CHECKED FOR: _____ CHECKER: _____ DATE: _____ (RED, YELLOW) BACK CHECKER: _____ DATE: _____ (GREEN) DRAFTER: _____ DATE: _____ (BLUE)

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
			562	269
			CONTRACT NO: 60881	
FED. ROAD DIST. NO.	ILLINOIS	FED. AID PROJECT		

PROJECT SPECIFICATIONS

A. GENERAL

(1) REFERENCE SPECIFICATIONS
- (a) All water supply improvements shall be constructed in accordance with the material, installation and testing requirements of the "Standard Specifications For Water And Sewer Main Construction in Illinois" 5th Edition (May 1996); except where said requirements are modified by the following Project Provisions.
- (b) References to "IDOT" requirements or standards shall mean in conformance to the material, installation and testing requirements of the Illinois Department Of Tranportation's "Standard Specifications For Road and Bridge Construction," adopted January 1, 2002 including all applicable current Supplemental Specifications and Special Provisions.

(2) UNSUITABLE SOIL CONDITIONS
- (a) When unsuitable soil conditions are encountered under pipes or structures that require the removal of unsuitable materials below the depth of the standard bedding, the Contractor shall replace the material removed with granular material of the gradation approved by the Engineer. Depth of removal shall be as determined by the Engineer.

(3) CONDUIT CASING PIPE
- (a) Where indicated on the Plans or specified by the Engineer, sewer and water main pipes (conduits) shall be installed in watertight casing pipe placed in the conduit trench.
- (b) Casing pipes shall be constructed of one or more of the following materials and meet the specifications noted. The type of material shall be as indicated on the Plans.
  - (i) Ductile Iron Pipe (AWWA-C151, class 50) with rubber gasket push-on joints (AWWA-C111).
  - (ii) PVC Pressure Pipe (AWWA-C900 or C905. DR25) with rubber gasket joints.
  - (iii) Steel Pipe (minimum yield strength 33,000 psi, minimum wall thickness 9.525mm) with welded joints.
- (c) When indicated on the Plans or in the Special Provisions the utility pipe shall be inserted into and supported within the casing pipe by the use of stainless steel casing spacers (as manufactured by Cascade Waterworks Manufacturing Co. or approved equal). Spacers shall be configured to provide restraint against utility pipe movement due to flotation. Spacers shall be placed at 3M (or less) intervals, except that PVC (thin-wall) and polyethylene pipes shall be supported at 1.83M (or less) intervals.
- (d) Ends of casing pipe shall be sealed with rubber end seals secured in place with stainless steel bands (Cascade Waterworks Manufacturing Co. or approved equal).

(4) PIPE BEDDING
- (a) Watermain pipes shall be placed on a granular cradle (bedding) with a minimum thickness equal to 1/4 of the outside diameter of the pipe, but not less than 100mm nor more than 200mm in thickness under the pipe. Granular cradle materials shall consist of graded crushed stone 4.75mm to 19mm in size (IDOT equivalent CA-11). This granular cradle material shall be placed up to 300mm above the top of pipe.

(5) GRANULAR BACKFILL
- (a) Selected granular backfill (as indicated on the plans) shall be used to backfill all trenches under all existing and proposed vehicle pavements and sidewalks; all trenches whose edge is closer than 600mm from the edge of an existing or proposed vehicle pavement or sidewalk and where specifically indicated on the Plans.
- (b) Granular backfill placed in trenches located under existing and proposed pavements shall be mechanically compacted (300mm maximum lift thickness), to not less than 92% of maximum density as determined by ASTM D1557; except that porous (free-draining) granular material shall be compacted to a minimum of 80% relative density in accordance with ASTM D4253 and D4254.
- (c) Granular backfill placed in trenches located adjacent to pavements shall be jetted and water soaked except where mechanical compaction is indicated on the Plans.

(6) FLOWABLE FILL
- (a) When indicated on the Plans or specified by the Engineer, Controlled Low-Strength Material (CLSM) shall be used to backfill trenches or excavations. CLSM shall consist of a mixture of portland cement, fly ash, fine aggregate and water proportioned to provide a backfill material that is self-compacting and capable of being excavated with hand tools, if necessary, at a later date. Materials, proportioning, placement and other requirements shall be as specified in IDOT Recurring Special Provision for Controlled Low-Strength Material.

(7) STRUCTURE ADJUSTMENT
- (a) All structure castings shall be adjusted to meet final ground and pavement surface elevations. Adjustments shall be made by adding or removing 600mm I.D. precast concrete adjustment rings or 1.2M I.D. precast concrete riser sections. Total height of 600mm I.D. adjustment rings shall not exceed 300mm.

B. WATER SYSTEM SPECIFICS

(1) PIPE MATERIALS
- (a) Water mains and building services of 75mm or larger diameter shall be constructed of Ductile Iron Pipe, Class 52 (AWWA-C151) with cement mortar lining (AWWA-C104) and rubber gasket, push-on joints (AWWA-C111) or mechanical joints (AWWA-C153) as indicated on the plans
- (b) Fittings for pipes of 75mm or larger diameter shall be of ductile iron with cement mortar lining and mechanical joints and conform to AWWA-C153.
- (c) Water services of less than 75mm diameter shall be seamless Copper Water Tube, Type K, soft temper, for underground installation conforming to ASTM B-88 and B-251.

(2) POLYETHYLENE ENCASEMENT
- (a) All ductile iron pipe and fittings, and other appurtenances in contact with soils, shall be encased in a loose wrapping of 8 mm polyethylene film.
- (b) Material specifications and installation procedures shall be in accordance with AWWA Standard C105-99.

(3) VALVES
- (a) Water main valves and service line valves (75mm and larger) shall be Resilient Seated Gate Valves manufactured to meet all requirements of AWWA-C509 and shall have a non-rising stem (open - turn left), 50mm square operating nut and two o-ring packing seals. Bonding or rubber sealing surfaces to cast iron wedge shall meet ASTM-D429. Valve ends shall be mechanical joints, except for hydrant auxiliary valves that shall have a flanged joint on one end.
- (b) Valves used for pressure connections to existing water mains shall be "Tapping" Gate Valves specifically manufactured for this purpose. Tapping valves shall have one flange end and one mechanical joint end and shall be furnished complete with a two-section mechanical joint "tapping" sleeve.
- (c) Valves installed on existing water lines (other than pressure connections) shall be "Cutting-In" Gate Valves specifically manufactured for this purpose. Cutting-in valves shall be furnished complete with a cutting-in sleeve. Valve ends and one end of the sleeve shall be of mechanical joint construction designed so that with one gasket it can be assembled on either sand cast or centrifugally cast iron pipe.

(4) VALVE VAULTS
- (a) All valves 150mm and larger (except hydrant auxiliary valves) shall be placed in valve vaults. Valve vaults shall be constructed of precast concrete units (ASTM-C478) with a cone section and mastic joints. Vault diameter and type of cone section shall be as specified on the standard detail drawings included in the Plans.
- (b) Where frame-casting adjustment to final grade is required, only precast concrete adjustment rings (600mm inside diameter) and riser sections (vault diameter) shall be used. Maximum height of adjustment rings shall be 300mm. No more than two adjustment rings and no more than one 50mm adjustment ring shall be used on a structure.
- (c) All joints between the various structure components (base, risers, cone, adjustment rings and frame casting) shall be sealed with a continuous layer of non-hardening preformed bituminous mastic material placed between the two adjacent components to provide a watertight seal.
- (d) Annular spaces between the vault wall and water pipes shall be filled with hydraulic grout to provide a watertight seal.
- (e) Frame and lid castings shall be Neenah R-1712. Lids shall be Type B "Self-Sealing" with the word "WATER" and "LINCOLNSHIRE" imprinted.
- (f) Cast iron manhole steps shall be provided on a straight vertical alignment at 400mm spacing. Steps shall be embedded 100mm (minimum) into the manhole wall and shall be anchored in place with hydraulic grout. Manhole steps shall be Neenah R1981-I with polypropylene coating (MA industry PS-I-PF or approved equivalent.)

(5) SERVICE LINE APPURTENANCES
- (a) Service line valves of 75mm and 100mm size shall be provided with a screw type adjustable cast iron valve box set over the operating nut. The valve box shall be the two-piece Buffalo Type with a 133mm shaft. The word "WATER" shall be imprinted on the lid.
- (b) Water services of less than 75mm diameter shall have a corporation stop, curb stop and curb box as specified on the standard detail drawings included in the Plans. If these items are not specified on the Plans, they shall be as required by the Village of Lincolnshire.

(6) FIRE HYDRANTS
- (a) Fire hydrants shall be as specified on the standard detail drawing included in the Plans and be complete with 133mm valve opening, two 64mm hose nozzles, one 113mm pumper nozzle, 150mm flanged inlet connection, 150mm auxiliary valve, 1.83M trench depth, National Standard operating nut (open left), National Standard nozzle threads, and O-Ring packing seals. Fire hydrants shall be of the break flange type and shall meet or exceed the requirements of AWWA-C502. Hydrant auxiliary valves shall be provided with an adjustable cast iron valve box (two-piece Buffalo Type 150mm shaft) set over the operating nut.

(7) WATERMAIN SHUTDOWN AND REOPENING
- (a) Procedures and schedules for shutting down and draining sections of existing water main (for connection or reconstruction purposes) and for opening the water main sections for use again shall be as required by the Village of Lincolnshire.
- (b) The Contractor is responsible for contacting the Village of Lincolnshire and for making all necessary arrangements.

(8) PRESSURE CONNECTIONS
- (a) Where so indicated on the Plans, connections to existing water mains shall be pressure connections making use of a tapping sleeve and valve for new lines of 75mm or larger diameter.
- (b) Water services of less than 75mm diameter shall be connected to existing mains by means of a corporation stop. A strap saddle shall be provided if required by the Village of Lincolnshire.

(9) BRACING AND ANCHORING
- (a) All fittings and hydrants shall be properly braced by means of concrete thrust blocks. Where conditions prevent the use of thrust blocks, restrained joints or tie rods of a type approved by the Engineer shall be used.
- (b) All joints on vertical bends of 11 1/4 degrees or greater and all pipe and fitting joints within 20 feet of the vertical bend shall be properly anchored by means of a ductile iron retainer gland ("Mega-Lug")or other restraint device approved by the Village of Lincolnshire.

(10) DEPTH OF COVER
- (a) Minimum depth of pipe cover for mains and service lines shall be 1.83M. Maximum pipe cover at valves and hydrants shall be 2.29M, except where a greater depth is indicated on the Drawings.
- (b) Where the required minimum depth of cover cannot be provided, an envelope of thermal insulation material shall be placed around the water pipe. Insulation material shall be "Geilsulate 500 XR" or an approved alternative. Installation details shall be in accordance with the material manufacturer's requirements and recommendations.

(11) TESTING
- (a) All water mains shall be pressure tested at 150 psig for a duration of at least 2 hours.
- (b) After completion of the pressure test, a leakage test shall be performed. Each leakage test shall be for a duration of 1 hour (minimum) in addition to the pressure test period. Allowable leakage shall be as indicated in Section 41-2.13C of the "Standard Specifications."
- (c) Disinfection of water mains shall be by the liquid chlorine method.

3. SOIL EROSION / SEDIMENT CONTROL AND SITE RESTORATION MEASURES

A. GENERAL
(1) The Contractor shall take suitable and sufficient measures to control soil erosion and sedimentation due to construction and to restore landscape areas. These measures shall be in substantial conformance with the principles, practices and standards described in the IEPA publication "Illinois Urban Manual."
(2) Specific erosion/sediment control and restoration measures shall be as indicated on the Project Plans and as stated in these Specifications.
(3) Contractor responsibilities shall include the maintenance and repair of all seeded, sodded, and planted surfaces until all specified vegetative covers within the project area are suitably established and erosion problems have ceased.

B. STABILIZATION PRACTICES
(1) Contractor shall limit removal of existing vegetated ground covers to areas only as absolutely required to perform the project work. Structural sediment barriers shall be installed at the construction limits of the site as indicated on the Plans. Vegetation within areas that are protected by such barrier fencing on the Plans shall not be disturbed during construction.
(2) Exposed soil surfaces shall be stabilized with vegetation and/or protective mulches or blankets. If conditions prevent effective use or placement of such measures, then the installation of structural controls such as sediment barrier fencing and sediment traps will be required.
(3) Stabilization measures shall be initiated as soon as practical after operations have temporarily or permanently ceased, but in no case more than 14 days after such operations have ceased. If construction activity is anticipated to temporarily halt for a period of less than 15 calendar days, then stabilization measures do not have to be initiated on that portion of the site. Where the initiation of stabilization measures by the 14th day after construction activity temporarily or permanently ceases is precluded by weather conditions, stabilization measures shall be initiated as soon as practical.
(4) Temporary seeding shall be employed when necessary due to seasonal limitations or temporary work stoppages. When seasonal weather conditions prevent seeding, sodding and planting operations, sloped surfaces shall be mulched with suitable material as a means of temporary erosion protection.

C. SEDIMENT BARRIERS
(1) Temporary sediment barriers shall be installed where indicated on the Plans and maintained until all soil surfaces have been stabilized with grass or other types of permanent cover. Such barriers shall be a filter fabric fence or other devices as indicated on the Plans.
(2) All sediment barriers shall be replaced or cleaned as necessary during construction when they become clogged or ineffective. All sediment traps and shall be cleaned periodically during construction to allow them to operate effectively.

D. WATER DIVERSION AND DEWATERING
(1) Methods for diverting water flow, controlling groundwater and removing stormwater from work sites shall include erosion and sediment control measures as necessary to prevent erosion at pump discharge locations and to minimize the discharge of settleable solids.
(2) Stone or concrete block riprap protection shall be provided at discharge locations when deemed necessary by the Engineer.
(3) Sediment traps and water removal sump pits shall be provided when required by the Engineer.

E. UNVEGETATED AREAS
(1) Unvegetated areas anticipated to remain unpaved or unrestored for longer than 60 days shall be stabilized with temporary erosion control seeding and mulching within 14 days after operations have ceased.
(2) If unvegetated areas are to remain unpaved or unrestored for less than 60 days, sediment barrier fences or excavated sediment traps shall be installed where the Engineer determines that sediment runoff will affect adjacent areas.

F. TOPSOIL PLACEMENT AND VEGETATIVE COVER
(1) Weather conditions permitting, topsoil shall be placed and graded within each defined construction area immediately upon completion of operations within that area.
(2) Seeding, planting and erosion protection operations to establish permanent vegetative ground cover shall be performed within 5 days after topsoil placement, whenever weather conditions are adequate for such work.

G. EROSION CONTROL SEEDING AND MULCHING
(1) The seed mixture to be used for temporary erosion control seeding of excavated, filled, graded or otherwise disturbed areas shall be IDOT Class 7 - 114 lbs./acre.
(2) Seeded areas shall be protected with a wood cellulose fiber mulch containing a prebonded chemical tackifier. Mulch application rate shall be 2,000 lbs. per acre (minimum).
(3) When seasonal weather conditions prevent seeding, sodding, or planting operations, sloped topsoil surfaces shall be protected with a wood cellulose fiber mulch/tackifier combination (2,000 lbs. per acre) as a means of temporary erosion protection, if required by the Engineer.

H. PERMANENT VEGETATIVE COVERS
(1) Grass areas damaged by construction activities shall be sodded.

REVISIONS	
NAME	DATE

ILLINOIS DEPARTMENT OF TRANSPORTATION
IL RTE 22 (FAP 337)
IL RTE 83 TO US 45 / IL 21 (MILWAUKEE AVE)

WATERMAIN SPECIFICATIONS
DRAWING WM-6
SHEET OF

SCALE: NONE DRAWN BY: TCK
DATE: 3-22-2004 CHECKED BY: CMS

PATRICK ENGINEERING INC. LISLE, ILLINOIS

tkoeppen(Lisle_Rdwy)
03/03/2004 09:18:40 AM P:\Lisle\Lincolnshire\9409A\Drawings\RDWY\shts\Dra\S_Dra_Specs.dgn