SPECIAL PROVISIONS

4-DUCT CONDUIT, CEMENT ENCASED, 4-INCH RIGID NONMETALLIC CONDUIT
DB-60

A. DESCRIPTION
THIS WORK CONSISTS OF FURNISHING AND INSTALLING CEMENT ENCASED MULTIPLE DUCT CONDUIT BELOW GRADE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, AS SHOWN ON THE PLANS AND AS FOLLOWS.

B. MATERIALS

1. CONDUIT. THE CONTRACTOR SHALL FURNISH DB-60 POLYVINYL CHLORIDE (PVC) CONDUIT

PVC CONDUIT AND FITTINGS SHALL CONFORM TO THE REQUIREMENTS OF STANDARD SPECIFICATIONS FOR SMOOTH-WALL POLY (VINYL CHLORIDE) (PVC) CONDUIT AND FITTINGS FOR UNDERGROUND INSTALLATION, ASTM DESIGNATION: F512 (LATEST EDITION).

2. CONCRETE. THE TYPE OF CONCRETE TO BE USED TO ENCASE THE DUCTS WILL BE:

CLASS OF CONCRETE	TYPE OF CEMENT	MIN. CEMENT CONTENT SACKS PER CUBIC YARD	SIZES OF COARSE AGGREGATE
G-1	STANDARD PORTLAND CEMENT TYPE IA OR ISA	6.0	SHARP TORPEDO SAND ONLY

3. SLURRY BACKFILL. AGGREGATE SLURRY BACKFILL CONSISTS OF NO. 1 CONCRETE AGGREGATE CLASS "C" CONCRETE MIX WITH THE CEMENT DELETED.

FLY ASH (CLASS C)	75 LBS.
CONCRETE SAND (DAMP)	1830 LBS.
NO. 1 CONCRETE AGGREGATE	1830 LBS.

THE MATERIAL SHALL BE MIXED WITH WATER TO INUNDATE THE AGGREGATE SUFFICIENTLY TO PROVIDE AN APPROXIMATE 3 INCH SLUMP. THE MIX SHALL BE DEPOSITED IN THE TRENCH DIRECTLY FROM A CONCRETE TRANSIT MIX TRUCK.

4. PULL ROPE. PULL ROPE SPECIFICATIONS WILL BE:
FLAT CONSTRUCTION (7/16" TO 5/8" WIDE)
100% WOVEN ARAMID FIBER (MAY INCLUDE TRACER WIRE)
1500 LBS. MINIMUM PULL STRENGTH PRELUBRICATED
SEQUENTIAL FOOTAGE MARKINGS FOR LOCATION

FOR ANY QUESTIONS ON MATERIALS, CONTACT MS. KAREN ROGNEY AT (414) 286-3243.

C. CONSTRUCTION METHOD

1. EXCAVATION. THE EXCAVATION SHALL HAVE THE MINIMUM OR MAXIMUM DIMENSIONS SHOWN ON THE PLANS AND AS FOLLOWS:

NO. OF DUCTS WIDE	MINIMUM	MAXIMUM
2	14 1/8"	16 5/8"
3	19 3/4"	22 1/4"
4	25 3/8"	27 7/8"

THESE MINIMUM AND MAXIMUM TRENCH WIDTHS APPLY TO STANDARD 4 INCH PVC ELECTRICAL DUCT ONLY. WHEN REQUIRED, THE EXCAVATION MAY BE WIDENED FOR THE HANDLING AND PLACING OF MATERIALS.

OPEN-CUT TRENCHES SHALL BE SHEATHED AND BRACED AS REQUIRED BY CODE AND AS NECESSARY TO MAINTAIN SAFETY. THE COST OF FURNISHING, PLACING AND REMOVING OF SHEATHING AND BRACING SHALL BE INCLUDED IN THE UNIT BID FOR THE WORK.

THE DIMENSIONS OF THE EXCAVATION WILL BE GOVERNED BY THE NUMBER, CONFIGURATION AND THE GRADE (COVER) TOWHICH THE CONDUIT IS TO BE INSTALLED AS SHOWN ON THE PLAN. THE WALLS OF THE EXCAVATION SHALL BE CLEAN AND TRUE.

PREVIOUS TO EXCAVATING TRENCHES, THE CONTRACTOR SHALL EXPOSE THE EXISTING MANHOLE AND CONDUIT LINES. THE OBJECT OF THIS IS TO PERMIT ADJUSTMENTS IN LINE AND GRADE TO AVOID SPECIAL CONSTRUCTION METHODS. THE EXPOSED MANHOLE AND CONDUIT SHALL BE PROTECTED FROM DAMAGE.

THE CONDUIT SHALL BE LAID AT A DEPTH SO THAT SUFFICIENT PROTECTION FROM DAMAGE IS PROVIDED. ALLOWABLE COVERS SHALL BE AS FOLLOWS:

THE STANDARD COVER FOR MAINLINE CONDUIT IS 39 INCHES AND THE MINIMUM COVER ACCEPTABLE SHALL BE 28 INCHES.

THE STANDARD COVER SHALL BE MAINTAINED WHEREVER POSSIBLE AND ANY DEVIATION LESS THAN THE MINIMUM MAY BE ALLOWED ONLY WITH SPECIFIC APPROVAL OF THE ENGINEER.

THE TRENCH SHALL BE GRADED SO THAT IT WILL HAVE A MINIMUM PITCH OF THREE INCHES PER 100 FEET. WHEN AN OBSTRUCTION IS ENCOUNTERED IN THE TRENCH AND IT IS NECESSARY TO EXCAVATE A DEEPER TRENCH THAN WOULD OTHERWISE BE REQUIRED, IN ORDER TO OBTAIN DRAINAGE, REFER THE MATTER TO THE INSPECTOR TO DETERMINE WHETHER THE EXTRA EXCAVATION SHOULD BE MADE.

IN GRADING A TRENCH FOR MAINLINE CONDUIT, THERE ARE THREE GENERAL PRACTICES FOR DIRECTION OF PITCH.
(A) WHEN GRADING A TRENCH IN A STREET WITH A LEVEL GRADE, THE HIGH POINT OF THE TRENCH BOTTOM SHOULD ORDINARILY BE CENTERED BETWEEN MANHOLES AND PITCHED DOWNWARD EQUALLY TOWARD EACH MANHOLE.

(B) WHERE THE STREET SLOPES IN ONE DIRECTION, LOCATE THE HIGH POINT OF THE TRENCH BOTTOM APPROXIMATELY 30 FEET FROM THE END WALL OF THE HIGHER MANHOLE AND GRADE TOWARD BOTH MANHOLES.

(C) WHERE A STEEP GRADE IS ENCOUNTERED, GRADE THE TRENCH AT THE MINIMUM PITCH FROM THE END WALL OF THE HIGHER MANHOLE TO A POINT 20 FEET PLUS OR MINUS TOWARD THE LOWER MANHOLE. FROM THIS POINT, FOLLOW THE STREET GRADE AT THE STANDARD COVER TO A POINT 20 FEET PLUS OR MINUSUM AWAY FROM THE END WALL OF THE LOWER MANHOLE. FROM THIS POINT, THE REMAINDER OF THE SECTION SHALL BE LAID AT THE NORMAL PITCH.

AFTER THE ROUGH EXCAVATION IS COMPLETED, THE BOTTOM OF THE TRENCH SHALL BE PREPARED TO RECEIVE THE CONDUIT. THE DUCT BED SHALL BE BROUGHT TO THE FINAL GRADE AND GRADED UNIFORMLY FROM THE HIGH POINT TO THE LOW OR DRAINAGE POINTS. STONE CHIPS OR LIMESTONE SCREENINGS SHALL BE USED FOR GRADING THE TRENCH.

2. PLACING OF DUCT
PLACING OF THE DUCT IS TO PROCEED AS SOON AS THE DUCT BED HAS BEEN COMPLETED. ALL DUCTS SHALL BE INSPECTED BEFORE PLACING TO SEE THAT THE BORES ARE CLEAN AND FREE FROM MUD, SAND, ETC. ONLY DUCTS WITH A SMOOTH BORE, FREE FROM BURRS, ROUGH PROJECTIONS ETC. SHALL BE USED. WHERE BURRS OR OTHER ROUGH AREAS LIKELY TO DAMAGE CABLE ARE FOUND IN THE DUCT, THEY SHALL BE SMOOTHED OFF BY RASPING OR SCRAPING.

THE DUCT SHALL BE PLACED (AS SHOWN ON THE DETAIL) WITH THE ENDS STAGGERED SO NO TWO COUPLINGS ARE ADJACENT. THIS MAY BE ACCOMPLISHED BY THE USE OF THE SHORT LENGTHS IN STOCK OR CUTTING BACK FULL LENGTH SECTIONS TO THE DESIRED LENGTHS. IF CUT PIECES ARE USED, THE CUT END SHALL BE PLACED AT THE MANHOLE.

FULL LENGTH PIECES SHALL BE USED FOR THE BALANCE OF THE CONDUIT LINE.

FORMATIONS OF TWO DUCTS OR MORE IN HEIGHT ARE TO BE CARRIED FORWARD IN FULL FORMATION, THAT IS, AS EACH TIER OF TWENTY FOOT LENGTHS IS LAID, THE NEXT HIGHER TIER OF DUCTS SHALL THEN BE PLACED ON THE BASE SPACERS. THESE SPACERS SHALL BE TWO FEET FROM EACH DUCT END. THE INTERMEDIATE SPACERS AND DUCTS SHALL BE PLACED FOR THE REMAINING TIERS. EACH LENGTH SHALL BE GLUED INTO THE ADJOINING COUPLING. A TWIST AND PUSH ON THE DUCT BEING PLACED WILL SUFFICE FOR A WATER TIGHT JOINT. CAUTION MUST BE EXERCISED IN THE DRIVING OPERATION, SO THAT NEITHER THE COUPLING OR DUCT WILL BE SPLIT OR DAMAGED IN ANY WAY. AFTER THE FULL FORMATION HAS BEEN COMPLETED, WOOD TRENCH AND DUCT BRACING SHALL BE PLACED ON THE DUCTS TO PREVENT SHIFTING OR FLOATING WHILE THE CONCRETE ENVELOPE IS BEING PLACED AND DURING DRIVING OPERATION.

THIS PROCEDURE SHALL BE FOLLOWED WITH SUCCEEDING LENGTHS, PROVIDING SPACERS (AS SHOWN ON THE DETAIL) AT THE PROPER INTERVALS, UNTIL SUFFICIENT TRENCH FOOTAGE OF COMPLETED FORMATION HAS BEEN PLACED AND IS READY TO RECEIVE CONCRETE ENCASEMENT.

THE STANDARD TERMINATING POINT FOR MAINLINE CONDUIT WILL BE THE INSIDE MANHOLE WALL.

A STANDARD END BELL FITTING SHALL BE INSTALLED ON ALL DUCT ACCESS POINTS.

WHEN THE TERMINATING POINT IS NOT AT A MANHOLE BUT UNDER PAVEMENT, AN END CAP SHALL BE GLUED TO THE END OF EACH DUCT. THE GROUT ENCASEMENT SHALL STOP 4 INCHES FROM THE END OF THE DUCTS LEAVING THE ENDS EXPOSED.

A #10 COPPER TRACER WIRE SHALL BE INSTALLED ALONG AND ABOVE THE CENTERLINE OF THE DUCT FOR ENCASEMENT IN THE CONCRETE. THE WIRE SHALL BE 4 FEET LONGER THAN THE RUN OF CONDUIT AND BE AT LEAST 2 FEET LONG AT EACH ACCESS POINT.

A PULL ROPE SHALL BE INSTALLED IN EACH RUN OF CONDUIT, AS LAID. THE ROPE SHALL BE 4 FEET LONGER THAN THE RUN OF CONDUIT AND SHALL BE DOUBLED BACK AT LEAST 2 FEET AT EACH RACEWAY ACCESS POINT. THE PULL ROPE SHALL BE ANCHORED AT EACH ACCESS POINT IN A MANNER ACCEPTABLE TO THE ENGINEER.

3. CONCRETING. AFTER SUFFICIENT CONDUIT HAS BEEN LAID AND THE TRENCH AND DUCT HAVE BEEN INSPECTED, CONCRETING IS TO BEGIN. THE MINIMUM CONCRETE ENCASEMENT OF THE DUCTS SHALL BE THREE (3) INCHES ON THE TOP, TWO (2) INCHES ON THE SIDES AND THREE (3) INCHES ON THE BOTTOM (AS SHOWN ON THE DETAIL). AFTER PLACING, THE CONCRETE SHALL BE PUDDLED WITH A SPLICING BAR OR SIMILAR TOOL SO THAT COMPLETE DUCT ENCASEMENT IS ACCOMPLISHED. WOOD BRACES USED TO KEEP THE CONDUIT FROM FLOATING SHALL BE REMOVED BEFORE THE CONCRETE SETS COMPLETELY AND THE RESULTANT ENCASEMENT VOIDS FILLED WITH CONCRETE.

CONCRETE ENCASEMENT SHALL BE ALLOWED SUFFICIENT TIME TO SET BEFORE BACKFILLING IS COMMENCED.

4. BACKFILLING. THE BACKFILLING OF THE CONDUIT SHALL COMMENCE IMMEDIATELY AFTER THE DUCT HAS BEEN INSPECTED, APPROVED AND HAS HAD SUFFICIENT TIME TO SET TO WITHSTAND THE LOAD.

ALL TRENCHES UNDER PAVEMENT SHALL BE BACKFILLED WITH SLURRY.

ALL TRENCHES UNDER CONCRETE CURB SHALL BE BACKFILLED WITH SLURRY TO A POINT 3 FEET BEYOND THE BACK OF CURB.

ALL TRENCHES IN GRASS AREAS SHALL BE BACKFILLED WITH THE EXCAVATED MATERIAL.

AN AGGREGATE SLURRY AS SPECIFIED SHALL BE USED TO BACKFILL THE CONCRETE ENCASED CONDUIT. THE TRENCH SHALL BE SLURRY BACKFILLED TO THE PROPOSED OR EXISTING SUBGRADE. THE MIX SHALL BE DEPOSITED IN THE TRENCH DIRECTLY FROM A CONCRETE TRANSIT MIX TRUCK.

D. METHOD OF PAYMENT. THE ITEM 4-DUCT CONDUIT, CEMENT ENCASED, 4-INCH RIGID NON-METALLIC CONDUIT DB-60, FURNISHED AND INSTALLED AT THE LOCATIONS ON THE PLANS, WILL BE MEASURED BY THE LINEAR FOOT. THE MEASURED QUANTITY WILL EQUAL THE LINEAR FEET OF ENCASED DUCT, BASED ON THE DISTANCE ALONG THE CENTERLINE OF DUCT BETWEEN ENDS OF CONDUIT.

E. BASIS OF PAYMENT. PAYMENT FOR THE 4-DUCT CONDUIT CEMENT ENCASED BID ITEM IS FULL COMPENSATION FOR PROVIDING THE CONDUIT, CONDUIT BODIES, AND CONDUIT FITTINGS; FOR PROVIDING ALL CONDUIT SPACERS USED TO SUPPORT CONDUITS FOR PULL ROPES, TRACE WIRE; FOR EXCAVATING, BEDDING, ENCASEMENT AND BACKFILLING INCLUDING ANY CONCRETE, STONE, AGGREGATE SLURRY, BRACING, OR OTHER RELATED MATERIALS; FOR DISPOSING OF SURPLUS MATERIALS; AND FOR MAKING INSPECTIONS.

INSTALLING CONDUIT INTO EXISTING ITEM

A. DESCRIPTION
THE WORK UNDER THIS ITEM SHALL CONSIST OF LOCATING EXISTING CONDUIT SYSTEM MANHOLES AND INSTALLING NEW CONDUIT INTO THOSE MANHOLES AT THE LOCATIONS SHOWN ON THE PLANS. THE CONTRACTOR SHALL VERIFY EXISTING CONDUIT MANHOLE LOCATIONS WITH THE CITY OF MILWAUKEE, AND SHALL MAINTAIN ANY EXISTING CONDUCTORS, FIBERS, AND CONDUIT PATHS WITHOUT INTERRUPTION OR DAMAGE. REPAIR AND RESTORATION OF ALL DISTURBED AREAS RESULTING FROM THE WORK SHALL BE IN ACCORDANCE WITH THE PERTINENT PROVISIONS OF THE STANDARD SPECIFICATIONS, AND AS HEREINAFTER PROVIDED.

B. MATERIALS
CONDUIT, AS PROVIDED AND PAID FOR UNDER OTHER ITEMS IN THIS CONTRACT. ALL MATERIALS SHALL CONFORM TO THE PERTINENT PROVISIONS OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED.

C. CONSTRUCTION
CAREFULLY EXPOSE THE OUTSIDE OF THE EXISTING STRUCTURE WITHOUT DISTURBING ANY EXISTING CONDUITS OR CABLING.

DRILL THE APPROPRIATE SIZED HOLE FOR THE ENTERING CONDUIT AT A LOCATION WITHIN THE STRUCTURE THAT WILL NOT DISTURB THE EXISTING CABLING AND WILL NOT HINDER THE INSTALLATION OF NEW CABLING WITHIN THE INSTALLED CONDUIT.

FILL ANY VOID AREA BETWEEN THE DRILLED HOLE AND CONDUIT WITH AN ENGINEER-APPROVED FILLING MATERIAL TO PROTECT AGAINST CONDUIT MOVEMENT AND ENTRY OF FILL MATERIAL INTO THE STRUCTURE.

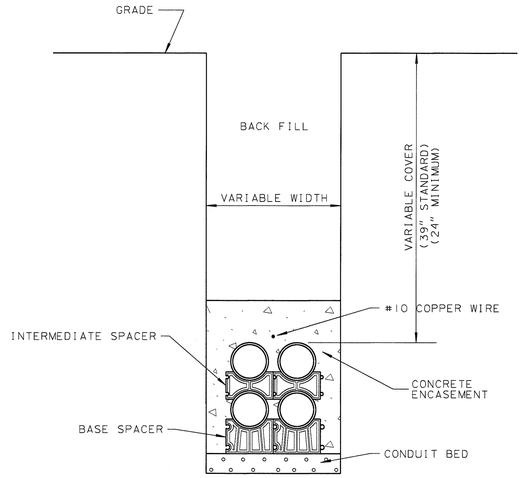
CAREFULLY TAMP BACKFILL INTO PLACE.

ALL DISTURBED AREAS SHALL BE REPAIRED AND RESTORED IN KIND.

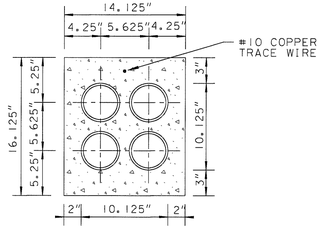
D. MEASUREMENT
INSTALLING CONDUIT INTO EXISTING ITEM BY THE UNIT, ACCEPTABLY INSTALLED. UP TO SIX CONDUITS ENTERING A STRUCTURE PER ENTRY POINT INTO THE EXISTING STRUCTURE WILL BE CONSIDERED A SINGLE UNIT. CONDUITS IN EXCESS OF SIX, OR CONDUITS ENTERING AT SIGNIFICANTLY DIFFERENT ENTRY POINTS INTO THE EXISTING PULL BOX, MANHOLE, OR JUNCTION BOX WILL CONSTITUTE MULTIPLE UNITS.

E. PAYMENT
PAYMENT IS FULL COMPENSATION FOR DRILLING HOLES; FURNISHING AND INSTALLING ALL MATERIALS, INCLUDING BRICKS, AND COARSE AGGREGATE; FOR EXCAVATION, BEDDING AND BACKFILLING, INCLUDING ANY SAND OR OTHER REQUIRED MATERIALS; FOR DISPOSAL OF SURPLUS MATERIALS; FOR MAKING INSPECTIONS; AND FOR FURNISHING ALL LABOR, TOOLS, EQUIPMENT, AND INCIDENTALS NECESSARY TO COMPLETE THE WORK.

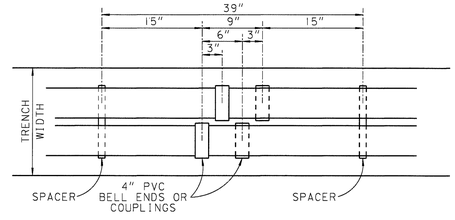
CONSTRUCTION DETAILS



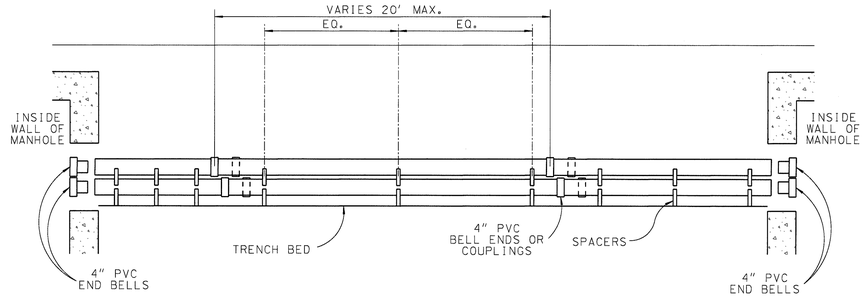
TYPICAL CROSS-SECTION OF TRENCH & CONDUIT



TYPICAL CROSS-SECTION OF CONDUIT ENCASEMENT



PLAN VIEW
N.T.S.



SECTION VIEW
N.T.S.

DUCT INSTALLATION DETAIL

CALL DIGGERS HOTLINE
1-800-242-8511
TOLL FREE TO OBTAIN LOCATION OF UNDERGROUND BEFORE YOU DIG. WISCONSIN STATUTE 182.0175 REQUIRES MIN. OF 3 WORK DAYS NOTICE BEFORE YOU EXCAVATE

TRANSPORTATION SECTION
INFRASTRUCTURE SERVICES DIVISION
DEPARTMENT OF PUBLIC WORKS
MILWAUKEE, WISCONSIN

UNDERGROUND CONDUIT PLAN

N. EDISON STREET
CONSTRUCTION DETAILS & SPECIAL PROVISIONS

SCALE HORIZ.	1"=
SCALE VERT.	1"=
1W SEC. NO.	392
PLAN DATE	9/10/13
DRAWN BY	N. STUIBER
CHECKED BY	S.J.S.
DESIGNED BY	K.L.R.
PROJ. ID.	ST280100201

APPROVED DATE

9/12/13
CHIEF TRAFFIC AND LIGHTING ENGINEER

9/16/13
TRANSPORTATION DESIGN MANAGER

CITY ENGINEER & SPECIAL DEPUTY COMMISSIONER OF PUBLIC WORKS

SHEET NO. 1 OF 2 PLAN FILE NO. 11-08A

MICROFILMED