



VILLAGE OF MUNDELEIN

CONSTRUCTION STANDARD DETAILS AND NOTES
6/22/16 UPDATE



Construction Standard Details and Notes

Roadway/Sidewalk/Miscellaneous

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R-2	Multi-Family Residential Driveway Approach
R-3	Single Family Residential Driveway Approach
R-4	Sidewalk Detail
R-5	Residential Cul-De-Sac Design
R-6	Manhole Ramping Detail
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Storm Sewer

ST-1	Curb Inlet
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ST-7	Sump Pump Connection to Storm Sewer
ST-8	Typical Storm Sewer Trench Detail

Water Main

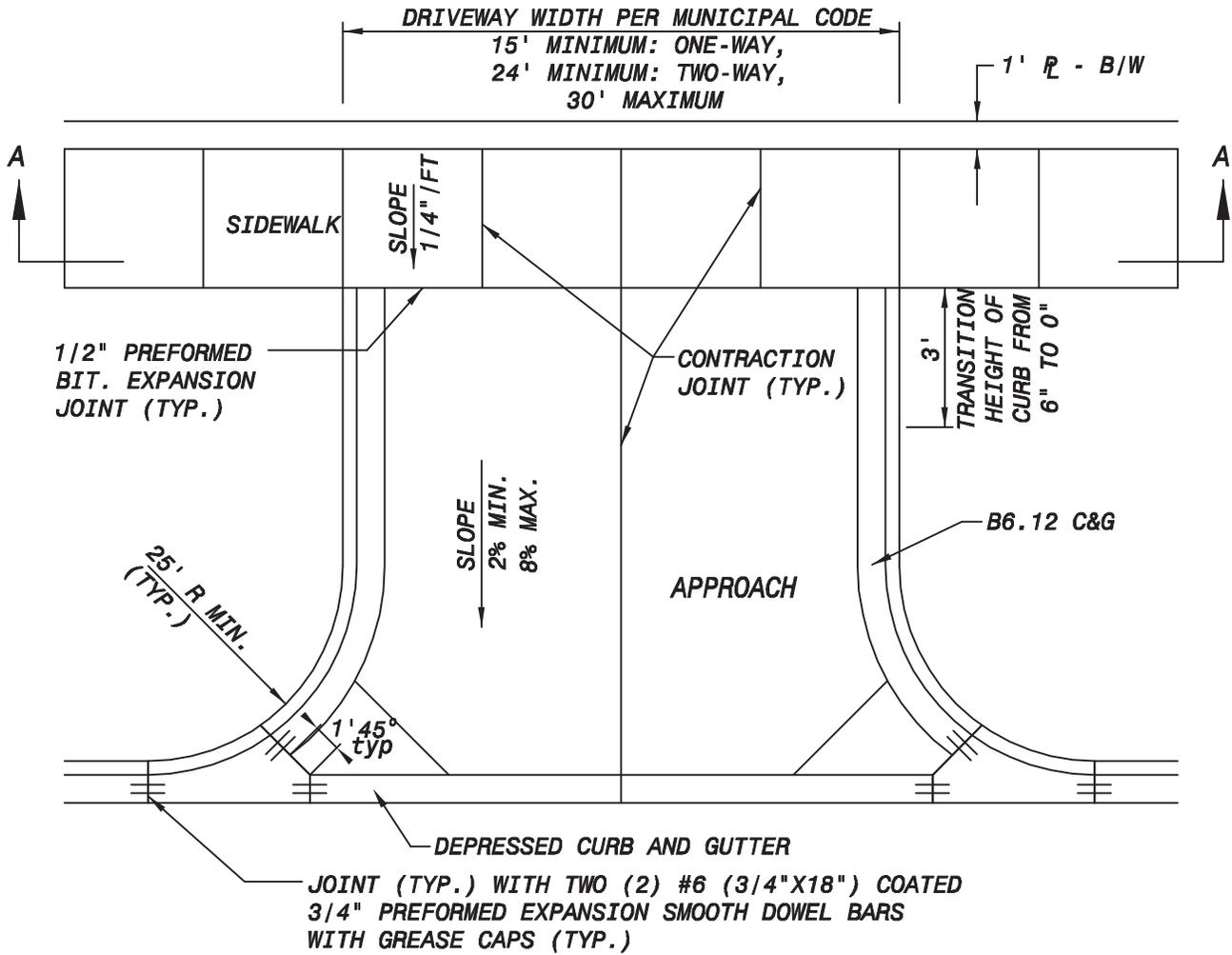
W-0	Miscellaneous Water Main Notes
W-1	Fire Hydrant Detail
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W-4	Typical Water Main Trench Cross-Section
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W-8	Tracer Wire Access Box
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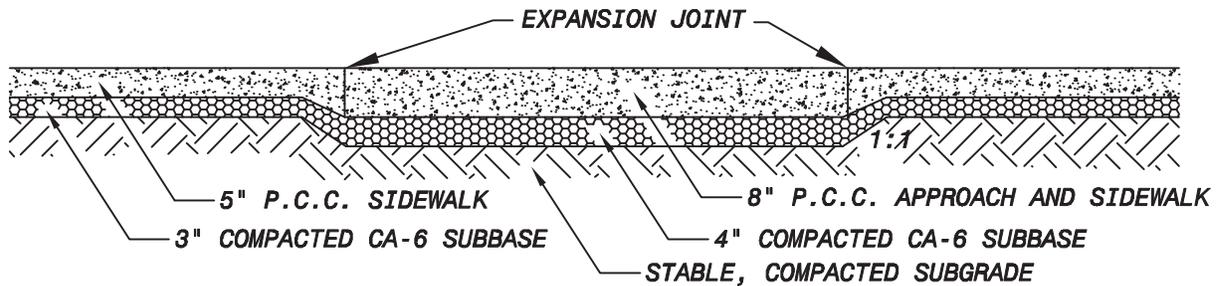
Miscellaneous Roadway Standards/Notes

1. All connecting roadway gradients with an algebraic difference of greater than 1.2 percent shall be connected with a vertical curve. All standards contained in AASHTO's "A Policy on Geometric Design of Highways and Streets," latest edition, regarding vertical curves shall be followed. A design speed of 45 mph shall be used on collector commercial/industrial roads and a design speed of 35 mph shall be used on local streets.
2. Street jogs with centerline offsets of less than 150-feet are not allowed on local roads. Offsets on collector roads are not allowed, and spacing between two (2) cross streets on collector roads shall be no closer than 500-feet.
3. Gradients of all streets shall be at least 0.6 percent
 - a. Collector and industrial streets shall not exceed five (5) percent;
 - b. Local streets shall not exceed eight (8) percent.
4. Any pavement patches located within intersections will require the entire intersection, to radius returns on all the legs, to be milled and resurfaced with two (2)-inch bituminous concrete surface course.
5. Roadway cross-sections showing existing and proposed sections shall be provided at a scale of one (1)-inch = two (2)-feet V, one (1)-inch = ten (10)-feet H for any existing roadway reconstruction and at a scale of one (1)-inch = five (5)-feet V, one (1)-inch = ten (10)-feet H for new roadways.
6. One (1) copy of the Final Engineering Plans must be submitted to the Village in Adobe® format.
7. All Plats of Subdivision shall be submitted to the Village on a 24-inch x 36-inch Mylar for recording purposes. It shall also be submitted to the Village in Adobe® format on a CD. All coordinates shall be based upon State Plane Coordinates and shall tie to existing monuments as established by the Village of Mundelein. The following specific electronic layers are required: the boundary, roadway centerline, property lines, and roadway right-of-way must each be on a separate layer.
8. A minimum of two (2) permanent concrete bench mark monuments (see Standard Detail R-17) shall be established in all new residential, commercial, and industrial subdivisions. Number of monuments and monument placement shall be approved by the Village Engineer.
9. A qualified soils engineer must certify the acceptability of the subgrade of all subdivision streets prior to placing any base course material. This must be based upon the latest addition of the Village of Mundelein's Specifications "Field Quality Control Procedures for Pavement Area Subgrade" (I-1.)



PLAN

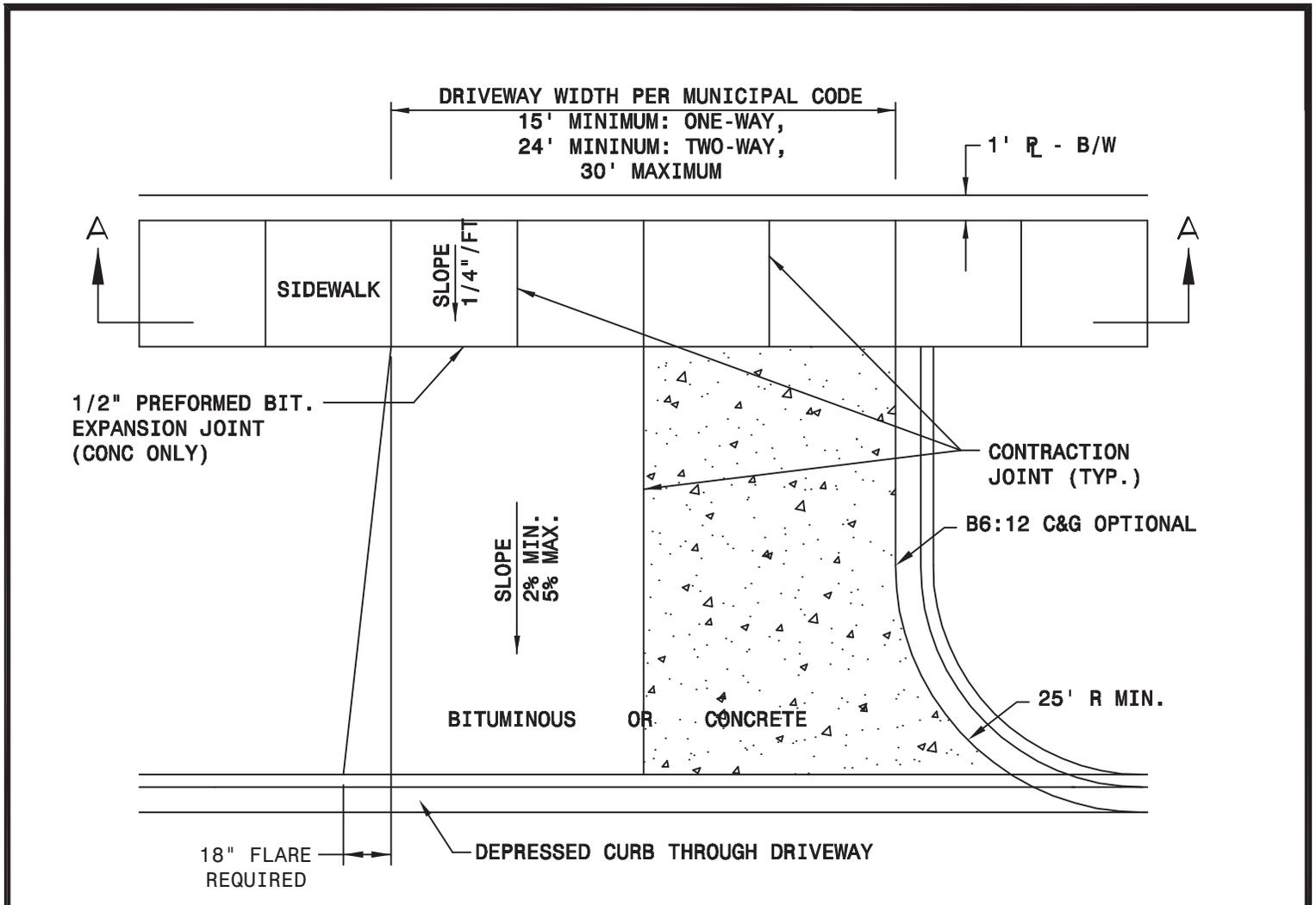
NOTE:
ALL AGGREGATE SUBGRADE SHALL BE MECHANICALLY COMPACTED. SAW CUTTING OF TOP OF CURB PROHIBITED



SECTION A-A

REVISIONS			
REV.	BY	DATE	REVISION
1.	MDJ	04-04-05	APPROVED
2.			
3.			

REVISIONS			
REV.	BY	DATE	REVISION
4.			
5.			
6.			



1/2" PREFORMED BIT. EXPANSION JOINT (CONC ONLY)

CONTRACTION JOINT (TYP.)

B6:12 C&G OPTIONAL

SLOPE 2% MIN. 5% MAX.

BITUMINOUS OR CONCRETE

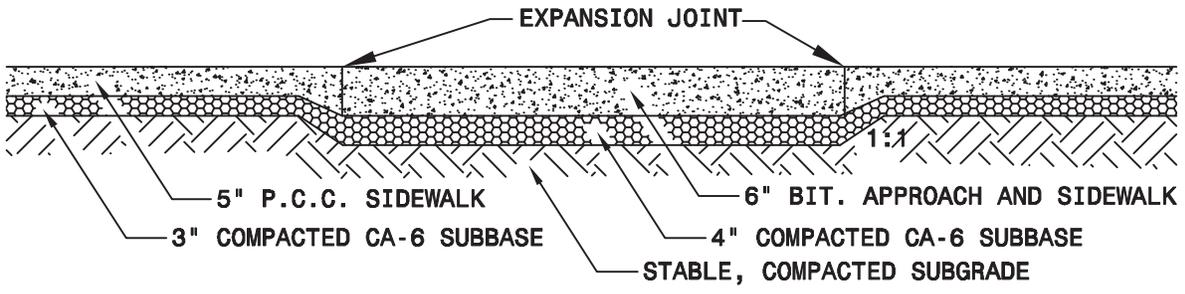
25' R MIN.

18" FLARE REQUIRED

DEPRESSED CURB THROUGH DRIVEWAY

NOTE:
ALL AGGREGATE SUBGRADE SHALL BE MECHANICALLY COMPACTED. SAW CUTTING OF TOP OF CURB PROHIBITED.

PLAN



SECTION A-A



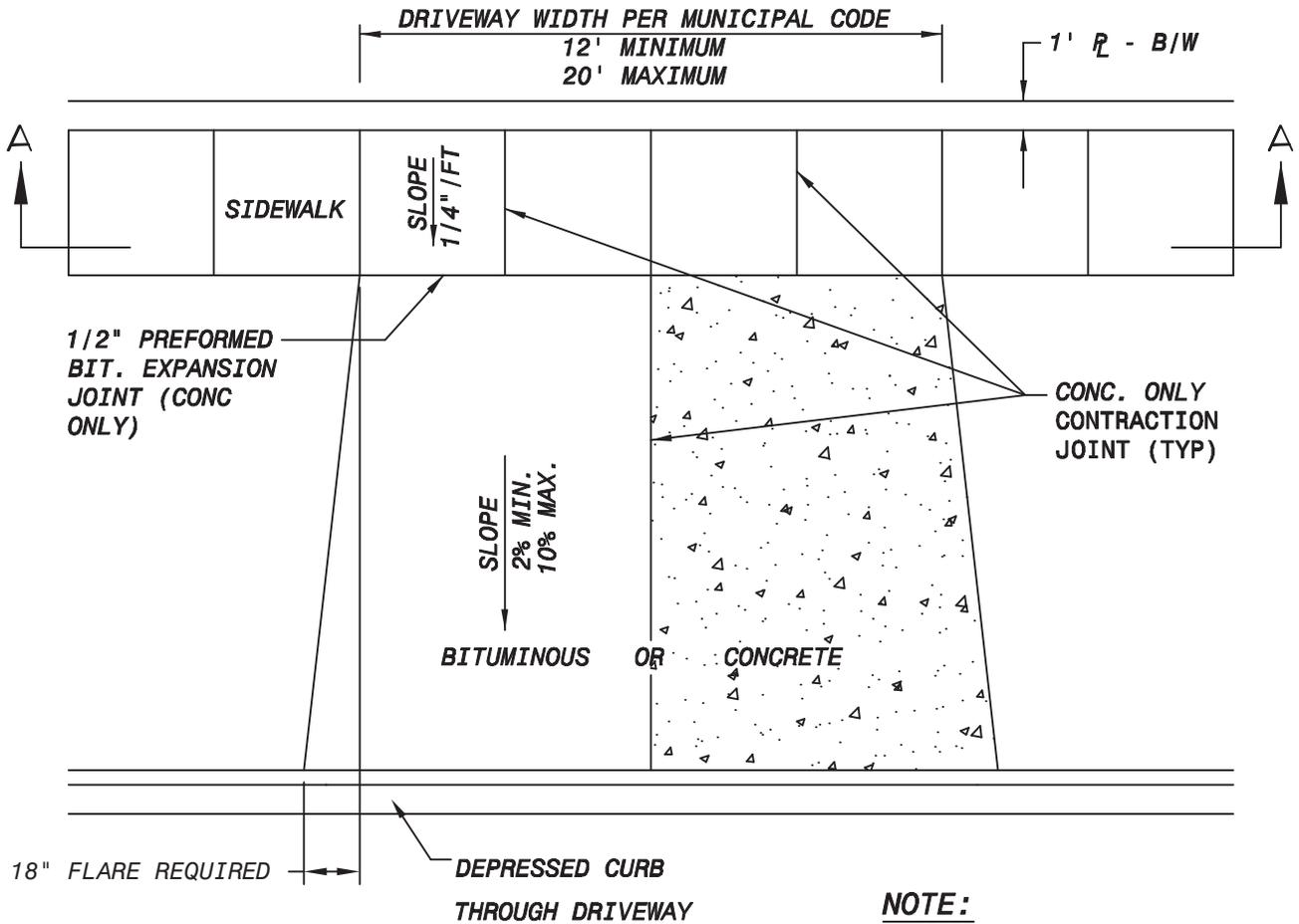
VILLAGE OF MUNDELEIN
ENGINEERING DETAILS

MULTI-FAMILY RESIDENTIAL
DRIVEWAY APPROACH

REVISIONS			
REV.	BY	DATE	REVISION
1.	MDJ	04-04-05	APPROVED
2.			
3.			

REVISIONS			
REV.	BY	DATE	REVISION
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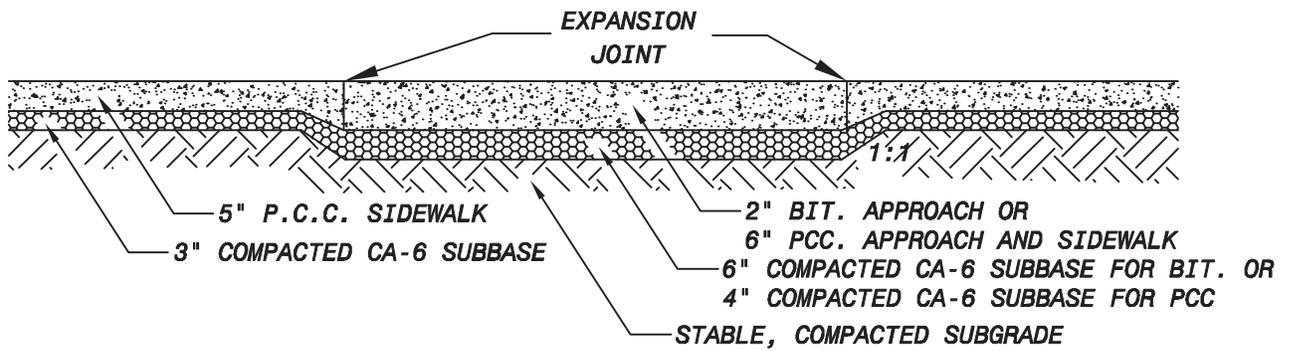
DETAIL NO.
R-2



PLAN

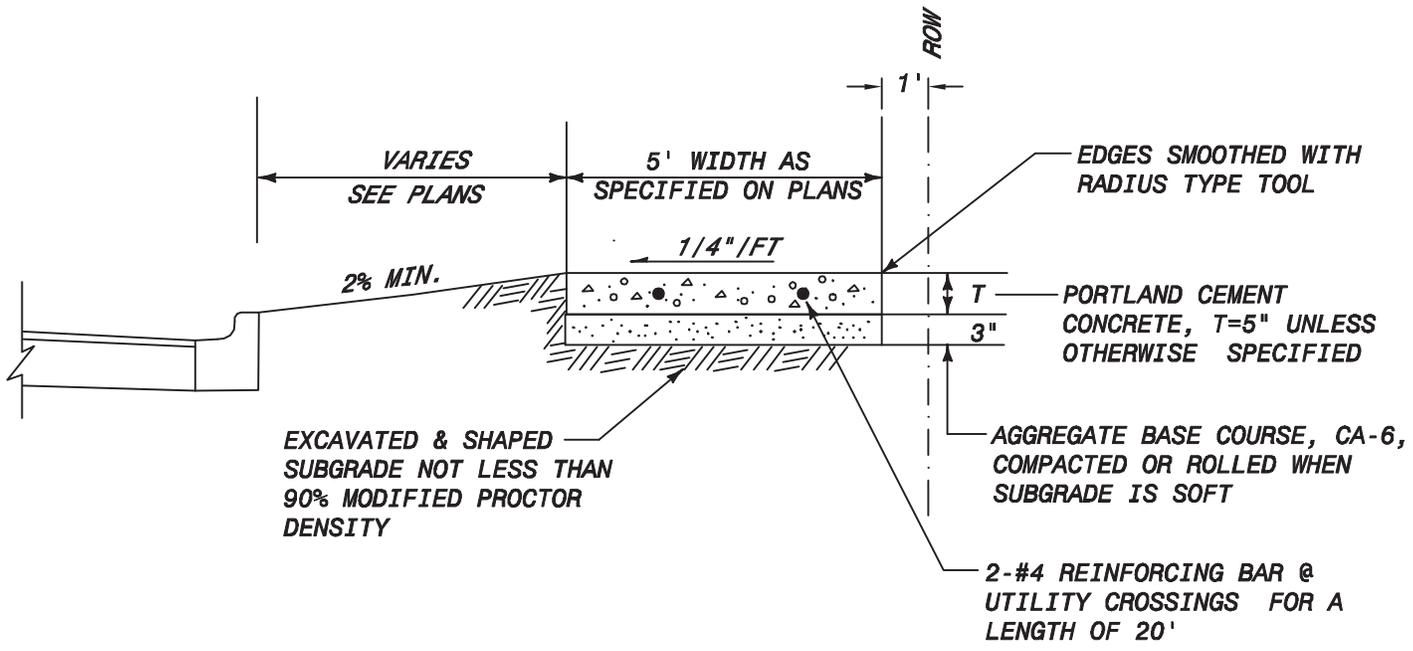
NOTE:

- ALL AGGREGATE SUBGRADE SHALL BE MECHANICALLY COMPACTED.
- SAW CUTTING OF TOP OF CURB PROHIBITED.



SECTION A-A

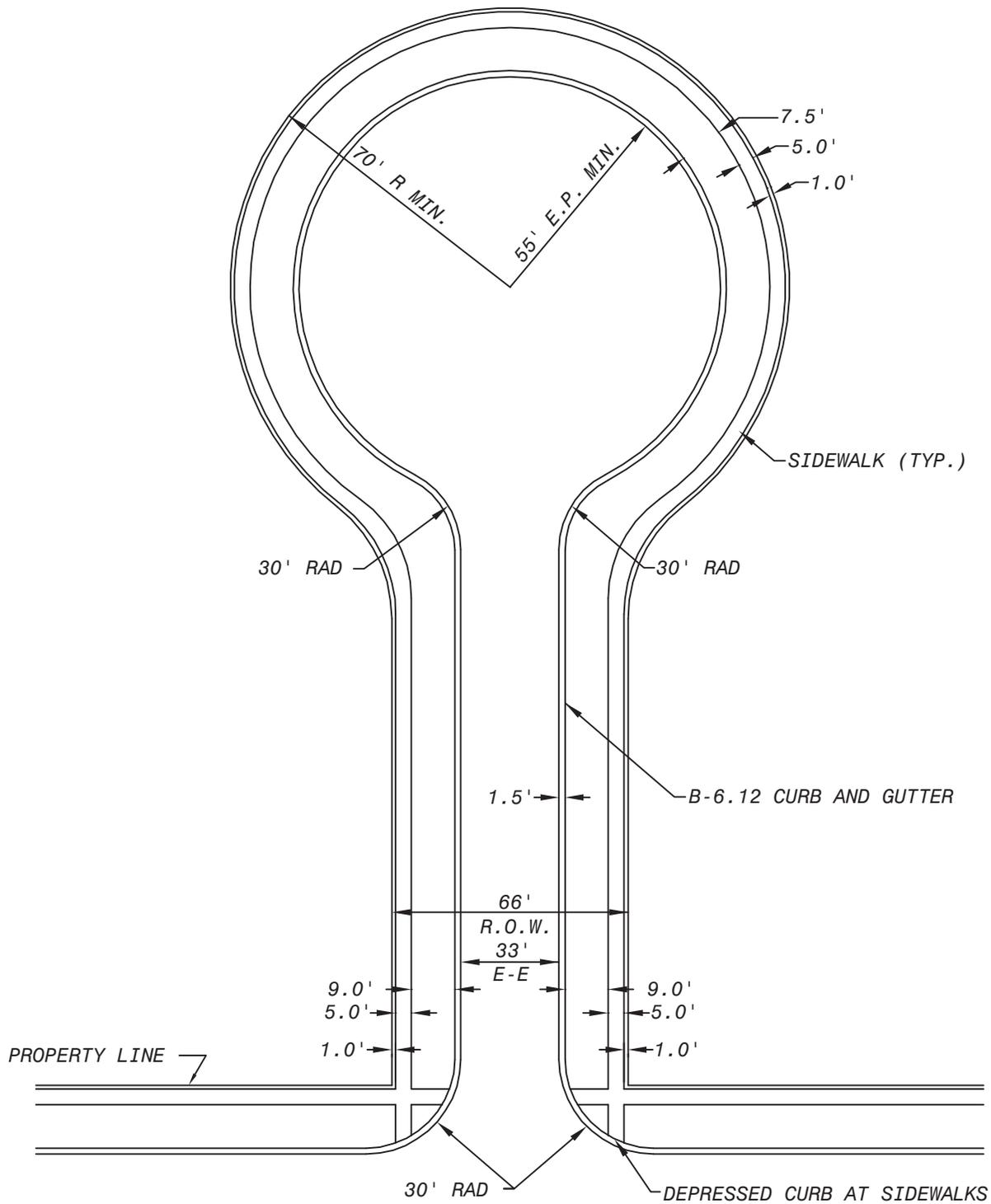
REVISIONS				REVISIONS			
REV.	BY	DATE	REVISION	REV.	BY	DATE	REVISION
1.	MDJ	04-04-05	APPROVED	4.			
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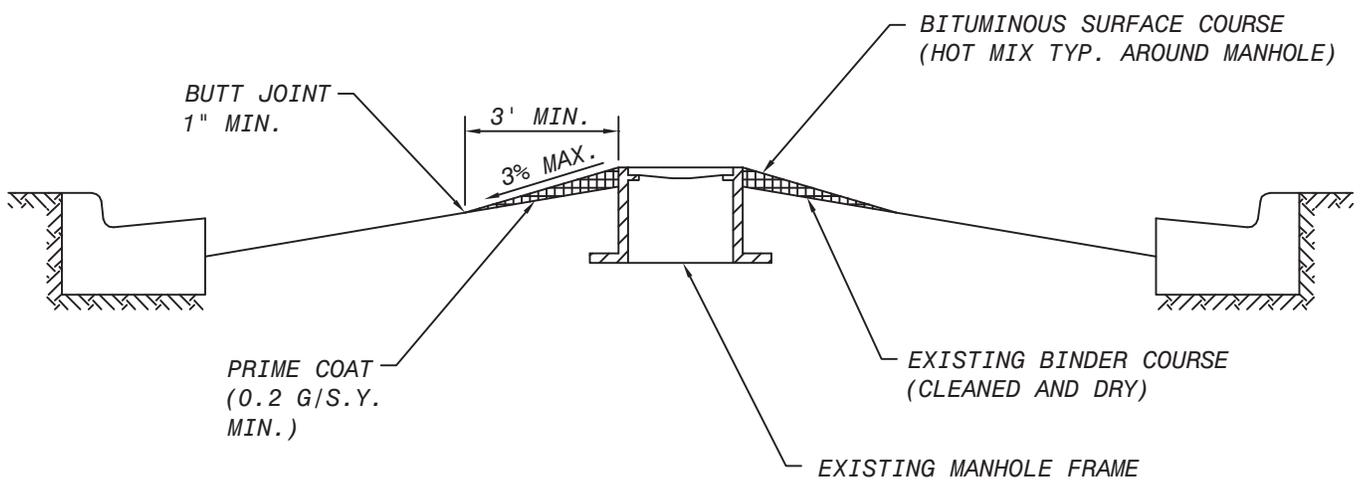
NOTES:

1. LIGHT BROOMED SURFACE FINISH
2. SIDEWALK WIDTH TO BE 5' CONCRETE (UNLESS OTHERWISE APPROVED TO MATCH EXISTING)
3. EXPANSION JOINTS EVERY 50' WITH PREFORMED BITUMINOUS JOINT FILLER
4. TOOLED CONTRACTION JOINT, ONE FOURTH THE DEPTH OF THE SIDEWALK EVERY 5 FEET

REVISIONS				REVISIONS			
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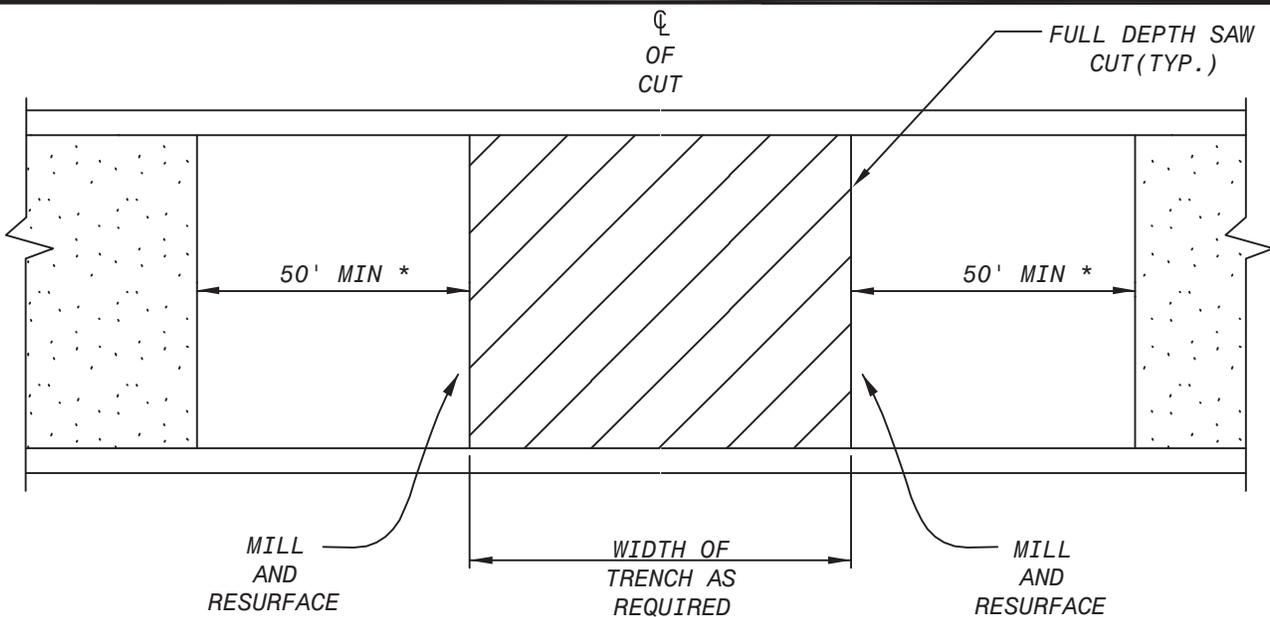
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NOTES:

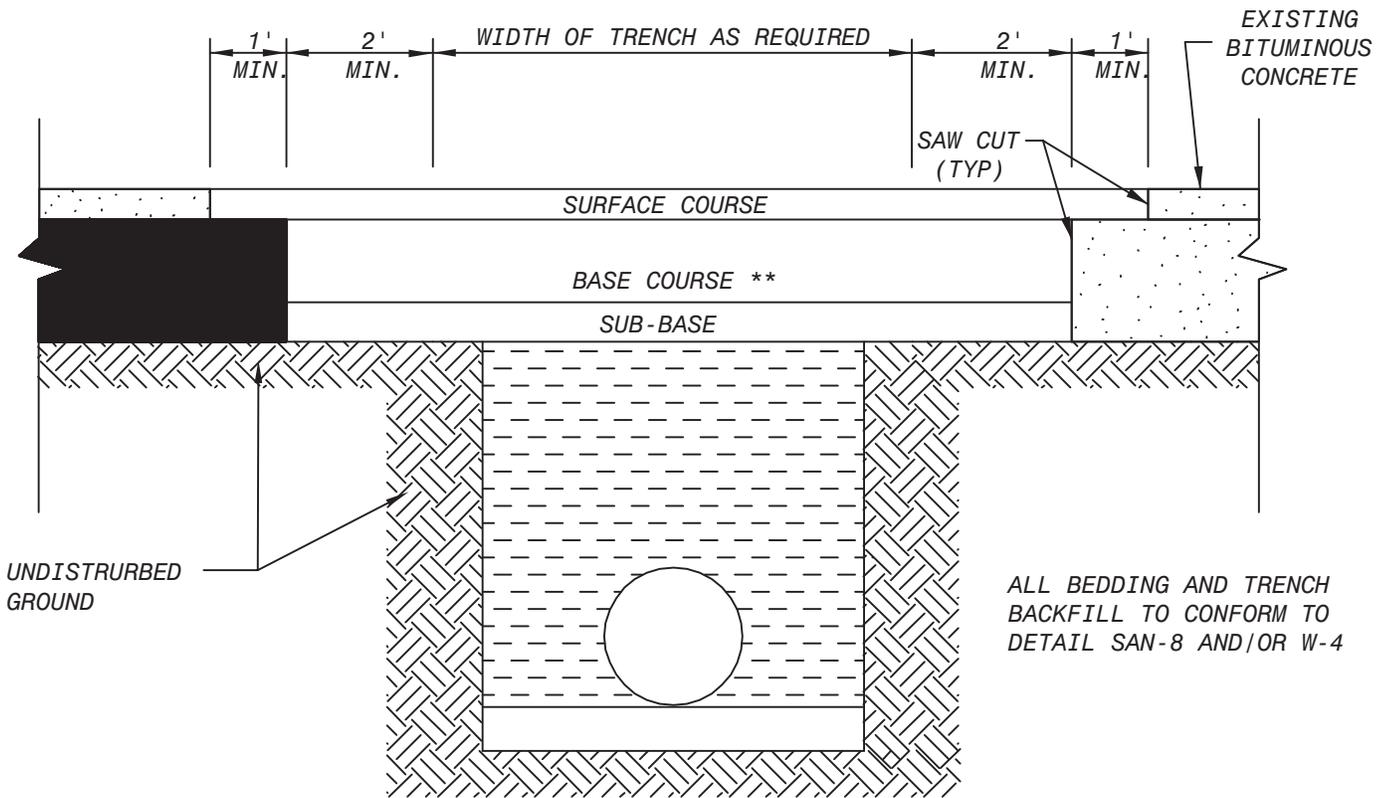
1. RAMP TO BE MAINTAINED THROUGHOUT THE WINTER AND UNTIL FINAL SURFACE IS IN PLACE.
2. RAMP MATERIAL TO BE REMOVED BY MILLING OR OTHERWISE REMOVED BEFORE PLACEMENT OF FINAL SURFACE COURSE.

REVISIONS				REVISIONS			
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*OR AS DIRECTED BY VILLAGE ENGINEER

PLAN VIEW



CROSS SECTION VIEW

** BASE COURSE THICKNESSES SHALL BE IN ACCORDANCE WITH DETAIL R-9

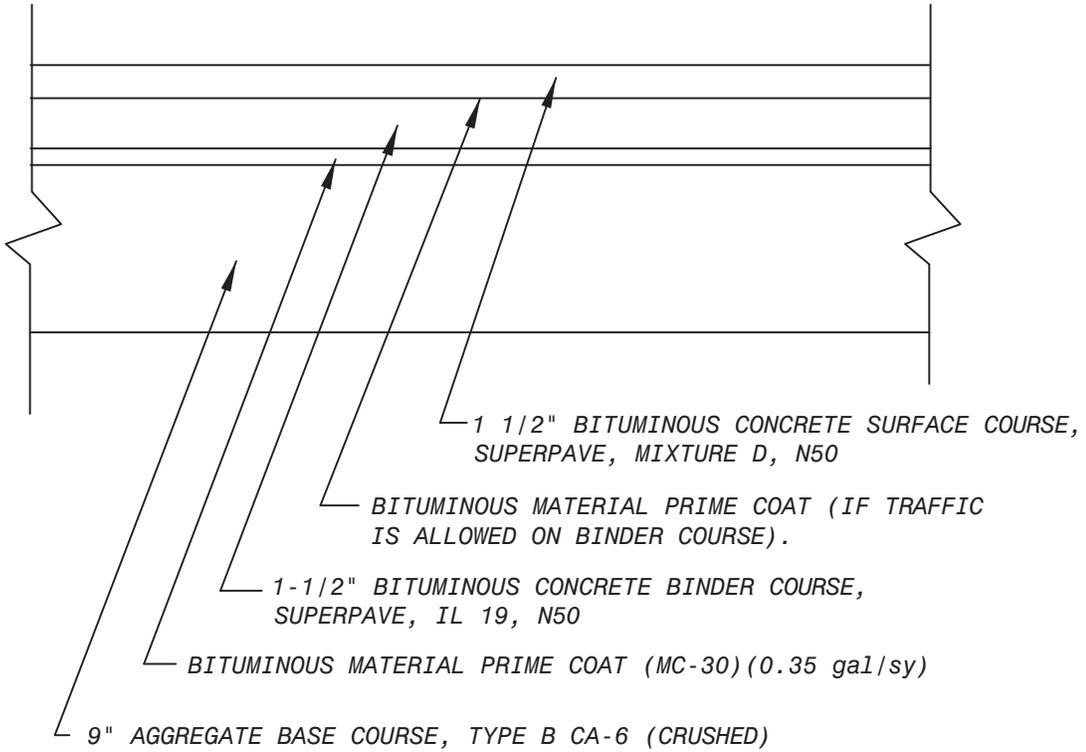


VILLAGE OF MUNDELEIN
ENGINEERING DETAILS

OPEN CUT ROADWAY
PATCHING / PAVEMENT
REMOVAL AND REPLACEMENT
(NEW UTILITY
CONNECTIONS)

REVISIONS				REVISIONS			
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1.	MDJ	04-04-05	APPROVED	4.			
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DETAIL NO.
R-7

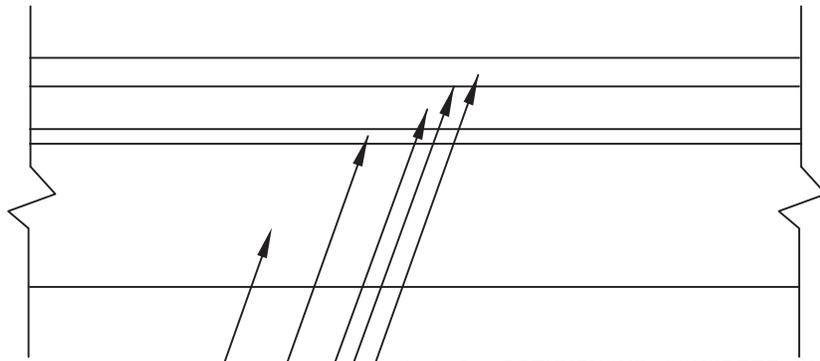


VILLAGE OF MUNDELEIN
ENGINEERING DETAILS

PARKING LOT TYPICAL
PAVEMENT SECTION

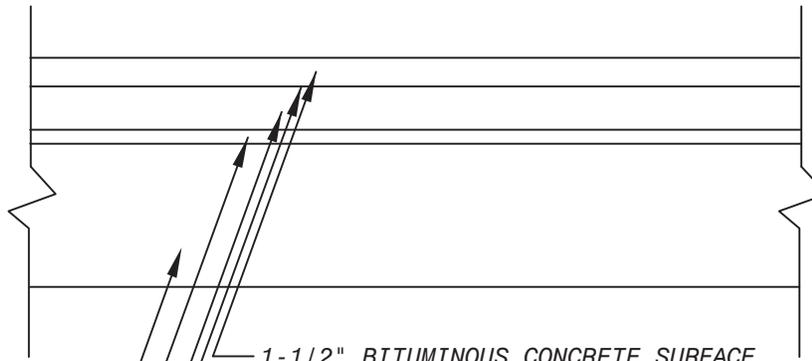
REVISIONS				REVISIONS			
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1.	MDJ	04-04-05	APPROVED	4.			
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DETAIL NO.
R-8



- 1 1/2" BITUMINOUS CONCRETE SURFACE COURSE, SUPERPAVE, MIXTURE D, N50
- BITUMINOUS MATERIAL PRIME COAT (IF TRAFFIC IS ALLOWED ON BINDER COURSE).
- 2" BITUMINOUS CONCRETE BINDER COURSE, SUPERPAVE, IL 19, N50
- BITUMINOUS MATERIAL PRIME COAT (MC-30)(0.35 gal/sy)
- 9 1/2" AGGREGATE BASE COURSE, TYPE B CA-6 (CRUSHED)., [6" B.A.M. WITH 4" GRANULAR MATERIAL SUBBASE MAY BE USED IN LIEU OF 9 1/2" OF AGGREGATE]

LOCAL STREET
PAVEMENT SECTION



- 1-1/2" BITUMINOUS CONCRETE SURFACE SUPERPAVE, MIXTURE D, N50
- BITUMINOUS MATERIAL PRIME COAT (IF TRAFFIC IS ALLOWED ON BINDER COURSE).
- 2" BITUMINOUS CONCRETE BINDER COURSE SUPERPAVE, IL 19, N50
- BITUMINOUS MATERIAL PRIME COAT (MC-30)(0.35 gal/sy)
- 13" AGGREGATE BASE COURSE, TYPE B CA-6 (CRUSHED)., [7" B.A.M. WITH 4" GRANULAR MATERIAL SUBBASE MAY BE USED IN LIEU OF 13" OF AGGREGATE]

COLLECTOR / INDUSTRIAL
PAVEMENT SECTION



VILLAGE OF MUNDELEIN
ENGINEERING DETAILS

LOCAL & COLLECTOR /
INDUSTRIAL STREETS
TYPICAL PAVEMENT
SECTION

REVISIONS				REVISIONS			
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1.	MDJ	04-04-05	APPROVED	4.			
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DETAIL NO.
R-9

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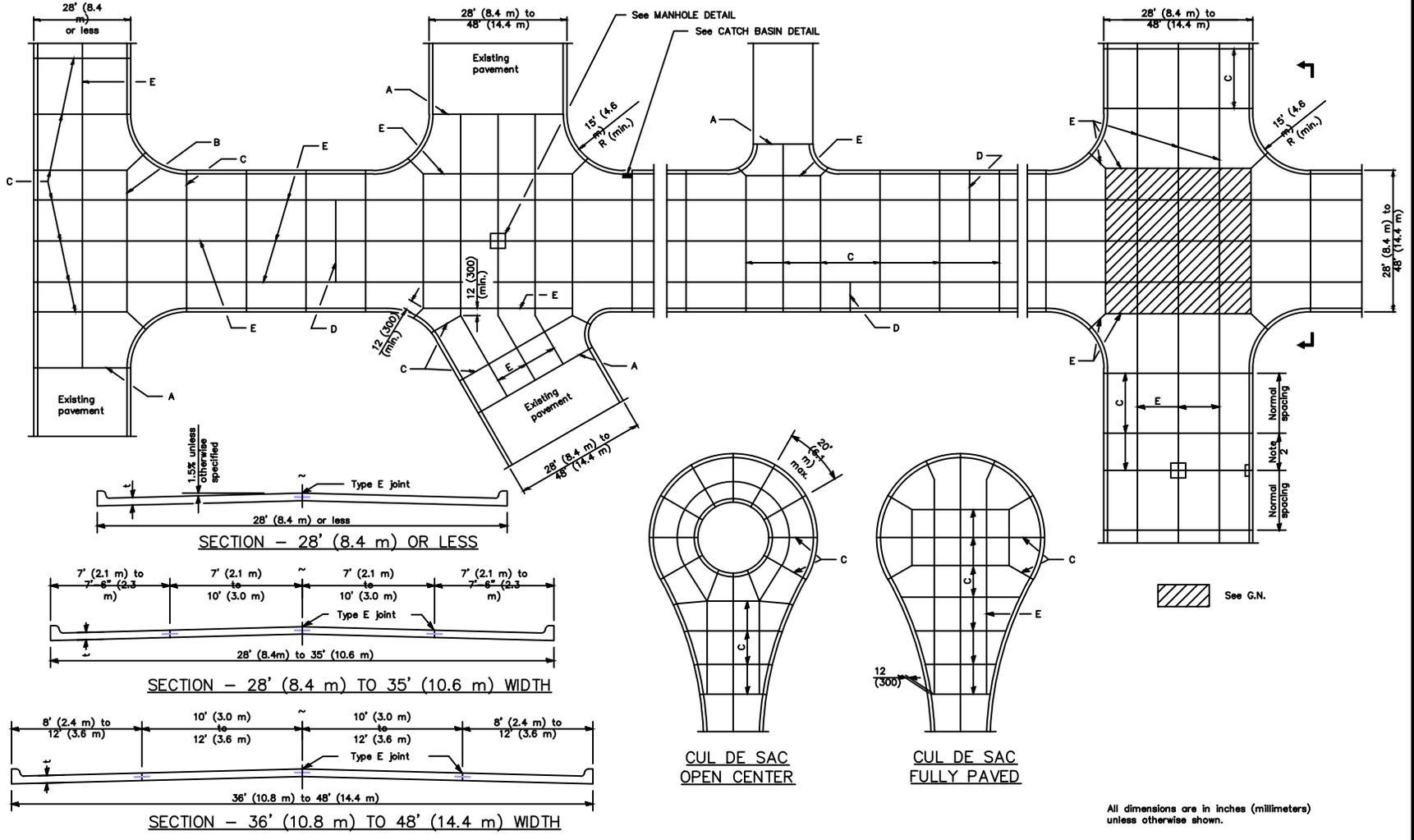


VILLAGE OF MUNDELEIN
ENGINEERING DETAILS

REV.	BY	DATE	REVISIONS
4.			
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6.			

LOCAL STREET
TYPICAL CONCRETE
PAVEMENT SECTION
(1 OF 2)

DETAIL NO. R-9C

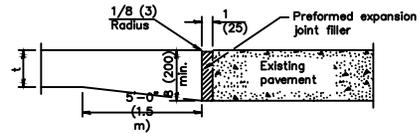


t = See typical cross section on plans for thickness

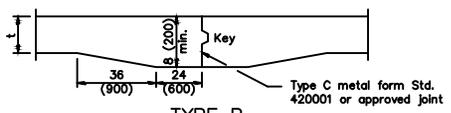
All dimensions are in inches (millimeters) unless otherwise shown.

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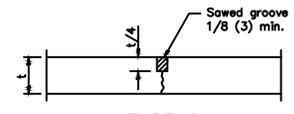
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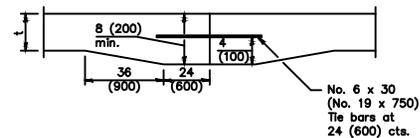
TYPE A
EXPANSION JOINT



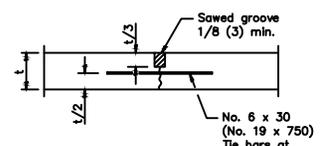
TYPE B
KEYED JOINT



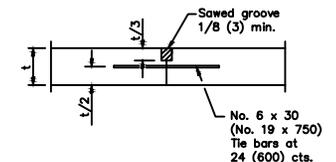
TYPE C
SAWED TRANSVERSE JOINT



TYPE D
TIED TRANSVERSE CONSTRUCTION JOINT



TYPE E
SAWED LONGITUDINAL JOINT



TYPE E
LONGITUDINAL CONSTRUCTION JOINT

GENERAL NOTES

All catch basins shall be separated from the pavement and curb by boxing out as shown in the detail. Manhole castings within the pavement limits shall be boxed in a like manner except when telescoping type castings are used.

When a joint falls within 5 ft. (1.5 m) of or contacts basins, manholes, or other structures, shorten one or more panels either side of opening to permit joint to fall at the corners of the box out.

When specified, roundouts as shown on Standard 420111 shall be used in lieu of the manhole detail shown herein.

All transverse joints must extend through curbs and be continuous across pavement, except tied transverse construction joints. Expansion joints will be required as shown on the plans.

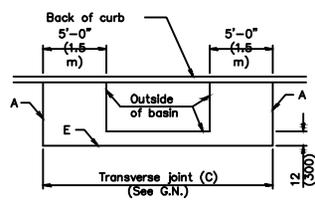
When specified, the pavement structure thickness at intersections shall be increased. This requirement generally will occur when the design traffic through the intersection exceeds the typical design of the pavement structure either side of the intersection.

Joints shall be sawed to a depth of t/4 for transverse joints and t/3 for longitudinal joints. Saw joints shall be sealed with material meeting the requirements of Section 1050 of the Standard Specifications.

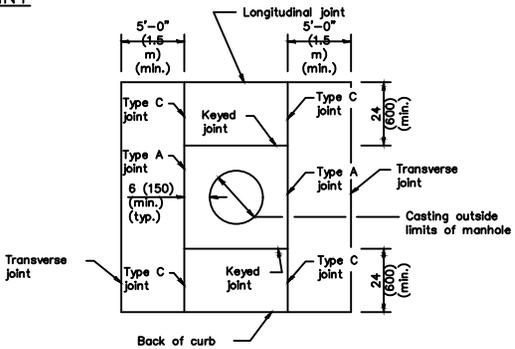
This alternate construction is at the Contractor's option and shall be constructed in accordance with Section 606 of the Standard Specifications. The combination concrete curb and gutter shall be measured in place and the area computed in sq. yards (sq. meters). This work will be paid for at the contract unit price per sq. yards (sq. meters) for portland cement concrete pavement special with integral curb of the thickness specified and shall include all materials and labor.

Transverse joint spacing shall not exceed 15 ft. (4.6 m).

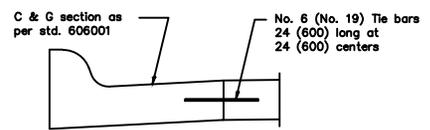
Construct TYPE D tied transverse construction joint when construction joint does not fall at a TYPE C sawed transverse joint.



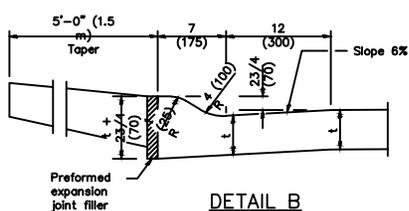
CATCH BASIN DETAIL



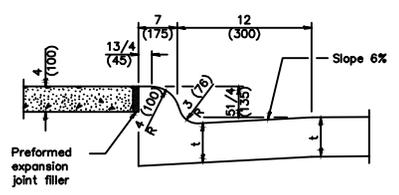
MANHOLE DETAIL
Showing Joint types



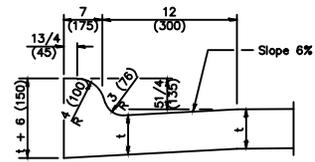
COMB. CURB & GUTTER DETAIL
Alt. const. see G.N.



DETAIL B



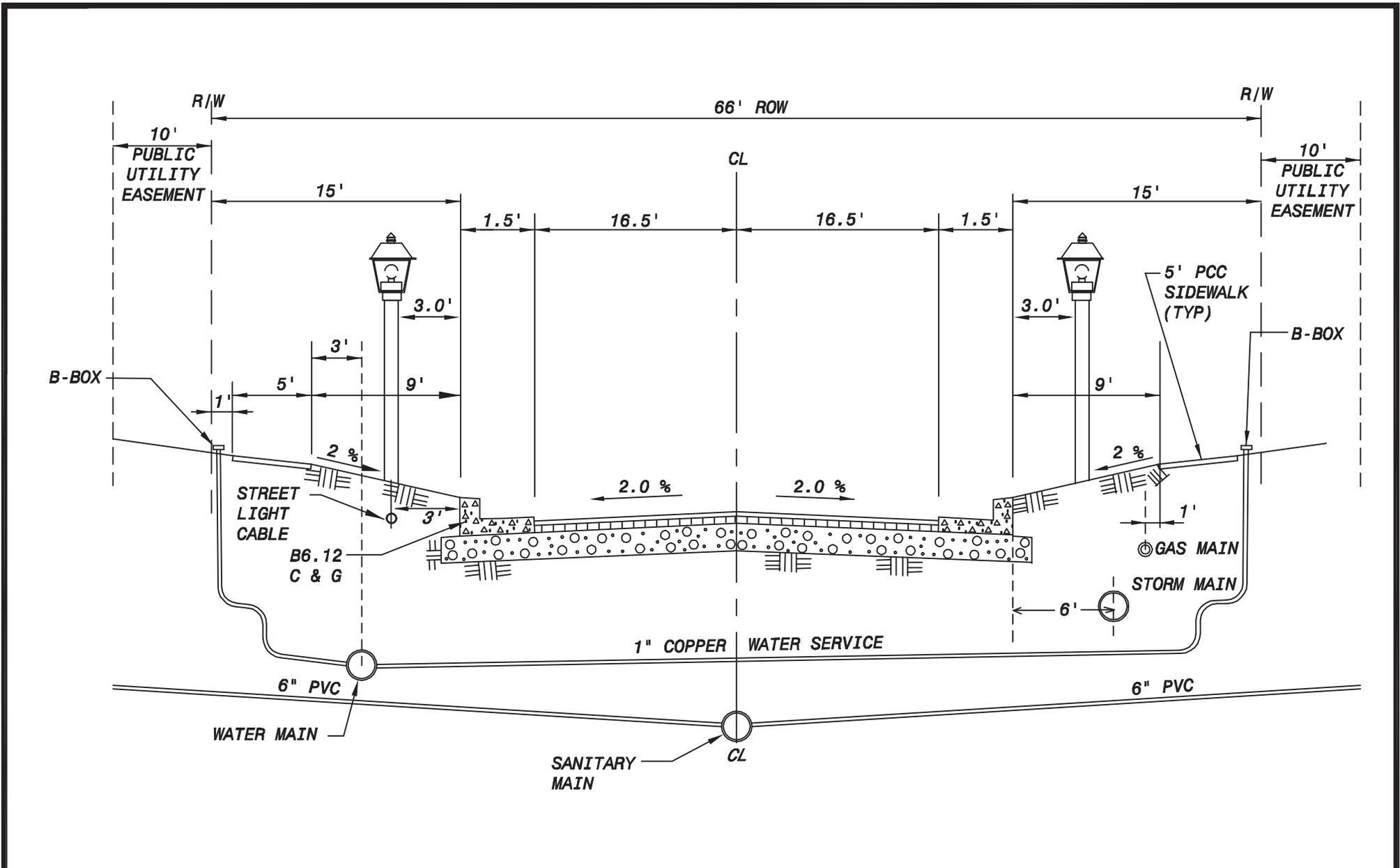
DETAIL A



INTEGRAL CURB

See DETAIL A for crosswalks and DETAIL B for driveways.

Pavement & Right-of-Way Widths		
Type of Street	Pavement Width (Feet)	Right-of-Way Width (Feet)
Local	33	66
Industrial	36	80
Collector	36 - 60	80 - 100
Minimum Horizontal Street Radius		
Type of Street	Minimum Centerline Radius (Feet)	
Local	250	
Industrial	400	
Collector	350	



VILLAGE OF MUNDELEIN
ENGINEERING DETAILS

TYPICAL STREET UTILITY LOCATIONS

REVISIONS				REVISIONS			
REV.	BY	DATE:	REVISION:	REV.	BY	DATE:	REVISION:
1.	MDJ	04-04-05	APPROVED	4.			
2.				5.			
3.				6.			

DETAIL NO.
R-11

Street Sign Standards

Sign Specifications

1. All sign posting shall be installed in accordance to the install diagram printed in the latest edition of the M.U.T.C.D. Manual.
2. All signage shall be fabricated in accordance with the latest revision of the Federal Highway Standards Manual and the M.U.T.C.D. Manual Publication.
3. All aluminum shall meet or exceed State of Illinois Aluminum Sign Specification 5052-H3 Alloy Mil Finish ATSM B-209-88, Conversion Coating ATSM B-4449-67A, Class 2 or latest revisions and .080 aluminum thickness.
4. All signs shall be mounted to a height of seven (7)-feet to the bottom of the sign.
5. Posting Type

- a. **Decorative Streetscape (See page 3 of 3 for item depiction)**

Postings shall be smooth finish gloss black powder-coated finished .109 Aluminum, 2 3/8" outside diameter by TAPCO® **StreetScape Decoratives** style (or equal) including a slip over decorative base for 2 3/8" round post, Vulcan black finish and ball finial for 2 3/8" post top in black finish.

Base shall be as manufacturer recommendation.

Sign Mounting Hardware – Streetscape Round Metal Tubing

Single sided 2 3/8" round pole "Z Bracket (or equal) for 2 3/8" outside diameter round pole.

6. Postings with two (2) signs should be mounted with the top sign at seven (7)-feet, bottom of sign with the second sign directly below, leaving minimal or no gap between signs.
7. All postings, except where shown on plans (print), shall be posted at or as close to the property lot lines wherever possible unless a conflict with underground utilities exists.
8. All postings shall be plumb and true with a level or similar device and will be checked by Village of Mundelein – Public Works personnel for accuracy of installation. If any installations are rejected they shall be re-installed at the contractor's expense.
9. All street name signs installed on street light poles shall be to a height of ten (10)-feet.

Reflective Sheeting

1. The sign face shall be reflective sheeting conforming to the specifications for "Prismatic Lens Reflective Sheeting Illinois Type AZ and ASTM Type 9 for Traffic Control Signs."
2. Signs must be fabricated with 3M VIP Diamond Grade reflective sheeting with 1170 series 3M EC (electronically cut) film.

Reflectorized Street Name Signs



1. Mounted street name signs shall have a standard width of nine (9)-inches. The overall length of the face and blade shall be determined by the number of letters in the street name, including the prefixes and suffixes. The name plate shall have a minimum length of 30-inches or as requested. Where extra length is required, it shall be provided in six (6)-inch increments.
2. Sign blanks are to be flat .080 aluminum.
3. All cut uppercase letters are to be six (6)-inches in height, lowercase letters to be three (3)-inches in height.
4. All compass prefix and suffix letters are to be three (3)-inches in height.
5. Sign blanks are to be faced with 3M VIP Diamond Grade (White) sheeting.
6. White base material shall be covered with Green EC (electronically cut) film with ¼-inch borders.

Traffic Control Signs

1. Stop signs shall be 30-inches x 30-inches with 3M VIP Diamond Grade reflective sheeting.
2. Yield signs shall be 30-inches with 3M VIP Diamond Grade reflective sheeting.

Decorative Streetscape Posting



2 3/8" Diameter Black Aluminum Poles

SKU: 203-00210

Pole, Smooth, 2-3/8"x10"x.109 Wall, Aluminum, Black Finish, decorative streetscape pole

[Save for later](#) | [Remove item](#)



Aluminum Mini Bases

SKU: 203-00024

Mini Base for 2-3/8" Painted Black Finish, Decorative Slip Over Base Improves Look

[Save for later](#) | [Remove item](#)



Ball Finial for Pole Top

SKU: 203-00248

Finial, Ball Cap for 2 3/8" Round Post Toppers, Decorative Vulcan Black Finish

[Save for later](#) | [Remove item](#)



V-Loc® Post Anchor for Round 3" Posts

SKU: 034-00088

V-Loc, 30-VR3B Model, for 3" Round Posts going into soil, Includes: Clean-out Bar, Wedge, Post Anchor

[Save for later](#) | [Remove item](#)

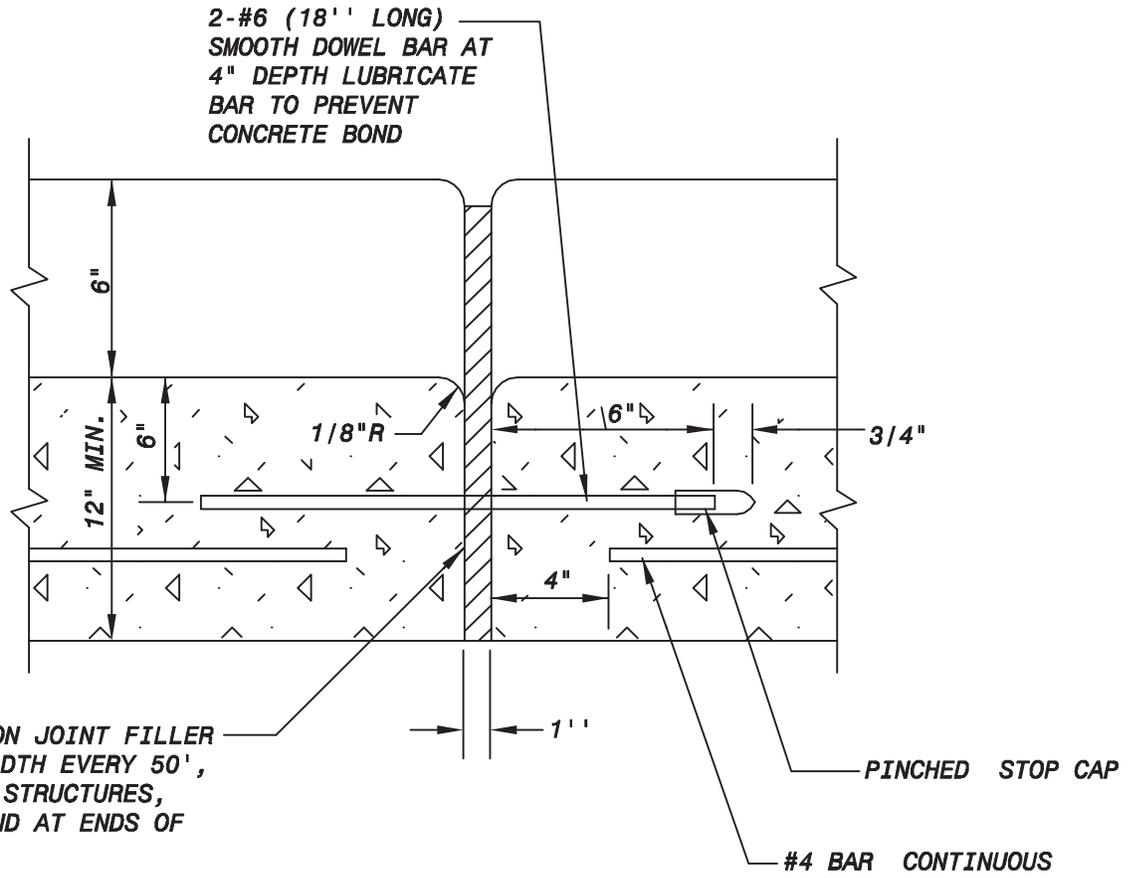


Z Bracket Single-Sided Round Pole Brackets

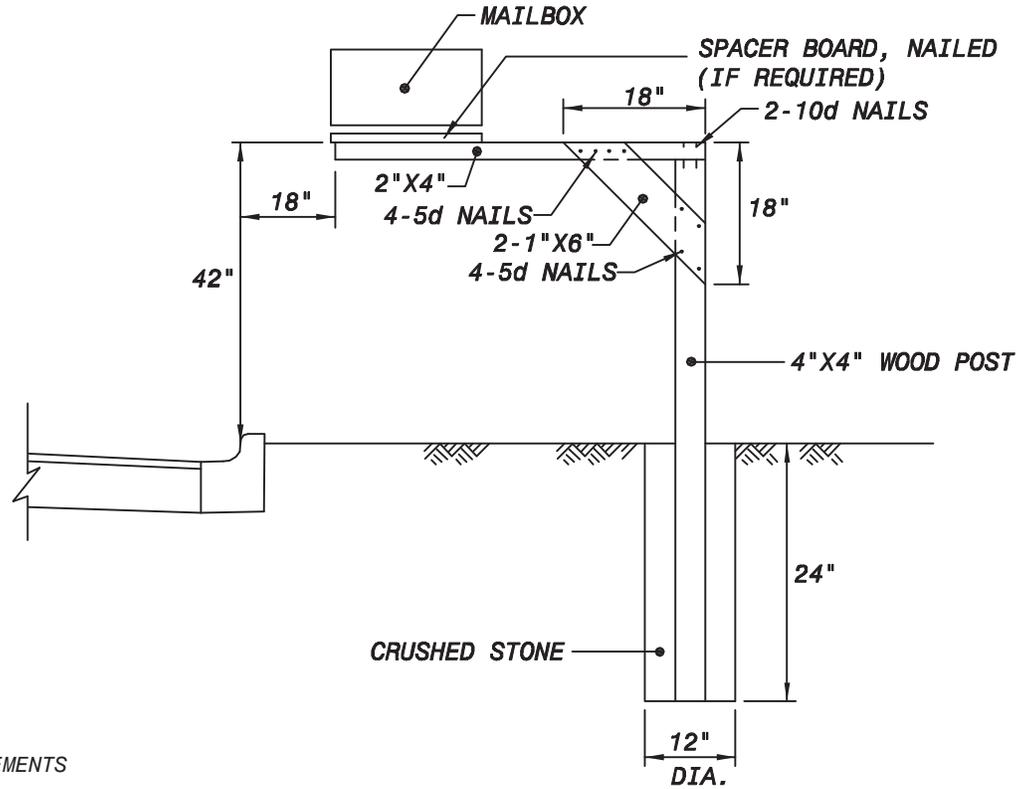
SKU: 037-00005

Sign Mounting Kit, Z-Bracket, 2-3/8", For Mounting One Static Sign to 2-3/8" OD Pole

[Save for later](#) | [Remove item](#)



REVISIONS				REVISIONS			
REV.	BY	DATE:	REVISION:	REV.	BY	DATE:	REVISION:
1.	MDJ	04-04-05	APPROVED	4.			
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3.				6.			



RESIDENTIAL MAILBOX REQUIREMENTS

STRUCTURE:

NOTE: STRUCTURE ORNAMENTAL MONUMENT TYPE MAILBOXES, WHICH DO NOT MEET THE FOLLOWING REQUIREMENTS, ARE NOT PERMITTED.

THE MAILBOX IS TO BE OF LIGHT STEEL, ALUMINUM, PLASTIC, OR SIMILAR WEIGHT MATERIALS AND NOT EXCEED 11 POUNDS. IT SHALL MEET U.S. POSTAL SERVICE REGULATIONS.

THE MAILBOX POST IS TO BE A SINGLE 4" BY 4" WOOD POST, A 4 1/2" DIAMETER WOOD POST, OR A METAL POST WITH STRENGTH NO GREATER THAN A 2" IN DIAMETER STANDARD STEEL PIPE. A METAL POST SHALL NOT BE FITTED WITH AN ANCHOR PLATE, BUT MAY HAVE AN ANTI-TWIST DEVICE THAT EXTENDS NO MORE THAN 10" BELOW THE GROUNDS SURFACE.

THE MAILBOX POST SHALL BE EMBEDDED INTO THE GROUND 24". POST NOT ALLOWED TO BE SET IN CONCRETE.

THE MAILBOX POST SHALL NOT BE EMBEDDED OVER 24" INTO THE GROUND TO ALLOW POST TO BREAK RATHER THAN BE A SAFETY HAZARD TO MOTORISTS.

THE POST-TO-BOX ATTACHMENT SHOULD BE OF SUFFICIENT STRENGTH TO PREVENT THE BOX FROM SEPARATING FROM THE POST IF A CAR STRIKES THE INSTALLATION.

LOCATION:

MAILBOXES SHALL BE PLACED 12" FROM THE FACE OF THE CURB TO THE FACE OF THE MAILBOX. EXISTING PAVED ROADS WITHOUT CURBS SHALL REQUIRE THE FACE OF THE MAILBOX TO BE SETBACK THE WIDTH OF THE SHOULDER, PLUS 12".

THE MAILBOX SHALL BE MOUNTED NOT MORE THAN 52" FROM THE GROUND TO THE TOP OF THE BOX, AND NO LESS THAN 42" FROM THE GROUND TO THE BOTTOM OF THE BOX.

FOR FURTHER REQUIREMENTS CONTACT THE MUNDELEIN POST OFFICE.



VILLAGE OF MUNDELEIN
ENGINEERING DETAILS

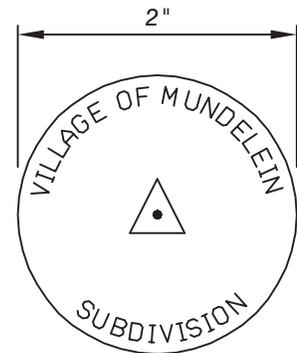
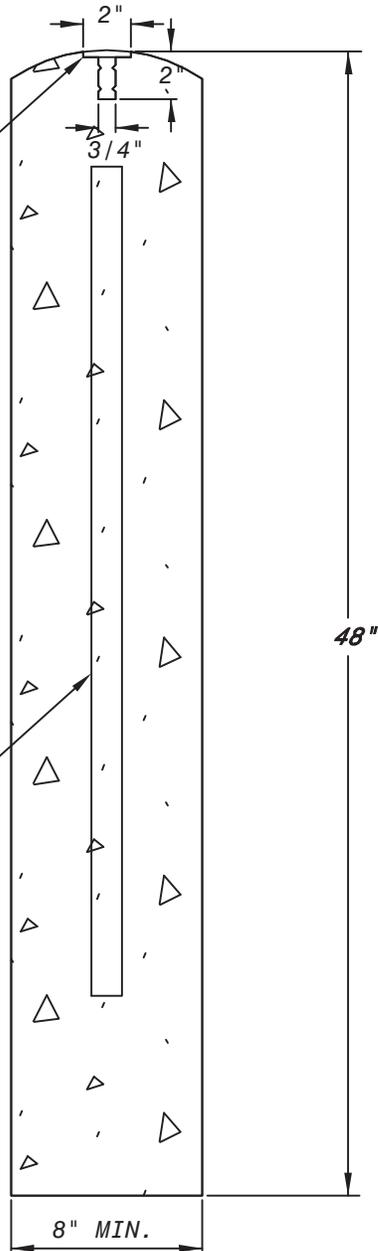
STANDARD MAILBOX
SUPPORTS

REVISIONS				REVISIONS			
REV.	BY	DATE:	REVISION:	REV.	BY	DATE:	REVISION:
1.	MDJ	04-04-05	APPROVED	4.			
2.				5.			
3.				6.			

DETAIL NO.
R-14

MINIMUM 2" DOMED CONCRETE MARKER
(ALUMINUM) (BERNSTEN CD2 OR
EQUIVALENT) WITH ACTUAL CORNER
POSITION STAMPED ON MARKER.

5/8" REBAR 30" TO 36" LENGTH



BERNSTEN CD2 OR EQUIVALENT

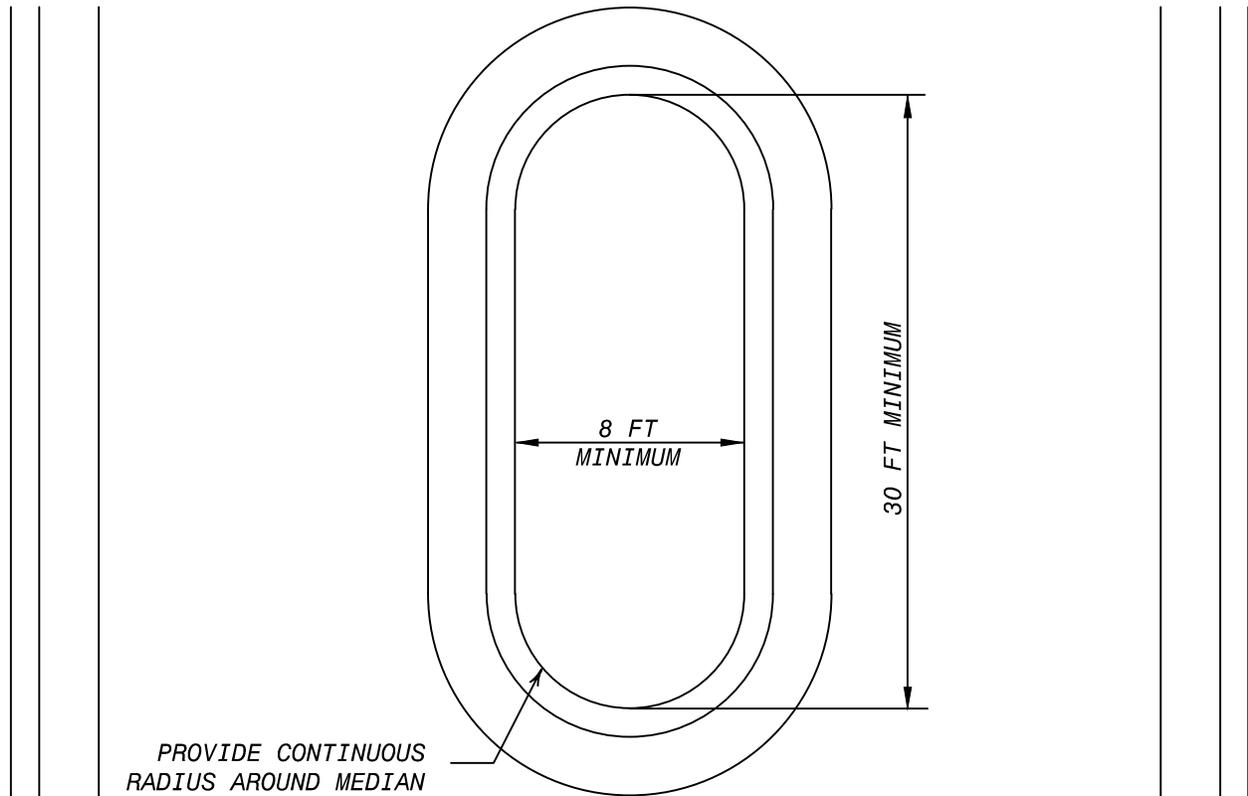
NOTES

1. MONUMENT COORDINATES SHALL BE ESTABLISHED USING NAD83 (1986 OR 1997)
2. MONUMENT ELEVATION SHALL BE ESTABLISHED USING NAVD88

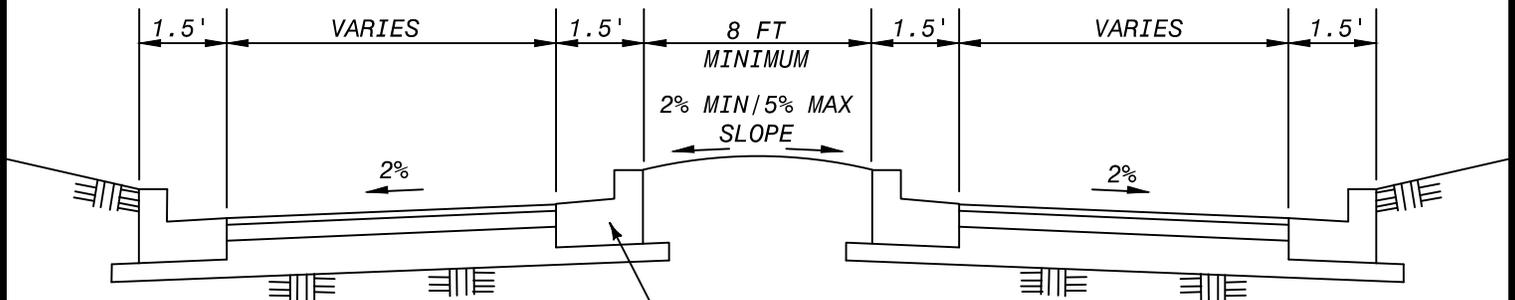
REVISIONS				REVISIONS			
REV.	BY	DATE:	REVISION:	REV.	BY	DATE:	REVISION:
1.	MDJ	04-04-05	APPROVED	4.			
2.				5.			
3.				6.			

Field Quality Control Procedures For Pavement Area Subgrade

1. The work area will first be stripped of vegetation or, in cut areas, excavated to a Design Subgrade Elevation as shown on the plans.
 - a. The subgrade after cut will be proof rolled to verify a stable subgrade as directed by the soils engineer.
 - b. A series of test pits may be needed as directed by the soils engineer to verify additional undercut as predicted or estimated by Boring Logs and the Earthwork Undercut Plan.
 - c. Proof rolling procedures will be as follows:
 - 1) Two (2) to four (4) passes with a 25 ton rubber tire roller or equivalent; and
 - 2) Concentrate additional passes in areas that exhibit instability as directed by the soils engineer.
2. Unstable and unsuitable subgrade materials will be removed to the depth encountered as directed by the Soils Engineer.
 - a. Materials at undercut subgrade elevation should:
 - 1) Have an unconfined compressive strength (Q_u) of 2.0 tsf minimum, or cone index of 250 minimum;
 - 2) Contain no foreign materials or have organic contents in excess of six (6) percent total organic matter as determined by the Wet Combustion Method (AASHTO T-194); or maximum dry densities less than 105 pcf as determined by AASHTO T-180 (ASTM D-1557); and
 - 3) Be able to support necessary construction equipment without severe rutting or deflection.
3. At undercut subgrade elevation, the upper eight (8)-inches of soil shall be scarified or disked and re-compacted to 95 percent of the maximum dry density as defined by AASHTO T-180 (ASTM D-1557), prior to remedial work fill placement.
4. Proof rolling of the prepared undercut subgrade will be done if required by the soils engineer to further verify a stable subgrade prior to fill placement.
5. Roadway FILL shall be placed in successive horizontal lifts of not more than six (6)-inches in loose depth (cohesive material), or not more than nine (9)-inches in loose depth (porous granular material.)
6. The upper eight (8)-inches of subgrade in areas not undercut shall also be scarified and re-compacted to 95 percent of the maximum dry density as defined by AASHTO T-180 (ASTM D-1557), prior to placement of subsequent lift of FILL material.
7. Once the existing subgrade is stabilized, FILL can be placed and compacted in lifts to Design Subgrade Elevation. All roadway FILL materials shall be compacted to 95 percent of AASHTO T-180 (ASTM D-1557.)
8. When the work listed in the steps above has been completed, the subgrade will be checked by proof rolling and approved by the Village before construction of the subbase, base course, or pavement is started. The Village will make the determination as to whether areas failing this proof roll require additional drying and re-compaction or whether the soil conditions warrant more extensive treatment.



PLAN VIEW



CURB TO BE CONSTRUCTED TO DRAIN OUT TO PAVEMENT IN AREAS WHERE NO STORM COLLECTION HAS BEEN PROVIDED.

REVISIONS				REVISIONS			
REV.	BY	DATE	REVISION:	REV.	BY	DATE	REVISION:
1.	JRB	06-20-16	APPROVED	4.			
2.				5.			
3.				6.			

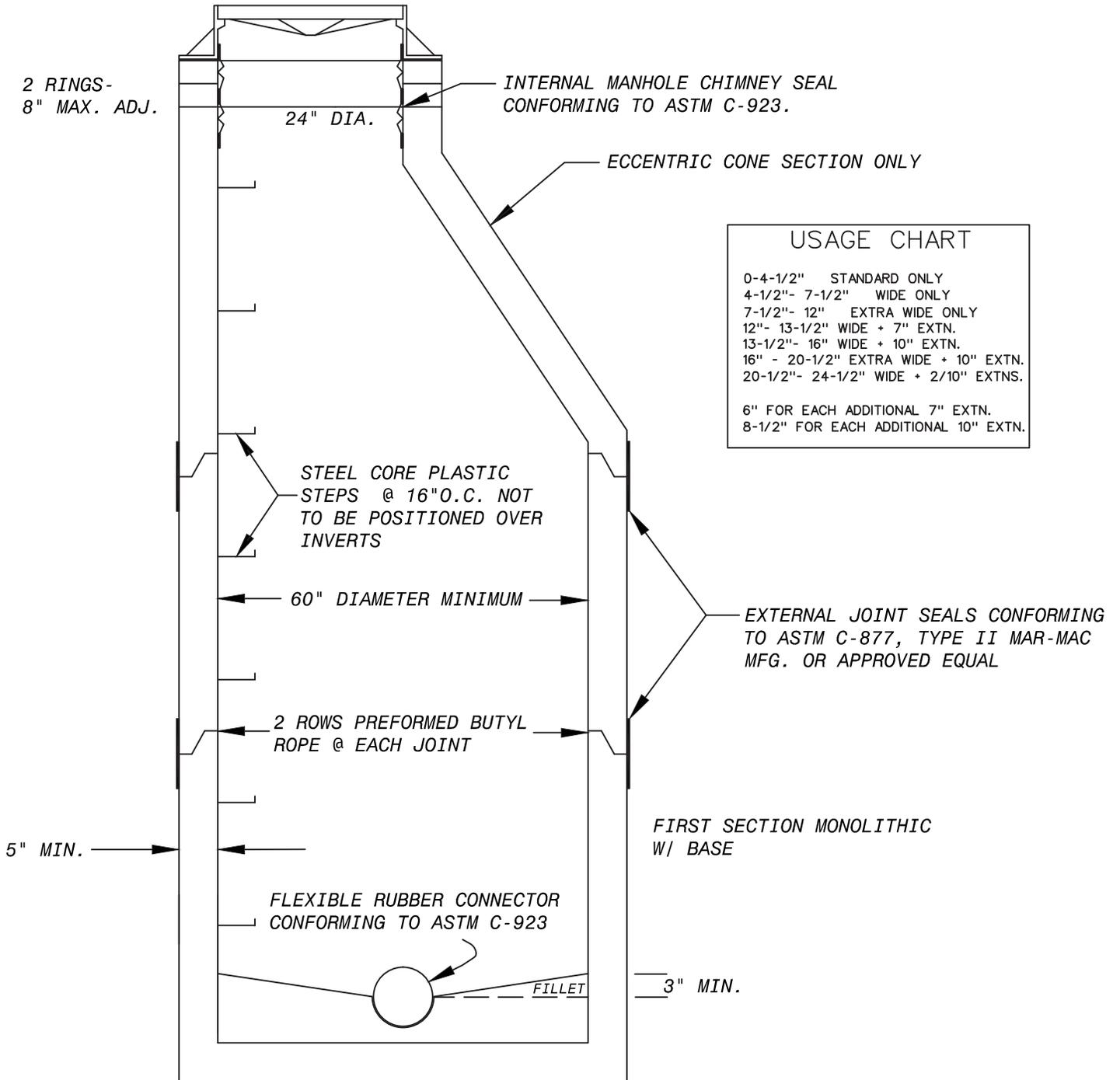
Miscellaneous Sanitary Standards/Notes

1. Sanitary sewers, main, and services and their fittings shall be constructed of one (1) or more of the following materials:
 - a. PVC pipe, ASTM D-3034, SDR 26, with elastomeric gasket joints conforming to ASTM D-3212.
 - b. Ductile iron pipe Class 52 with joints conforming to ANSI A21.11. Only when approved for structural purposes by the Village Engineer.
2. Sanitary sewer manholes shall be five (5)-feet zero (0)-inches diameter precast structures. Frames shall be Neenah R1712-C or EAST Jordan 1050 HD with self-sealing application lids with concealed pick holes. Lids shall be imprinted with the word "sanitary."
3. Sanitary sewer manholes and inspection manholes shall have eccentric cones. All manhole sections and adjusting rings shall be securely sealed to each other using pre-formed bituminous mastic such as "RAM-NEK." This mastic shall be applied in such a manner that ground water inflow cannot enter the manhole through gaps between barrel sections or cone sections and adjusting rings. Double "TAR STICK" may be required in areas with high water tables. Internal "CRETEX" brand chimney seals shall be installed in all manholes. "MAC RAP" is to be used at all manhole section joints.
4. Water stop gaskets shall be provided at all sanitary sewer manhole/pipe connections as approved by the Village Engineer.
5. Sanitary sewer service risers shall be used when sewer main exceeds 12-feet in depth. The bedding under the riser tee shall be thoroughly compacted. The engineer reserves the right to require concrete encasement of the riser or a concrete thrust block under the tee.
6. All sanitary sewers including service stubs shall be subject to an air test Section 31 of the Standard Specifications. Applicable portions of main line sewer including main with riser sections shall be subjected to a deflection test conducted by the contractor. All testing shall be observed by a Village of Mundelein Engineering Department Representative.
7. The main sanitary sewer shall be televised prior to acceptance. A videotape, CD, or DVD along with a paper report shall be submitted to the Village of Mundelein Engineering Department. The paper reports shall include the following: Date, time, street name, manhole numbers from and to, manhole depths, pipe size, pipe type, direction televised, surface conditions, clock position of services, final distances in feet, and observation details with footage. (Include still photos for each observation that is indicated.) The contractor, without delay, shall perform all necessary corrective work.
8. Control and sampling manholes must be installed in the ROW or as approved by the Village of Mundelein on a straight portion of the line without any bends inside the manhole or within five (5)-feet of the exterior of the manhole. In the event that a grease trap is needed, the grease trap shall precede the sample manhole. The grease waste service must connect to a main service before the sample manhole.
9. All sump pumps must discharge to the storm sewer system. All interior floor drains and waste ejector pits must connect to the sanitary sewer system.
10. All sanitary sewer stubs shall be marked with 4x4 post painted red.
11. Structures, manholes, inlets, catch basin sumps, and valve vaults shall be cleaned prior to any inspection at the end of the project and prior to Village acceptance. Sanitary and storm sewer main shall be jet

cleaned if evidence of debris build-up is present at the time of Village acceptance.

12. Connections to any existing manhole shall be done using a KOR-N-SEAL connection.
13. All external drains shall connect to the storm sewer system.
14. Vehicle and truck dock drains must meet the plumbing code requirements, including waste interceptors, and must be approved by the Village Plumbing Inspector.
15. When existing stubs are not available, all service connections to mainline sewers shall consist of the following:
 - a. If existing sewer is PVC or clay pipe, the mainline sewer shall be cut and a wye section with chamfer shall be installed with non-shear mission coupling placed over connection points; for clay, a minimum of two (2)-feet of PVC is required on each side of wye;
 - b. Existing stubs or services planned for use must be televised and verified by the Village of Mundelein to be in acceptable condition prior to use or reuse; and
 - c. Break in connections are not permitted.

9" HEAVY DUTY FRAME
 NEENAH FOUNDRY CO. R1713 W/ SELF SEALING LID
 IMPRINTED W/ "VILLAGE OF MUNDELEIN" & "SANITARY"
 (OR EQUIVALENT E.J.I.W. PRODUCT)

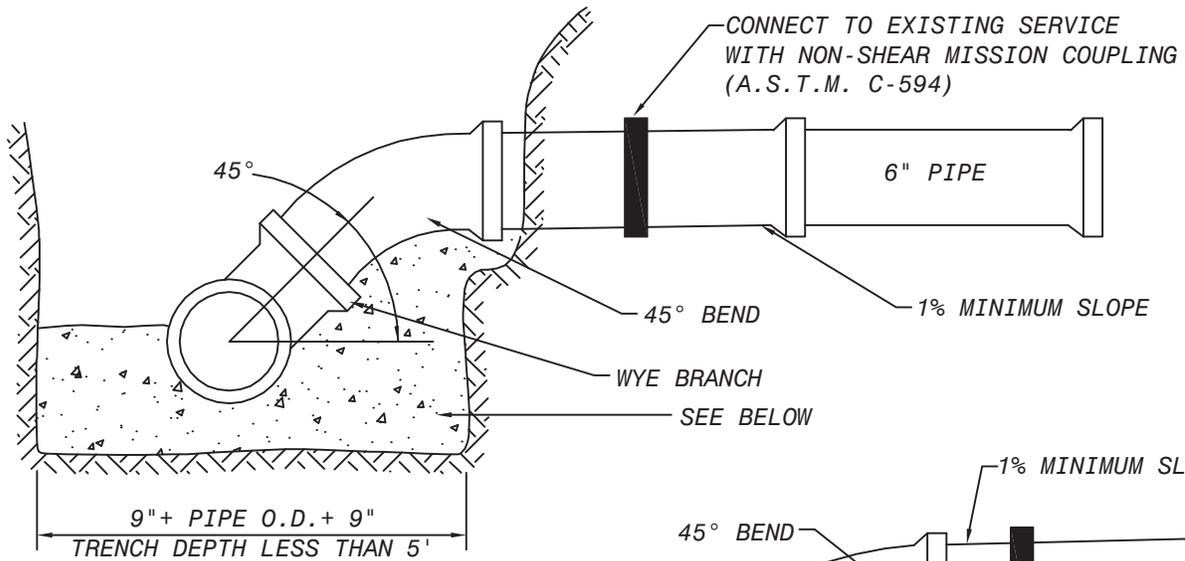


VILLAGE OF MUNDELEIN
ENGINEERING DETAILS

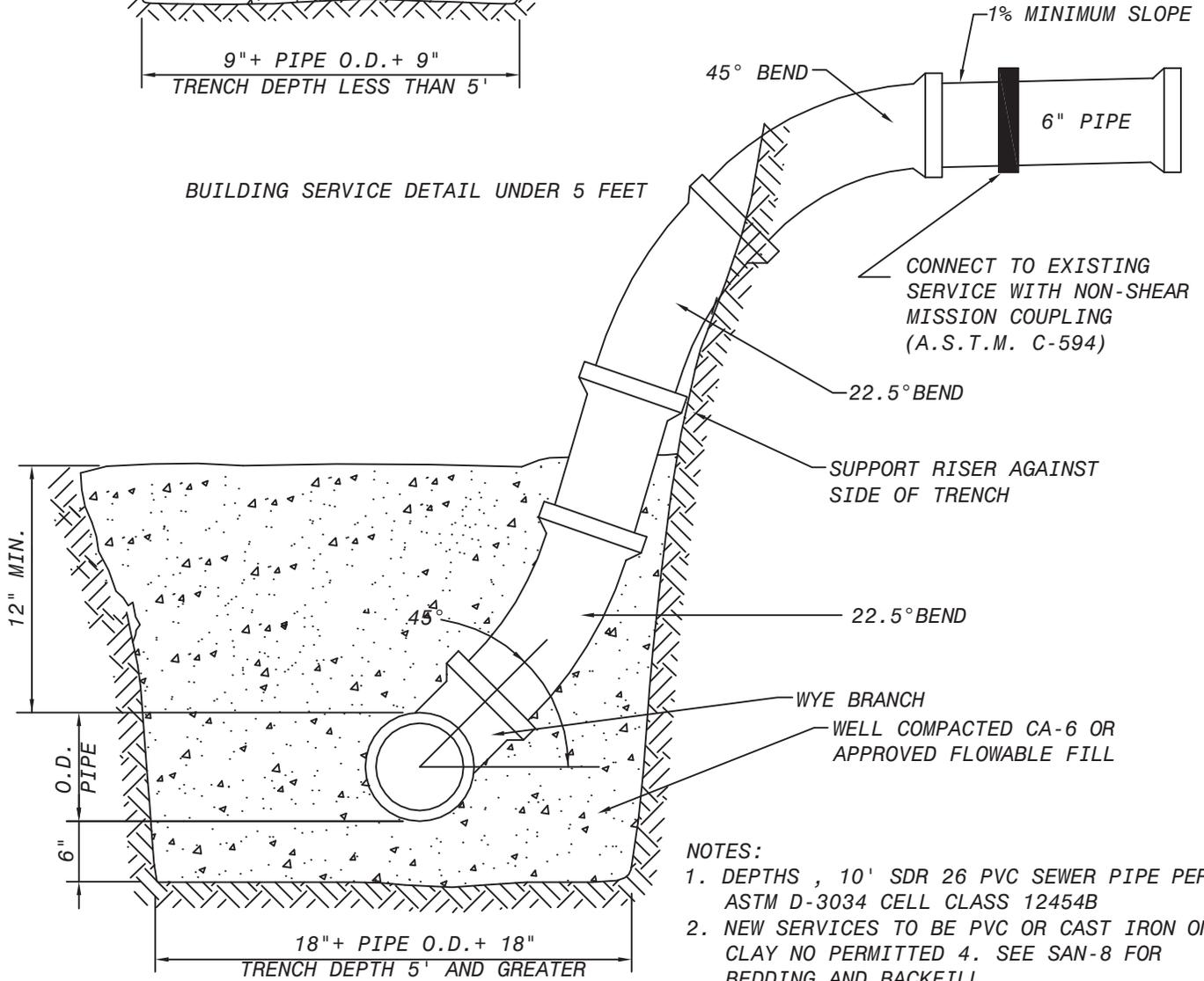
SANITARY MANHOLE
TYPE 1

REVISIONS				REVISIONS			
REV.	BY	DATE:	REVISION:	REV.	BY	DATE:	REVISION:
1.	MDJ	04-04-05	APPROVED	4.			
2.	JRB	04-14-15	APPROVED	5.			
3.				6.			

DETAIL NO.
SAN-1



BUILDING SERVICE DETAIL UNDER 5 FEET



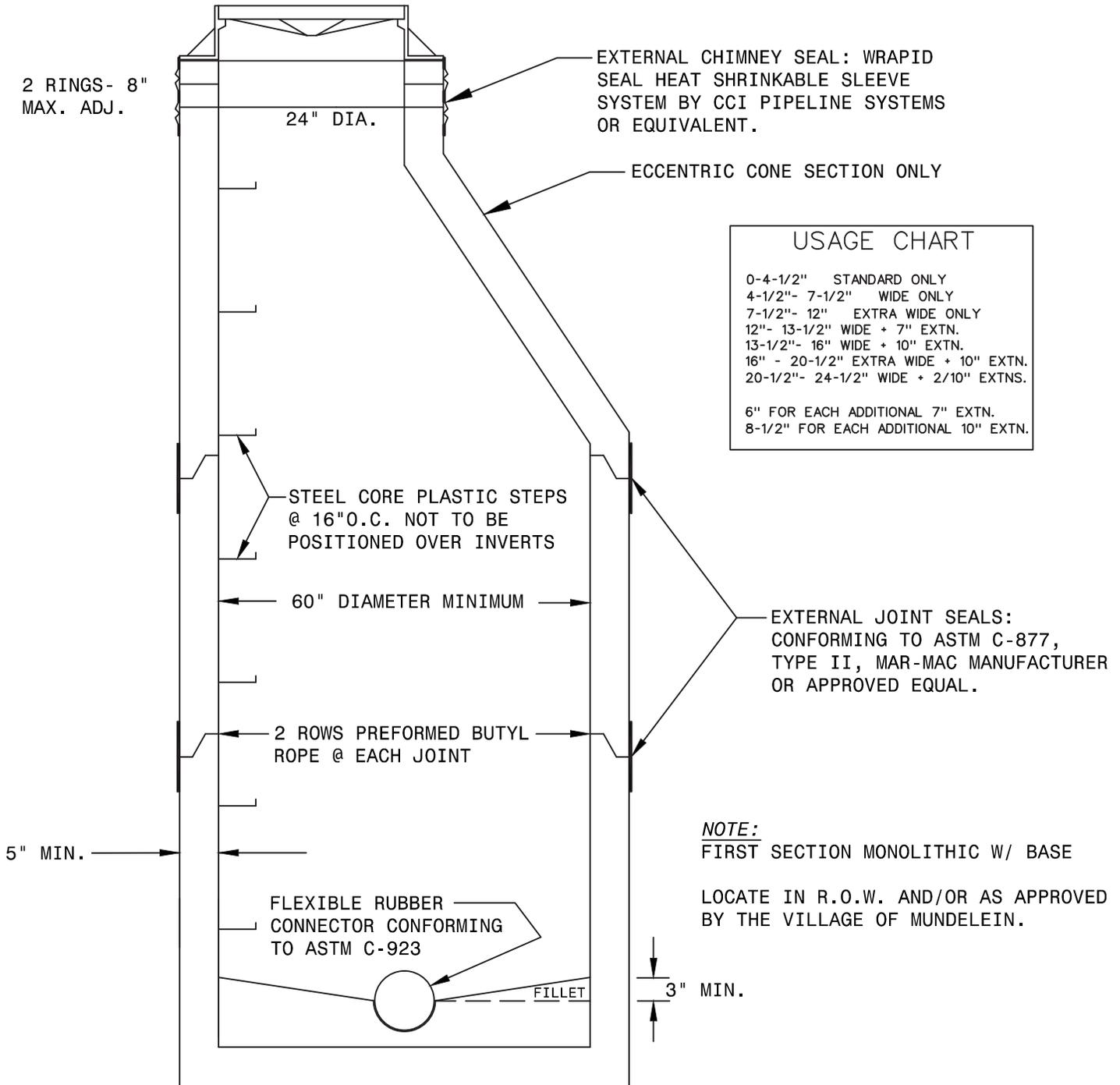
NOTES:

1. DEPTHS , 10' SDR 26 PVC SEWER PIPE PER ASTM D-3034 CELL CLASS 12454B
2. NEW SERVICES TO BE PVC OR CAST IRON ONLY CLAY NO PERMITTED 4. SEE SAN-8 FOR BEDDING AND BACKFILL
3. SEE SAN-08 FOR BEDDING AND BACKFINLL.

REVISIONS				REVISIONS			
REV.	BY	DATE:	REVISION:	REV.	BY	DATE:	REVISION:
1.	MDJ	04-04-05	APPROVED	4.			
2.				5.			
3.				6.			

HEAVY DUTY FRAME W/ SELF SEALING / LOCKING LID

(NEENAH FOUNDRY LIFTMATE R-1650-LM SPECIAL/PARENT #165-960)
 IMPRINTED W/ "SANITARY" AND LOCKING MECHANISM



USAGE CHART	
0-4-1/2"	STANDARD ONLY
4-1/2"- 7-1/2"	WIDE ONLY
7-1/2"- 12"	EXTRA WIDE ONLY
12"- 13-1/2"	WIDE + 7" EXTN.
13-1/2"- 16"	WIDE + 10" EXTN.
16" - 20-1/2"	EXTRA WIDE + 10" EXTN.
20-1/2"- 24-1/2"	WIDE + 2/10" EXTNS.
6" FOR EACH ADDITIONAL 7" EXTN.	
8-1/2" FOR EACH ADDITIONAL 10" EXTN.	

NOTE:
 FIRST SECTION MONOLITHIC W/ BASE
 LOCATE IN R.O.W. AND/OR AS APPROVED
 BY THE VILLAGE OF MUNDELEIN.

NOTE:
 THIS MANHOLE MUST BE INSTALLED ON A STRAIGHT PORTION OF THE SANITARY SEWER
 SERVICE LINE WITHOUT BENDS INSIDE THE MANHOLE OR WITHIN 5 FEET OF THE MANHOLE
 EXTERIOR. INSTALL DOWNSTREAM OF THE GREASE SERVICE AND SANITARY SERVICE.



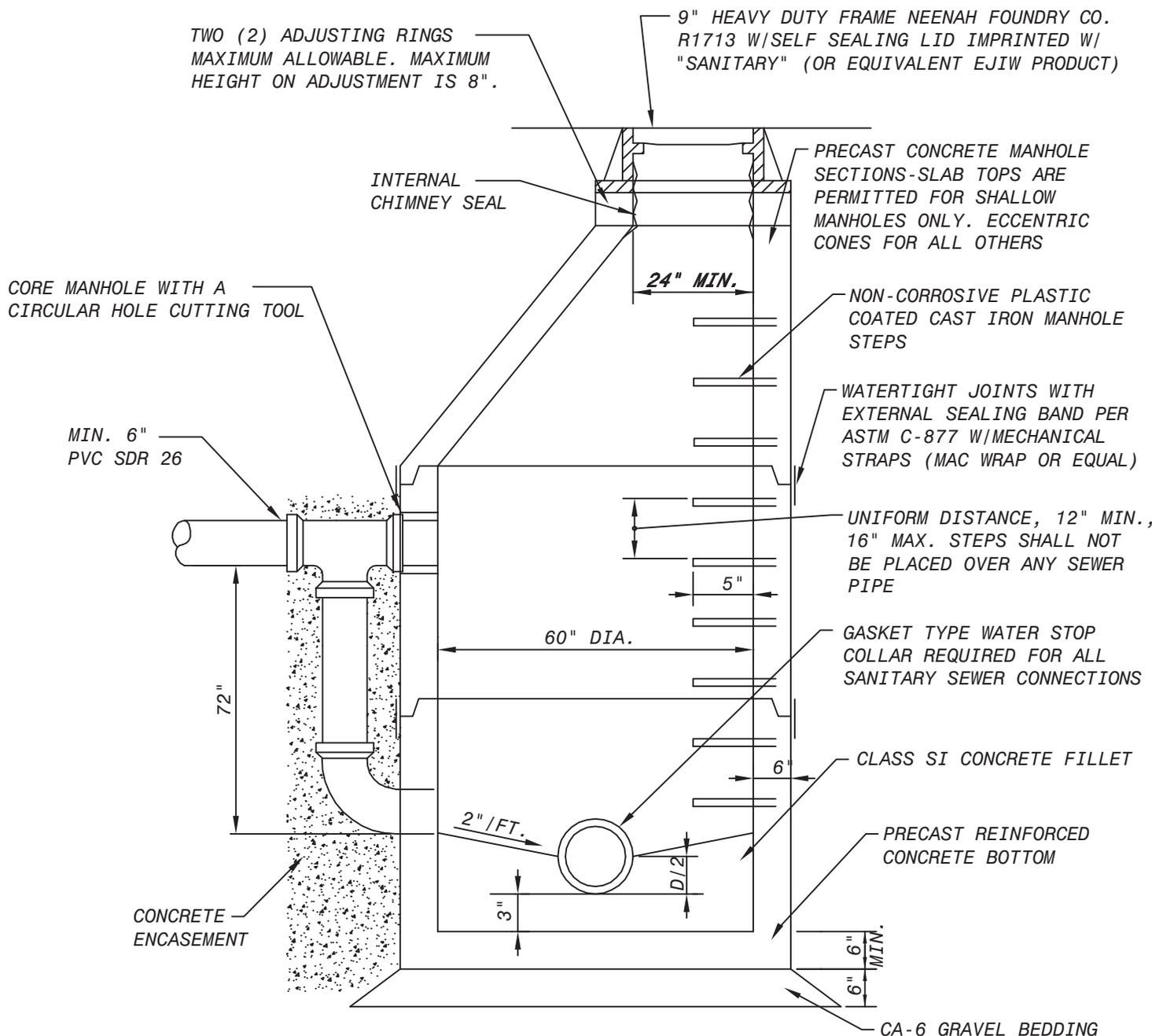
VILLAGE OF MUNDELEIN
 ENGINEERING DETAILS

CONTROL AND SAMPLING
 SANITARY MANHOLE
 (INSPECTION)

REVISIONS			
REV.	BY	DATE:	REVISION:
1.	MDJ	04-04-05	APPROVED
2.			
3.			

REVISIONS			
REV.	BY	DATE:	REVISION:
4.			
5.			
6.			

DETAIL NO.
 SAN-3



NOTES:

1. ALL PIPE CONNECTION OPENINGS SHALL BE PRECAST WITH RESILIENT RUBBER WATER TIGHT PIPE SLEEVES.
2. MANHOLE FRAME, ADJ. RINGS & ALL CONCRETE SECTIONS SHALL BE SET ON A PREFORMED BIT. PLASTIC GASKET (RUB-R-NEK OR EZ STIK)
3. FILL LUG HOLES WITH BITUMINOUS MASTIC JOINT MATERIAL.

USE DROP CONNECTIONS FOR ANY SANITARY SEWER PIPE ENTERING TWO (2) FEET OR MORE ABOVE THE LOWEST PIPE INVERT.

ALL PRECAST CONCRETE STRUCTURES MUST CONFORM TO AASMT0 M199



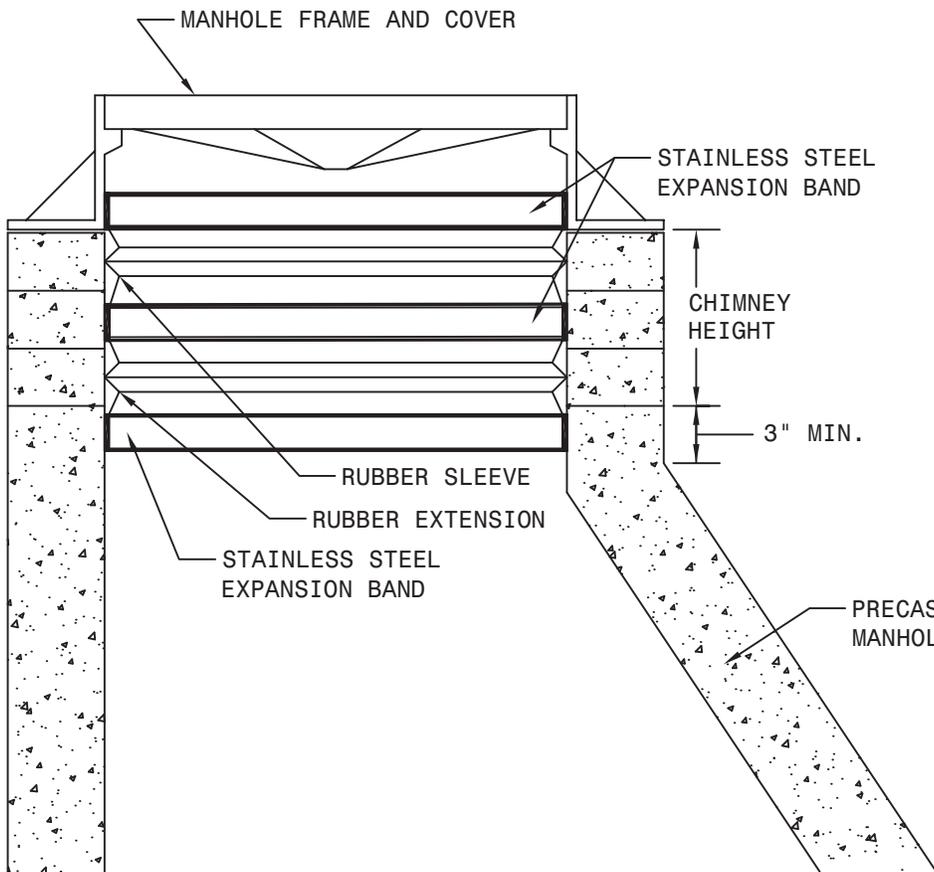
VILLAGE OF MUNDELEIN
ENGINEERING DETAILS

DROP MANHOLE
DETAIL OUTSIDE
TYPE

REVISIONS			
REV.	BY	DATE	REVISION
1.	MDJ	04-04-05	APPROVED
2.			
3.			

REVISIONS			
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5.			
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DETAIL NO.
SAN-4



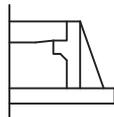
REQUIRED ON ALL SANITARY MANHOLES EXCEPT FOR CONTROL AND SAMPLING INSPECTION MANHOLES
 "CRE-TEX" INTERNAL SEALS ARE REQUIRED

NOTE:

MANHOLE FRAME-CHIMNEY SEAL - AN INTERNAL RUBBER SEAL SHALL BE INSTALLED ON ALL SANITARY MANHOLES ON THIS PROJECT. A RUBBER SEAL EXTENSION, TO COVER ANY ADDITIONAL HEIGHTS OF CHIMNEY NOT COVERED BY THE SEAL ITSELF, SHALL BE USED AS DIRECTED. THE INTERNAL RUBBER SEAL AND SEAL EXTENSIONS SHALL BE AS MANUFACTURED BY CRETEX SPECIALTY PRODUCTS, OR EQUAL. THE SLEEVES AND EXTENSIONS SHALL HAVE A MINIMUM THICKNESS OF 3/16 INCHES AND SHALL BE EXTRUDED OR MOLDED FROM A HIGH GRADE RUBBER COMPOUND CONFORMING TO THE APPLICABLE REQUIREMENTS OF ASTM C923, WITH A MINIMUM 1500 PSI TENSILE STRENGTH, MAXIMUM 18% COMPRESSION SET AND A HARDNESS (DUROMETER) OF 48±5. THE BANDS USED FOR COMPRESSING THE SLEEVE AND EXTENSION AGAINST THE MANHOLE SHALL BE FABRICATED FROM 16 GAUGE STAINLESS STEEL CONFORMING TO ASTM A240 TYPE 304. ANY SCREW BOLTS OR NUTS USED ON THIS BAND SHALL BE STAINLESS STEEL CONFORMING TO ASTM F593 AND 594, TYPE 304. CEMENT MORTAR SHALL BE USED IN THE JOINT BETWEEN THE MANHOLE FRAME AND CHIMNEY OR CONE. DETAILED INSTALLATION PROCEDURES SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. THE SLEEVE SHALL BE DOUBLE PLEATED WITH A MINIMUM UNEXPANDED VERTICAL HEIGHT OF 8 INCHES AND BE CAPABLE OF VERTICAL EXPANSION OF NO LESS THAN 2 INCHES WHEN INSTALLED. ALL COSTS FOR THE FURNISHING AND INSTALLATION OF THE INTERNAL RUBBER SEAL AND EXTENSION SHALL BE INCLUDED IN THE UNIT PRICE BID FOR SANITARY MANHOLES.



TAPERED FRAME



STRAIGHT FRAME

USAGE CHART

0-4-1/2" CHIMNEY SEAL ONLY
 OVER 4-1/2"- 10-1/2" SEAL + 7" EXTENSION
 OVER 10-1/2" - 13" SEAL + 10" EXTENSION
 OVER 13" SEAL + MULT. EXTENSIONS
 +6" FOR EACH ADDED 7" EXTENSION
 +8" FOR EACH ADDED 10" EXTENSION

NOTE: FRAME OFFSETS AND DIAMETER DIFFERENTIALS WILL REDUCE THESE SPAN HEIGHTS.

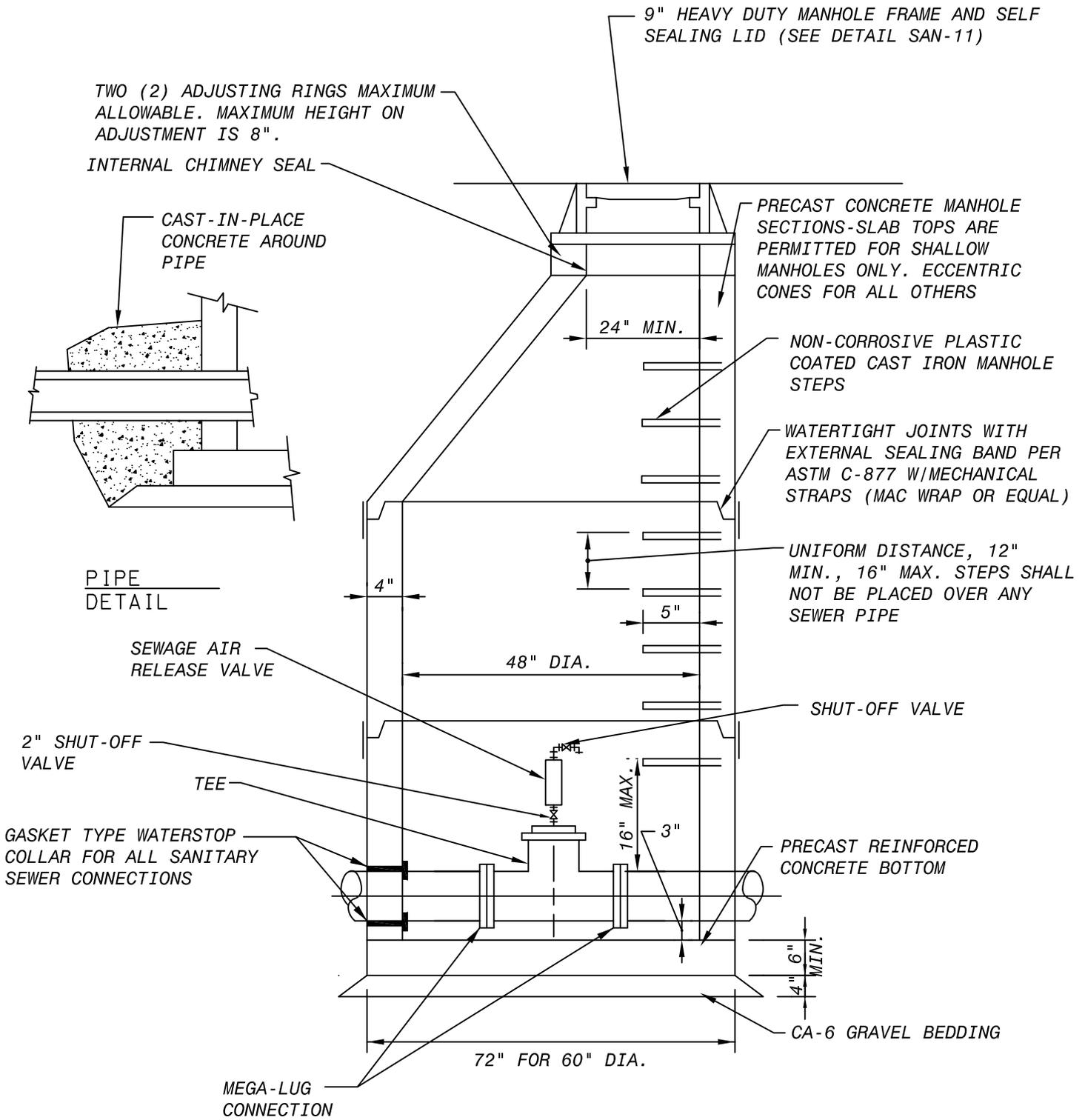


VILLAGE OF MUNDELEIN
 ENGINEERING DETAILS

SANITARY SEWER
 INTERNAL CHIMNEY
 SEAL DETAIL

REVISIONS				REVISIONS			
REV.	BY	DATE	REVISION	REV.	BY	DATE	REVISION
1.	MDJ	04-04-05	APPROVED	4.			
2.				5.			
3.				6.			

DETAIL NO.
 SAN-5



ALL PRECAST CONCRETE STRUCTURES MUST CONFORM TO AASHTO M199



VILLAGE OF MUNDELEIN
ENGINEERING DETAILS

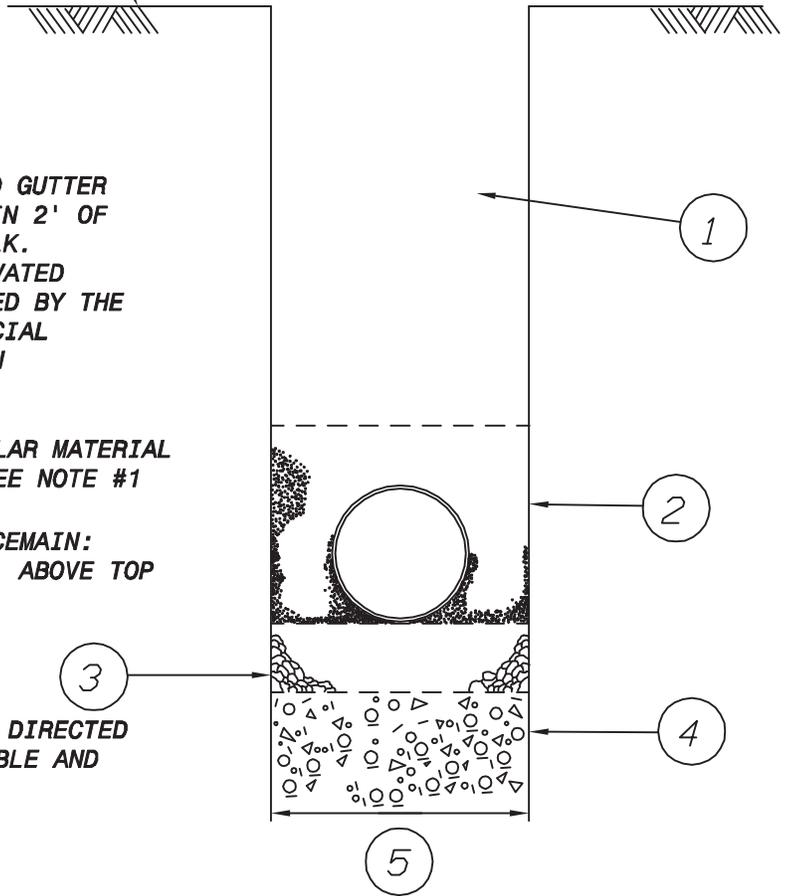
SANITARY SEWER
AIR RELEASE
MANHOLE DETAIL

REVISIONS			
REV.	BY	DATE	REVISION
1.	MDJ	04-04-05	APPROVED
2.			
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5.			
6.			

DETAIL NO.
SAN-6

FINISHED GRADE



- ① TRENCH BACKFILL UNDER PAVEMENT, CURB AND GUTTER AS INDICATED IN ROAD SUBGRADES AND WITHIN 2' OF ANY PROPOSED CURB AND GUTTER OR SIDEWALK. MECHANICALLY COMPACTED BACKFILL OF EXCAVATED MATERIALS IN OTHER LOCATIONS IF APPROVED BY THE ENGINEER. REFER TO TRENCH BACKFILL SPECIAL PROVISIONS FOR MATERIALS AND COMPACTION REQUIREMENTS.
- ② FOR SANITARY SEWER PVC: COMPACTED GRANULAR MATERIAL CA-6 TO 12" ABOVE TOP OF PIPE. (ALSO SEE NOTE #1 BELOW)
FOR SANITARY SEWER DIP, WATER MAIN, FORCEMAIN: COMPACTED GRANULAR MATERIAL CA-6 TO 12" ABOVE TOP OF PIPE (ALSO SEE NOTE #1 BELOW)
- ③ 6" COMPACTED BEDDING, CA-6 GRADATION
- ④ UNSUITABLE MATERIAL TO BE REMOVED WHERE DIRECTED BY THE ENGINEER AND REPLACED WITH SUITABLE AND COMPACTED MATERIAL
- ⑤ TRENCH WIDTH - PIPE O.D. + 12" MINIMUM
PIPE O.D. + 18" MAXIMUM

NOTES:

- 1. PVC PIPE CONFORMING TO THE SDR SPECIFIED IN THE PLANS SHALL BE INSTALLED TO THE LATEST REVISED SPECIFICATION REQUIREMENTS OF ASTM D2321 USING EITHER COMPACTED CLASS I OR CLASS II GRANULAR MATERIALS FOR BEDDING, HAUNCHING AND INITIAL BACKFILL OF 12" OVER THE TOP OF PIPE TO PROVIDE THE NECESSARY SUPPORT FOR THE PIPE SO THAT THE MAXIMUM DEFLECTION DOES NOT EXCEED 5% OF THE PIPE'S ORIGINAL INTERNAL DIAMETER.
- 2. ALL CA-6 MATERIAL TO BE IDOT APPROVED.

SANITARY SEWER AND SERVICES



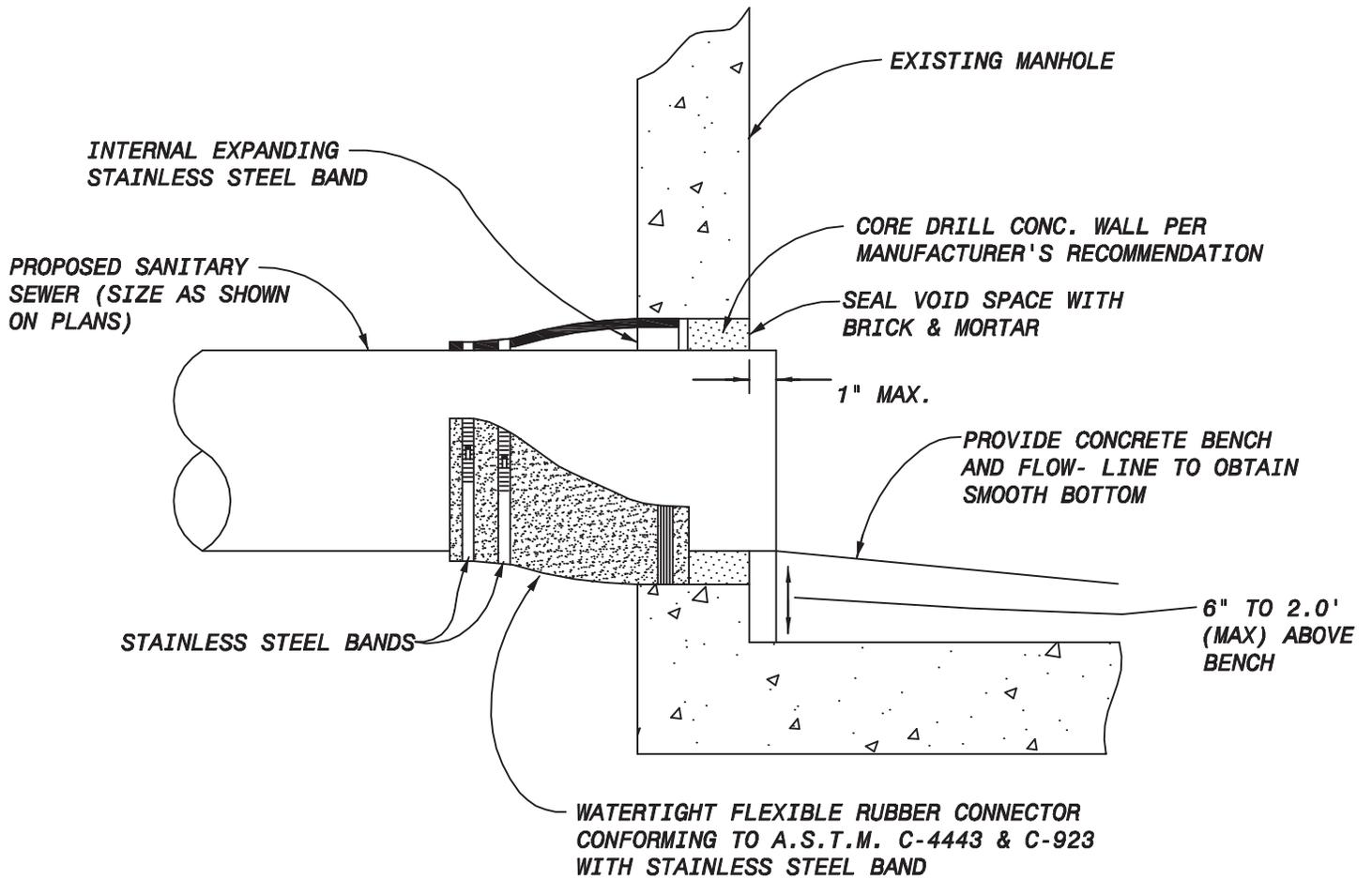
VILLAGE OF MUNDELEIN
ENGINEERING DETAILS

TYPICAL SANITARY TRENCH
CROSS SECTION

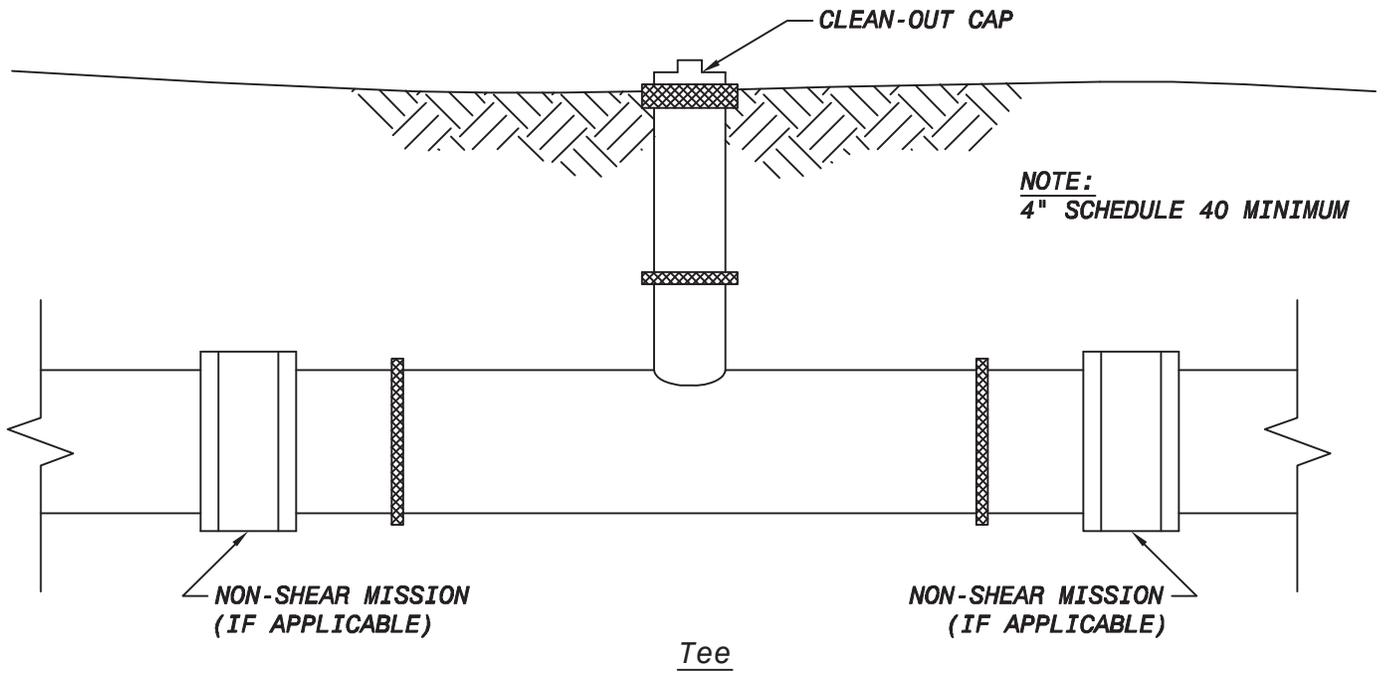
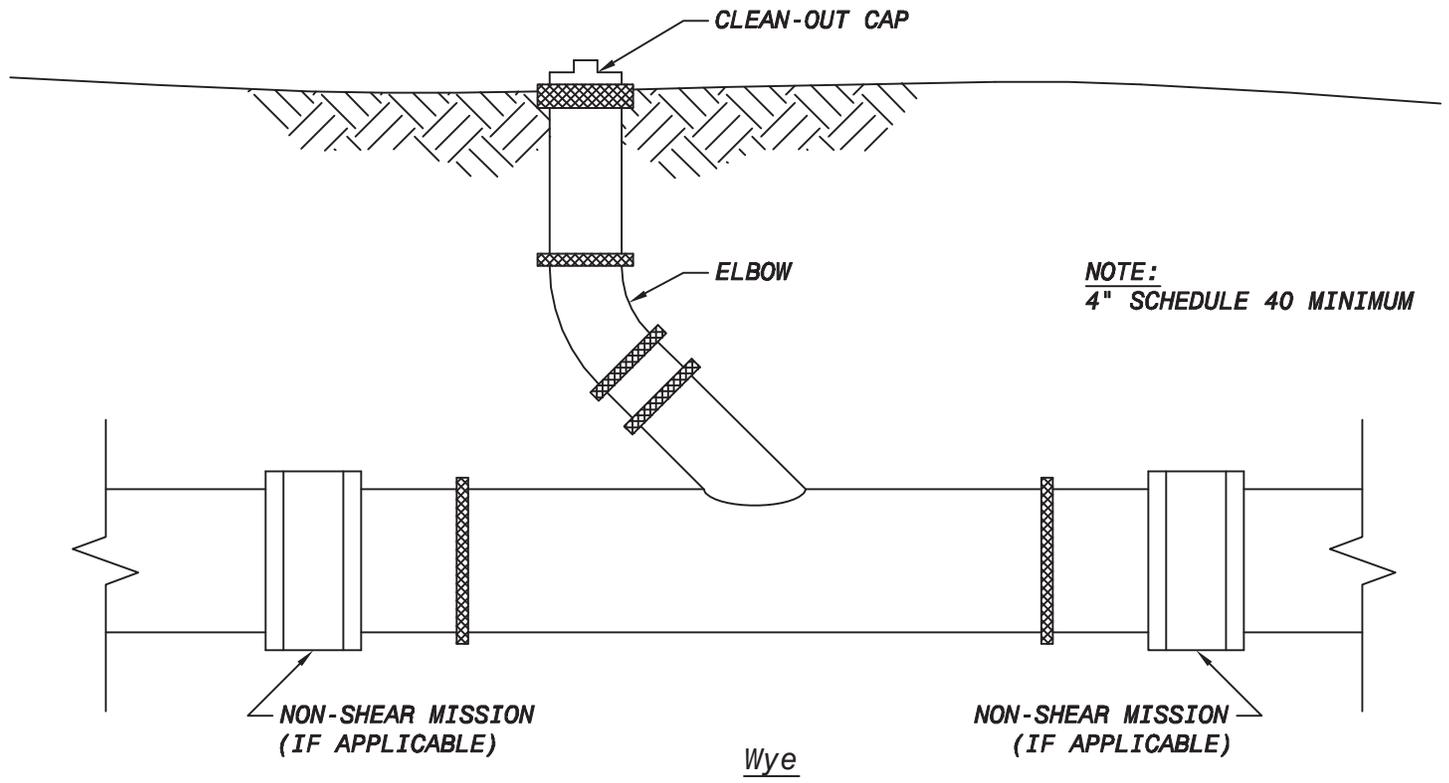
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DETAIL NO.
SAN-7



REVISIONS				REVISIONS			
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1.	MDJ	04-04-05	APPROVED	4.			
2.	JRB	04-14-15	APPROVED	5.			
3.				6.			



NOTE:
EXTERIOR CLEAN-OUTS CANNOT BE INSTALLED FURTHER THAN 5 FEET FROM THE FOUNDATION.
EXCEPTION: WHEN EXISTING CONDITIONS PREVENT THE INSTALLATION AS SPECIFIED, THE
CLEAN-OUT MAY BE INSTALLED IN A LOCATION AS DETERMINED BY THE DIRECTOR OF PUBLIC WORKS.

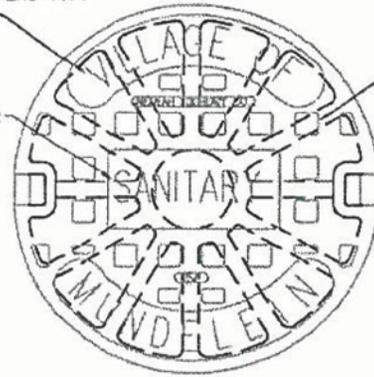
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1.	MDJ	04-04-05	APPROVED	4.			
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2" [51mm] RAISED LETTERS TYP.
FLUSH WITH SURFACE

ALTERNATE LETTERING:

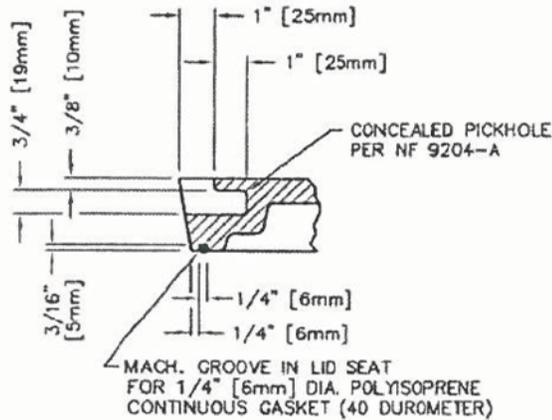
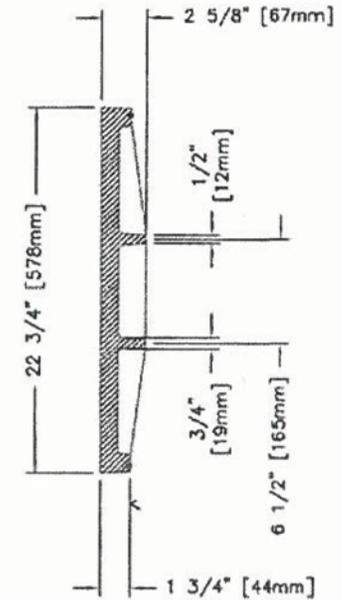
WATER

STORM



TYPE 'B' RECESSED POCKETS

(2) CONCEALED TYPE PICK HOLE
PER NF - 9204-A



SELF-SEAL/CONCEALED PICKHOLE DETAIL
QUARTER SCALE



VILLAGE OF MUNDELEIN
ENGINEERING DETAILS

SANITARY MANHOLE SELF SEALING LID

REVISIONS				REVISIONS			
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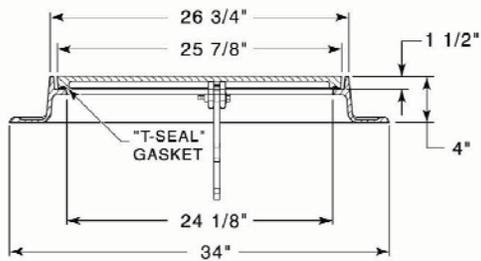
DETAIL NO.
SAN-10

R-1650-LM- Manhole Frames and Covers

R-1650-LM

LiftMate Frame, Solid Gasketed Lid

Heavy Duty



Furnished with six 1-1/8" anchor holes on 29-11/16" diameter bolt circle.

Hinge plug available for self-seal application.

Catalog Number	A	B	C	E	F
R-1650-LM	26	1			

All dimensions are listed in inches unless otherwise noted.

REVISIONS				REVISIONS			
REV.	BY	DATE:	REVISION:	REV.	BY	DATE:	REVISION:
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2.				5.			
3.				6.			

Sanitary Sewer Testing Specifications

1. Testing and Inspection for Acceptance of Sanitary Sewers

- a. Exfiltration of air under pressure.
- b. Deflection of flexible Thermoplastic Pipe.
- c. Televising.

2. Testing Technique

All Testing Methods: All wyes, tees, and stubs shall be plugged with flexible jointed caps, or acceptable alternate, securely fastened to withstand the internal test pressure. Such plugs or caps shall be readily removable.

- a. Air Testing Method Procedures: The section of sewer to be tested shall have been trench backfilled and cleared. Pneumatic plugs (having a sealing length equal to or greater than the diameter of the pipe to be tested) placed in both ends of the pipe to be tested shall be inflated to 25 psig. The sealed sewer pipe shall then be pressurized to four (4) psig above the average back pressure of groundwater over the sewer pipe and the air pressure allowed to stabilize for at least two (2) minutes.

After the stabilization period the line shall be pressurized to three and a half (3.5) psig and the time in minutes measured for pressure to drop to two and a half (2.5) psig. If groundwater is present, the air pressure within shall be increased to three and a half (3.5) psig above the level of the groundwater and the drop of one (1) pound of air pressure measured in minutes.

Air testing techniques shall be in accordance with the latest ASTM Standard Practice for testing sewer lines by low-pressure air test method for the appropriate pipe material, except that the time shall not be less than that shown in the Air Test Table contained in Section 31-1.11 C of the Standard Specifications for Water and Sewer Main Construction.

3. Deflection Testing for Flexible Thermoplastic Pipe:

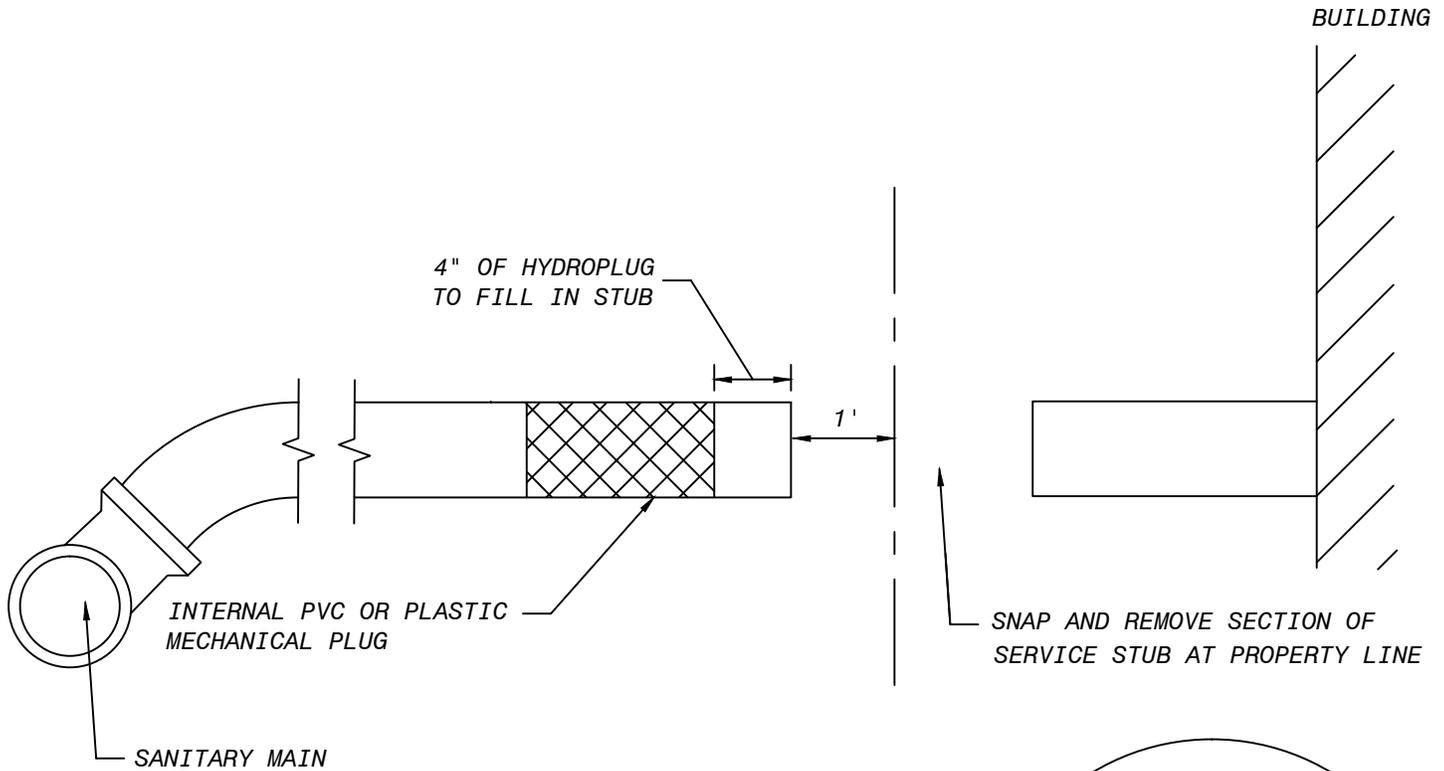
- a. The pipeline shall be tested for excess deflection by pulling a "go/no go" mandrel through the pipe from manhole to manhole. The mandrel shall be sized in accordance with Section 31-1.11 C (4) and as specified in the Special Provisions. A "deflectometer" may also be used to check and record deflection.
- b. Wherever possible and practical, the testing shall initiate at the downstream lines and proceed towards the upstream lines.
- c. Where deflection is found to be in excess of allowable testing limits, the Contractor shall excavate to the point of excess deflection and carefully compact around the point where excess deflection was found. The line shall then be retested for deflection. However, should after the initial testing the deflected pipe fail to return to the original size (inside diameter), the line shall be replaced.

4. Televising Standards

- a. The main sanitary sewer shall be televised prior to acceptance. A videotape, CD, or DVD (along with a paper report) shall be submitted to the Village of Mundelein Engineering Department. The paper reports shall include the following: Date, time, street name, manhole numbers from

and to, manhole depths, pipe size, pipe type, direction televised, surface conditions, clock position of services, final distances in feet, and observation details with footage. (Include still photos for each observation that is indicated.) The contractor without delay shall perform all necessary corrective work

AIR TEST TABLE									
TIME (MIN:SEC) REQUIRED FOR PRESSURE DROP FROM 30 TO 20 PSIG WHEN TESTING ONE PIPE DIAMETER ONLY									
Pipe Length (feet)	PIPE DIAMETER, Inches								
	4	6	8	10	12	15	18	21	24
2	0:04	0:10	0:18	0:28	0:40	1:02	1:29	2:01	2:38
4	0:09	0:20	0:35	0:55	1:19	2:04	2:58	4:03	5:17
6	0:13	0:30	0:53	1:23	1:59	3:06	4:27	6:04	7:55
8	0:18	0:40	1:10	1:50	2:38	4:08	5:56	8:05	10:34
10	0:22	0:50	1:28	2:18	3:18	5:09	7:26	9:55	11:20
12	0:26	0:59	1:46	2:45	3:58	6:11	8:30		
14	0:31	1:09	2:03	3:13	4:37	7:05			
16	0:35	1:19	2:21	3:40	5:17				12:06
18	0:40	1:29	2:38	4:08	5:40			10:25	13:36
20	0:44	1:39	2:56	4:35			8:31	11:35	15:07
22	0:48	1:49	3:14	4:43			9:21	12:44	16:38
24	0:53	1:59	3:31				10:12	13:53	18:09
30	1:02	2:19	3:47			8:16	11:54	16:12	21:10
32	1:10	2:38			6:30	9:27	13:36	18:31	24:12
38	1:19	2:50			6:48	10:38	15:19	20:50	27:13
40	1:28			5:14	7:34	11:49	17:01	23:09	30:14



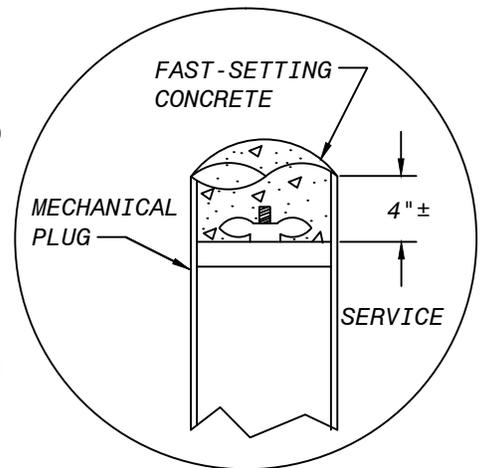
RE-CONSTRUCTION

-- EXISTING STUBS OR SERVICES PLANNED FOR USE MUST BE TELEVISED AND VERIFIED BY THE VILLAGE OF MUNDELEIN TO BE IN ACCEPTABLE CONDITION PRIOR TO USE OR REUSE. BREAK IN CONNECTIONS ARE NOT PERMITTED.

RECONSTRUCTING - CONNECT NEW PVC PIPE TO A 1' LENGTH OF EXISTING PIPE USING A NON-SHEAR COUPLING.

IF THE EXISTING TEE IS NOT ACCEPTABLE, THE MAINLINE SEWER SHALL BE CUT AND A WYE SECTION WITH CHAMFER SHALL BE INSTALLED WITH NON-SHEAR MISSION COUPLINGS PLACED OVER CONNECTION POINTS. FOR CLAY PIPE, A MINIMUM OF TWO (2) FEET OF PVC IS REQUIRED ON EACH SIDE OF WYE.

FOR A MAIN THAT HAS BEEN LINED, AN INSERT-A-TEE BRAND FITTING CAN BE USED OVER EXISTING CONNECTION SPOT.



NOTES:

1. ALL SANITARY SEWER SERVICE DISCONNECTS SHALL BE OBSERVED BY A VILLAGE OF MUNDELEIN WASTEWATER DIVISION REPRESENTATIVE.
2. PROVIDE TO THE VILLAGE, A DRAWING WITH MEASUREMENTS FROM 2 STATIONARY OBJECTS INDICATING THE DISCONNECTED SANITARY SEWER SERVICE STUB LOCATION.



VILLAGE OF MUNDELEIN
ENGINEERING DETAILS

SANITARY SEWER
DISCONNECTION DETAIL

REVISIONS				REVISIONS			
REV.	BY	DATE:	REVISION:	REV.	BY	DATE:	REVISION:
1.	MDJ	04-04-05	APPROVED	4.			
2.	PW	12-10-10		5.			
3.				6.			

DETAIL NO.
SAN-13

9" HEAVY DUTY FRAME NEENAH CATALOG NO. R-1713 OR R-1772 MANHOLE FRAME, W/ TYPE G STANDARD FLAT GRATE

OR

EAST JORDAN IRON WORKS CATALOG NO. 1022 FRAME W/ TYPE M2 FLAT BAR GRATE

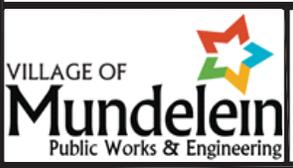
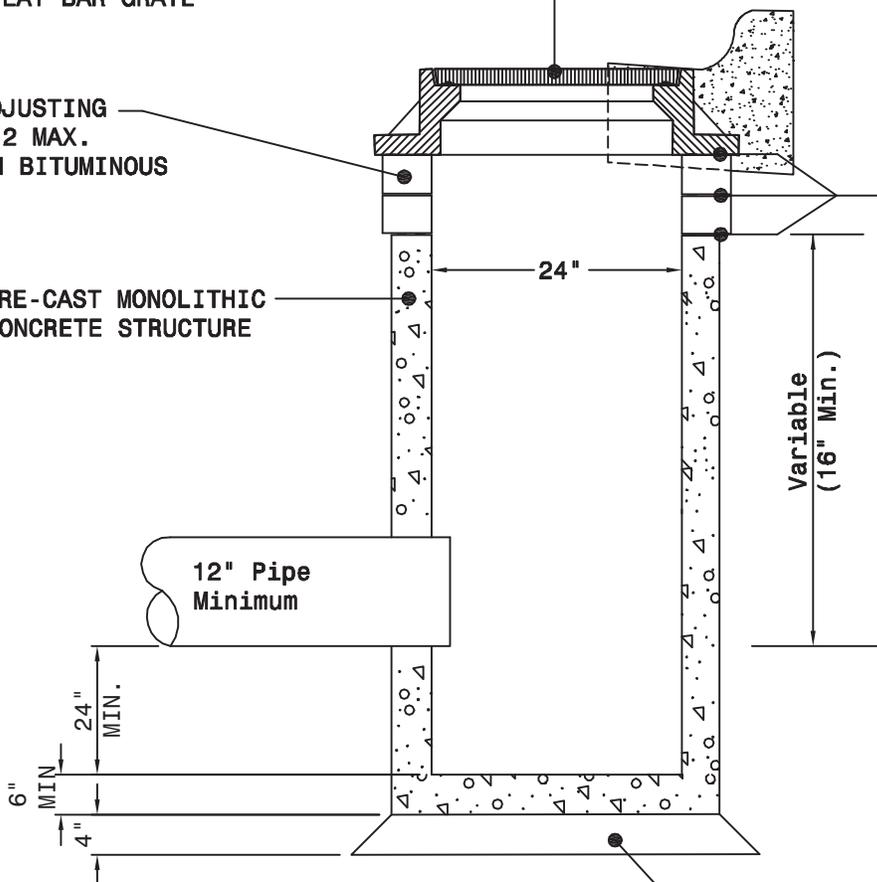
PRE-CAST CONCRETE ADJUSTING RINGS (IF NEEDED - 2 MAX. ALLOWED, MAX 8" WITH BITUMINOUS GASKET MATERIAL)

PRE-CAST MONOLITHIC CONCRETE STRUCTURE

BITUMINOUS GASKET MATERIAL

12" Pipe Minimum

CA-6 GRAVEL BEDDING



VILLAGE OF MUNDELEIN
ENGINEERING DETAILS

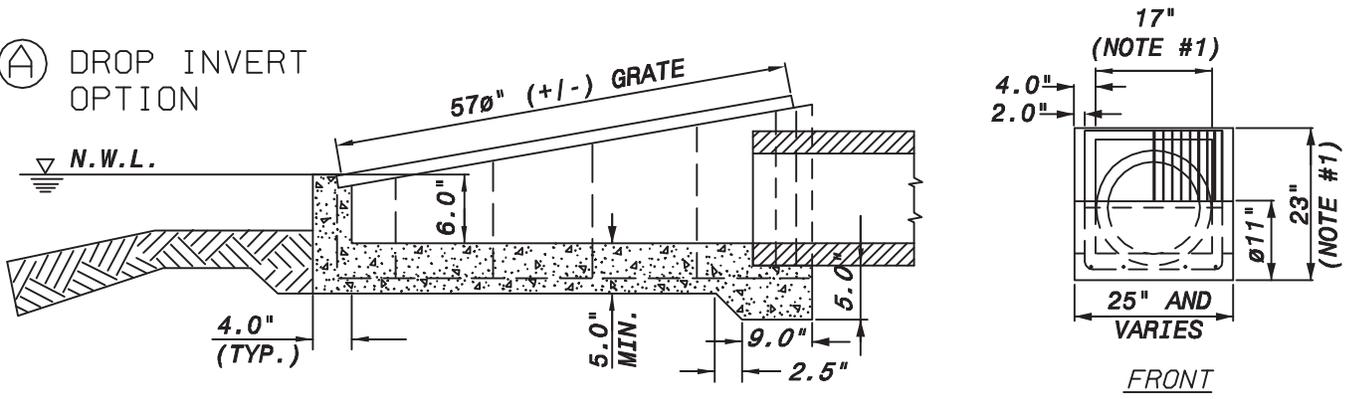
CURB INLET

REVISIONS			
REV.	BY	DATE	REVISION
1.	MDJ	04-04-05	APPROVED
2.			
3.			

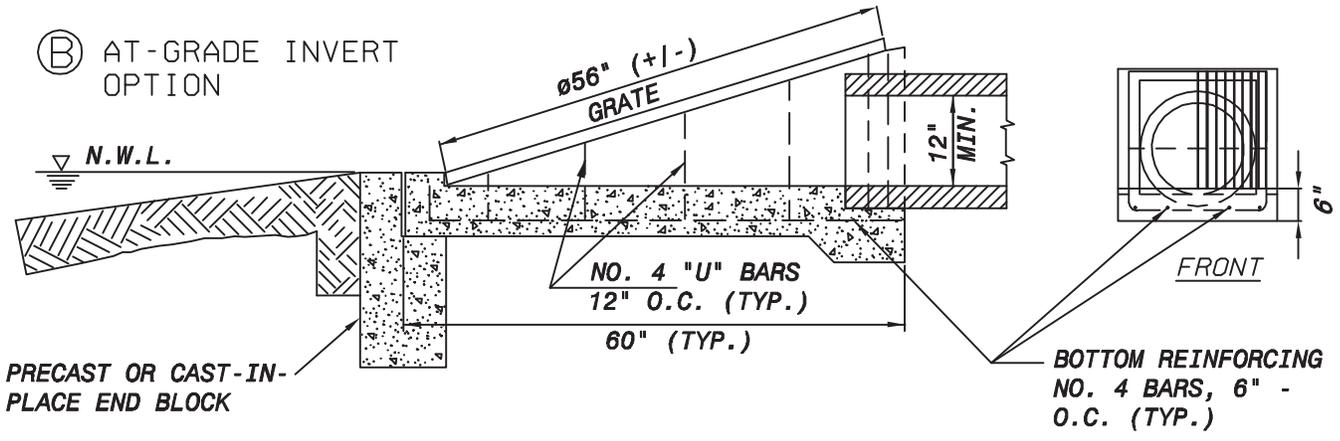
REVISIONS			
REV.	BY	DATE	REVISION
4.			
5.			
6.			

DETAIL NO.
ST-1

(A) DROP INVERT OPTION

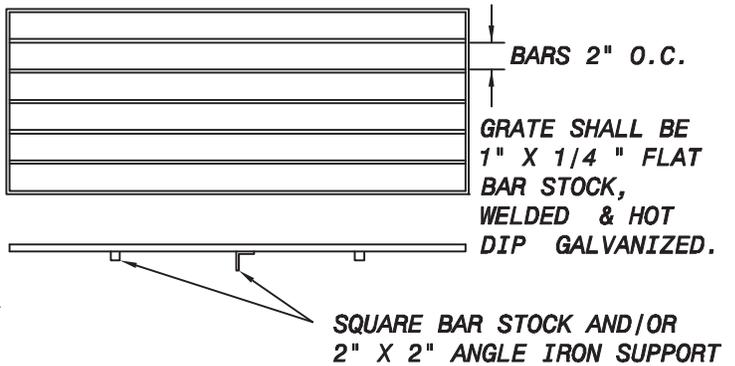


(B) AT-GRADE INVERT OPTION

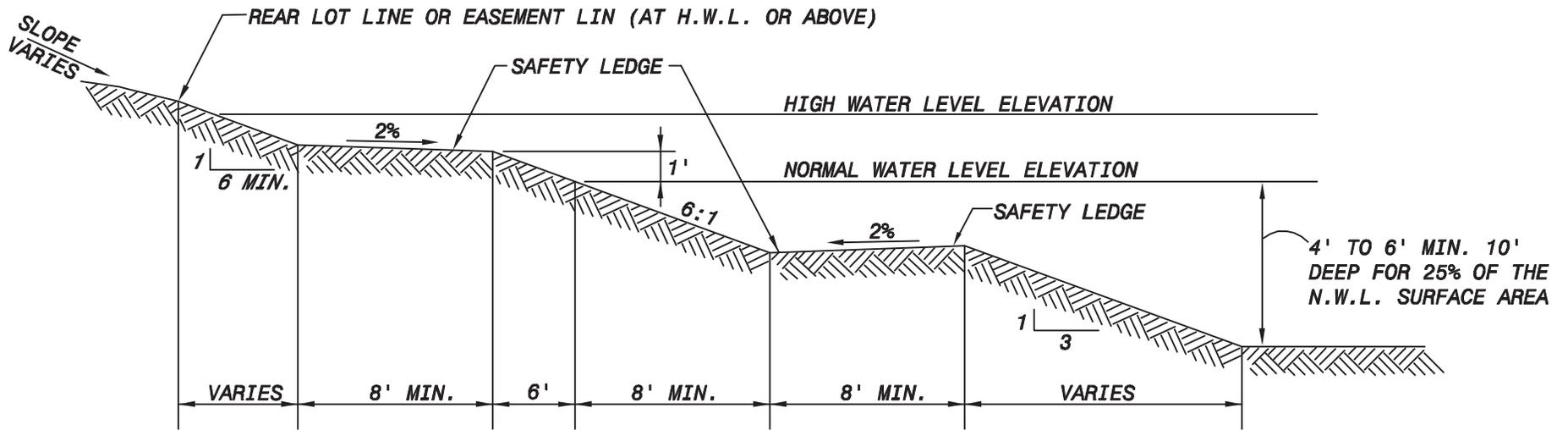


NOTES:

1. DIMENSION FOR MINIMUM 12" STANDARD OUTLET. LARGER OUTLET PIPES REQUIRE CUSTOM DESIGN.
2. ALL CONCRETE SHALL BE IDOT CLASS PC PER ARTICLES 504 AND 1020.
3. REINFORCE SIMILAR TO IDOT STD 542501 AND 542506.
4. FASTEN BAR GRATE WITH 2 1/2" x 3/8" LAG BOLTS WITH MASONRY ANCHORS.
5. FIELD MEASURE OPENING FOR GRATE PRIOR TO FABRICATION.
6. FRONT WALL OF DROP INVERT MAY BE MODIFIED FOR INSTALLATION OF AN ORIFICE ONLY WITH ENGINEERS APPROVAL.
7. SUBMIT SHOP DRAWING FOR VILLAGE APPROVAL PRIOR TO INSTALLATION.

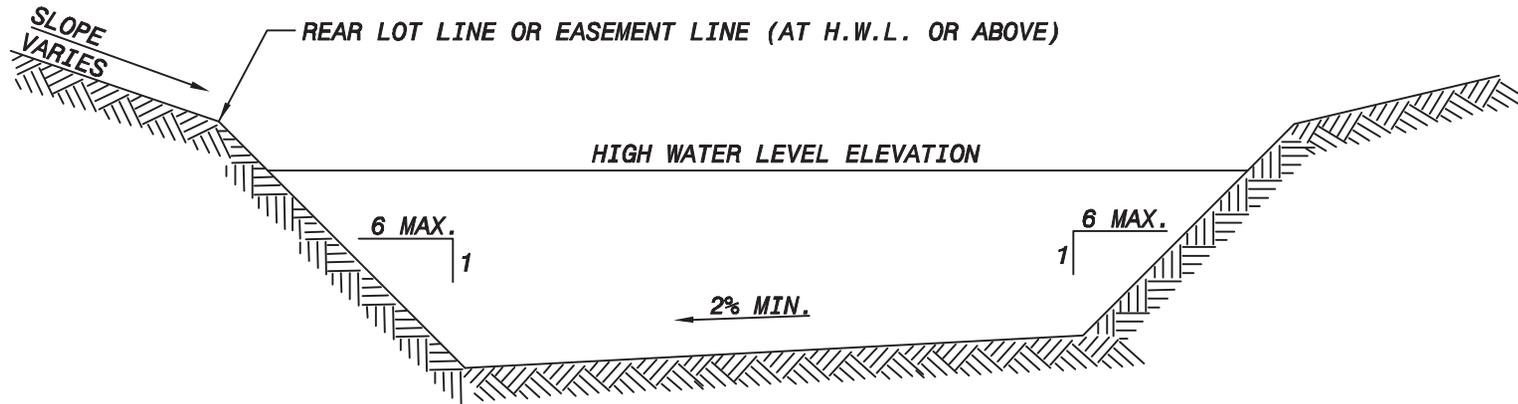


REVISIONS				REVISIONS			
REV.	BY	DATE	REVISION	REV.	BY	DATE	REVISION
1.	MDJ	04-04-05	APPROVED	4.			
2.				5.			
3.				6.			



TYPICAL DETENTION POND CROSS-SECTION - WET BASIN

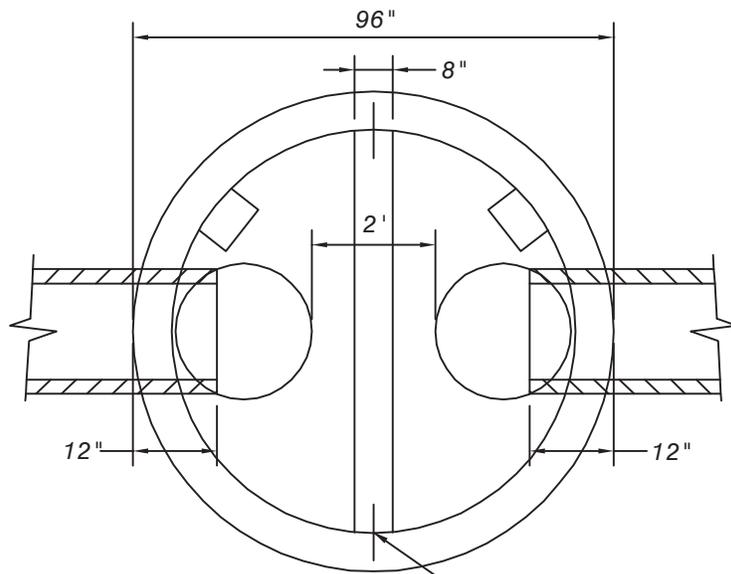
(NOT APPLICABLE FOR DRY BOTTOM DET-BASINS OR WETLANDS)



TYPICAL DETENTION POND CROSS-SECTION - DRY BASIN

(NOT APPLICABLE FOR WET BOTTOM DET-BASINS OR WETLANDS)

REVISIONS				REVISIONS			
REV.	BY	DATE:	REVISION:	REV.	BY	DATE:	REVISION:
1.	MDJ	04-04-05	APPROVED	4.			
2.				5.			
3.				6.			



#5 EPOXY COATED DOWELS
DRILL & GROUT @ 16" O.C.

TWIN NEENAH R-1700-A
FRAMES & LIDS
IMPRINTED "STORM"

RIM ELE. = _____

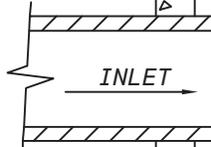
INTERNAL SPILLWAY
@ 100 YR H.W.L.
ELEV. = _____

100 YR EVENT
INV ELE. = _____
DIAMETER _____

96" MIN. PRECAST
CONCRETE CATCH BASIN
WITH 8" REINFORCED
CONCRETE BAFFLE WALL

STEPS @ 16" O.C.
BOTH SIDES

#5 EPOXY COATED BARS @ 8"
O.C. VERT & HORIZONTAL



INLET



OUTLET

2 YR EVENT
INV ELE. = _____
DIAMETER _____

3" COMPACTED
CA-6

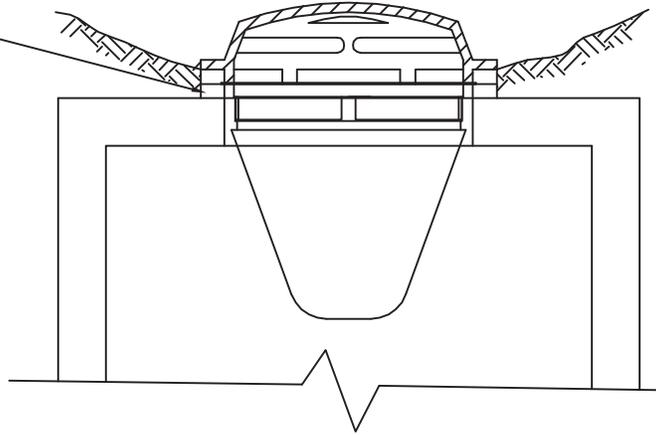
SUMP
18" MIN.

UNDISTURBED EARTH

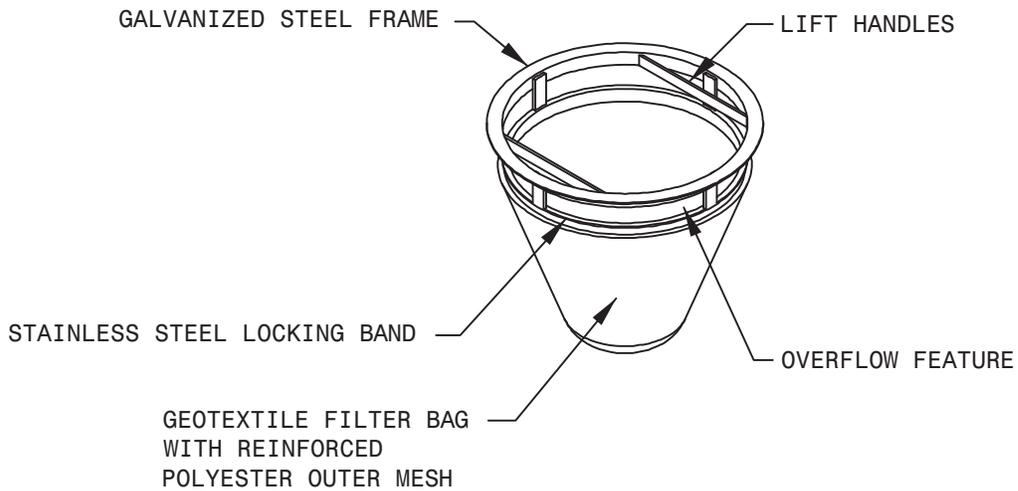
REVISIONS			
REV.	BY	DATE	REVISION
1.	MDJ	04-04-05	APPROVED
2.			
3.			

REVISIONS			
REV.	BY	DATE	REVISION
4.			
5.			
6.			

MANHOLE
ADJUSTING
RINGS



SECTION THROUGH MANHOLE



FILTER INSERT

REVISIONS			
REV.	BY	DATE:	REVISION:
1.	MDJ	04-04-05	APPROVED
2.			
3.			

REVISIONS			
REV.	BY	DATE:	REVISION:
4.			
5.			
6.			

TYPICAL REAR YARD INLET BEEHIVE NEENAH R-4340 B

**R-4340 Series
Round Beehive Grates**

Light Duty—For Ditch Drainage Construction

May be used in vitrified clay pipe bell, on a concrete catch basin, or in a cast iron frame as shown below. Effective where debris may interfere with drainage, such as at a roadside or in a median strip.

Bell and spigot vitrified clay and concrete pipe are made under many specifications and dimensions vary. Check the grate sizes in the table to be sure they will fit the pipe you are using.

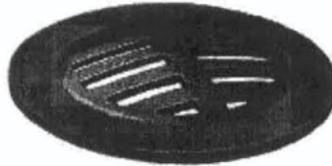
Specify:

1. Catalog number.
2. Cast iron frame if required.

Catalog No.	Dimensions in Inches							
	O Dia.	O.D. Lugs	Dia. Bhv	Ht. Bhv	No. Lugs	Size Bars	Size Op.	Pipe Size
R-4340-A	34	26 1/4	23 7/8	6	*	1	1 1/2	24
* R-4340-B	33	23	23	3	6	1 1/2	2	24
R-4340-C	33	29	23	5 3/4	4	1 1/4	1	24
R-4340-F	33	28	25	5	4	1	1	24
R-4340-F1**	25 1/2	21 3/4	17	3	4	1	1	18
R-4340-G**	28	18	19	3	3	2	1 3/4	15
R-4340-H	25	15	17	3	3	1 3/4	1 5/8	12

*Furnished with ring instead of lugs.

**Do not have frame available.

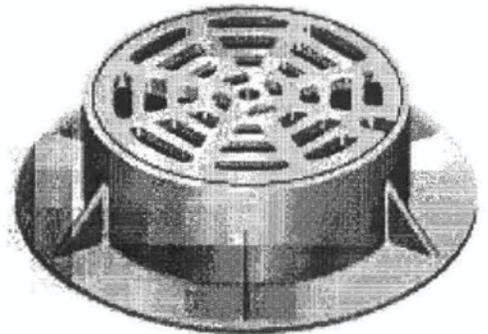
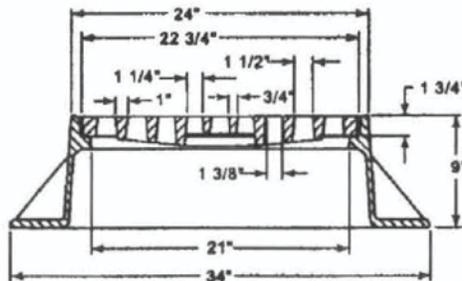


Illustrating R-4340-B

ALTERNATE REAR YARD INLET BEEHIVE NEENAH R-2504
TO BE USED ONLY IN AREAS WITH SMALL DRAINAGE TRIBUTARY AREAS (LOW SPOTS, SHORT SWALES, ETC.) APPROVAL REQUIRED BY VILLAGE ENGINEER.

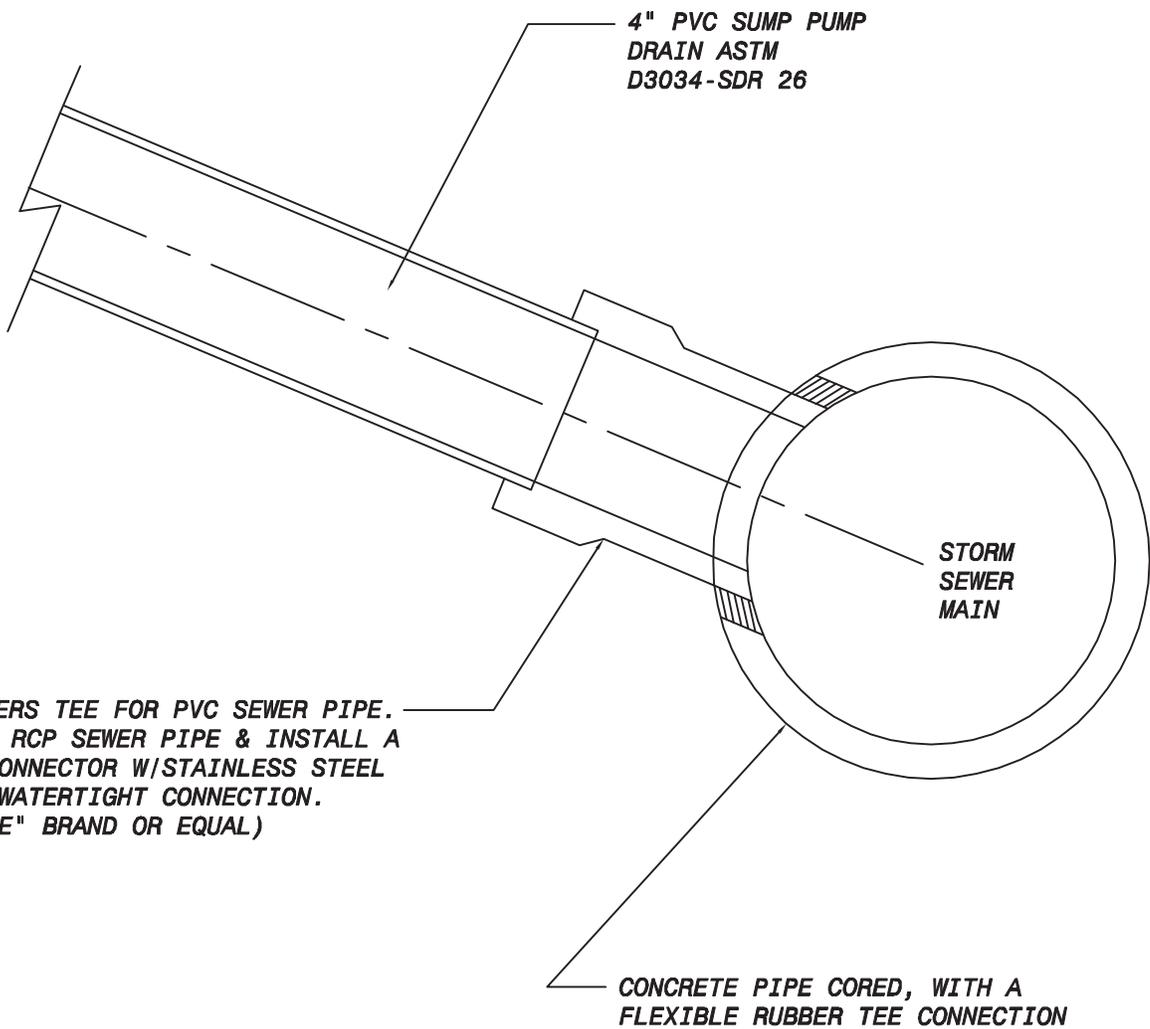
**R-2504
Catch Basin Frame and Grate**

Heavy Duty



Uses R-1713 frame.

REVISIONS				REVISIONS			
REV.	BY	DATE:	REVISION:	REV.	BY	DATE:	REVISION:
1.	MDJ	04-04-05	APPROVED	4.			
2.				5.			
3.				6.			

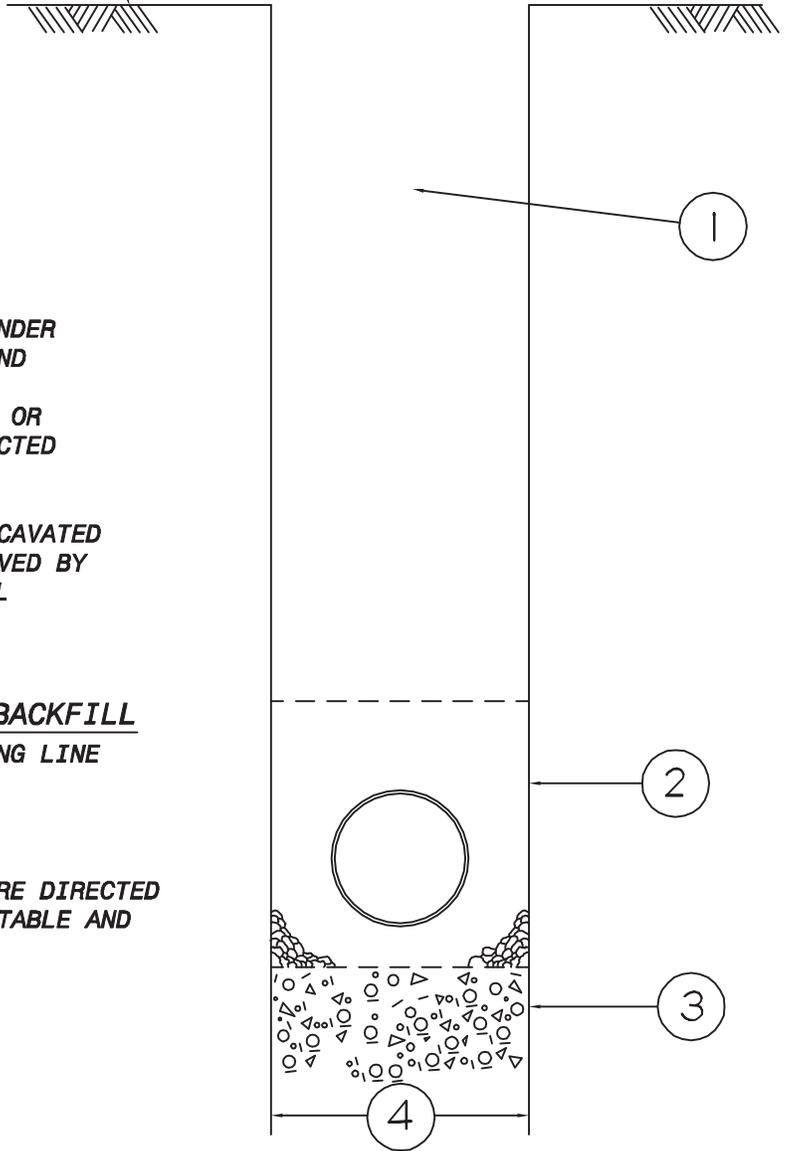


1. MANUFACTURERS TEE FOR PVC SEWER PIPE.
2. FIELD CORE RCP SEWER PIPE & INSTALL A FLEXIBLE CONNECTOR W/STAINLESS STEEL BANDS FOR WATERTIGHT CONNECTION. ("KOR-N-TEE" BRAND OR EQUAL)

NOTE:
NOT TO BE INSTALLED UNDER DRIVEWAY OR SIDEWALK

REVISIONS				REVISIONS			
REV.	BY	DATE:	REVISION:	REV.	BY	DATE:	REVISION:
1.	MDJ	04-04-05	APPROVED	4.			
2.				5.			
3.				6.			

FINISHED GRADE



① SELECT TRENCH BACKFILL

GRANULAR TRENCH BACKFILL TO BE USED UNDER EXISTING OR PROPOSED PAVEMENT, CURB AND GUTTER, SIDEWALK OR WITHIN 2' OF ANY EXISTING/ OR PROPOSED CURB AND GUTTER OR SIDEWALK, SHALL BE MECHANICALLY COMPACTED CA-6, GRADE #9

MECHANICALLY COMPACTED BACKFILL OF EXCAVATED MATERIALS IN OTHER LOCATIONS IF APPROVED BY THE ENGINEER. REFER TO TRENCH BACKFILL SPECIAL PROVISIONS FOR MATERIALS AND COMPACTION REQUIREMENTS.

② PIPE BEDDING & INITIAL TRENCH BACKFILL

#6 WASHED STONE FROM 6" BELOW TO SPRING LINE OF PIPE.

③ UNSUITABLE MATERIALS

IF ENCOUNTERED - SHALL BE REMOVED WHERE DIRECTED BY THE ENGINEER AND REPLACED WITH SUITABLE AND COMPACTED MATERIAL

④ TRENCH WIDTH

MINIMUM = PIPE O.D. + 12"
MAXIMUM = PIPE O.D. + 18"

NOTES:

1. ALL CA-6 MATERIAL TO BE IDOT APPROVED.

REVISIONS				REVISIONS			
REV.	BY	DATE:	REVISION:	REV.	BY	DATE:	REVISION:
1.	MDJ	04-04-05	APPROVED	4.			
2.				5.			
3.				6.			

Miscellaneous Water Main Notes

Water Main

1. Water Main Pipe Materials
 - a. PVC SDR 18 AWWA C-909 Pipe or Class 52 Ductile Iron cement lined ANSI/AWWA c104/A21.4 Pipe.
 - b. Water main pipe must have a minimum of five (5)-feet six (6)-inches cover per the Trench Material Detail.
2. Restrained Joints
 - a. All mechanical joint fittings are to be restrained with mega-lugs produced by EBBA Iron Inc. or approved equivalent. This shall be for C-909 Pipe or Class 52 Ductile Iron Pipe.
 - b. All mechanical joint fittings to be assembled with stainless steel Teflon coated nuts and bolts.
 - c. All mechanical joint fittings must contain zinc anode (6 ounce minimum) caps attached to every other bolt of each fitting (see detail.)
3. Tracer Wire
 - a. Tracer wire Copperhead *Soloshot*™ 12 AWG high strength copper clad steel conductor (HS-CCS), insulated with a 45-mil high density, high molecular weight polyethylene jacket and rated for direct burial use at 30 volts.
 - b. Tracer wire must be secured to the top of water main pipe at intervals not to exceed four (4)-feet with an approved adhesive tape.
 - c. Tracer connectors shall be as specified by the client Copperhead “Snakebite”™ twist lock LSC, part #LSC1230B) and must be brought to bottom of frame in valve vaults.
 - d. Fire hydrants shall include magnetized tracer boxes (“Snake Pit”™) be installed as shown on the plan details.
 - e. Tracer wire must be secured to the top of valve vaults (per detail.)

Fire Hydrants

1. Hydrant Materials
 - a. The Fire Hydrant must be Mueller Super Centurion 250, A-423 Model.
 - b. All hydrants shall be “Safety Red.”
 - c. The below grade nuts & bolts on the hydrant must be stainless steel installed from the manufacturer.
 - d. Water main “spool” pieces of pipe between the branch tee and the hydrant shoe must be made of ductile iron pipe material.

- e. Fire hydrant tees must be installed in a horizontal position to the water main. Hydrant auxiliary value boxes of excessive depth must have an extension on the value operative nut to permit clear operation above the hydrant.
- f. Bury depth of hydrant must be parallel to profile grade line. Grade line on hydrant must meet final ground elevation. Field adjustments must include hydrant bury depth.

2. Hydrant Spacing and Locations

- a. Fire hydrants shall be installed along all water mains constructed in public right-of-way, at a maximum spacing of 350-feet. However, fire hydrants must be installed on lot lines in single-family residential installations.
- b. Fire hydrants must be at least 20-feet from any intersection.
- c. Hydrants shall be installed no closer than three (3)-feet to the back of curb from the steamer port (pumper nozzle), nor further than eight (8)-feet from the back curb unless otherwise approved by the Water Superintendent. No hydrant shall be installed within 48-inches of any obstruction, nor shall any obstruction be placed within 48-inches of an existing hydrant. A minimum five (5)-foot distance from any driveway entrance must be maintained.
- d. Fire Department review required for distance from building.

Valves

1. Materials

- a. All water valves must be Mueller Brand (per detail.)

2. Spacing and Location

- a. Water main valves shall be spaced at a minimum of 400-feet, or at a distance such that in the event of a required shut down of the public main, no more than 24 single family residential units shall be out of water service, whichever results in the shortest valve spacing or as approved by the Public Works Department. Valve vaults shall not be allowed within driveways or sidewalks.

Connection to Existing Mains

- 1. All connections to the Village water distribution system shall be made under full water service pressure in accordance with Village Engineering Design Details or as required.
- 2. Materials
 - a. When connection is size on size piping, a two (2) piece Ductile Iron Sleeve is required.
 - b. When branch size is smaller than existing pipe, a stainless steel tapping sleeve will be used.
 - c. All tapping sleeves must be air tested prior to tapping water main.

Water Service Lines (Two (2)-Inches and Smaller)

1. Materials



- a. A water service line is designed to deliver water from a public water distribution main from the main to a single building, and includes corporation stop, curb stop, and service box. Service lines shall be Type K copper and installed approximately at a right angle to the centerline of the right-of-way. Service lines shall be continuous with no splices between either the corporation and the curb stop or the curb stop and the water meter.
 - b. The water service tap will include a full circle stainless steel tapping sleeve.
 - c. All fittings will consist of a flare by flare connection or a compression by compression connection.
 - d. Contractor/developer must complete all work related to the service line.
2. Spacing and Locations
- a. Service connections must maintain a three (3)-foot separation from any other service connection, pipe bell or fitting, valve vault, and/or fire hydrant.
3. Inspections Required
- a. The Village of Mundelein Water Superintendent or his designate must witness the tap/connection to water main. For taps on PVC water main, a coupon from the tap must be provided to the inspector. 24 hour advance notice is required.
 - b. The Village of Mundelein Plumbing Inspector or his designate must inspect the service line from the corporation stop to the curb stop. 24 hour advance notice is required.
 - c. The Village of Mundelein Plumbing Inspector or his designee must inspect the service line from the curb stop to the water meter. 24 hour advance notice is required.
4. Special Notes
- a. The water service line inside of building must have a minimum of 12 inches of Type K copper prior to the first fitting. The water meter must be set within 18-inches after entering the building.
 - b. The water service must enter the front side of a single family residential building upon which it services.

Water Service/Fire Lines (Larger Than Two (2)-Inches)

1. Water services that are larger than two (2)-inch Type K copper services shall be a minimum size of four (4)-inch water main pipe. (Three (3)-inch piping is not permitted.) These water services can be a combination system for both domestic use and fire protection.
2. Materials
 - a. Water service lines larger than two (2)-inches must follow all the materials, procedures, policies, and details for water main installations.
3. Fire Protection
 - a. Any water service line designated for fire protection must be sized appropriately in order to

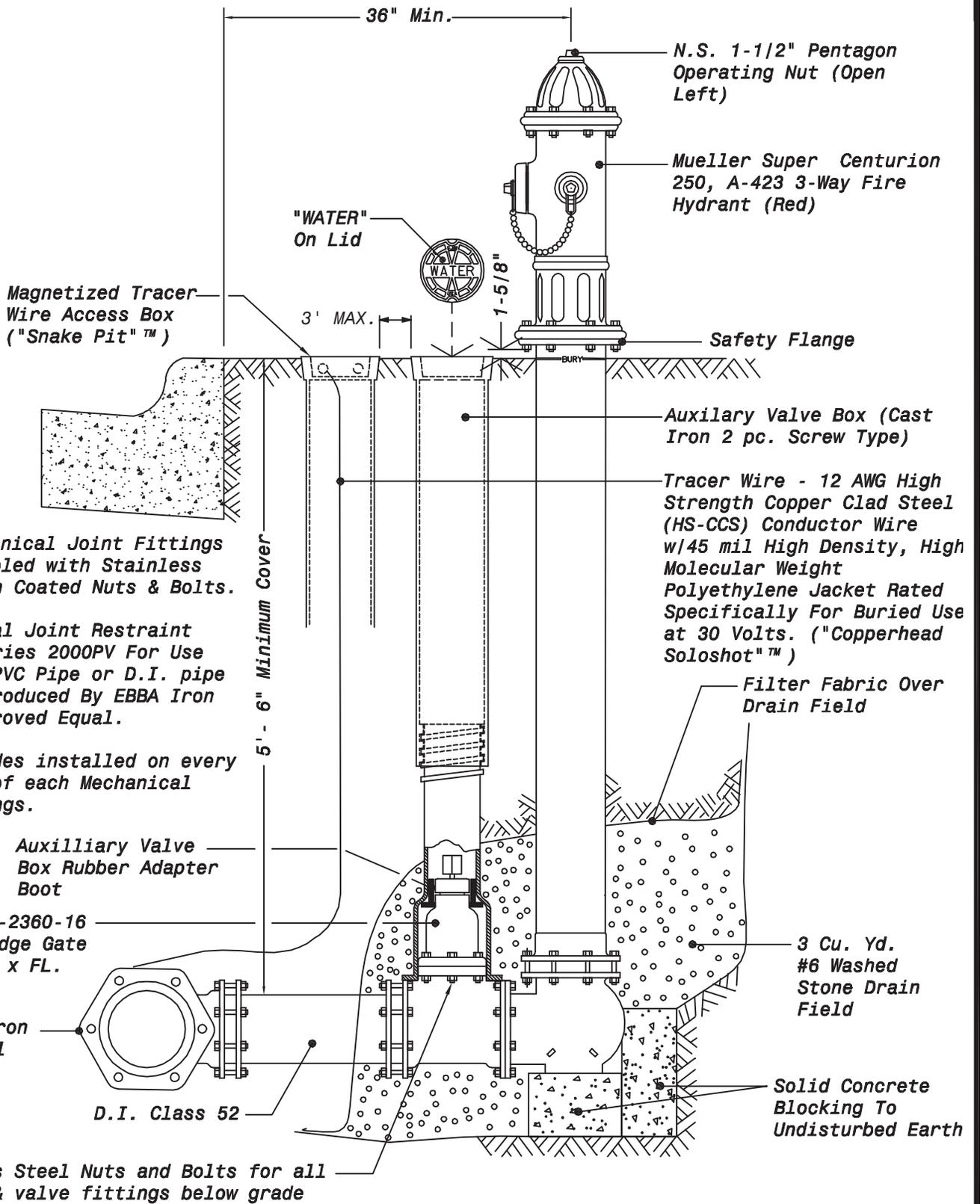
sufficiently supply water for fire protection based on the fire flow requirement of the building. Documentation must be submitted and approved by the Village of Mundelein Fire Department.

4. Combination Fire/Domestic Usage

- a. Any water service line designated for both fire and domestic usage must meet the following requirements.
- b. Water service line must be sized to meet the fire protection requirements and domestic usage of the building.
- c. Water service line must enter the building in a designated Meter/Fire Sprinkler Room. Meter/Fire Sprinkler Room must meet Village of Mundelein Code 16.08.260(f) meter rooms.
- d. Upon entering Meter/Fire Sprinkler Room, the domestic service will branch off from the fire service with valves installed on the fire line and domestic service prior to pressure testing.

5. Inspections and Testing

- a. The inspections and testing of the water service for fire/domestic usage shall follow the guidelines and methods for water main inspections and testing procedures.



REVISIONS				REVISIONS			
REV.	BY	DATE	REVISION	REV.	BY	DATE	REVISION
1.	MDJ	04-04-05	APPROVED	4.			
2.	JRB	04-14-15	APPROVED	5.			
3.				6.			

NEENAH CATALOG NO. R-1713 MANHOLE FRAME, TYPE "B" SELF-SEALING SOLID LID W/ "WATER" IMPRINT (OR EQUIVALENT EAST JORDAN IRON WORKS FRAME AND LID)

SECURE TRACER WIRE TO TOP OF STRUCTURE W/ TAPCON SCREW (1/2" MIN. DIA.)

PRE-CAST CONCRETE ADJUSTING RINGS (IF NEEDED)

MAX. ALLOWABLE ADJUSTMENT UTILIZING RINGS IS 8". IF GREATER ADJUSTMENT IS NEEDED, IT MUST BE ACCOMPLISHED UTILIZING 5' DIA. PRE-CAST BARREL SECTION.

BITUMINOUS GASKET MATERIAL

STEPS AT 16" O.C. NEENAH R-1980-1

TRACER WIRE - 12 AWG HIGH STRENGTH COPPER CLAD STEEL (HS-CCS) CONDUCTOR WIRE W/ 45 MIL HIGH DENSITY, HIGH MOLECULAR WEIGHT POLYETHYLENE JACKET RATED SPECIFICALLY FOR BURIED USE AT 30 VOLTS. ("COPPERHEAD SOLOSHOT"™)

5" MIN.

MUELLER CATALOG NO. A-2360 RESILIENT WEDGE GATE VALVE M.J. X M.J. (FOR SIZES THRU 12")

BITUMINOUS GASKET MATERIAL

5' - 6" MINIMUM BURY

TRACER CONNECTORS - COPPERHEAD "SNAKEBITE"™ - TWIST LOCK (#LSC1230B)

C-900, SDR 18 PVC Pipe OR D.I. CLASS 52

MECHANICAL JOINT RESTRAINT GLAND

6" GRANULAR BED

60" MIN.

SOLID CONCRETE BLOCK

NOTE:

- 1) All Mechanical Joint Fittings To Be Assembled with Stainless Steel Teflon Coated Nuts and Bolts.
- 2) Mechanical Joint Restraint Shall Be Series 2000PV For Use With C-900 PVC Pipe & D.I.P., Produced By EBBA Iron Inc. Or Approved Equal.
- 3) Zinc Anodes installed on every other bolt of each mechanical joint fitting.



VILLAGE OF MUNDELEIN
ENGINEERING DETAILS

TYPICAL VALVE VAULT
(5' I.D.)

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1.	MDJ	04-04-05	APPROVED	4.			
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3.				6.			

DETAIL NO.
W-2

NEENAH CATALOG NO. R-1713 MANHOLE FRAME, TYPE "B" SELF-SEALING SOLID LID W/ "WATER" IMPRINT (OR EQUIVALENT EAST JORDAN IRON WORKS FRAME AND LID.)

SECURE TRACER WIRE TO TOP OF STRUCTURE W/TAPCON SCREW (1/2" MIN. DIA.)

PRE-CAST CONCRETE ADJUSTING RINGS (IF NEEDED) MAX. ALLOWABLE ADJUSTMENT UTILIZING RINGS IS 8". IF GREATER ADJUSTMENT IS NEEDED, IT MUST BE ACCOMPLISHED UTILIZING 5' DIA. PRE-CAST BARREL SECTION.

BITUMINOUS GASKET MATERIAL

STAINLESS STEEL TAPPING SLEEVE (WHEN BRANCH IS OF LESSER SIZE THAN RUN). D.I.P. TAPPING SLEEVE IS TO BE USED FOR "SIZE-ON-SIZE" PRESSURE TAPS.

STEPS AT 16" O.C. NEENAH R-1980-1

TRACER WIRE - 12 AWG HIGH STRENGTH COPPER CLAD STEEL (HS-CCS) CONDUCTOR WIRE W/45 MIL HIGH DENSITY, HIGH MOLECULAR WEIGHT POLYETHYLENE JACKET RATED SPECIFICALLY FOR BURIED USE AT 30 VOLTS. ("COPPERHEAD SOLOSHOT"™)

60"

BITUMINOUS GASKET MATERIAL

MUELLER T-2360 RESILIENT WEDGE TAPPING VALVE M.J. X FL ENDS

C-900, SDR 18 PVC Pipe or D.I. Class 52

Mechanical Joint Restraint Gland

6" SPLIT CONCRETE BASE

6" GRANULAR BED

SOLID CONCRETE BLOCK

NOTE:

- 1) 72" VAULT WHEN PRESSURE CONNECTION IS LARGER THAN 10"
- 2) ALL JOINT FITTINGS TO BE ASSEMBLED WITH STAINLESS STEEL TEFLON COATED NUTS AND BOLTS.
- 3) ZINC ANODES INSTALLED ON EVERY OTHER BOLT OF EACH MECHANICAL JOINT FITTING.



VILLAGE OF MUNDELEIN
ENGINEERING DETAILS

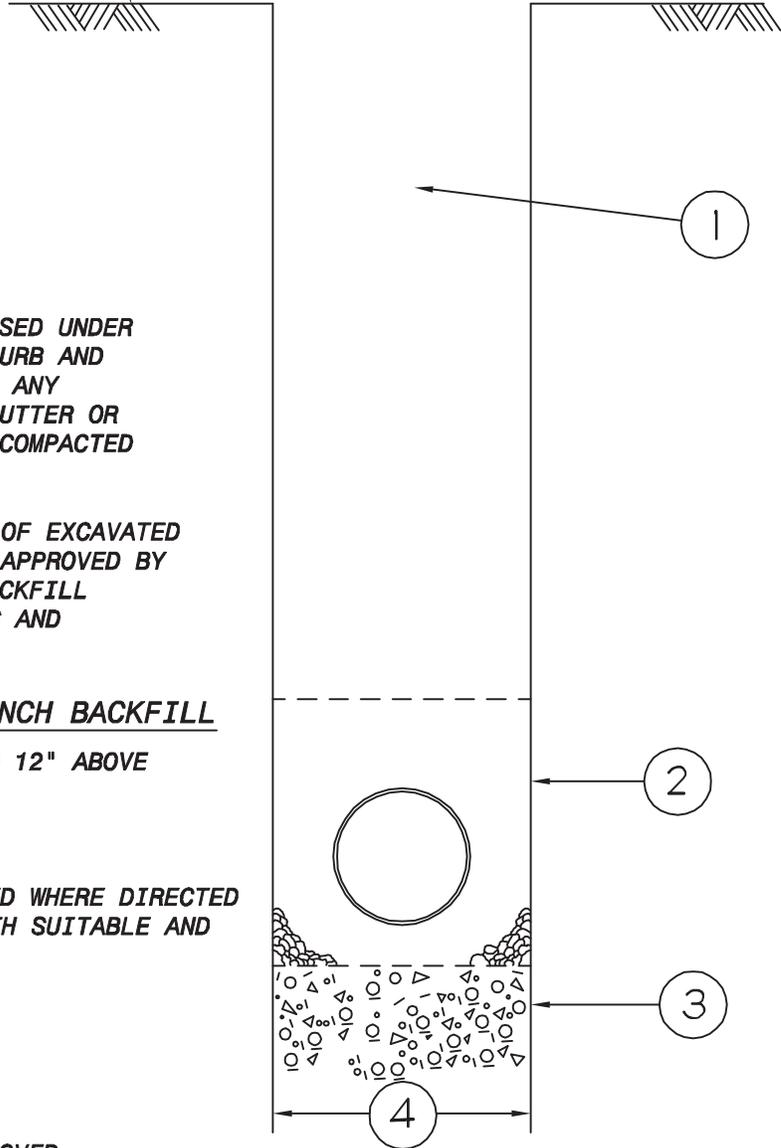
WATERMAIN PRESSURE
CONNECTION TAPPING
VALVE W/5' DIA. VAULT
(FOR WATERMAINS
10" & SMALLER)

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DETAIL NO.
W-3

FINISHED GRADE



① SELECT TRENCH BACKFILL

GRANULAR TRENCH BACKFILL TO BE USED UNDER EXISTING OR PROPOSED PAVEMENT, CURB AND GUTTER, SIDEWALK OR WITHIN 2' OF ANY EXISTING/ OR PROPOSED CURB AND GUTTER OR SIDEWALK, SHALL BE MECHANICALLY COMPACTED CA-6, (NON-LIMESTONE)

MECHANICALLY COMPACTED BACKFILL OF EXCAVATED MATERIALS IN OTHER LOCATIONS IF APPROVED BY THE ENGINEER. REFER TO TRENCH BACKFILL SPECIAL PROVISIONS FOR MATERIALS AND COMPACTION REQUIREMENTS.

② PIPE BEDDING & INITIAL TRENCH BACKFILL

#6 WASHED STONE FROM 6" BELOW TO 12" ABOVE TOP OF PIPE

③ UNSUITABLE MATERIALS

IF ENCOUNTERED - SHALL BE REMOVED WHERE DIRECTED BY THE ENGINEER AND REPLACED WITH SUITABLE AND COMPACTED MATERIAL

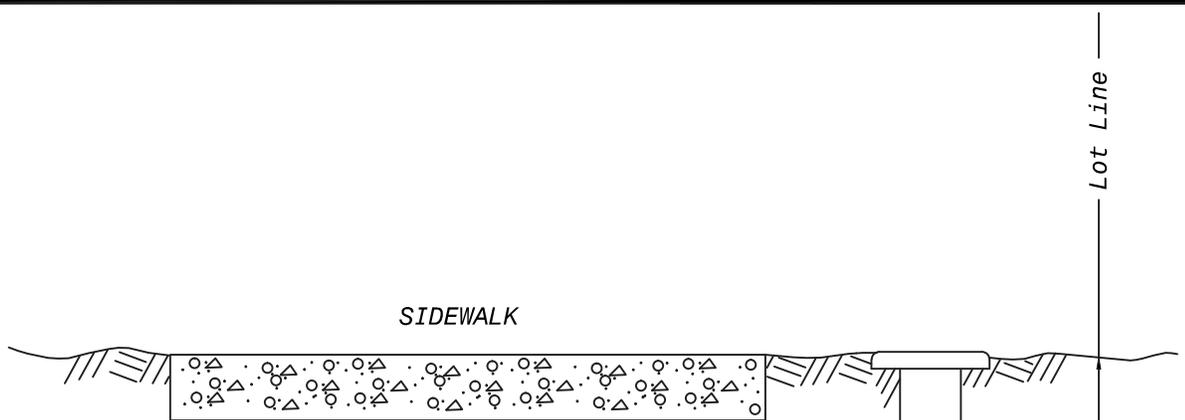
④ TRENCH WIDTH

MINIMUM = PIPE O.D. + 12"
MAXIMUM = PIPE O.D. + 36"

NOTES:

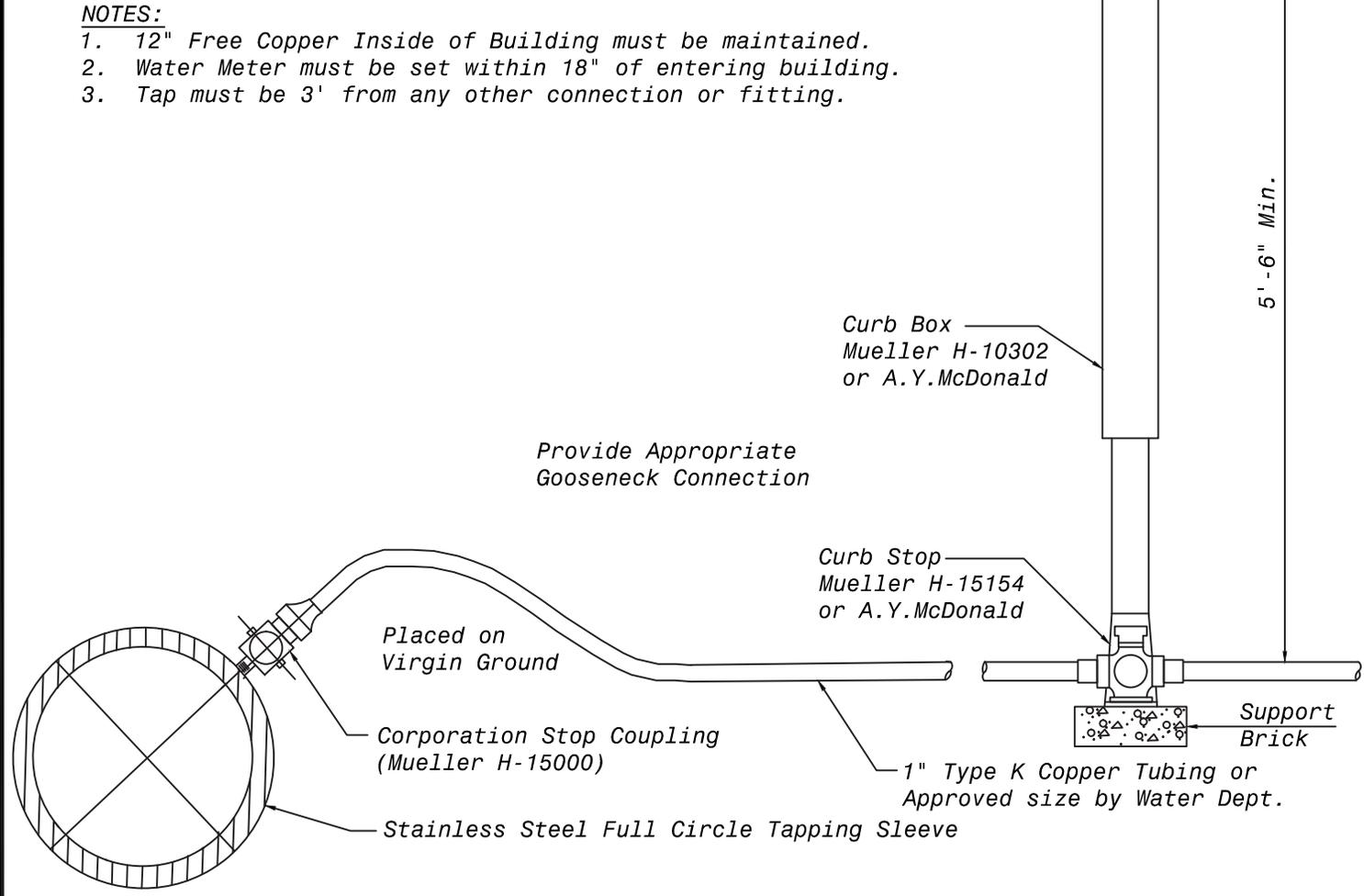
1. ALL CA-6 MATERIAL TO BE IDOT APPROVED.

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NOTES:

- 1. 12" Free Copper Inside of Building must be maintained.
- 2. Water Meter must be set within 18" of entering building.
- 3. Tap must be 3' from any other connection or fitting.



NOTES:

- 1. No Couplings permitted between Corporation and Curb Stop.
- 2. No Couplings permitted between curb stop and building
- 3. No Limestone backfill shall come in contact with copper or brass.
- 4. B-Boxes must be located in a grassy non-paved area.



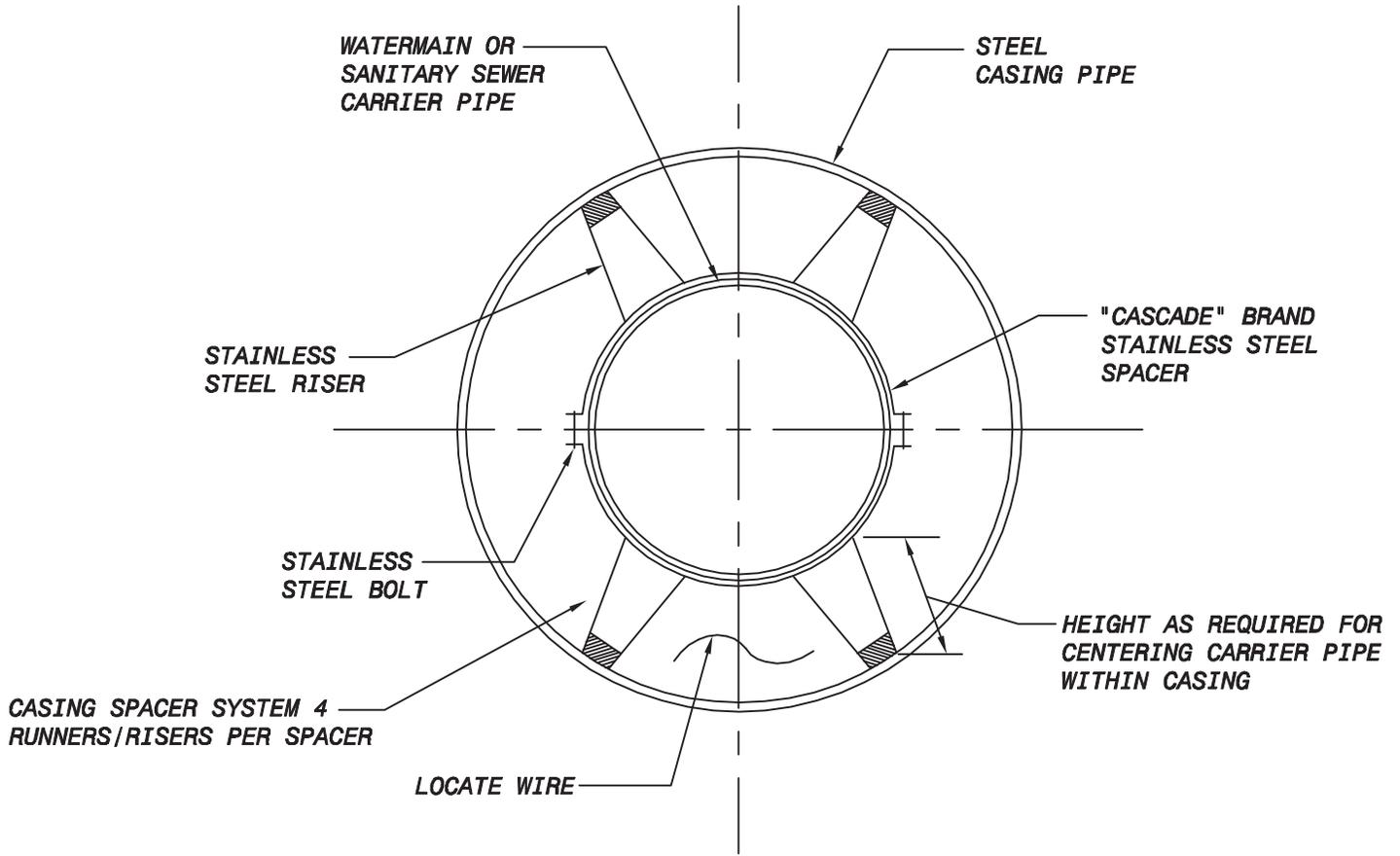
VILLAGE OF MUNDELEIN
ENGINEERING DETAILS

WATER SERVICE
CONNECTION

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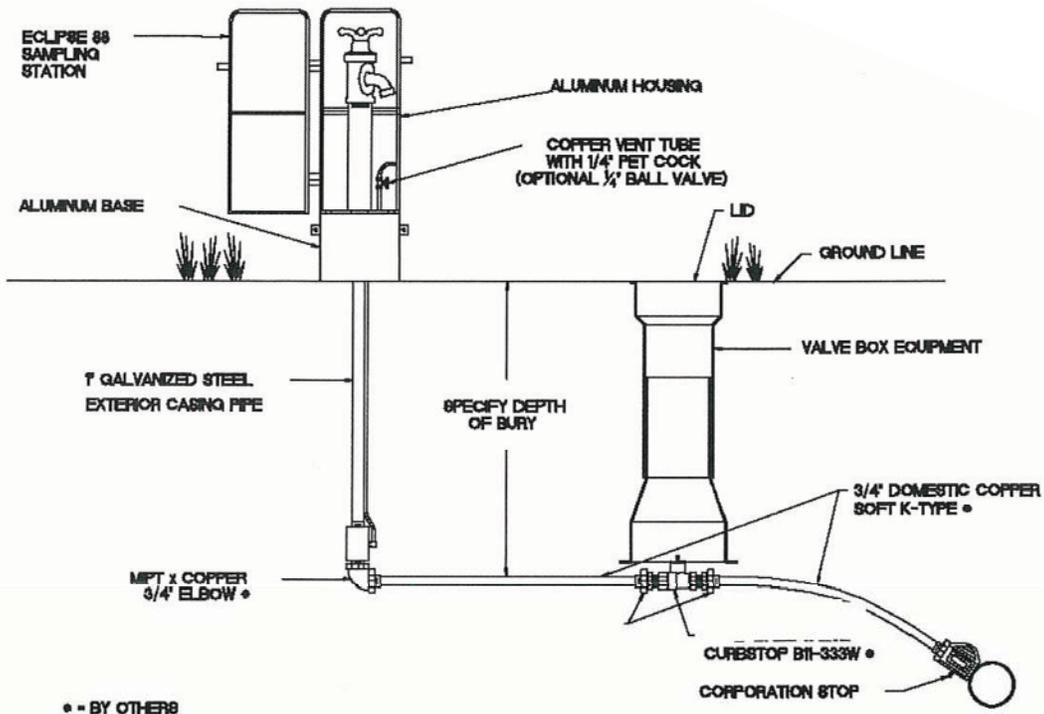
DETAIL NO.
W-5



CARRIER PIPE I.D.	CASING PIPE I.D.	PIPE T
6"	20"	0.375"
8"	20"	0.375"
12"	24"	0.500"
ADDITIONAL SIZES PER VILLAGE APPROVAL		

- NOTE:**
- 1) NUMBER OF SPACERS REQUIRED FOR EACH SECTION OF PIPE PER MANUFACTURES SPECIFICATIONS.
 - 2) BRICK AND MORTAR ENDS OF PIPE.
 - 3) NO SAND FILLER REQUIRED.
 - 4) LOCATING WIRE WITH PIPE.

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Sampling Stations shall be 6' bury, with a 3/4" FIP Inlet, and a (3/4" hose or unthreaded) nozzle.

All stations shall be enclosed in a lockable, nonremovable, aluminum-cast housing.

When opened, the station shall require no key for operation, and the water will flow in an all brass waterway.

All working parts will also be of brass and be removable from above ground with no digging. Exterior piping shall be brass or galvanized.

A copper vent tube will enable each station to be pumped free of standing water to prevent freezing and to minimize bacteria growth.

Eclipse No. #88 Sampling Station shall be manufactured by Kupferle Foundry, St. Louis, MO 63102.

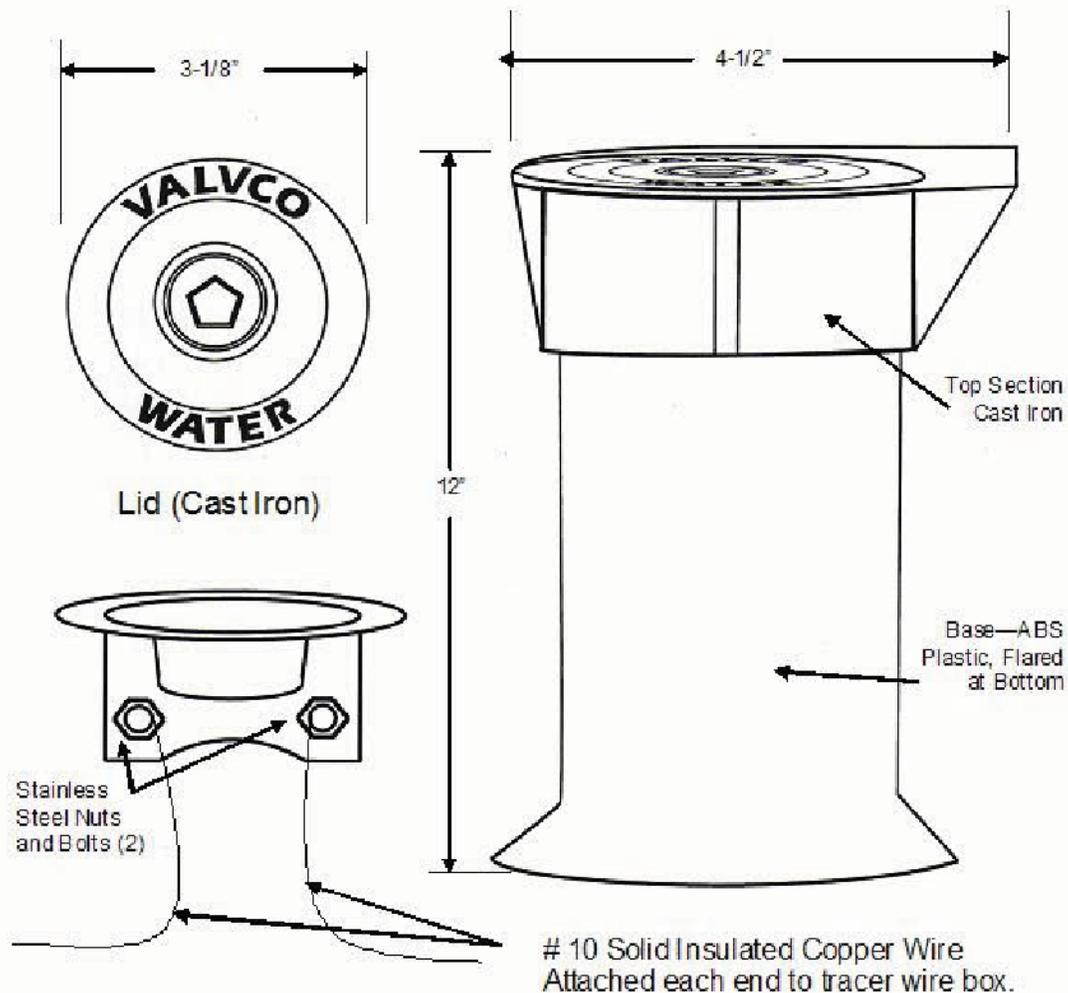
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Valvco

Tracer Wire Access Box Specification and Submittal

Tracer wire shall be terminated at each end in a flush mount access box. Access Box shall have a cast iron lid that can be locked and opened with a standard pentagon head key wrench. Tracer wires shall be stripped and attached to stainless steel screws mounted to the underside of the lid. Sufficient slack shall be left in wire length so cover can be lifted with wire intact. Tracer wire access box shall be located directly in front of fire hydrants or where indicated on drawings and be set to grade. Tracer wire access box shall be of domestic manufacture and be equal to Valvco TWAB.

Contact: Fischer, Harris & Associates for information 800-224-7579.



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Water Main Testing Specifications

Pressure and Leakage Test

1. Testing Procedures
 - a. All pressure leakage testing shall be tested against installed pipe, fittings, valves, joints, and fire hydrants up to nozzles.
2. Valve Operations
 - a. Village of Mundelein Water Division personnel are the only individuals authorized to operate any water valves.
3. Taps for Testing
 - a. Contractor/developer is required to provide one (1)-inch service taps in manholes for test gauges, flushing needs, and for disinfection at each end of the pipe test section.
 - b. Service tap shall include a full circle stainless steel tapping sleeve.
 - c. Contractor shall make the tap connection using an approved tapping tool on PVC C-900 piping, contractor shall provide removed coupon to Village of Mundelein Water Division Inspector.
 - d. Contractor shall schedule an appointment with the Village of Mundelein Water Division for the witnessing/inspection of all taps. 24-hour notice prior to appointment must be provided to the Village of Mundelein Water Division.
 - e. Contractor shall remove copper tube with goose neck assembly from manholes upon completion of testing and chlorination procedures.
4. Air Removal
 - a. Before applying the specified test pressure, air shall be expelled completely from the section of piping under test. Air removal will be done in conjunction with the flushing procedures of the water main (see Flushing Requirements.)
5. Allowable Leakage
 - a. No pipe installations will be accepted if the leakage is greater than that determined by the following formula:

Inch-pound units, $\frac{L}{133,200} = \frac{SDVP}{133,200}$ L=allowable leakage, in gallons per hour
S=length of pipe tested, in feet
D=nominal diameter of the pipe, in inches
P=average test pressure during the leakage test, in pounds per square inch (gauge)

In metric units $\frac{LM}{715,317} = \frac{SDVP}{715,317}$ LM=allowable leakage, in liters per hour
S=length of pipe tested, in meters
D=nominal diameter of the pipe, in millimeters
P=average test pressure during the leakage test, in kPa

These formulas are based on an allowable leakage of 11.85 gpd/mi/in. of nominal diameter at a pressure of 150 psi.

When testing against closed metal-seated valves, an additional leakage per closed valve of 0.0078 gal/b/in. of nominal valve size shall be allowed. When hydrants are in the test section, the test shall be made against the main valve in the hydrant.

6. Acceptance of Installation

- a. Acceptance shall be determined as the basis of allowable leakage or the procedures established by the Village of Mundelein Engineering Department. If any test of laid pipe discloses leakage greater than that specified, repairs or replacements shall be accomplished in accordance with the Specifications.
- b. All visible leaks are to be repaired regardless of the amount of leakage.
- c. Dye or any other form of coloring the water will not be introduced into the water main for the purpose of locating leaks.

Disinfection of Water Mains

1. Flushing Water Main

- a. Sections of pipe to be disinfected shall first be flushed to remove any solids or contaminated material that may have become lodged in the pipe. Fire hydrants in these sections will be flushed using either the two and a half (2 ½)-inches nozzle or the pumper nozzle to develop a velocity of at least two and five-tenths (2 5/10)-feet per second in the main.
- b. All fire hydrants will be flushed and operated in the section of water main to be tested and disinfected.
- c. Village of Mundelein Water Division personnel are the only individuals authorized to operate any water valves.
- d. All valves that are closed will have a tap with copper tube and goose neck assembly installed in the vault for the purpose of flushing, and disinfecting the water main to the furthest end point of each section being tested.

2. Requirement of Chlorine

Before being placed into service, all new mains and repaired portion of, or extensions to existing mains shall be chlorinated so that the initial chlorine residual is not less than 50 mg/l and that a chlorine residual of not less than 25 mg/l remains in the water after standing 24 hours in the pipe.

a. Liquid Chlorine

A chlorine gas-water mixture shall be applied by means of a solution-feed chlorinating device, or the dry gas may be fed directly through proper devices for regulating the rate of flow and providing effective diffusion of the gas into the water within the pipe being treated. Chlorinating devices for feeding solutions of the chlorine gas, or the gas itself, must provide means for preventing the backflow of water into the chlorine.

b. Chlorine- Bearing Compounds in Water

This method must have prior approval from the Village of Mundelein Water Superintendent before introduction. A mixture of water and high-test calcium hypo chlorite (65-70% Chlorine) may be substituted for the chlorine gas water mixture. The dry powder shall first be mixed as a paste and then thinned to a one (1) percent chlorine solution by adding water to give a total quantity of seven and five-tenths (7 5/10) gallons of water per pound of dry powder. This solution shall be injected in one (1) end of the section of main to be disinfected while filling the main with water in the amounts as shown in the table which follows:

Chlorine Requirements to Produce to mg/1 Concentration in 100-feet of Pipe – By Diameter		
Pipe Size In Inches	100 % Chlorine, Lb.	1 % Chlorine Solution, Gals.
4	0.027	0.33
6	0.061	0.73
8	0.108	1.30
10	0.170	2.04
12	0.240	2.88

c. **Tablet Disinfection**

This method must have prior approval from Village of Mundelein Water Superintendent before introduction. Since preliminary flushing must be eliminated in using this method, it should be utilized only when scrupulous cleanliness has been used in construction. It shall not be used if trench water or foreign material has entered the main or if the water is below 41° F, or if the piping length exceeds 50 linear feet.

Tablets should be placed in each section of pipe, hydrants, hydrant branches, and other appurtenances. Tablets must be at the top of the main and shall be attached by an adhesive approved by the Village Water Superintendent. Tablets in joints between pipe sections, hydrants, hydrant branches, or appurtenances are to be crushed and placed inside the annular space, rubbed like chalk in butt ends of sections to coat them if the type of assembly does not permit crushing.

In filling a section of piping with water when using the tablet method water velocity shall be less than one (1)-foot per second.

No. of 5-Grain Hypochlorite Tablets per Dosage of 50 MG/L per Length of Pipe Section					
Pipe Size (Inches)	Length of Pipe Section (Feet)				
	Up to 13	18	20	30	40
2	1	1	1	1	1
4	1	1	2	2	2
6	2	2	3	3	4
10	3	5	7	7	9
12	5	6	10	10	14

3. **Point of Application**

The preferred point of application of the chlorinating agent is at the beginning of the pipeline extension or any valved section of it, and through a corporation stop inserted in the pipe.

- a. The contractor will install corporation cocks with a copper tube gooseneck assembly for the purpose of disinfecting and as sample collection point at each branch, dead end, or a location which has a closed valve. Fire hydrants will be disinfected as part of this procedure.
- b. At a point not to exceed five (5)-feet downstream from the beginning of the new main the water entering the new main will receive a dose of chlorine fed at a constant rate such that the

water will have not less than 25 mg/1 free chlorine.

- c. Water from the existing distribution system shall be made to flow at a constant rate into the new main.
- d. The Village of Mundelein Water Division personnel must witness the disinfection process. An appointment with 24-hour prior notice must be scheduled with Village of Mundelein Water Division.
- e. In the process of chlorinating newly laid pipe, all valves, fire hydrants, or other appurtenances shall be operated while the pipe line is filled with the chlorinating agent and under normal operating pressures.

Disinfection of Water Services (Larger Than Two (2)-Inches)

For the purpose of clarifying this section, water service in this section refers to one (1) or more of the following installations that terminate inside of a building under construction.

- The service line being installed is for the purpose of a combination domestic and fire protection use.
- The service line being installed is for the purpose of branching into multiple domestic services inside of a meter room.
- The service line is the section of main being tested from the Village of Mundelein right-of-way valve to a location inside of the building.
- There are no fire hydrants installed on the service line.

1. Meter Rooms/Building Installations

- a. The service line will be disinfected to the inside valve of the meter room prior to any branch service being connected.
- b. The meter room will have a permanent heating system installed and in working condition prior to the disinfection.
- c. One (1) sample point will be provided at the source and one (1) sample point will be provided at the inside valve provided the length of pipe does not exceed 1,000-feet.
- d. The contractor will supply a copper tube gooseneck assembly at each of the sample points.
- e. The Village of Mundelein in Water Division personnel must witness the disinfection process. An appointment with 24 hours prior notice must be scheduled with Village of Mundelein Water Division.

2. Domestic/Fire Service Mains/Meter Room

- a. The service line will be disinfected up to the inside valve on both the fire branch and the domestic branch.
- b. The Fire Service Main Branch will have a valve of equal size to the riser section installed prior to chlorination.

- c. The building, meter room, or location of the incoming service line will have a permanent heating system installed and in working condition prior to the disinfection.
- d. One (1) sample point will be provided at the source and one (1) sample point will be provided at the inside valve provided the length of pipe does not exceed 1,000-feet.
- e. The contractor will supply a copper tube goose neck assembly at each of the sample points.
- f. The Village of Mundelein Water Division personnel must witness the disinfection process. An appointment with 24 hours prior notice must be scheduled with Village of Mundelein Water Division.

De-chlorination Requirements

Following chlorination, all treated water shall be thoroughly flushed from the newly laid pipe using the fire hydrant(s) and/or all the copper gooseneck assemblies. The flushing shall replace the highly chlorinated water with water that has a chlorine residual of less than 1mg/1 or equal to the residual from the supply service.

- The discharging of chlorinated water must be expelled to the surrounding ground surface.
- The contractor/developer must comply with all of the I.E.P.A. Rules, Regulations, and Standards for de-chlorinating water as part of the discharging.
- The contractor/developer is responsible for the equipment and materials to de-chlorinate the water at each point it is discharging.
- The Village of Mundelein Water Division personnel are the only individuals authorized to operate the valves.
- The Village of Mundelein Water Division personnel must witness the de-chlorination procedures when flushing the water mains. An appointment with 24-hour prior notice must be scheduled with Village of Mundelein Water Division.

Sampling and Testing

Sample collection for bacterial testing will start immediately after flushing the highly chlorinated water from the system and prior to any portion of the water main being placed into service. Samples will be collected at all sample points designated by the Village of Mundelein Water Superintendent. Sampling procedures must follow the I.E.P.A. Standards for construction of new water mains.

1. Locations and Spacing
 - a. Samples will be collected from each dead end, branch lateral, or section of pipe that has a closed valve. Samples will be collected from the copper tube with gooseneck assembly at these points.
 - b. Samples will be collected from fire hydrants at points not to exceed 1,000-feet of linear water main.
 - c. A sample will be collected from the copper goose-neck assembly point that is located no further than five (5)-feet downstream from the beginning of the new water main.

2. Collection Requirements

- a. The contractor is required to collect all samples at the location(s) designated by the Village of Mundelein Water Superintendent.
- b. Village of Mundelein Water Division personnel are the only individuals authorized to operate any water valves and must witness all samples at time of collection. 24-hour prior notice must be scheduled with the Village of Mundelein Water Division.
- c. The contractor is required to take the collected samples to a certified laboratory approved by the Village of Mundelein Water Superintendent.
- d. The Village of Mundelein Water Division has the right to collect quality control samples at the same time contractor collects samples. The charges for the quality control samples will be charged to the contractor.
- e. Samples will be collected on consecutive days with at least 24-hours of separation between the collection times.
- f. Each sample collected will be tested for quality and must show the absence of coliform organisms.

3. Satisfactory Sample Results

If all the samples tested meet the Bacterial Quality Standards and are certified as satisfactory by the testing lab:

- a. The contractor may have the lab email [rhaley@mundelein.org] the results directly to the Village of Mundelein Water Division;
- b. The contractor must provide original copies of the certified results to the Village of Mundelein Water Superintendent within seven (7) business days of the date on the test results; and
- c. The contractor must contact the Village of Mundelein Water Division to schedule an appointment to have the water main placed into service within 72 hours of the satisfactory test results being certified and only as approved by the Water Superintendent.

4. Unsatisfactory Sample Results

If anyone (1) of the samples tested fails to meet the Bacterial Quality Standards and is deemed unsatisfactory, then all the samples collected on the same date for the tested section of pipe, will be considered unsatisfactory.

- a. Unsatisfactory samples from the first day of collection will be discarded. A new first day collection must be scheduled with the second day to be consecutive.
- b. Unsatisfactory samples from the second day of collection will be discarded. First day samples will also be discarded and the contractor must schedule new first and second day samples.

The contractor will have up to three (3) chances of first day and two (2) chances of second day bacterial testing to obtain satisfactory results on all the samples collected and tested.
- c. Should the contractor fail to obtain satisfactory results after the allotted attempts, the water

main section being tested is to have the original disinfection procedures repeated until satisfactory results are obtained.

Street Lighting Notes and Special Provisions

General

1. At least two (2) weeks prior to the installation of street lighting, contact the Village of Mundelein Engineering Department and the Village of Mundelein Public Works Department Facility Maintenance Division at (847) 949-3278 to schedule a pre-construction conference. The Public Works Department must also be notified a minimum of 24-hours prior to commencement of work. All street lighting components must be within the right-of-way or dedicated easement.
2. The contractor shall call J.U.L.I.E. at (800) 892-0123 for utility locations prior to beginning any excavations.
3. Street lighting shall be based on a 110-volt AC system, with a maximum of ten (10) lamps per circuit. Streetlights shall be controlled by a central controller. The Controller shall be located three (3)-feet behind the sidewalk within the right-of-way or dedicated easement.
4. All underground circuit wiring shall be run in minimum one (1)-inch "Unit Duct" with three (3) #6 U.S.E XLP Copper Conductors. No circuit wiring shall be run in side or backyards. Larger conductors may be required by the Village for compensation of line loss over long distances.
5. The electrical supply from the utility company pedestal to the streetlight controller shall be determined by length of run and placed in a two (2)-inch rigid conduit.
6. A #6 Stranded Copper Ground Cable shall be installed in the same trench and adjacent to the unit duct.
7. A 5/8-inch diameter by eight (8)-foot copper ground rod shall be installed at each streetlight and at the controller.
8. Street lighting cables shall be installed three (3)-feet behind the back of the curb, and a minimum of 24-inches below finished grade.
9. When circuit wiring must cross under permanent pavement (streets, driveways, sidewalks, etc.), the unit duct must be installed within a four (4)-inch PVC Schedule 40 conduit that shall extend a minimum of one (1)-foot beyond the edge of the concrete or blacktop.

Streetlight Controller

1. The controller box shall be a minimum 26-inches x 17-inches x 15-inches NEMA 3R Single Door Enclosure installed on a 30-inch long, four and a half (4 ½)-inch O.D. Spun Aluminum pedestal pole, with a square aluminum base.
2. The aluminum controller box shall have a one-quarter-inch stiffener plate installed in the base.
3. The controller box catalog cuts must be supplied to and approved by the Village prior to installation.
4. There shall be a maximum of ten (10) streetlights per branch breaker within the controller cabinet and branch breakers shall be FA Type.
5. The cabinet shall be equipped with a latching device operated by a "Universal Key."
6. The cabinet shall be factory painted black and have a three (3)-inch x 11-inch stainless steel plate imprinted with "Street Lighting."

7. The equipment-mounting panel shall be half (½)-inch thick Arboron Material.
8. Exposed bus bars shall be insulated.
9. Connector screws shall be painted white for neutral bar, and green for ground bar connectors.
10. Power wiring screws shall be XLP 600 volts and control wiring shall be #12 MTW.
11. The power circuit shall be protected by Busman Brand Fast Acting KTK-20 Fuses in a BM Fuse Block.
12. All control wiring shall be stranded and marked with Brady Markers.
13. The controller shall be equipped with commercial grade, internal, GFCI Duplex Outlet with a rain tight horizontal mounting cover and a three (3)-inch gang box.
14. The controller box shall have a standard 125-volt outlet box lamp holder with pull chain mounted in the cabinet.

Residential Poles & Lamps – New Developments

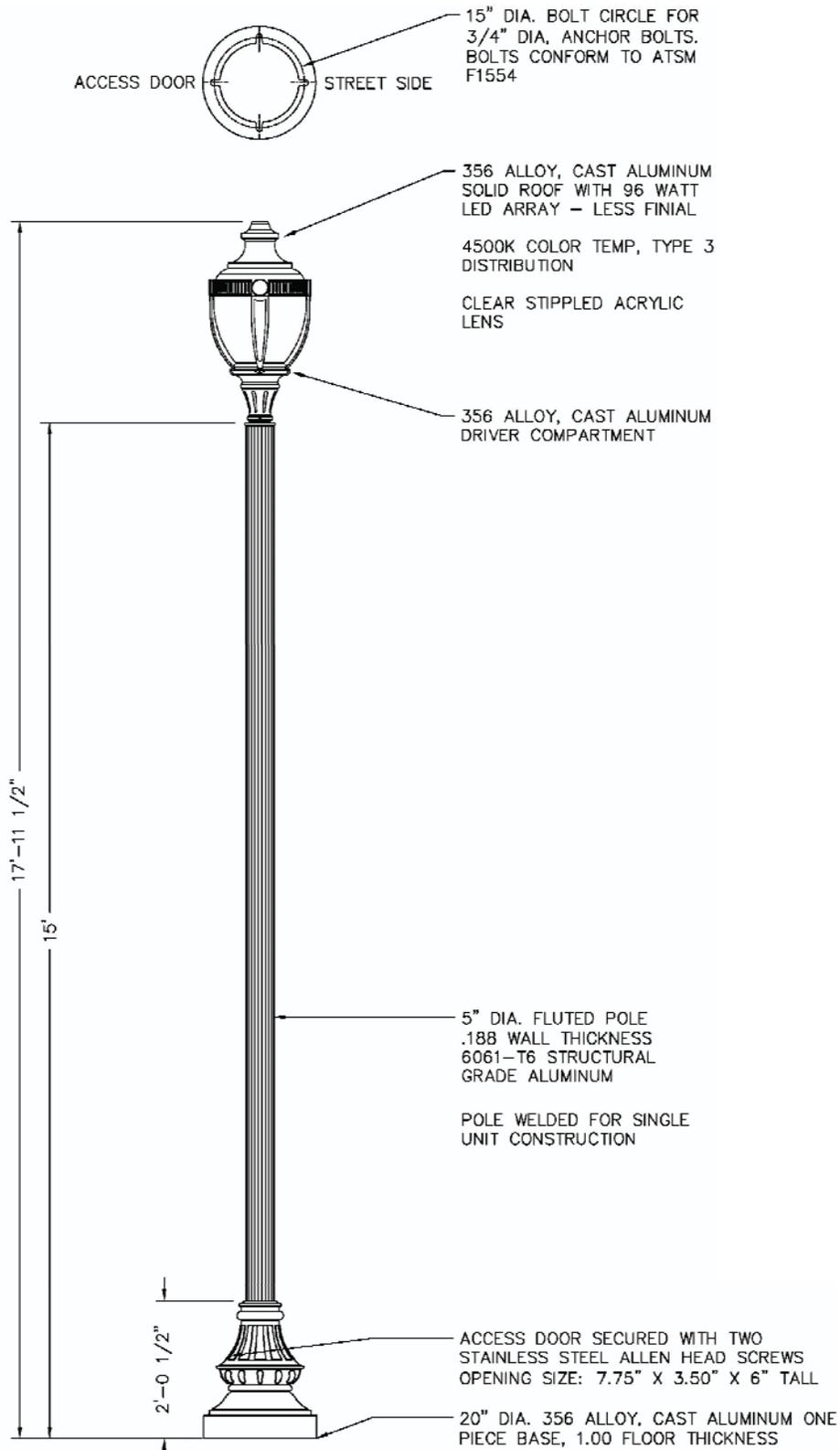
1. Standard residential streetlight poles shall be Sternberg Lighting and have a 15-foot mounting height with a 20-inch base. (Ordering Logic [A670TASRLED-NF/5PPT/5215FP5/6ARC45T3/ML/BK](#))
2. Poles located at intersections with arterial or collector streets or highways shall be Sternberg with a 23-foot mounting height. (Ordering Logic [1-1914LEDF/A/HS-H/FFA6/5223FP6.250/40L45T3-MDL21/BK](#))
3. The 15-foot poles should be installed three (3)-feet from the back of the curb to the center of the base. The 23-foot poles should be installed eight (8)-feet behind the back of the curb center of the radius.
4. Photoelectric controls shall not be used on the luminaries. A single photocell shall be located at the controller.
5. Each pole shall have a Fuse-Tron inline fuse, with rubber boot on the load side of the circuit. Sufficient internal wiring shall be provided at each pole for ease of maintenance.
6. Internal wiring of pole and luminaire shall be ten (10) gauge THHN wire, minimum.
7. Maximum spacing between poles in a residential development shall be designed at 200-feet, measured along the centerline of the street. Additional lights must be installed at all intersections, road curves, and at the end of cul-de-sacs.
8. Poles shall not be closer than 15-feet measured from any trunk of a tree.
9. Poles shall not be placed within six (6)-feet of a driveway.

Design References

All street or parking area lighting systems shall be designed and constructed in accordance with one (1) or more of the following references as they apply:

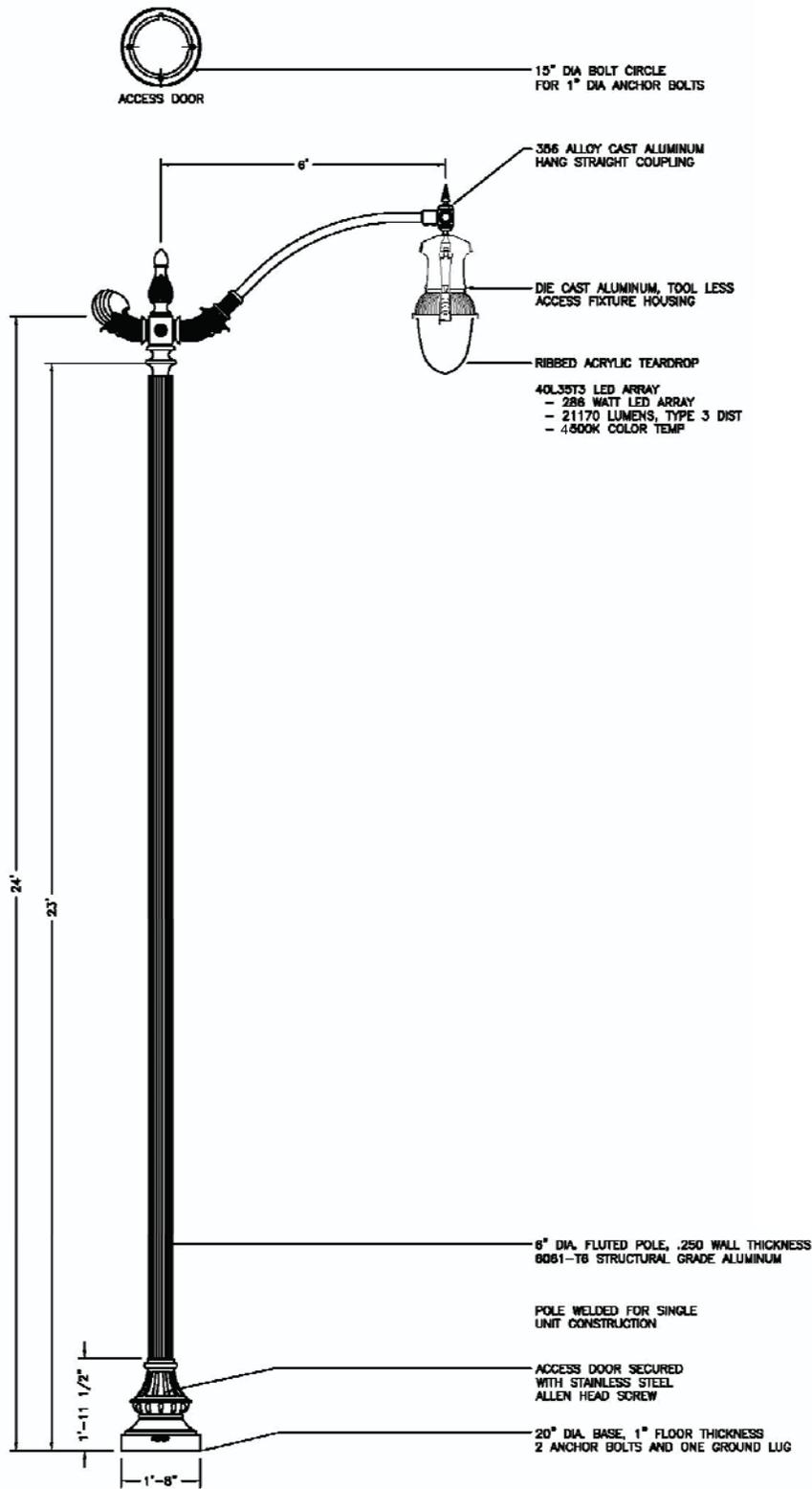
1. National Electric Code;

2. "Standard Specifications for Road and Bridge Construction" by Illinois Department of Transportation;
3. "Standard Specifications for Traffic Control Items" by Illinois Department of Transportation;
4. "Design Manual" by Illinois Department of Transportation;
5. Manufacturer – supplied literature; and
6. Municipal Electric Code.



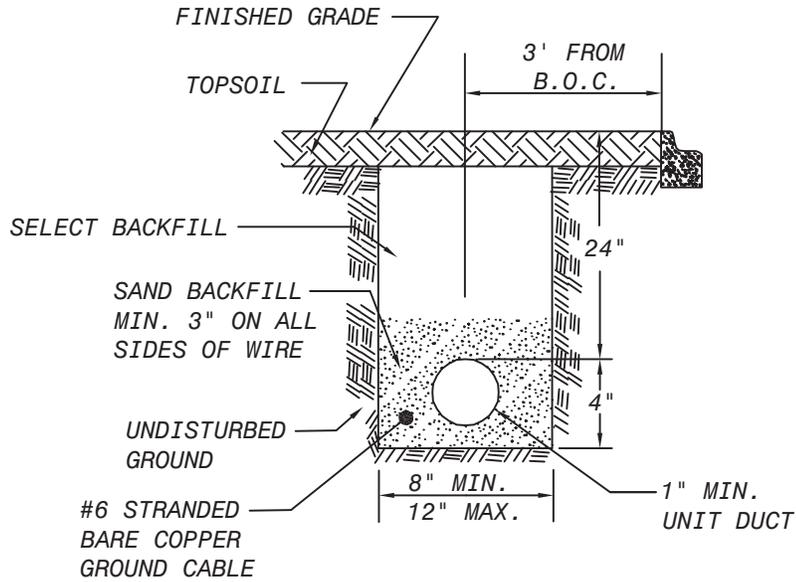
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1-1914LEDF/A/HS-H/FFA6/5223FP6.250/40L45T3-MDL21/BK

REVISIONS				REVISIONS			
REV.	BY	DATE:	REVISION:	REV.	BY	DATE:	REVISION:
1.				4.			
2.				5.			
3.				6.			



NOTE:

A CABLE INSPECTION IS REQUIRED PRIOR TO BACKFILL.
 CONTACT VILLAGE OF MUNDELEIN ENGINEERING DEPT. TO
 SCHEDULE.



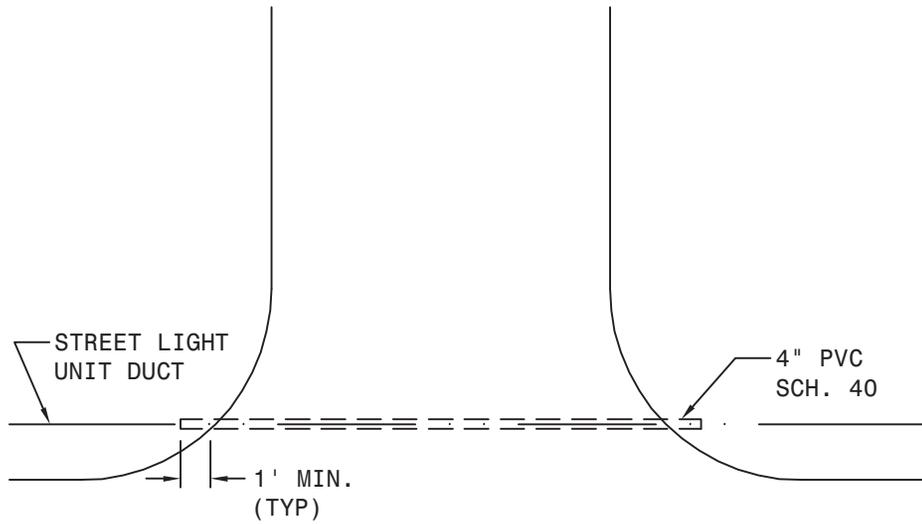
VILLAGE OF MUNDELEIN
 ENGINEERING DETAILS

STREET LIGHTING
 CABLE TRENCH DETAIL

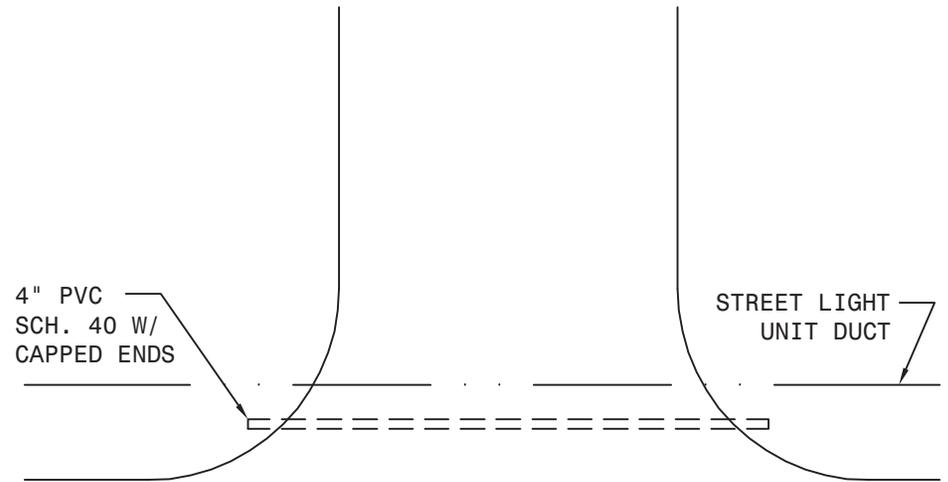
REVISIONS				REVISIONS			
REV.	BY	DATE:	REVISION:	REV.	BY	DATE:	REVISION:
1.	MDJ	04-04-05	APPROVED	4.			
2.				5.			
3.				6.			

DETAIL NO.

L-3



NEW CONSTRUCTION



PRE-EXISTING STREET LIGHT CABLE

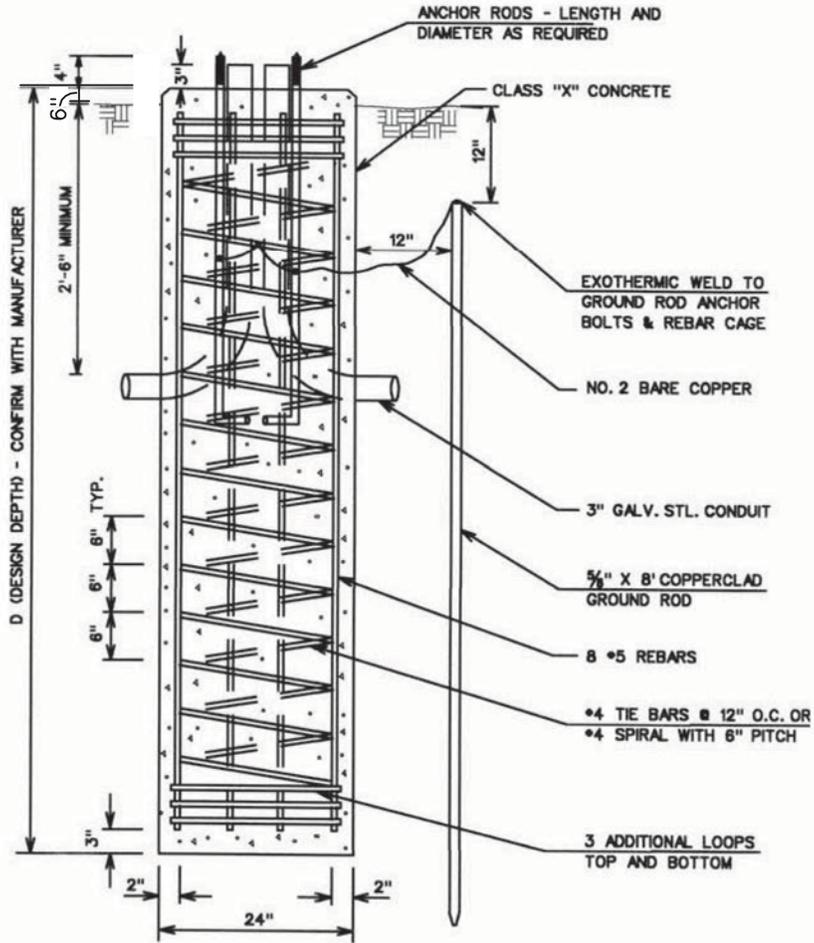
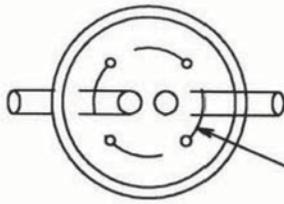


VILLAGE OF MUNDELEIN
ENGINEERING DETAILS

*STREET LIGHT CABLE CROSSING
UNDER DRIVEWAYS*

REVISIONS				REVISIONS			
REV.	BY	DATE:	REVISION:	REV.	BY	DATE:	REVISION:
1.	MDJ	04-04-05	APPROVED	4.			
2.				5.			
3.				6.			

DETAIL NO.
L - 4



LIGHT POLE FOUNDATION DIMENSIONS TO BE CONFIRMED BY LIGHT POLE MANUFACTURER. FOUNDATIONS FOR 14' LIGHT POLES MAY BE HELIX-TYPE FOUNDATIONS, AND MUST ALSO BE CONFIRMED BY LIGHT POLE MANUFACTURER.

REVISIONS				REVISIONS			
REV.	BY	DATE:	REVISION:	REV.	BY	DATE:	REVISION:
1.				4.			
2.				5.			
3.				6.			