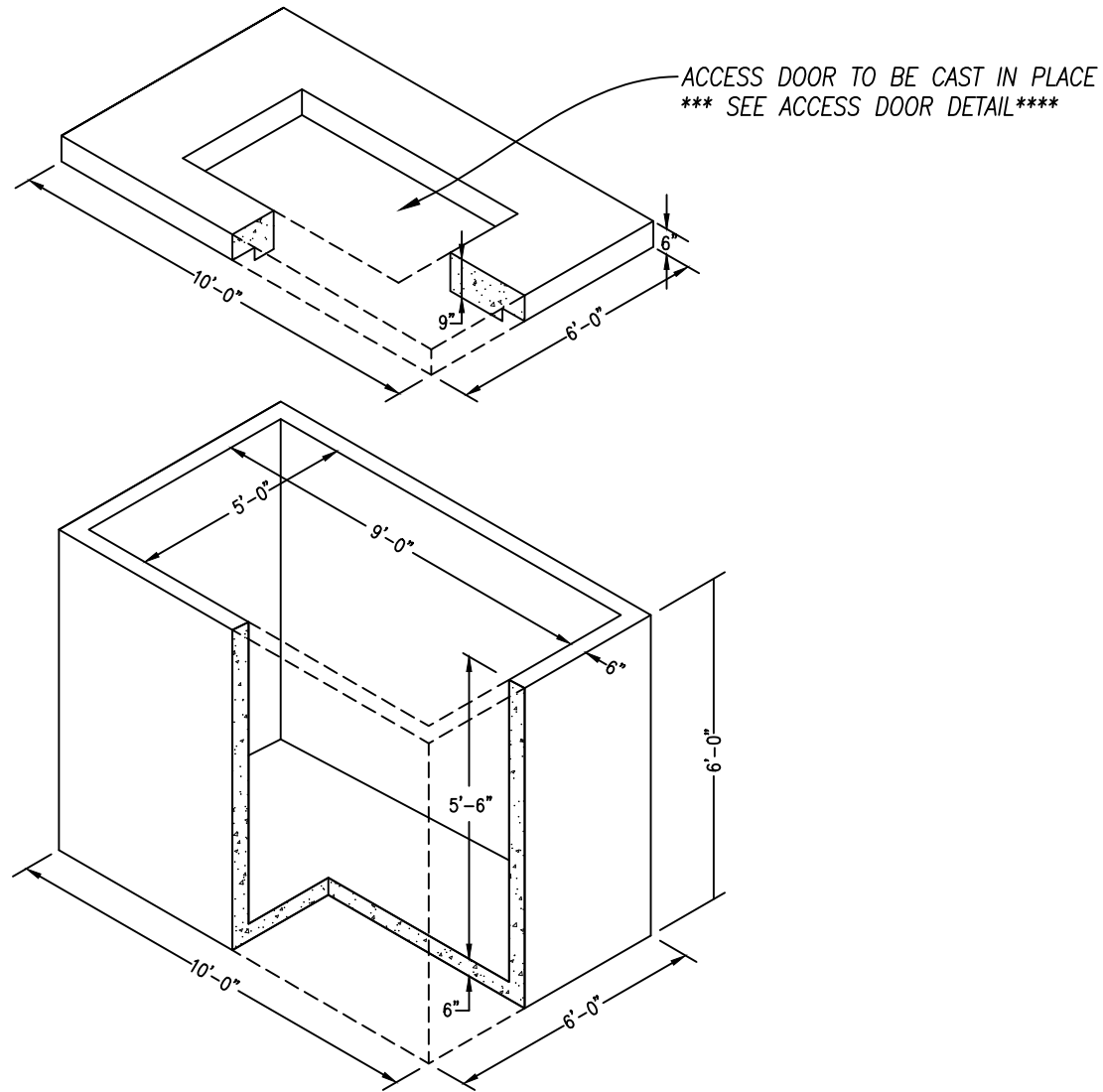
TITLE:
4", 6", & 8" METER SPECS
FOR VAULT DETAIL

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-20



3450 W. 131st. Street
 Carmel, IN 46074

Phone: 317-733-2855
 Fax: 317-733-2053

CARMEL WATER
 STANDARD DETAILS

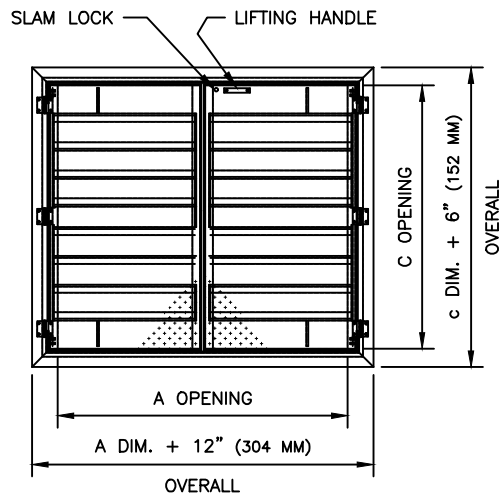
TITLE:
 WATER VAULT
 DETAIL

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

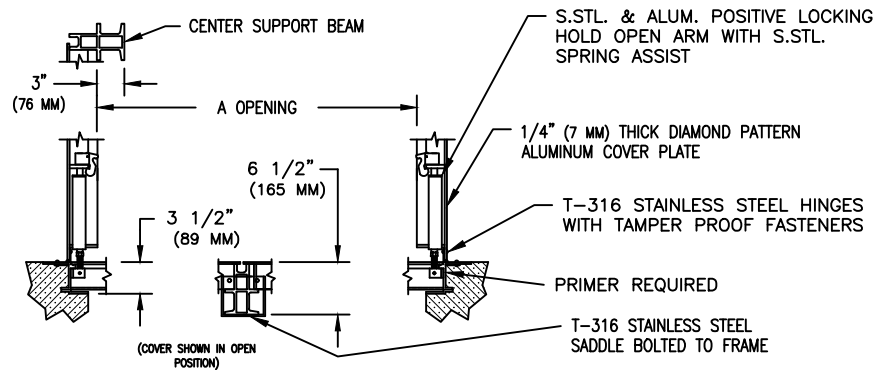
Drawing Name: CW-21



STANDARD FEATURES:

- AUTO-LOCK T-316 STAINLESS STEEL HOLD OPEN ARM WITH RELEASE HANDLE
- T-316 STAINLESS STEEL HINGES AND ATTACHING HARDWARE
- T-316 STAINLESS STEEL SLAM LOCK WITH REMOVABLE KEY
- STAINLESS STEEL COMPRESSION SPRING ASSIST
- DOUBLE LEAF CONSTRUCTION
- H20 LOAD RATING (SEE NOTES)
- EXTRUDED ALUMINUM FRAME
- RECESSED LIFTING HANDLE
- LIFETIME GUARANTEE

A DIM INCHES (A)	C DIM INCHES (MM)	UNIT WT. LBS. (KG.)
72 (1829)	48 (1219)	305 (138)



NOTES:

- 1) SUITABLE FOR USE IN OFF STREET LOCATION WHERE NOT SUBJECTED TO HIGH DENSITY TRAFFIC.
- 2) PROVIDE A FULL BED OF CLASS "A" CONCRETE UNDER FRAME AND SUPPORT ANGLES.



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CARMEL WATER
STANDARD DETAILS

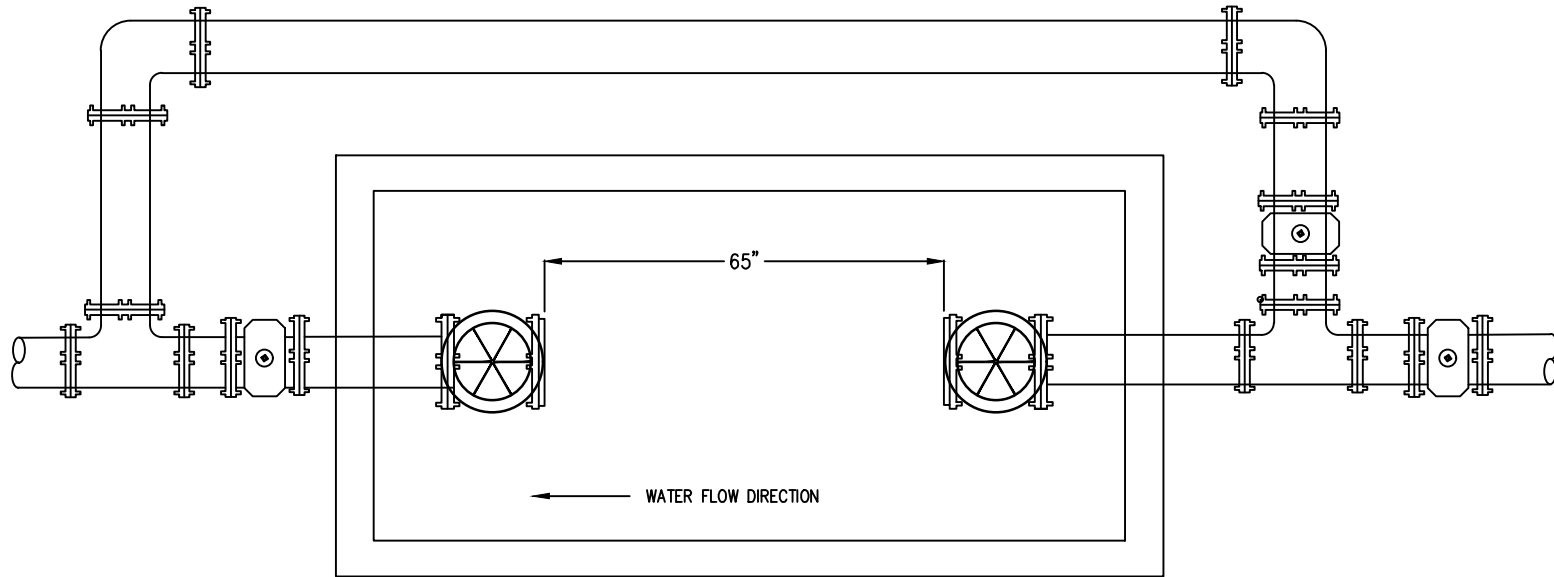
TITLE:
ACCESS DOOR
DETAIL

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-22



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CARMEL WATER
STANDARD DETAILS

TITLE:
BYPASS FOR
METER VAULT

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-23

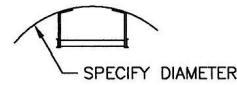
SERIES L1B and L1D LADDERS

STANDARD FEATURES:

- ALL ALUMINUM WELDED CONSTRUCTION
- 1 3/8" TYPE "D" RUNG WITH FLAT SLIP RESISTANT SURFACE
- CUSTOM FIT WALL MOUNTED STANDOFFS
- FLOOR AND WALL OR WALL-ONLY MOUNTING (SPECIFY)
- FLAT OR ROUND WALL MOUNTING (SPECIFY)
- AVAILABLE IN WELDED STAINLESS STEEL CONSTRUCTION

REQUIRED INFORMATION:

- BASIN DIAMETER OR FLAT WALL
- RAIL LENGTH IN FEET
- STANDOFF LENGTH (7" [178 MM] MIN.)
- L1B OR L1D MOUNTING

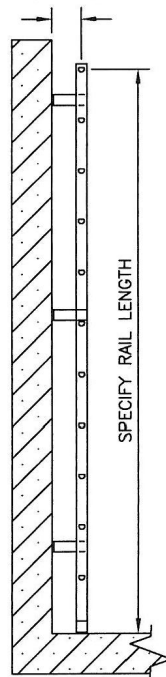


BASIN WALL MOUNTING

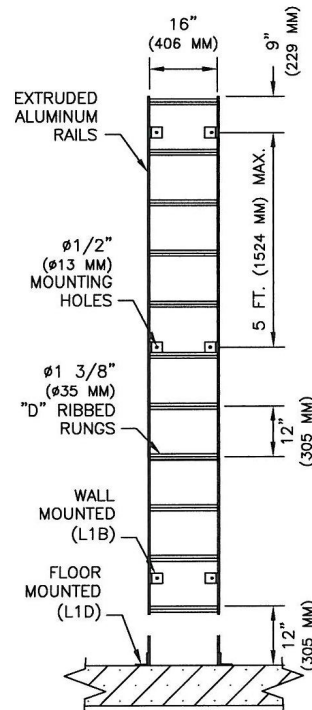


FLAT WALL MOUNTING

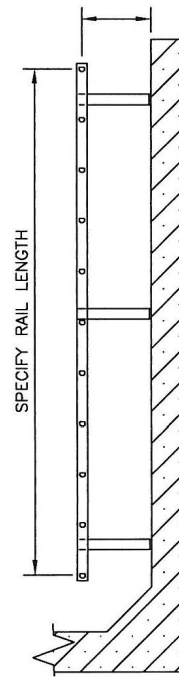
STANDOFF
(7" [178 MM] MIN.)
(ADVISE)



L1D (FLOOR AND WALL MOUNT)



STANDOFF
(7" [178 MM] MIN.)
(ADVISE)



L1B (WALL MOUNT)



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CARMEL WATER
STANDARD DETAILS

TITLE:

L1B AND L1D
LADDERS

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-24

SERIES L1E LADDER EXTENSION

STANDARD FEATURES:

- EASY TO INSTALL ON ALUMINUM OR STAINLESS LADDERS
- SECURE LOCKING IN THE EXTENDED POSITION
- LIGHT WEIGHT OPERATION
- ALL ALUMINUM AND STAINLESS STEEL CONSTRUCTION
- ALSO AVAILABLE IN ALL TYPE 304 OR TYPE 316 S.STL.

MODEL	HEIGHT	ABOVE LADDER	MIN. TANK DEPT.
A	37" (940MM)	42" (1067MM)	73" (1854MM)
B	34" (864MM)	39" (991MM)	55" (1397MM)

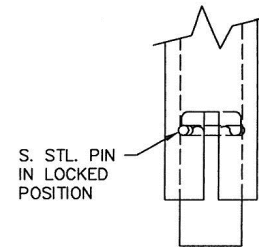
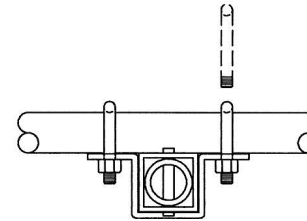
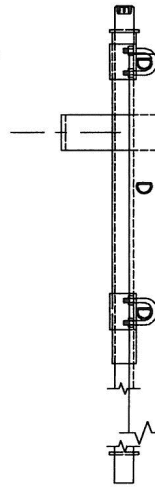
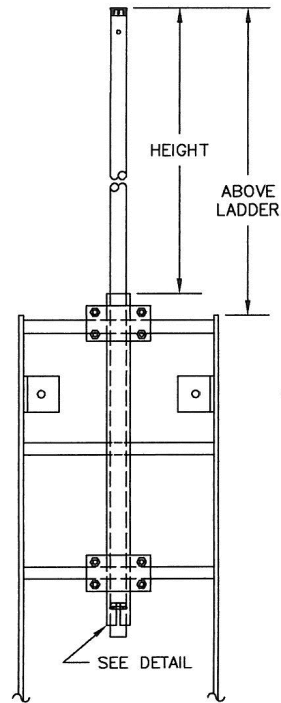
INSTALLATION & OPERATION INSTRUCTIONS

Installation:

- A) Place ladder flat on the ground with standoffs up.
- B) Place 2" (52 mm) square aluminum tube in center of rungs with the "T" shaped slot below third rung as shown (Model A) or second rung (Model B).
- C) Place stainless steel channel clamp over square aluminum tube so "U" clamp holes line up on either side of rungs as shown.
- D) Insert stainless steel "U" bolts over rung and through holes in stainless steel channel clamp as shown.
- E) Apply 10-15 foot pounds (1.3-2.1 kg./meter) of torque to all "U" bolt nuts.
- F) Verify that square aluminum tube is secured to ladder rungs.

Operation:

- A) To engage ladder extension, grasp aluminum post above the top stainless steel channel clamp, and pull straight up until lower stainless steel pin is seated.
- B) Rotate aluminum post 1/4 turn in either direction to secure pin in slot as shown in Detail.



S. STL. PIN
IN LOCKED
POSITION

DETAIL

NOTES:
PIN MUST BE IN LOCKED POSITION PRIOR
TO OPERATION.

 **City of Carmel Utilities**

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CARMEL WATER
STANDARD DETAILS

TITLE:

L1E LADDER
EXTENSION

Date: January 2023

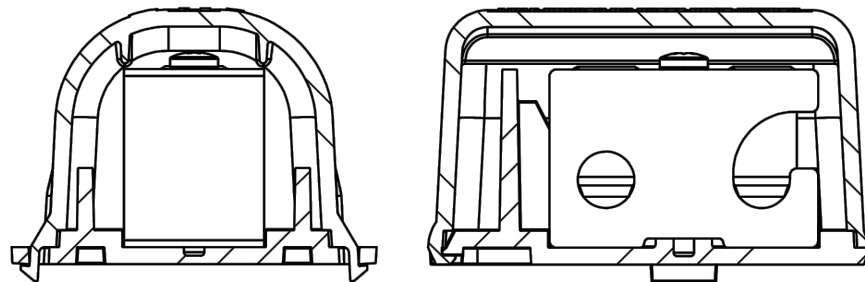
Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-25

NOTES

1. MAX VOLTAGE: 50V.
2. CONNECTOR MUST HAVE A WIRE RANGE THAT WILL ALLOW #14-10 SOLID COPPER, #14-10 STEEL CORE TRACER WIRE.
3. SILICONE SEALANT TEMPERATURE RATING -45°F TO 400°F.
4. LUG IS TO BE TIN PLATED HIGH CONDUCTIVITY ALUMINUM
SCREW: ZINC PLATED STEEL
HOUSING: HIGH IMPACT POLYPROPYLENE
SEALANT: NON-HARDENING VISCOUS DIELECTRIC SILICONE.



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CARMEL WATER
STANDARD DETAILS

TITLE: WATER PROOF
TRACER WIRE
CONNECTION

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-26

**Series 415
Side Fusion
Tapping Saddle**



Series 415 Side Fusion Tapping Saddle

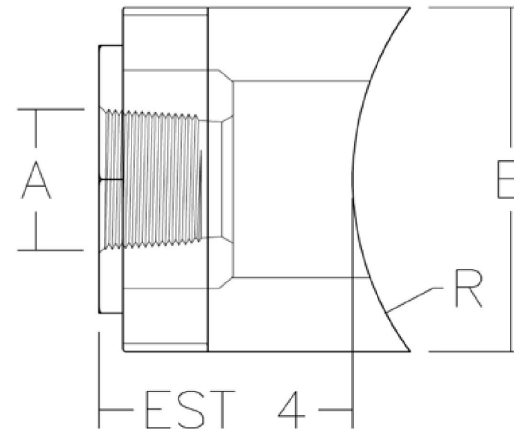
The Side Fusion Branch Saddle provides a cost effective dependable fitting for the water and industrial markets. The branch saddle can be installed with the standard side fusion equipment in the market today.

Meets ASTM D1598, D1599, D1588, and AWWA C906

- Branch outlet sizes .5"-2" NPT or CC thread (AWWA thread)
- Main size 4"-64" diameters
- Base size available 3" or 4" pivot head
- Full Pressure Rated 230 PSI

- HDPE Branch Saddle PE 3408 ASTM D3350 (Black) Cell Classification 345454C
- Female Threaded Insert Brass Alloy C360 AWWA C 800
- Stainless Compression Ring Grade type 304 or 316

R	A	B	Base Thickness
4	3	4.5/3.5	1.0/.75
6	3	4.5/3.5	1.0/.75
8	3	4.5/3.5	1.0/.75
10	3	4.5/3.5	1.0/.75
12	3	4.5/3.5	1.0/.75
14	3	4.5/3.5	1.0/.75
16	3	4.5/3.5	1.0/.75
18	3	4.5/3.5	1.0/.75
20	3	4.5/3.5	1.0/.75
24	3	4.5/3.5	1.0/.75



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CARMEL WATER
STANDARD DETAILS

TITLE: POLY-CAM SIDE
FUSION
TAPPING SADDLE

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-27

SADDLES

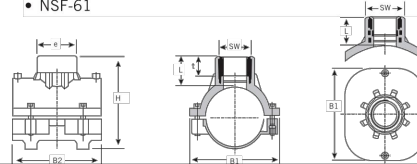
VA Electrofusion Service Saddles



Field of Application Installation of service and branch pipes
 Range of Application Gas up to 100 psi
 Water up to 200 psi
 Friatec Molded Saddle Fittings may be clamped onto pipes up to SDR 11 and sealed using electrofusion.

Benefits include:

- Universal compatibility with various diameters of polyethylene pipe from 3" up to 22" IPS
- Quick, easy and safe assembly
- NSF-61



Nominal Pipe d1 (in)	Main Size d2	Nominal Outlet	Product Code	B1	B2	H	L	t	e
3"	IPS	2" SSPT	228262	6.102	5.906	7.835	3.740	1.063	3.189
4"	IPS	2" SSPT	228170	6.890	7.087	8.228	3.740	1.063	3.189
4"	DIP	2" SSPT	228298	6.890	7.087	8.228	3.740	1.063	3.189
6"	IPS	2" SSPT	228171	8.858	7.677	10.197	3.740	1.063	3.189
6"	DIP	2" SSPT	228302	8.858	7.677	10.197	3.740	1.063	3.189
8" - TL*	IPS	2" SSPT	228218	9.843	7.677	11.693	3.740	1.063	3.189
8" - TL*	DIP	2" SSPT	228173	10.039	7.677	12.283	3.740	1.063	3.189
10" - 22" TL*	IPS	2" SSPT	228174	7.874	-	-	3.543	-	-
10" - 20" TL*	DIP	2" SSPT							

* FRIATEC Pneumatic Top-loading tool required

FRIATEC Safety fittings can be fused to all PE pipes SDR range 11 through 17.6.
 Assemble nipple, bushing or corporation stop into saddle using red LOCTITE #262
 (SSPT) = Straight Standard Pipe Thread. The use of tapered fittings for the outlet is not permitted

Brass fittings only on SSPT Reducer Bushings

Reducer to be Iron pipe to CC on 3/4" to 1 1/2" Service lines.

2" service is to be Iron pipe by iron pipe

SSPT Reducer Bushings



Description	Product Code
2" x 3/4" Male SSPT x Female NPT	228453
2" x 1" Male SSPT x Female NPT	228454
2" x 1 1/2" Male SSPT x Female NPT	228455



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CITY OF CARMEL
 STANDARD DETAILS

TITLE:
 ELECTRO FUSION
 SERVICE SADDLE

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-28

Outlet Half (load bearing half):

Sleeve Sizes 0450 through 1392, Outlet sizes 2" - 8"
Sleeve Sizes 1075 through 1392, Outlet sizes 10" and 12"
Sleeve Sizes 1420 and larger, all outlets

12 gauge Stainless Steel
10 gauge Stainless Steel
10 gauge Stainless Steel

Sleeve pressure rating with optional ANSI stainless steel flange:

Sleeves 4" - 12" nominal pipe sizes: 250 PSI working pressure, hydrostatic test pressure of 300 PSI.
Sleeves 14" - 24" nominal pipe sizes: 200 PSI working pressure, hydrostatic test pressure of 250 PSI

Sleeves shall be rated at 150 PSI working pressure with a hydrostatic test pressure of 200 PSI on pipe with a full circumferential break.

Material Specification

Body: Stainless Steel, 18-8 Type 304

Flange: 304 Stainless Steel, per ANSI/AWWA Standard C288, ANSI 150lb. Drilling, recessed for tapping valve per MSS-SP 60.

Bolts: Stainless Steel, 18-8 Type 304

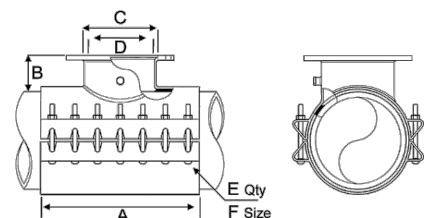
Branch Outlet: Schedule 10 Stainless Steel Pipe

Gasket: Full circumferential Virgin Styrene-Butadiene Rubber (SBR) - Compounded for use with water, salt solutions, mild acids and bases. Per ASTM D-2000 M4AA 607. Standard temperature range from -40° to 150°F (-40° to 65°C) constant, maximum intermittent 180° F (82°C). For applications on high temperatures or chemical pipelines, contact JCM Industries Technical Services.

ALL STAINLESS STEEL TAPPING SLEEVE DIMENSIONS

Flange Size	A	B	C	D	E	F
4	15	5	5-1/32	4.26	10	5/8
6	15	5	7-1/32	6.35	10	5/8
8	21	5-1/8	9-1/32	8.32	14	5/8
10	27	5-1/2	11-1/16	10.42	18	5/8
12	30	5-3/4	13-1/16	12.39	20	5/8

Dimensions represented in inches



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CITY OF CARMEL
STANDARD DETAILS

TITLE:
STAINLESS STEEL
TAPPING SLEEVE

Date: January 2023

Scale: No Scale

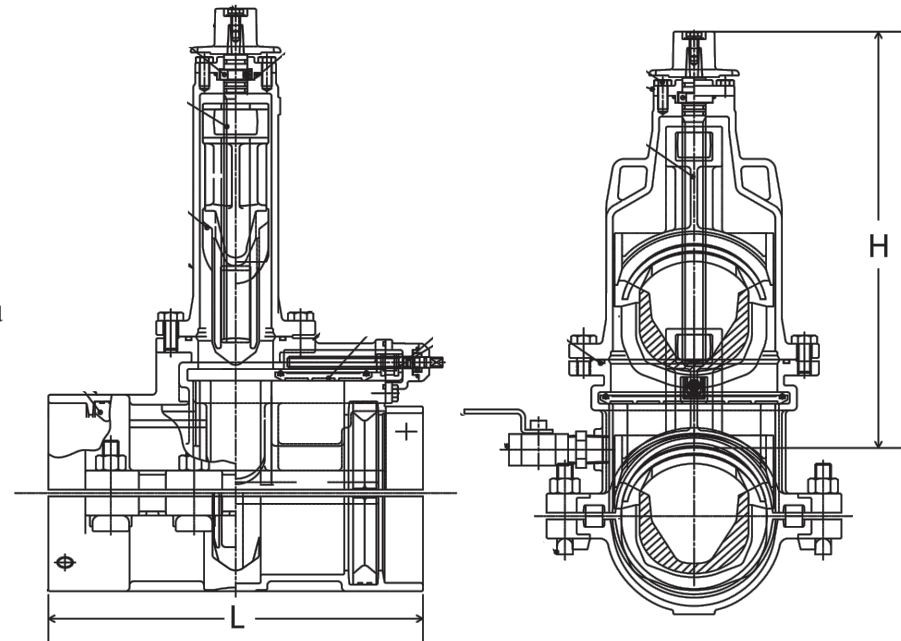
Drawn By: Crossroad Engineers

Drawing Name: CW-29

The specified equipment shall be compatible with the valve below.

- * The EZ Valve shall be capable of pressure-tight assembly to exterior of the pipe in which flow is to be stopped at a working pressure not to exceed 250 PSI.
- * The EZ Valve assembly shall be designed as to be easily rotated 120 degrees, perpendicular across the top of the pipe, while riding on two (2) separate rubber gaskets, constructed of (EPDM or SBR), by using a perpendicular rotary feed mechanism, driven by a chain.
- * The EZ Valve shall be constructed of a two (2) piece, Ductile Iron casting (Top & bottom), to be bolted together, using Stainless Steel bolts, manufactured to the Stainless Steel specification of 304 with nuts that meet the same standard and are teflon coated.
- * The EZ Valve shall meet or exceed AWWA Specification C509 for Resilient Seal Valves suitable for Potable water service.
- * The Ductile Iron Gate shall have a resilient rubber seal 360 degrees around the gate and is expandable to the ID (Inside Diameter) of the pipe.
- * The valve stem shall be made of Stainless Steel 1 CR 12, with a tensile strength of 60,000psi.
- * The valve body shall have an Amerlock™ two-part epoxy coating which conforms to NSF-61. The coating shall be chip and abrasion resistant and it shall be blue in color.
- * The EZ Valve shall use Stainless Steel fasteners joining the Valve Bonnet to the Valve top casting, unless otherwise noted in assembly drawings.
- * The final Restraint Fasteners (360 Degree) around the Valve Casting shall be constructed of Stainless Steel 304.
- * The valve shall be UL and NSF-61 compliant.

SIZE	HEIGHT	LENGTH
4"	18"	17 3/4"
6"	21"	17 3/4"
8"	24"	17 3/4"
10"	27"	19 3/4"
12"	29"	19 3/4"



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CARMEL WATER
STANDARD DETAILS

TITLE:

EZ VALVE

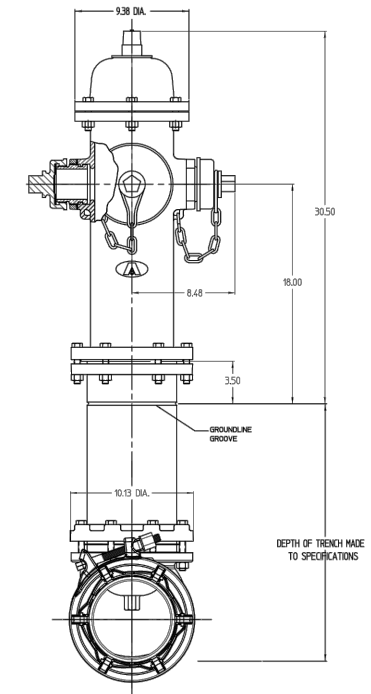
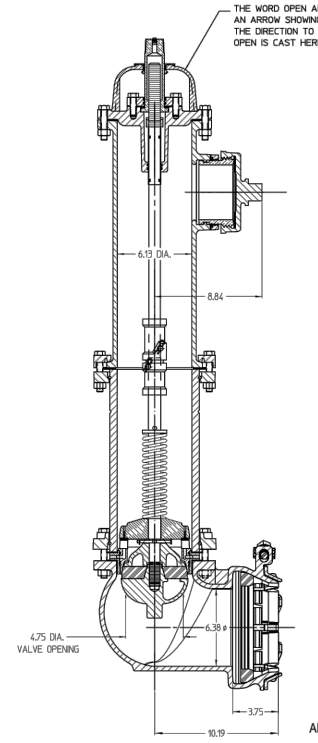
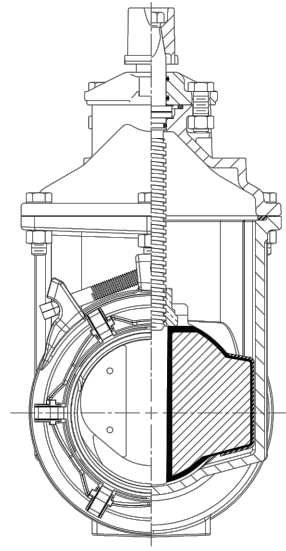
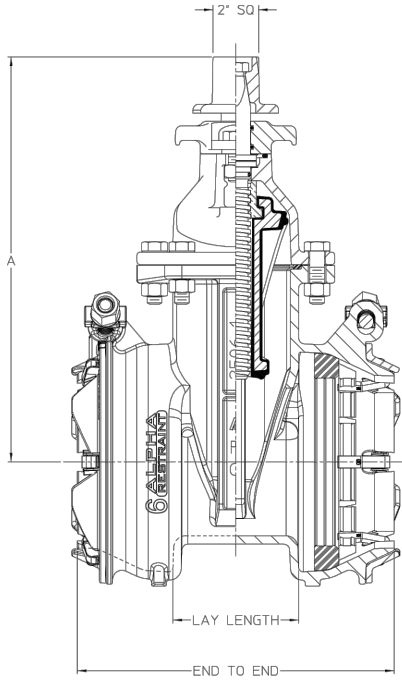
Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-30

ALPHA ROMAC VALVE AND HYDRANT



ALPHA restraint joints will accommodate the following pipe types and sizes:

ALPHA XL

- Gray iron (Class A, B, C, and D)

Nominal Size (in)	ALPHA XL OD Range (in)
4	4.80 - 5.10
6	6.90 - 7.20
8	9.05 - 9.40
10	11.10 - 11.45
12	13.20 - 13.60

AWWA

IL4625

DIMENSION	VALVE SIZE				
	4"	6"	8"	10"	12"
End to End	12.64	13.40	17.38	18.30	20.27
A	13.91	17.12	20.47	24.06	27.59
Lay Length	4.24	5.32	6.37	7.15	8.31
Handwheel Diameter	10.00	12.00	14.00	16.00	16.00
No. of Turns to Open	14	20	26	32	38

ALPHA restraint joints will accommodate the following pipe types and sizes:

ALPHA

- Ductile iron per AWWA C151
- PVC per ASTM D1785 (Schedule 40 and 80)
- PVC per ASTM D2241 (SDR 21)
- PVC per AWWA C900
- HDPE per AWWA C906 (SDR 9, 11, 13.5, and 17)

Nominal Size (in)	ALPHA OD Range (in)
6	6.60 - 7.00

NOTES:

1. Size and shape of operating nut and nut on caps, threading on nozzles and caps and the direction of opening made to specifications.
2. Cap chains are not furnished unless specified.
3. Bolts and nuts are rustproof steel ASTM A307 or equivalent, in accordance with AWWA 502
4. Working pressure 250 psig, test pressure 500 psig.
5. Hydrant conforms to AWWA standard C502
6. Valve top, valve bottom and base coated with fusion bonded epoxy coating.
7. Certified to NSF/ANSI Standard 61 and NSF/ANSI 372.
8. Nominal turns to open is 19-1/2.



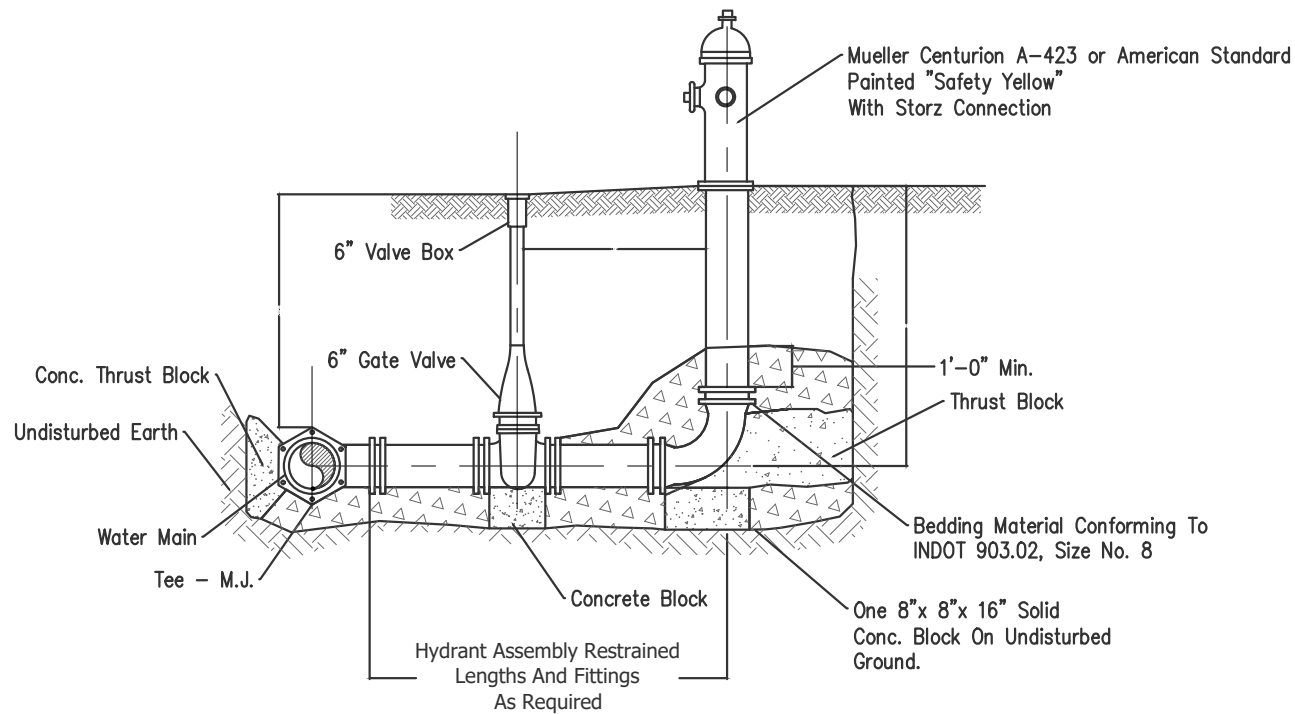
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CARMEL WATER STANDARD DETAILS

TITLE:
ALPHA ROMAC VALVE AND HYDRANT

Date:	January 2023	Scale:	No Scale	Drawn By:	Crossroad Engineers	Drawing Name:	CW-31
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NOTES

1. All Joints Shall Be Restrained.
2. Hydrants Shall Be Set At 500' Max. Horizontal Distance, Or Less As Specified By Fire Department.
3. All Valves Must Include Posi-Cap Or Equivalent.
4. Private Hydrants To Be Painted Red From Factory
5. Hydrant Valves Must Be Restrained To The Tee
6. All Hydrant Stubs Must Have Tracer Wire.



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CARMEL WATER
STANDARD DETAILS

TITLE:

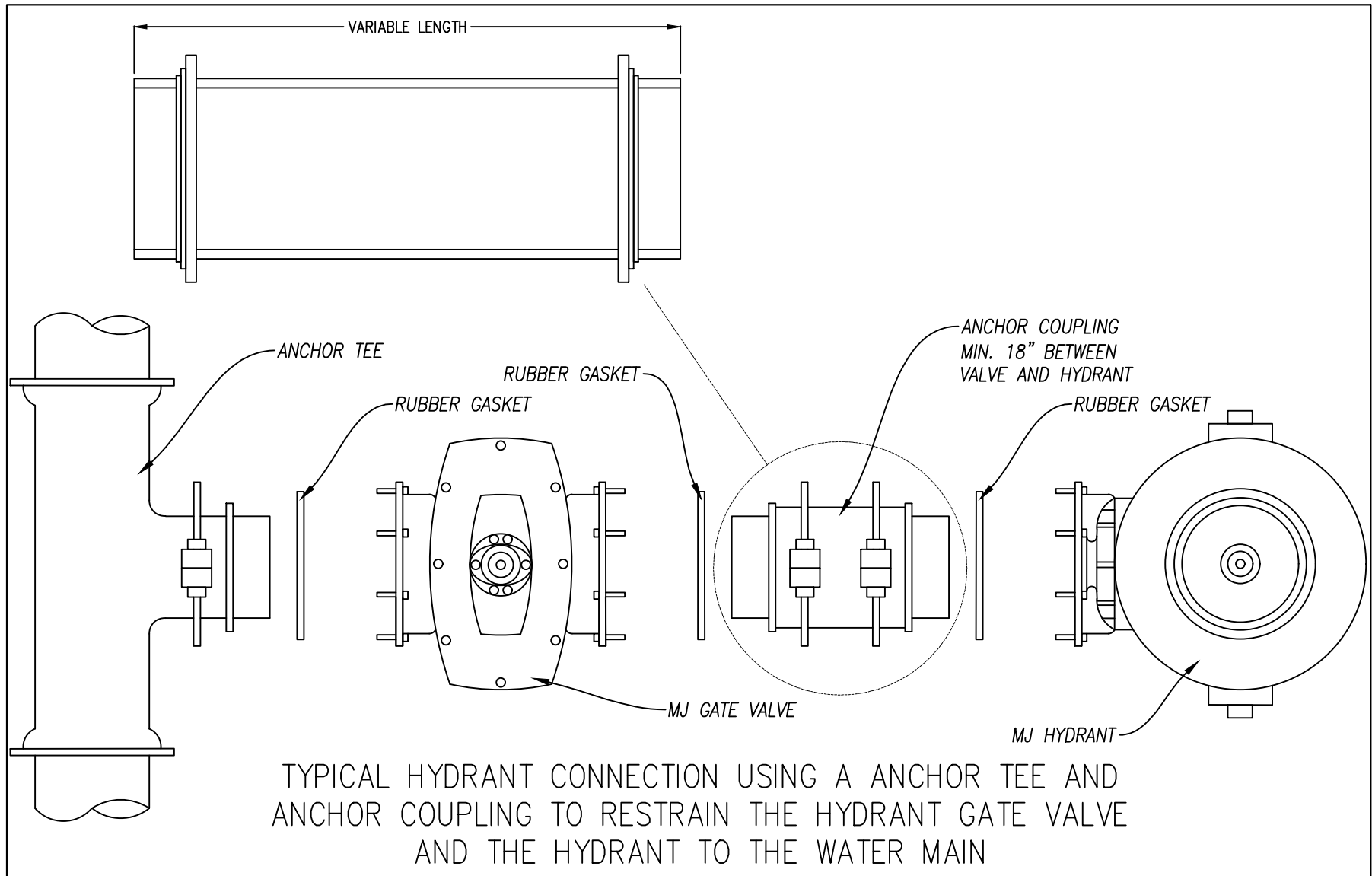
FIRE HYDRANT
ASSEMBLY

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-32



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CARMEL WATER
STANDARD DETAILS

TITLE:
DUCTILE IRON
ANCHOR COUPLING

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-33

Specifications

- Working Pressures up to 225 psi
- Qualification Tested to 1.5X Working Pressure
- Gasket Material: NSF-61 Approved NBR Rubber for Water and Sewer Service
- Shell of Fabricated Carbon Steel or Cast Ductile Iron Construction
- Temperature Range: -20 degrees F to 180 degrees F
- Nuts, Bolts and Washers: 18-8 Grade 304 Stainless Steel Bolts and 316 Stainless Nuts Coated with Fluoropolymer Coating to Prevent Galling
- Coating – Minimum 10 Mil Fusion-Bonded Epoxy (NSF-61 Compliant)
- Equipped with Vent Plugs on Top and Bottom Shells
- Optional Test Port Plug with Lifting Eye
- Perimeter Bolting and Gasket System (no end glands to tighten)

PRESSURE RATING, TEMPERATURE RATING, AND BOLT TORQUE SHOWN ON PRODUCT LABEL IS THE ACTUAL RATINGS FOR THIS INDIVIDUAL PRODUCT.

Nominal Pipe Size	Effective Range
2 inch	2.35 to 2.90
4 inch	4.45 to 5.10
6 inch	6.54 to 7.20
8 inch	8.95 to 9.40
10 inch	11.04 to 11.53
12 inch	13.08 to 13.56



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CARMEL WATER
STANDARD DETAILS

TITLE:

QUICK SLEEVE
JOINT REPAIR

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-34

BOLT-THRU MECHANICAL JOINT RESTRAINT

RESTRAIN MJ VALVES AND FITTINGS TO EACH OTHER



BOLT-THROUGH MJ RESTRAINT

Simple Secure

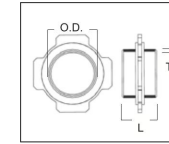
PRODUCT APPLICATIONS

Valves to tees, crosses

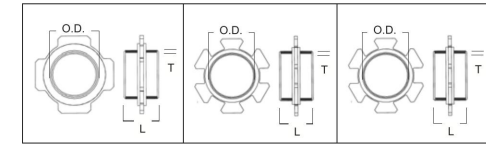
90's, 45's other fittings

SIZE, inches	DIMENSIONS, inches			ADAPTOR Weight lbs.	PAK Weight lbs.	TOTAL Weight lbs.
	O. D.	T	L			
3	3.96	.34	4	6	5	11
4	4.80	.35	4	8	8	16
6	6.90	.37	4	16	9	25
8	9.05	.39	4	19	10	29
10	11.10	.40	4	29	13	42
12	13.20	.43	4.5	31	15	46
14	15.30	.48	6.75	55	16	71
16	17.40	.51	6.75	60	20	80
18	19.50	.55	6.75	92	16	108
20	21.60	.58	6.75	101	20	121
24	25.80	.62	6.75	117	28	135
30	32.00	.66	7.75	153	68	221
36	38.30	.75	7.75	220	86	306

Adaptor sizes, dimensions and weights are nominal



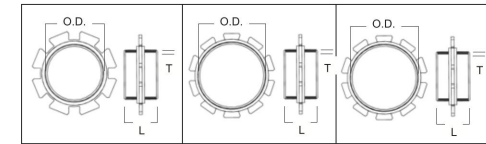
3-INCH



4-INCH

6-INCH

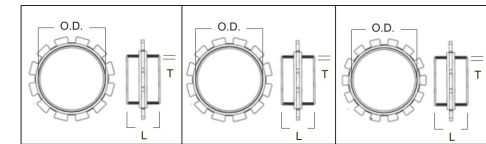
8-INCH



10-INCH

12-INCH

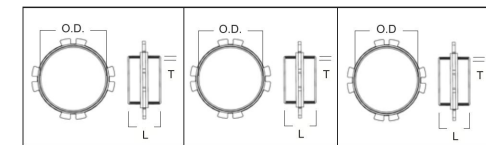
14-INCH



16-INCH

18-INCH

20-INCH



24-INCH

30-INCH

36-INCH



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CARMEL WATER
STANDARD DETAILS

TITLE:

FOSTER ADAPTER

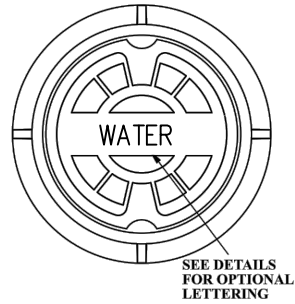
Date: January 2023

Scale: No Scale

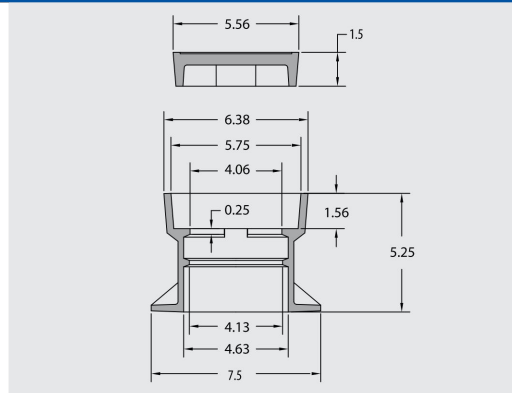
Drawn By: Crossroad Engineers

Drawing Name: CW-35

2197 VALVE BOX



- Notes:**
 - Material - Cast Iron
 - Per ASTM A48 Class 30B
 - Dimensions in Inches
 - Domestic Only

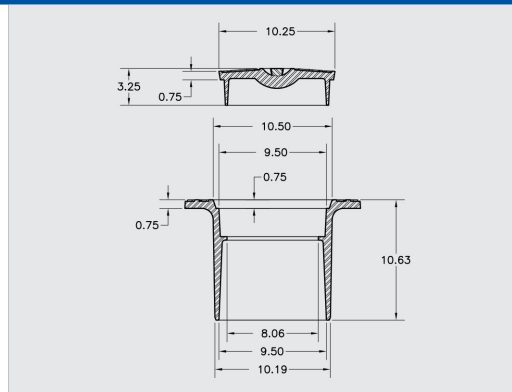


CARMEL SPEC

VBIWCW



- Notes:**
 - Material - Cast Iron
 - Per ASTM A48 Class 35B
 - Dimensions in Inches
 - Domestic Only



CARMEL CLAY SPEC



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 Fax: 317-733-2053

CARMEL WATER
 STANDARD DETAILS

TITLE:

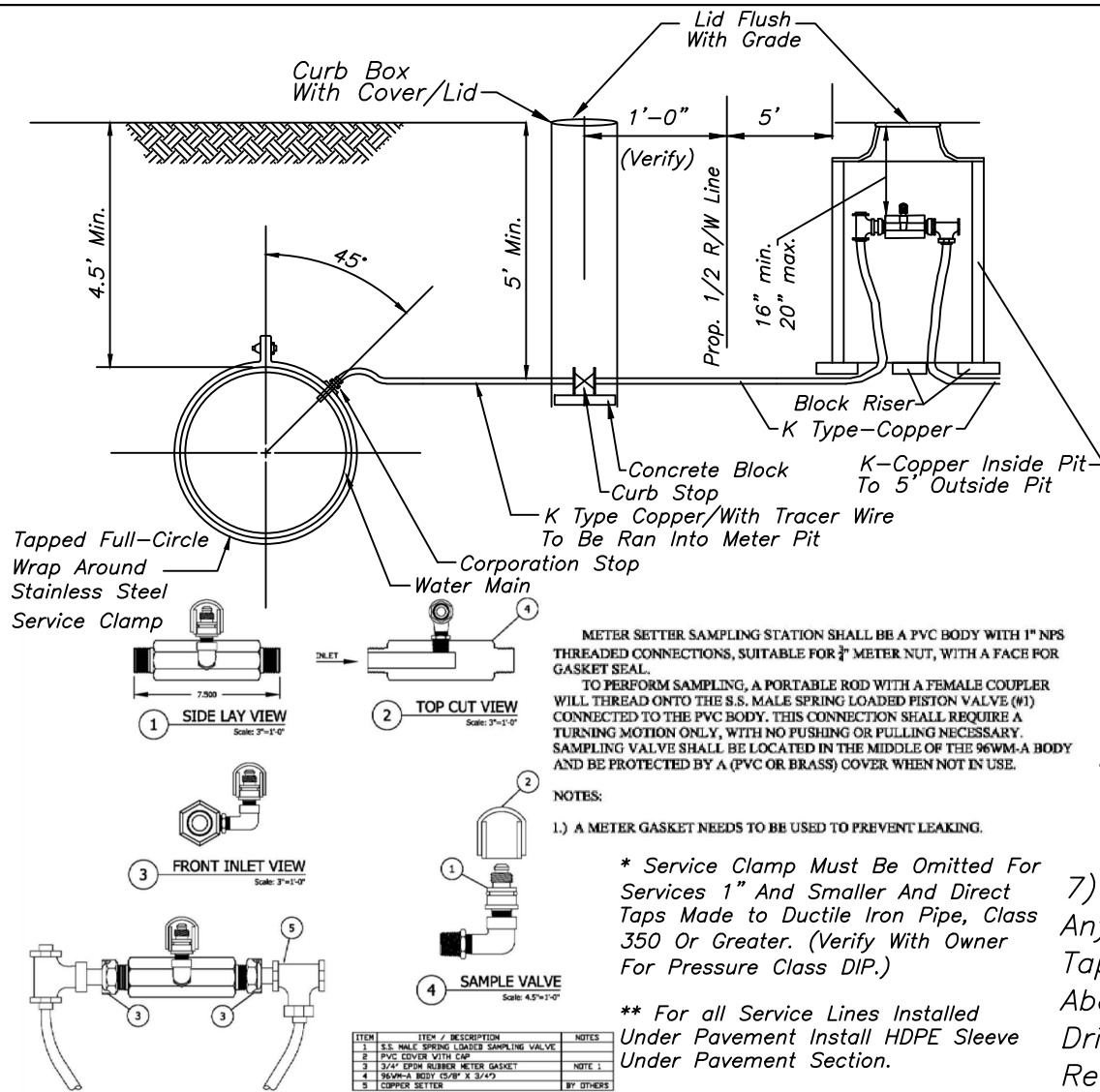
VALVE BOX LIDS

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-36



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CARMEL WATER STANDARD DETAILS

TITLE:

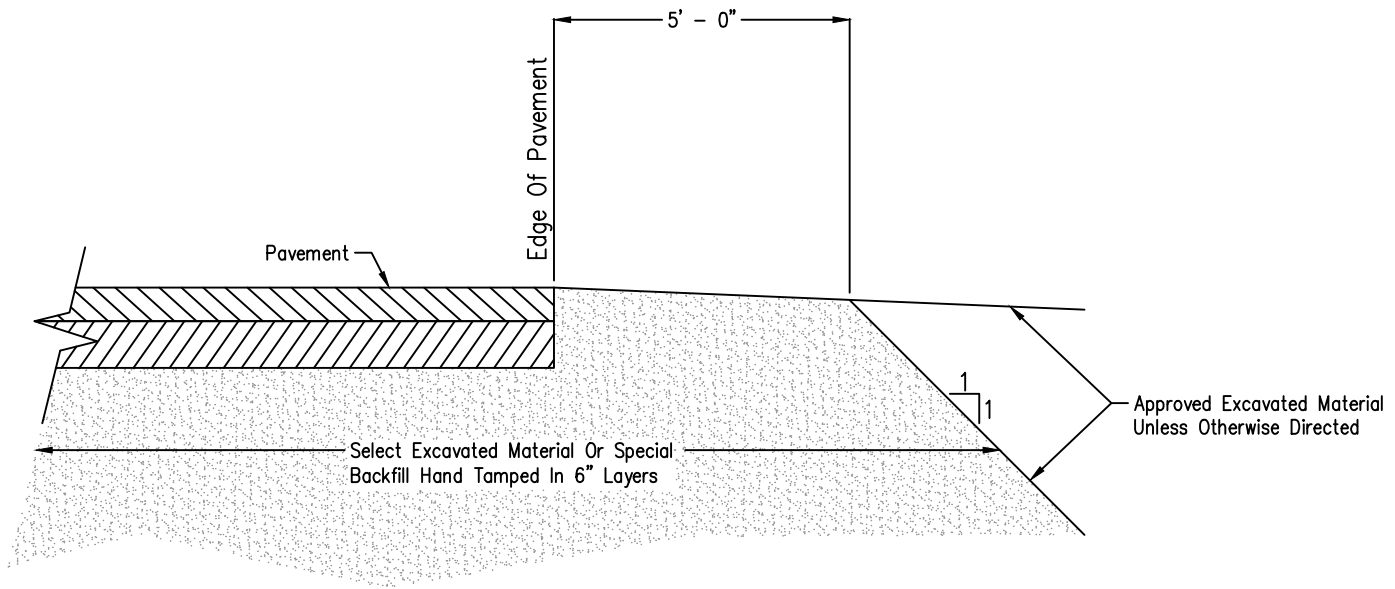
WATER SERVICE DETAIL FOR
SAMPLING STATION

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-37



Note: Select Excavated Material Or Special Backfill Shall Be Placed Under All Pavements And Within The Limits Shown Above.

Special Backfill Shall Conform To INDOT 211.02b

Select Excavated Material Shall Be Approved By Engineer



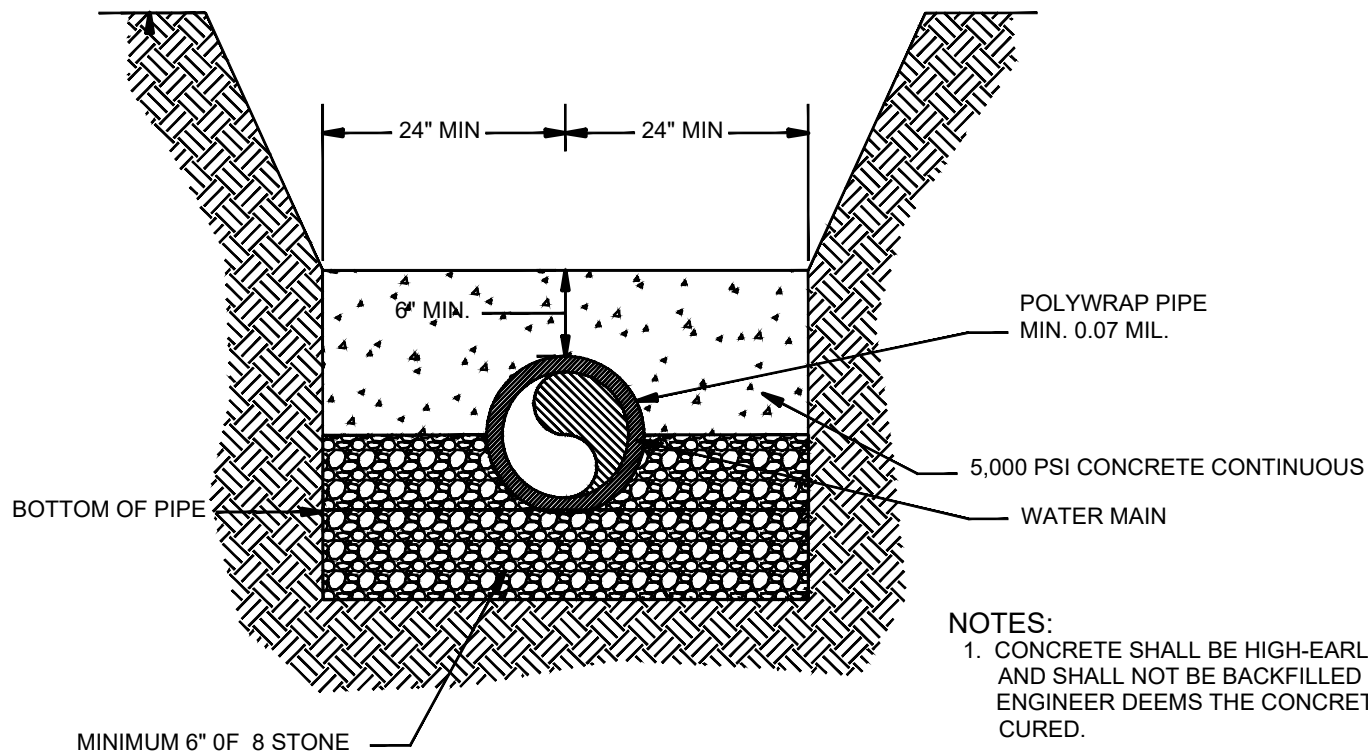
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Fax: 317-733-2053

CARMEL WATER
STANDARD DETAILS

TITLE:
LIMITS OF
SPECIAL BACKFILL

Date: January 2023	Scale: No Scale	Drawn By: Crossroad Engineers	Drawing Name: CW-38
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NOTES:

1. CONCRETE SHALL BE HIGH-EARLY YIELD AND SHALL NOT BE BACKFILLED UNTIL ENGINEER DEEMS THE CONCRETE ADEQUATELY CURED.
2. TO BE USED PER ENGINEER'S DIRECTION OR WHERE NOTED ON THE CONSTRUCTION PLANS.
3. WATER MAIN TO BE POLY WRAPPED BEFORE CONCRETE/STONE INSTALLATION.



FRATCO HDPE SMOOTH-CORR METER PITS: Available in a variety of sizes.

INSIDE DIAMETER	AVAILABLE HEIGHTS
20-inch	24-inch, 30-inch, 36-inch, 48-inch*
24-inch	24-inch, 30-inch, 36-inch, 48-inch*



NOTE:

NO MORE THAN 2
RISERS PER PIT.



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CARMEL WATER
STANDARD DETAILS

TITLE:
SMOOTH CORR METER
PITS AND RISER

Date: January 2023

Scale: No Scale

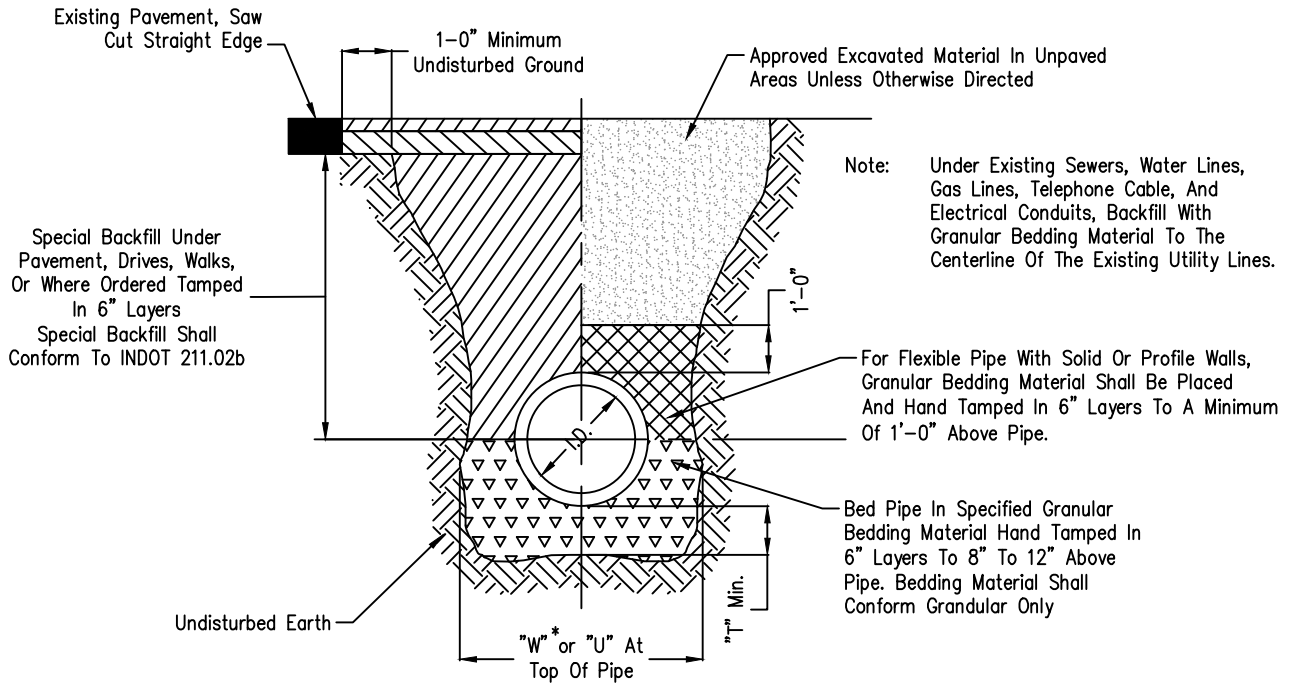
Drawn By: Crossroad Engineers

Drawing Name: CW-40

SIZE	"W"	"U" **	"T"
6"	2'-6"	2'-0"	4"
6"	2'-6"	2'-1"	4"
10"	2'-6"	2'-3"	4"
12"	2'-9"	2'-5"	4"
15"	3'-0"	2'-8"	5"
18"	3'-6"	3'-0"	5"
21"	3'-11"	3'-4"	6"
24"	4'-3"	3'-8"	6"
27"	2'-6"	3'-11"	6"
30"	5'-9"	4'-4"	6"
36"	6'-3"	5'-2"	6"
42"	6'-11"		8"
48"	7'-4"		9"
54"	8'-0"		9"
60"	8'-6"		9"
66"	9'-1"		9"
72"	9'-8"		10"
78"	10'-3"		10"

TRENCH SCHEDULE

** Table Is For ASTM D-3034, Wall Thickness Class SDR 35 For 6"-15" And ASTM F-679 Wall Thickness Class T-1 For 18"-36". For Other Flexible Pipes, Minimum Trench Width "U" Shall Meet Manufacturer's Requirements.



* Note: "W" Is The Maximum Width For Rigid Pipes.
"U" Is The Maximum Width For Flexible Pipes In Accordance With ASTM D-2321.

TRENCH DETAIL FOR WATER MAINS (N.T.S.)



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CARMEL WATER
STANDARD DETAILS

TITLE:
TRENCH DETAIL &
TRENCH SCHEDULE

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-41

JOINT RESTRAINT TABLE										
Length Of Pipe To Be Restrained In Each Direction From 1/4 Of Bend Based On 150 PSI Test Pressure										
Degree Of Bend	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"
90°, Tees & Plugs	27'	35'	42'	50'	58'	65'	73'	80'	95'	115'
45°	7'	9'	11'	13'	15'	17'	19'	21'	24'	29'
22-1/2°	3'	4'	5'	6'	7'	8'	9'	10'	12'	14'
11-1/4°	2'	2'	3'	3'	4'	4'	4'	5'	6'	7'

*Restrained Joints Shall Be Mechanical Joint With Retainer
Glands. US Pipe TR Flex Joint System, US Pipe Field LOK
Gasket System, Or Equal.*

NOTE:
*THE ABOVE RESTRAINED JOINT LENGTHS ARE MINIMUM LENGTHS.
THE DESIGN ENGINEER SHALL DETERMINE IF LONGER LENGTHS
ARE REQUIRED.*



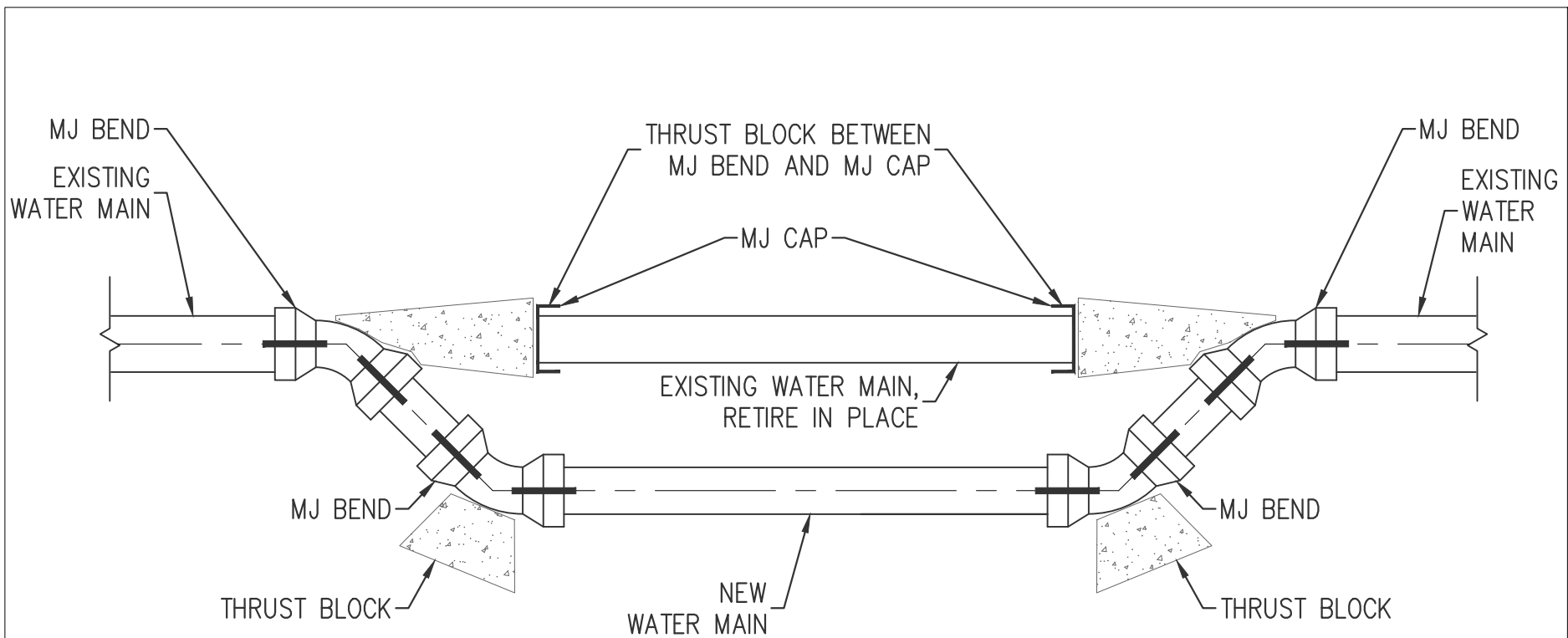
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CARMEL WATER
STANDARD DETAILS

TITLE:
JOINT RESTRAINT
TABLE

Date: January 2023	Scale: No Scale	Drawn By: Crossroad Engineers	Drawing Name: CW-42
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PLAN

NOTES:

- 1) RESTRAIN PIPE PER JOINT RESTRAINT TABLE
- 2) ALL WATER MAIN CONNECTIONS ARE TO BE APPROVED BY CWU PRIOR TO WORK
- 3) CONTRACTOR TO SCHEDULE OUTAGES WITH CWU 3 DAYS PRIOR TO OUTAGE
- 4) THIS DRAWING IS A SIMPLIFIED DETAIL. MORE FITTINGS MAY BE REQUIRED ONCE ACTUAL LOCATION ELEVATIONS HAVE BEEN VERIFIED BY CONTRACTOR
- 5) CONTRACTOR MUST COORDINATE WITH CWU ON WHICH RELOCATIONS MUST UNDERGO PRESSURE TESTING AND WATER QUALITY TESTING
- 6) PREFORMED THRUST BLOCKS ARE REQUIRED.



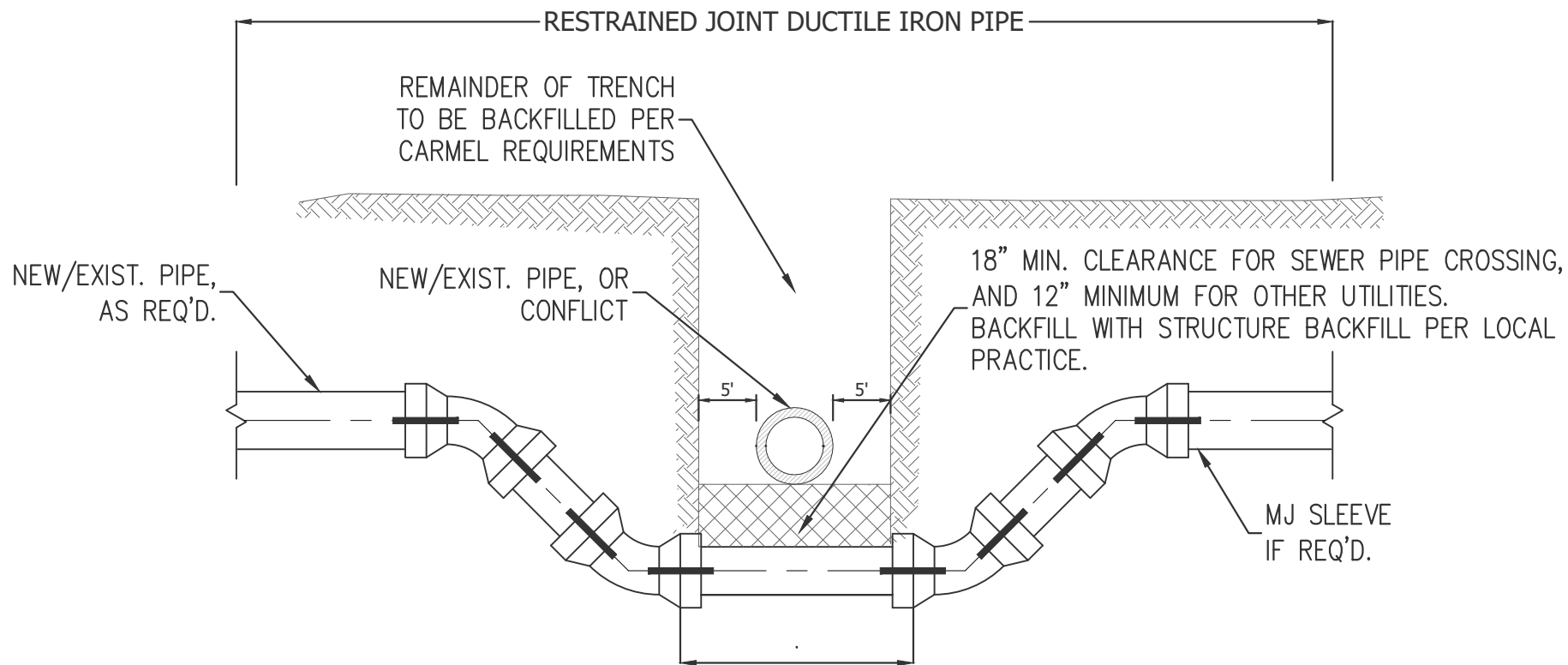
3450 W. 131st. Street
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Fax: 317-733-2053

CARMEL WATER
STANDARD DETAILS

TITLE: WATER MAIN
CONNECTION AND
HORIZONTAL RELOCATION

Date:	January 2023	Scale:	No Scale	Drawn By:	Crossroad Engineers	Drawing Name:	CW-43
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NOTES:

1. All pipe to be restrained joint.
2. Pipe is to be ductile iron, minimum pressure class 350.
3. Bottom of lowering shall be centered on conflict, and shall be a solid piece of pipe with no joints or fittings under the existing pipe or conflict.



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CARMEL WATER
STANDARD DETAILS

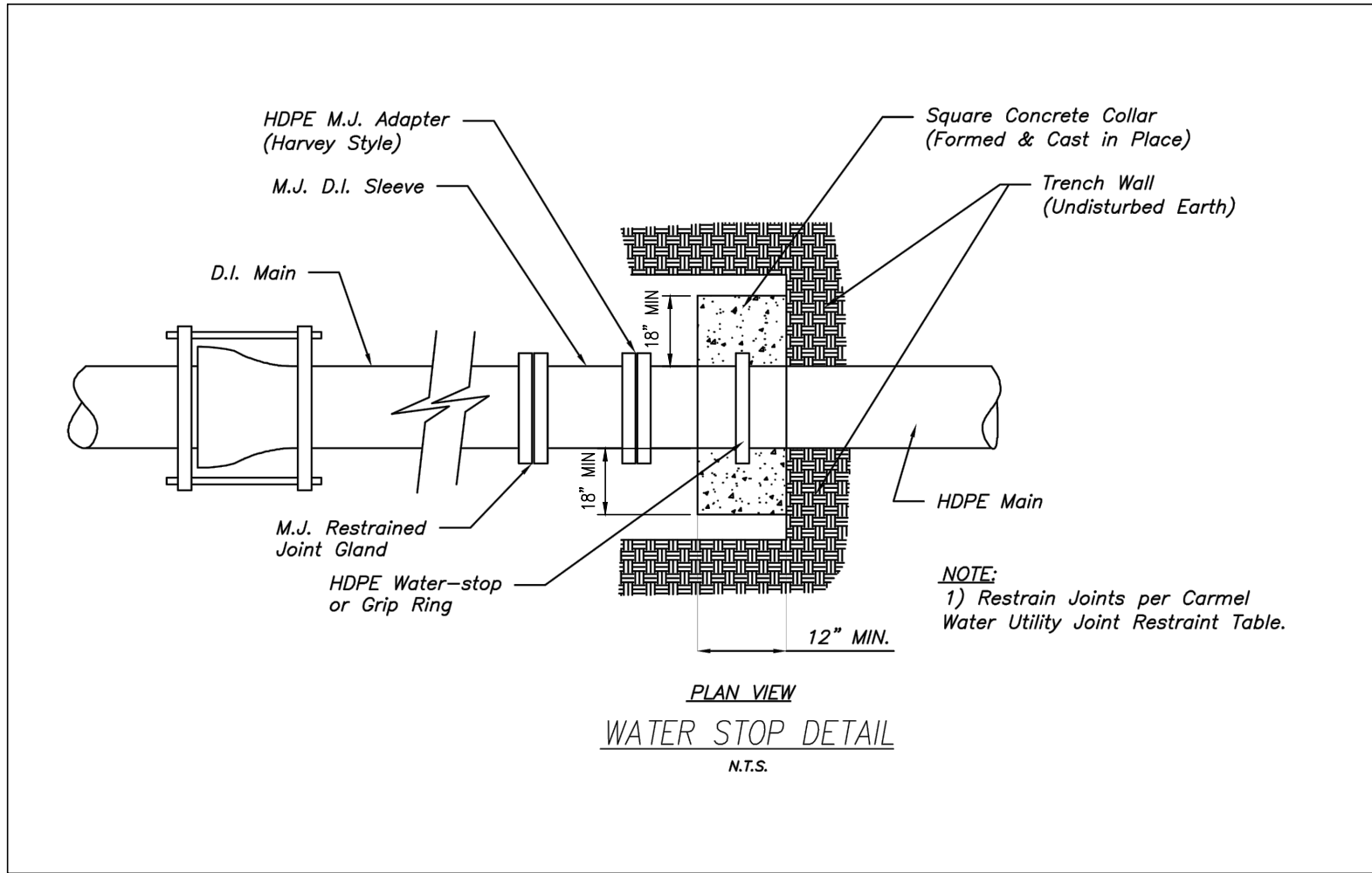
TITLE:
WATER MAIN
LOWERING

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-44



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CARMEL WATER
STANDARD DETAILS

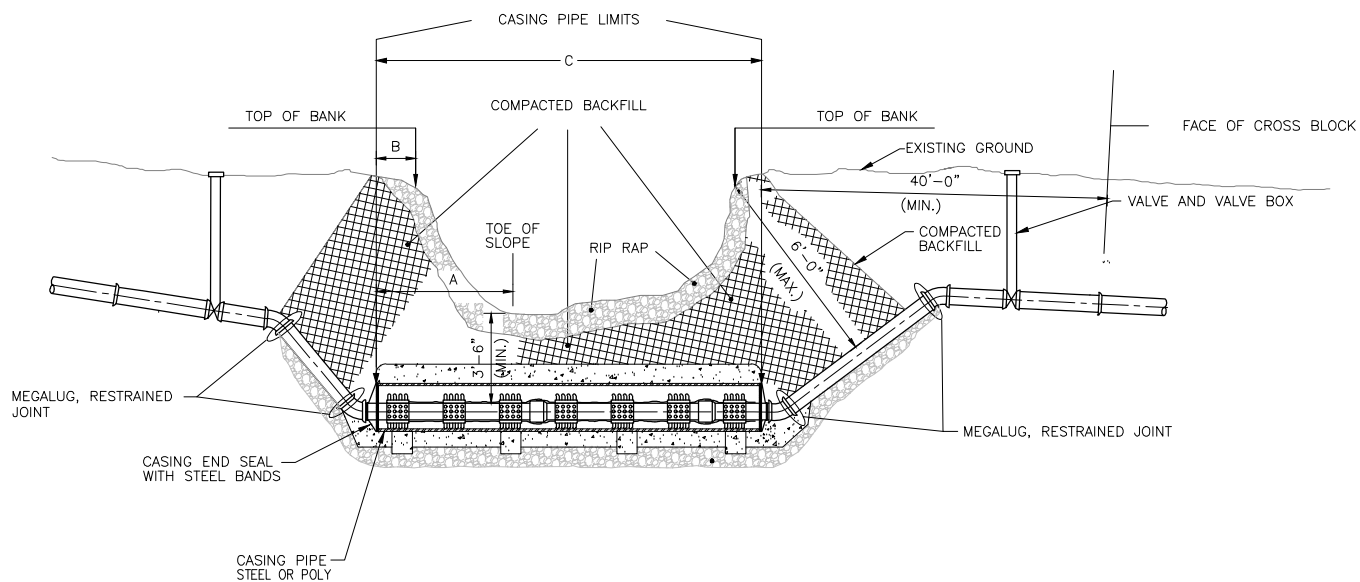
TITLE:
WATER STOP
DETAIL

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-45



NOTES:

1. FOR ENCASMENT SPACER DETAILS AND TYPICAL THRUST RESTRAINT FOR D.I. OVER BENDS AND PIPING.
2. DIMENSIONS A, B & C TO BE DETERMINED BY **CWU**.
3. MINIMUM ENCASMENT LIMITS ARE SHOWN ON THE DRAWINGS. THE ACTUAL LIMITS SHALL BE DETERMINED AT THE TIME OF CONSTRUCTION SUCH THAT THE ENCASMENT TERMINATES AT A PIPE JOINT.
4. RIP RAP SHALL BE INSTALLED TO MATCH CONTOUR OF STREAM BOTTOM AND STREAM BANK SIDES. DEPTH OF RIP RAP OF 18 INCHES.
5. ALL PIPE AND FITTINGS SHALL BE RESTRAINED JOINT DUCTILE IRON.
6. TR FLEX RESTRAINT JOINT OR HDPE SDR11 IS REQUIRED FOR ANY DIAMETER PIPE NON-VERTICAL. FIELD CUT JOINTS SHALL BE COMPLETED WITH A RESTRAINED JOINT OR WELDED BUTT JOINT.
7. VALVES SHALL BE INSTALLED AT BOTH ENDS OF THE CROSSING. VALVE BOXES SHALL BE ACCESSIBLE AND NOT SUBJECT TO FREQUENT FLOODING, VALVE LOCATION TO BE DETERMINED BY **CWU**.
8. CASING END SEAL ARE REQUIRED



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CITY OF CARMEL
STANDARD DETAILS

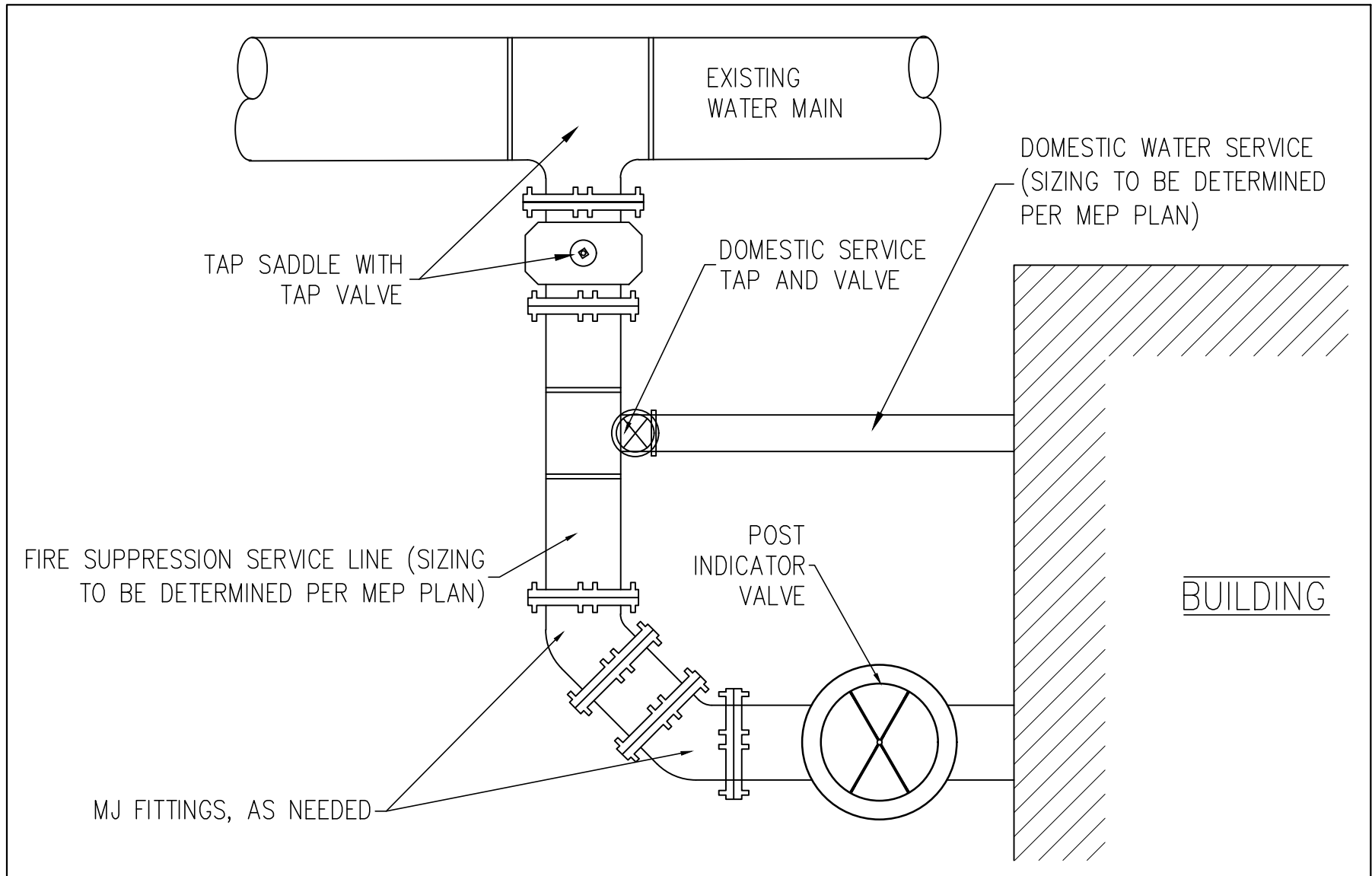
TITLE:
WATER MAIN CASING
ENCASEMENT DETAIL

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-46



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CARMEL WATER
STANDARD DETAILS

TITLE: COMMERCIAL FIRE
SUPPRESSION & DOMESTIC
SERVICE LINE INSTALLATION

Date: January 2023

Scale: No Scale

Drawn By: Crossroad Engineers

Drawing Name: CW-47