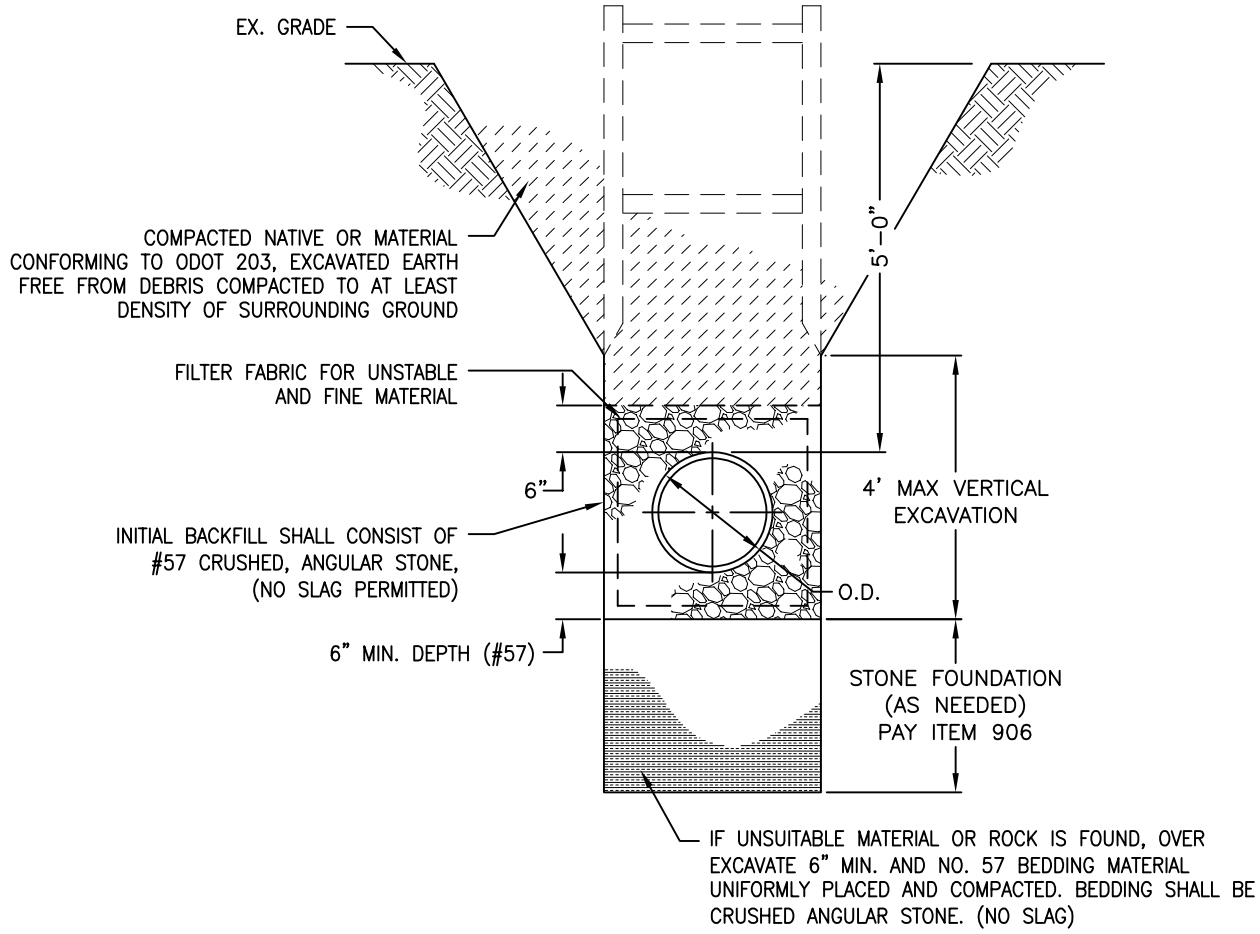



NOTES:

1. REFER TO OSHA REQUIREMENTS FOR TRENCH EXCAVATION SAFETY.
2. PROVIDE FILTER FABRIC WHEN VERY FINE OR UNSTABLE MATERIAL IS ENCOUNTERED
3. REFERENCES TO ODOT SHALL MEAN OHIO DEPARTMENT OF TRANSPORTATION CONSTRUCTION AND MATERIAL SPECIFICATIONS, LATEST EDITION.

MATERIAL SPECIFICATIONS:

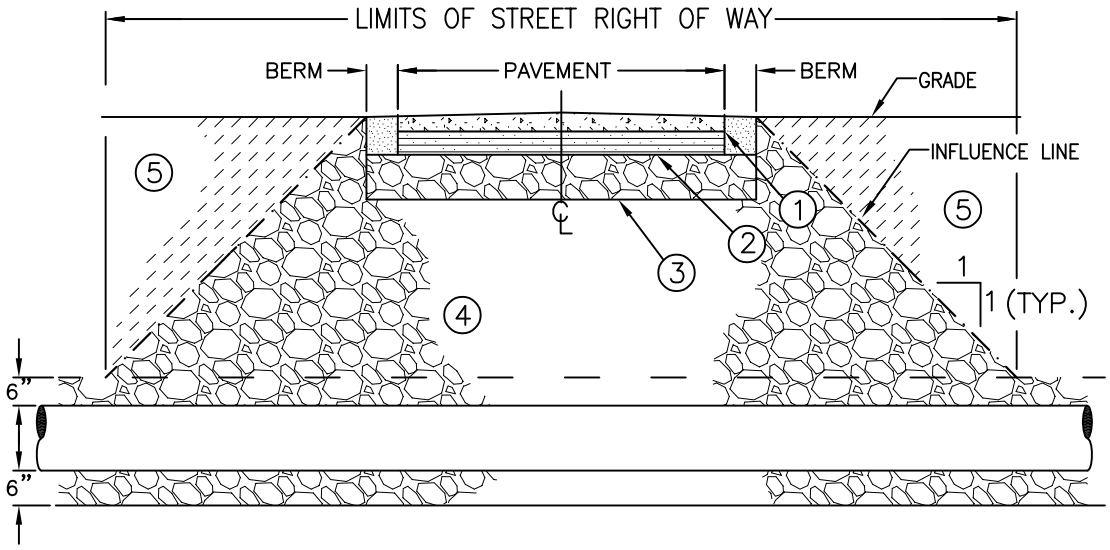
ALL PIPING SPECIFICATIONS SHALL COMPLY WITH THE FOLLOWING:

| PIPE | MATERIAL | JOINT | BEDDING |
|---|---|---|---|
| WATER MAIN: | | | |
| PVC | AWWA C-900, DR18 CL 150 | AWWA C-900 | AWWA C605 |
| DIP | ANSI/AWWA C151/A21.51, CL 52 | ANSI/AWWA C111/A21.11 | AWWA C600 |
| TRACE WIRE FOR NONMETALLIC PIPE REQUIRED | | | |

Portage COUNTY WATER RESOURCES

PORTAGE COUNTY WATER RESOURCES

| TYPICAL TRENCH | 04-01-2023 APPROVED DATE | WM-1 |
|---|---|---|




CONCRETE

(1) ODOT ITEM 452 NONREINFORCED OR ODOT ITEM 451 REINFORCED CONCRETE PAVEMENT (8" THICK)

ASPHALT

(1) ODOT ITEM 448 – ASPHALT CONCRETE (1–1/2" THICK)
PAVEMENT SURFACE COURSE

(2) ODOT ITEM 301 – (8" THICK)
PAVEMENT BASE COURSE

(3) ALL PAVEMENT TRENCH SECTIONS REQUIRE ODOT 304 CRUSHED AGGREGATE

(4) BACKFILL, ODOT 304 LIMESTONE REQUIRED UNDER PAVEMENTS, DRIVEWAYS, ETC. IN LAYERS NOT EXCEEDING 8" LOOSE DEPTH AND COMPACTED BY MECHANICAL DEVICES TO NOT LESS THAN 98% OF STANDARD DENSITY.

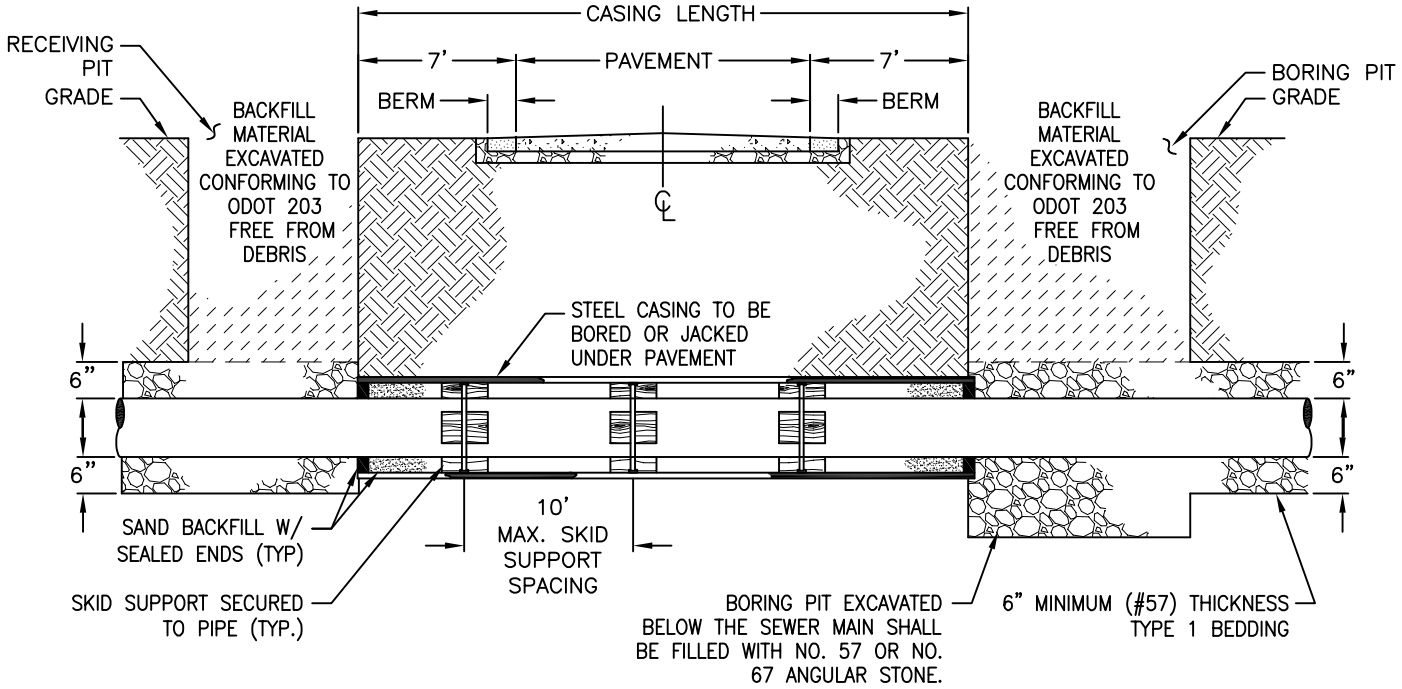
(5) BACKFILL OUTSIDE INFLUENCE LINE, CONFORMING TO ODOT 203, EXCAVATED EARTH FREE FROM DEBRIS, COMPACTED TO AT LEAST DENSITY OF SURROUNDING GROUND.

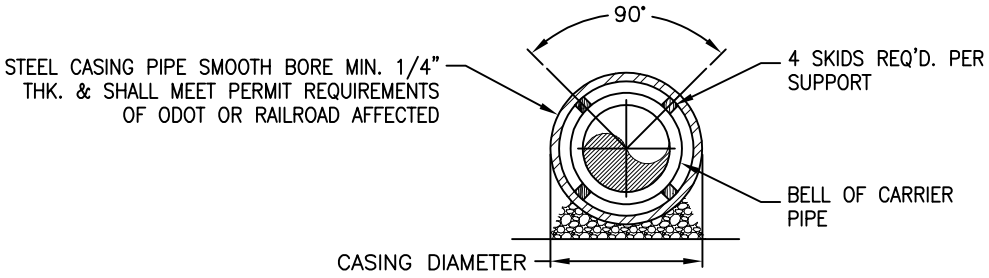
NOTES:

1. PAVEMENT REPAIR AND BACKFILL REQUIREMENTS SUBJECT TO ROADWAY JURISDICTIONAL REQUIREMENTS.

Portage COUNTY WATER RESOURCES

| PORTAGE COUNTY WATER RESOURCES | | |
|---|---|---|
| ROAD CROSSING (OPEN CUT) UNDER PAVEMENT WITHOUT CASING | 04–01–2023<br>APPROVED DATE | WM–2 |



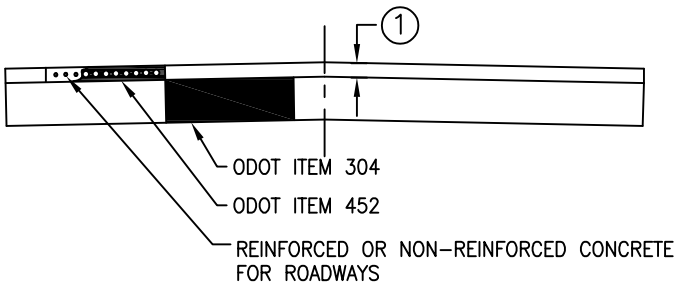

END VIEW

Portage COUNTY WATER RESOURCES

| PORTAGE COUNTY WATER RESOURCES | | |
|---|---|---|
| BORED CROSSING WITH CASING | 04-01-2023<br>APPROVED DATE | WM-3 |

## CONCRETE SECTION

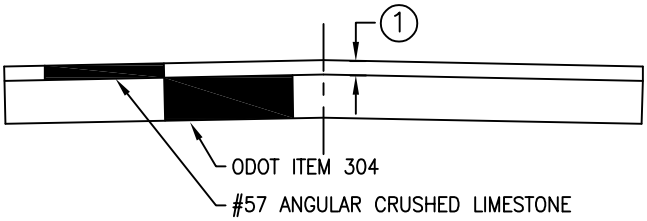
ROADWAYS, COMMERCIAL, AND RESIDENTIAL DRIVES




(1) ROADWAY AND COMMERCIAL DRIVES – 8" THICK CONCRETE
RESIDENTIAL DRIVE – 6" THICK CONCRETE

## STONE SECTION

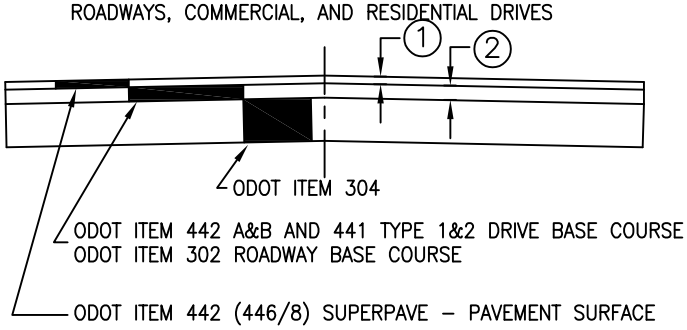
COMMERCIAL AND RESIDENTIAL DRIVES




(1) COMMERCIAL DRIVES – 8" THICK CRUSHED LIMESTONE
RESIDENTIAL DRIVE – 6" THICK CRUSHED LIMESTONE

## ASPHALT SECTION

ROADWAYS, COMMERCIAL, AND RESIDENTIAL DRIVES

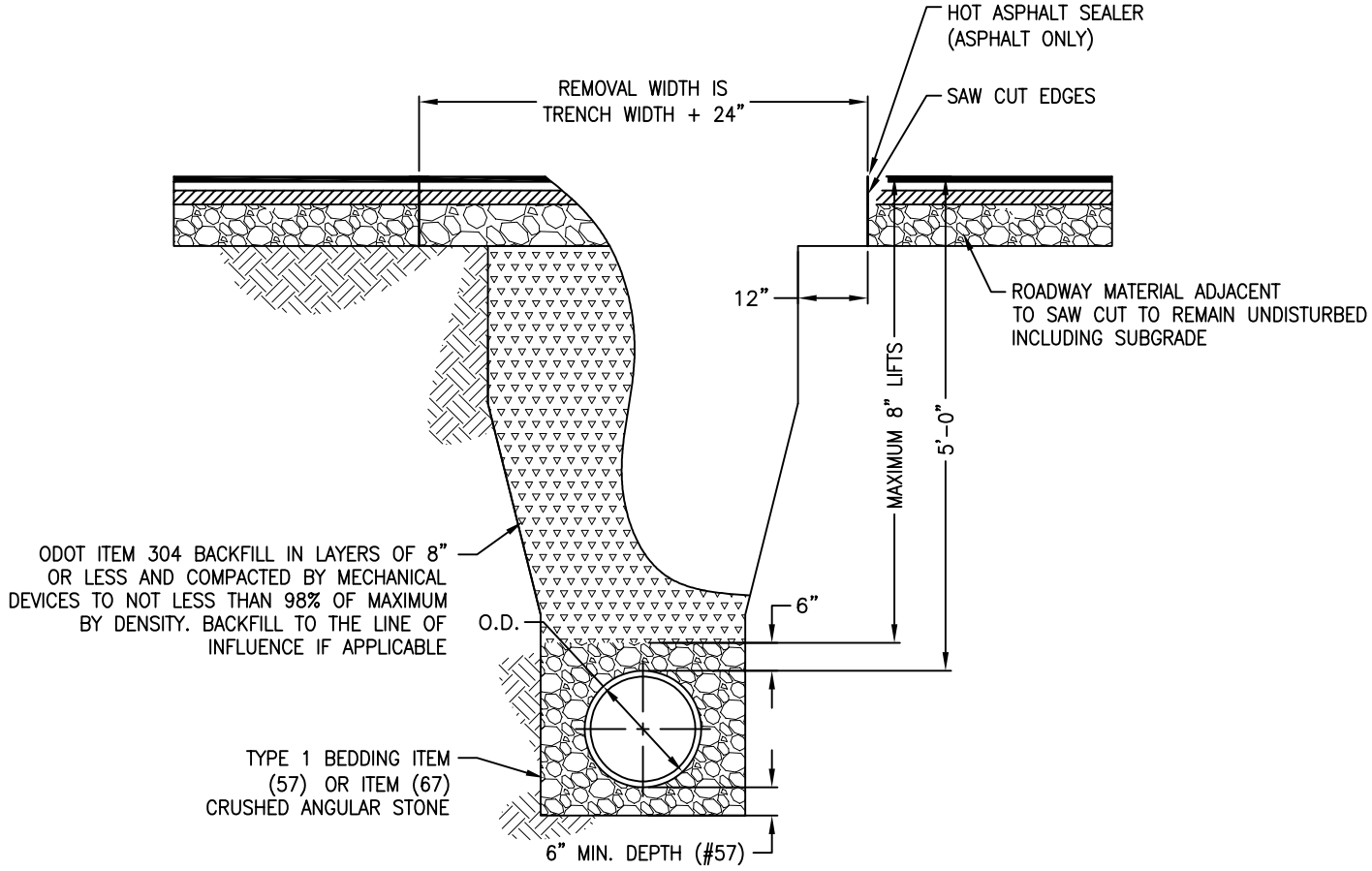



(1) COMMERCIAL & RESIDENTIAL DRIVES – 2–½" THICK SURFACE COURSE
ROADWAY – 1–½" THICK SURFACE COURSE

(2) RESIDENTIAL DRIVE – 3–½" THICK PAVEMENT BASE COURSE, COMMERCIAL DRIVE – 5–½" THICK PAVEMENT BASE COURSE, ROADWAY– 8" THICK PAVEMENT BASE COURSE

Portage COUNTY WATER RESOURCES

| PORTAGE COUNTY WATER RESOURCES | | |
|---|---|---|
| PAVEMENT REPLACMENT SECTIONS | 04–01–2023<br>APPROVED DATE | WM–4 |

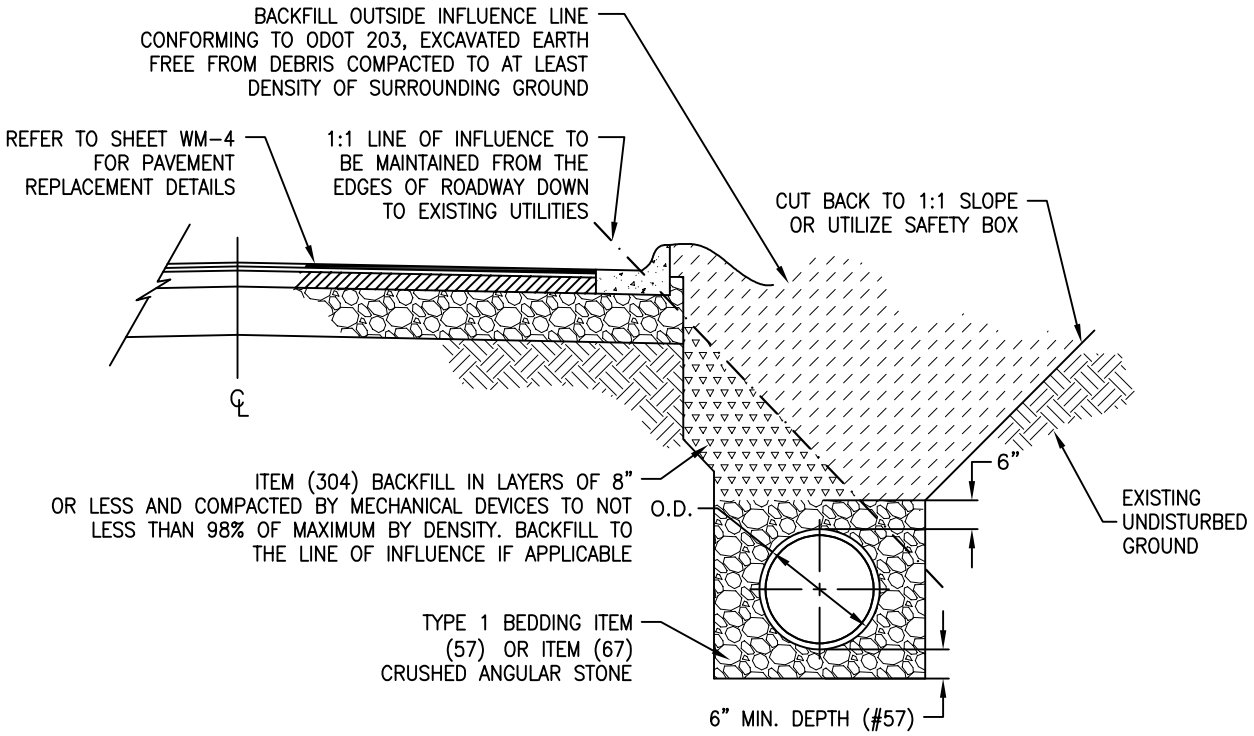



NOTES:

1. NEWLY INSTALLED ROADWAY NEEDS TO MEET EXISTING ROADWAY OR FALL WITHIN TABLE MINIMUM OR CITY REQUIREMENTS. REFER TO SHEET WM-4 FOR ROADWAY DETAILS.

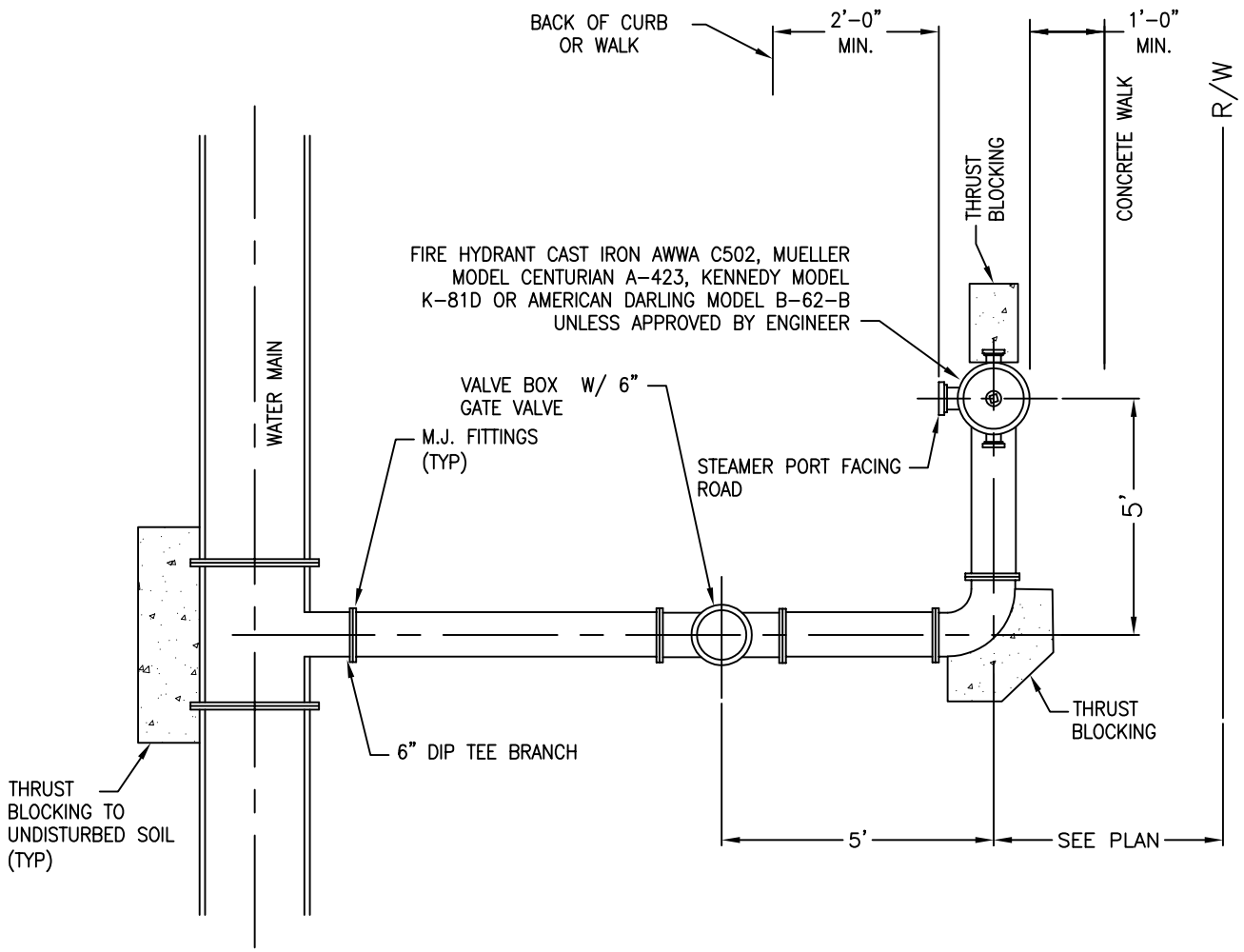
Portage COUNTY WATER RESOURCES

| PORTAGE COUNTY WATER RESOURCES | | |
|---|---|---|
| PAVEMENT TRENCH SECTION | 04-01-2023<br>APPROVED DATE | WM-5 |




Portage COUNTY WATER RESOURCES

| PORTAGE COUNTY WATER RESOURCES | | |
|---|---|---|
| UTILITY ADJACENT TO PAVED SURFACES WITHIN 45° INFLUENCE LINE | 04-01-2023<br>APPROVED DATE | WM-6 |




## PLAN VIEW

HYDRANT NOTES:

1. SHALL BE GIVEN 2 COATS OF RED HYDRANT ENAMEL, OR AS SPECIFIED IN PCWR SPECIFICATIONS.
2. HYDRANTS SHALL BE FURNISHED WITH (2) 2-1/2" HOSE NOZZLES AND (1) INTEGRAL 4-INCH STORZ NOZZLE.

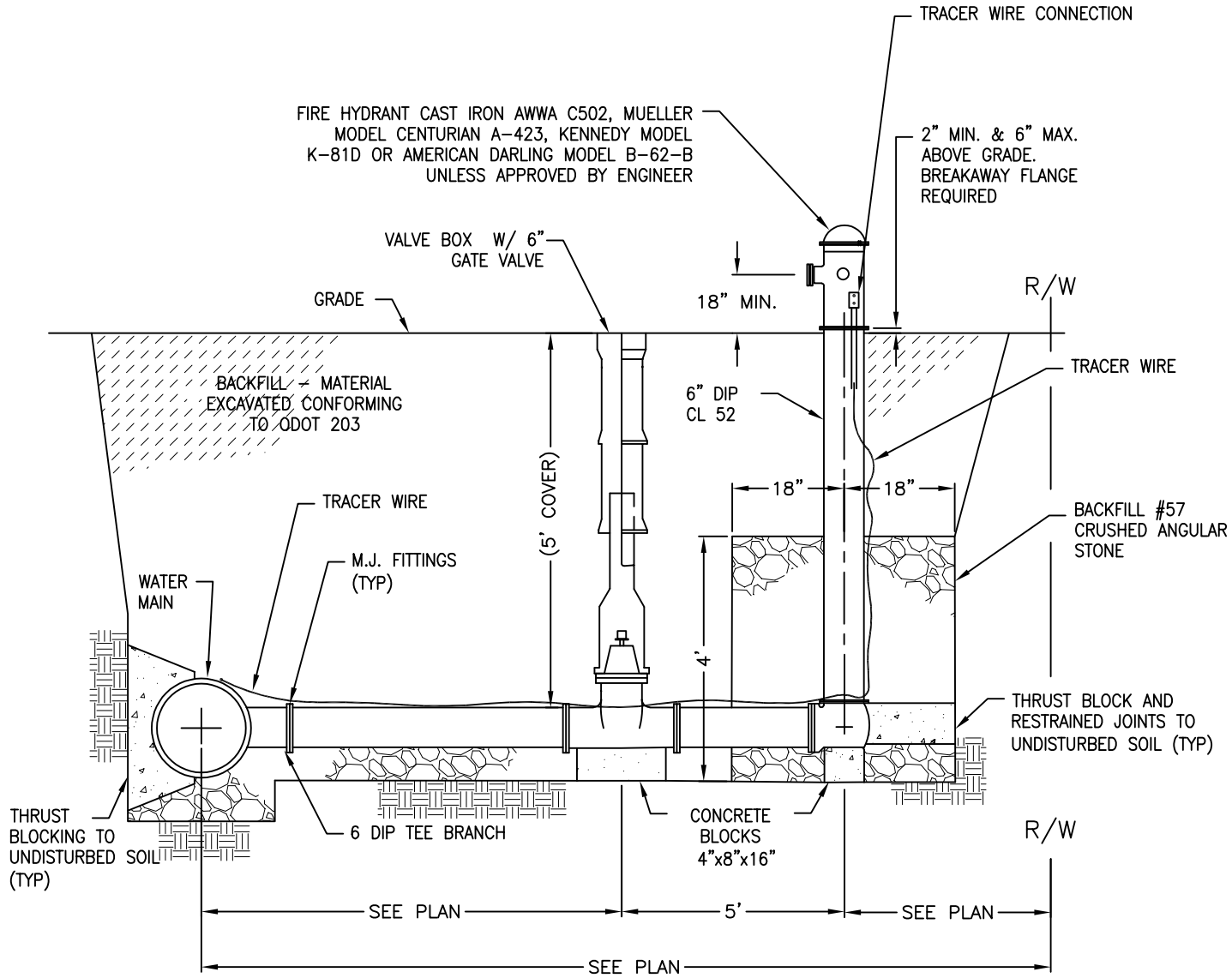
2a. FIRE DEPARTMENTS FOR SHALERSVILLE TWP. AND MANTUA TWP. REQUIRE 5-INCH STORZ NOZZLE.

3. RESTRAINED JOINTS AND BLOCKING REQUIRED TO PREVENT SEPARATION OF JOINTS. METHOD MUST BE APPROVED BY THE ENGINEER.
4. ALL HARDWARE SHALL BE 306 STAINLESS STEEL.
5. ALL VALVES ARE REQUIRED TO OPEN TO THE LEFT IN A COUNTER CLOCKWISE MOTION.
6. HYDRANT SHALL BE MIN. 4' CLEAR OF ANY DRIVE OR VEHICLE PATHWAY.
7. STATIONS, OFFSETS, & ELEVATIONS SHALL BE PROVIDED FOR EACH HYDRANT AND TEE.
8. NO VALVES OR HYDRANTS SHALL BE INSTALLED IN CONCRETE WALKS.
7. ALL CAST IRON WATER MAIN SHALL BE WRAPPED IN POLYETHYLENE.

Portage COUNTY WATER RESOURCES

PORTAGE COUNTY WATER RESOURCES

| TYPICAL FIRE HYDRANT ASSEMBLY – PLAN VIEW | 04-01-2023 APPROVED DATE | WM-7 |
|---|---|---|




HYDRANT NOTES:

1. SHALL BE GIVEN 2 COATS OF RED HYDRANT ENAMEL, OR AS SPECIFIED IN PCWR SPECIFICATIONS.
2. HYDRANTS SHALL BE FURNISHED WITH (2) 2-1/2" HOSE NOZZLES AND (1) INTEGRAL 4-INCH STORZ NOZZLE.

2a. FIRE DEPARTMENTS FOR SHALERSVILLE TWP. AND MANTUA TWP. REQUIRE 5-INCH STORZ NOZZLE.

3. RESTRAINED JOINTS AND BLOCKING REQUIRED TO PREVENT SEPARATION OF JOINTS. METHOD MUST BE APPROVED BY THE ENGINEER.
4. ALL HARDWARE BOLTS SHALL BE 306 STAINLESS STEEL.
5. ALL VALVES ARE REQUIRED TO CLOSE CLOCKWISE.
6. WEEP HOLES SHALL NOT BE WRAPPED IN POLYETHYLENE ENCASEMENT.
7. ALL CAST IRON WATER MAIN SHALL BE WRAPPED IN POLYETHYLENE.

Portage COUNTY WATER RESOURCES

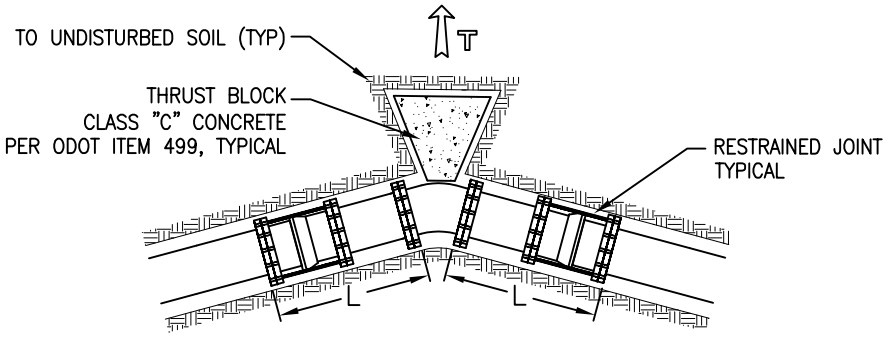
PORTAGE COUNTY WATER RESOURCES

TYPICAL FIRE HYDRANT ASSEMBLY - ELEVATION VIEW

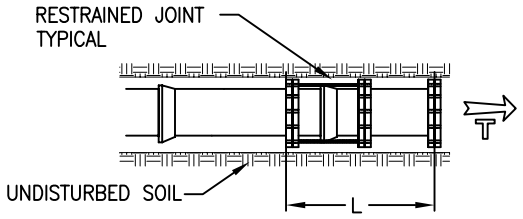
04-01-2023
APPROVED DATE

WM-8

| THRUST BLOCKING BEARING AREA (S.F.) REQUIRED FOR 200 PSI WATER PRESSURE BASED ON 2000 PSF SOIL | | | | | |
|---|---|---|---|---|---|
| NOM. PIPE DIA. | DEAD END | 90° BEND | 45° BEND | 22½° BEND | 11¼° BEND |
| (IN.) | S.F. | S.F. | S.F. | S.F. | S.F. |
| 6" | 3.7 | 5.3 | 2.9 | 1.5 | 0.7 |
| 8" | 6.4 | 9.1 | 4.9 | 2.5 | 1.3 |
| 10" | 9.7 | 13.7 | 7.4 | 3.8 | 1.9 |
| 12" | 13.7 | 19.4 | 10.5 | 5.3 | 2.7 |
| 16" | 23.8 | 33.6 | 18.2 | 9.3 | 4.7 |




## HORIZONTAL BEND RESTRAINT LENGTH




## DEAD END OR VALVE RESTRAINT LENGTH

| HORIZONTAL BEND | | | | | *CROSS | VALVE or DEAD END PLUG |
|---|---|---|---|---|---|---|
| SIZE | 11 ¼° | 22 ½° | 45° | 90° | | |
| 6" | 2' | 3' | 5' | 12' | 6' | 36' |
| 8" | 2' | 4' | 7' | 16' | 17' | 47' |
| 10" | 2' | 4' | 8' | 19' | 26' | 57' |
| 12" | 3' | 5' | 10' | 22' | 36' | 67' |
| 16" | 3' | 6' | 12' | 28' | 55' | 87' |

NOTES:

1. SEE DETAIL WM-1 FOR AGGREGATE BEDDING SPECIFICATIONS
2. ALL DUCTILE IRON WATER MAIN SHALL BE WRAPPED IN POLYETHYLENE.

Portage COUNTY WATER RESOURCES

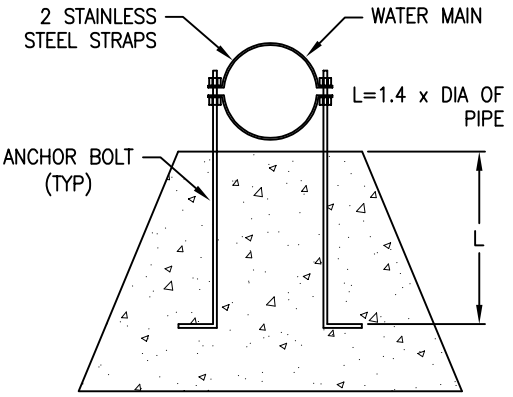
PORTAGE COUNTY WATER RESOURCES

THRUST BLOCKING 1

04-01-2023
APPROVED DATE

WM-9

| RESTRAINED JOINT DIMENSIONS FROM BEND | | |
|---|---|---|
| PIPES SIZE | VERTICAL OFFSET | |
| | UPPER | LOWER |
| 6" | 15' | 5' |
| 8" | 20' | 7' |
| 10" | 24' | 8' |
| 12" | 28' | 10' |
| 16" | 36' | 12' |




SECTION A-A

THRUST BLOCK ANCHOR DETAIL

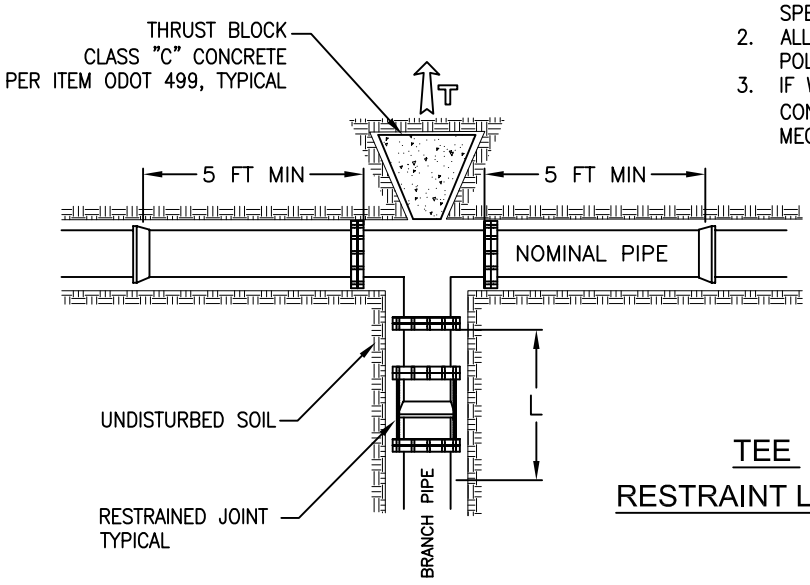



VERTICAL OFFSET RESTRAINT LENGTH

| THRUST BLOCKING BEARING AREA (S.F.) REQUIRED FOR 200 PSI WATER PRESSURE BASED ON 2000 PSF SOIL | | | | | |
|---|---|---|---|---|---|
| NOM. PIPE DIA. | DEAD END | 90° BEND | 45° BEND | 22½° BEND | 11¼° BEND |
| (IN.) | S.F. | S.F. | S.F. | S.F. | S.F. |
| 6" | 3.7 | 5.3 | 2.9 | 1.5 | 0.7 |
| 8" | 6.4 | 9.1 | 4.9 | 2.5 | 1.3 |
| 10" | 9.7 | 13.7 | 7.4 | 3.8 | 1.9 |
| 12" | 13.7 | 19.4 | 10.5 | 5.3 | 2.7 |
| 16" | 23.8 | 33.6 | 18.2 | 9.3 | 4.7 |

NOTES:

1. SEE DETAIL WM-1 FOR AGGREGATE BEDDING SPECIFICATIONS.
2. ALL DUCTILE IRON WATER MAIN SHALL BE WRAPPED IN POLYETHYLENE.
3. IF WATER MAIN IS GOING TO BE CHARGED BEFORE CONCRETE THRUST BLOCKS HAVE CURED (28 DAYS), MECHANICAL RESTRAINING RODS ARE REQUIRED.




TEE RESTRAINT LENGTH

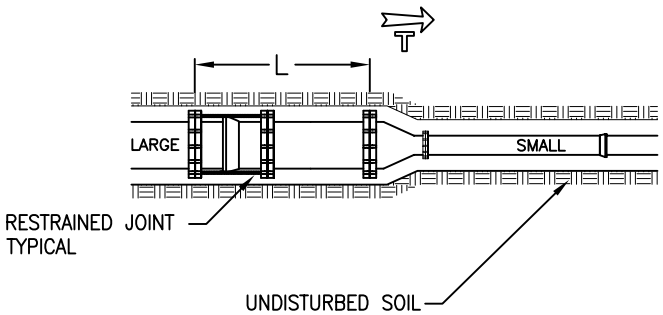
| *TEE/NOMINAL PIPE SIZE | | | | | | |
|---|---|---|---|---|---|---|
| BRANCH PIPE SIZE | | 6" | 8" | 10" | 12" | 16" |
| | 6" | 6' | 1' | 1' | 1' | 1' |
| | 8" | 24' | 17' | 9' | 1' | 1' |
| | 10" | | | 26' | 20' | 6' |
| | 12" | | | | 36' | 25' |
| | 16" | | | | | 55' |

Portage COUNTY WATER RESOURCES

PORTAGE COUNTY WATER RESOURCES

| THRUST BLOCKING 2 | 04-01-2023 APPROVED DATE | WM-10 |
|---|---|---|

| STRAIGHT REDUCER PVC PIPE (LARGE SIDE) | | | | | |
|---|---|---|---|---|---|
| SML. SIZE | 6" | 8" | 10" | 12" | 16" |
| 6" | | 20' | 35' | 49' | 73' |
| 8" | | | 19' | 36' | 63' |
| 10" | | | | 20' | 52' |
| 12" | | | | | 37' |




## STRAIGHT REDUCER RESTRAINT LENGTH

NOTE:

1. RESTRAINED LENGTH IS BASED ON 5' FT MINIMUM NOMINAL PIPE LENGTH. IF DISTANCES ON NOMINAL PIPE IS LESS THAN 5' FT, CONTRACTOR SHALL USE DEAD END RESTRAINED LENGTH. IF NOMINAL PIPE LENGTH EQUALS 20FT, BRANCH RESTRAINED LENGTH IS A MINIMUM OF ONE FOOT. IF BRANCH PIPE IS LARGER THAN NOMINAL PIPE SIZE, CONTRACTOR SHALL REFER TO STRAIGHT REDUCER RESTRAINT LENGTH. FOR TAPPING SLEEVES CONTRACTOR SHALL USE VALVE AND DEAD END RESTRAINT LENGTHS ON BRANCH PIPE.

2. THE NOTED REQUIREMENTS WERE CALCULATED IN ACCORDANCE WITH THRUST RESTRAINT CALCULATOR V6.1 BY EBAA IRON (http:rcp.ebaa.com/calculator.php) WITH THE FOLLOWING ASSUMPTIONS:
   SOIL CONDITIONS: CL, GRANULAR FILL
   LAYERING CONDITIONS: 5
   MINIMUM COVER: 5' FT SAFETY FACTOR: 1.5
IF FIELD CONDITIONS DIFFER FROM THE ABOVE EXAMPLE, CONTRACTOR SHALL NOTIFY PCWR. FOR PIPE LARGER THAN INCLUDED IN THE ABOVE TABLES, ENGINEER OF RECORD SHALL SUBMIT CALCULATIONS FOR EACH JOINT REQUIRING RESTRAINT.

3. RESTRAINED JOINTS AND THRUST BLOCKING IS REQUIRED AT ALL BENDS, DEADENDS, VALVES, PIPE REDUCERS, TEES, CROSSES AND OFF SETS.

MATERIAL SPECIFICATIONS

ALL PIPING SPECIFICATIONS SHALL COMPLY WITH THE FOLLOWING

| PIPE | MATERIAL | JOINT | BEDDING |
|---|---|---|---|
| WATER MAIN: | | | |
| PVC | AWWA C-900, DR18 CL 150 | AWWA C-900 | AWWA C605 |
| DIP | ANSI/AWWA C151/A21.51, CL 52 | ANSI/AWWA C111/A21.11 | AWWA C600 |
| TRACE WIRE FOR NONMETALLIC PIPE REQUIRED | | | |

Portage COUNTY WATER RESOURCES

| PORTAGE COUNTY WATER RESOURCES | | |
|---|---|---|
| RESTRAINED JOINT | 04-01-2023<br>APPROVED DATE | WM-11 |