

**CHAPTER 57: STANDARD SPECIFICATIONS FOR THE
VILLAGE OF EAST DUNDEE**

SECTION 57.100 - GENERAL REQUIREMENTS AND COVENANTS: The Specifications contained herein shall be for the construction of the following public facilities within the Village of East Dundee:

- Section 100 – General Requirements and Covenants
- Section 200 – Storm Sewer System
- Section 300 – Sanitary Sewer System
- Section 400 – Street Pavements, Curb and Gutters
- Section 500 – Water Distribution System
- Section 600 – Sidewalks
- Section 700 – Driveways
- Section 705 – Parking Lot Improvements
- Section 800 – Maintenance of Traffic and Restoration of Areas
- Section 900 to Section 910 – Village Forestry Standards and Specifications
- Section 1000 – Street and Parking Lot Lighting Improvements

Unless specifically stated in these specifications, the following documents shall provide general requirements and covenants applicable to construction within the Village of East Dundee.

State of Illinois, Standard Specifications for Road and Bridge Construction, as adopted January 1, 2002 and the Illinois Department of Transportation’s “Supplemental Specifications and Recurring Special Provisions”, adopted January 1, 2002 and subsequent editions thereto. All of these specifications are hereinafter referred to in these village standard specifications as State Specifications for Road and Bridge Construction.

I.S.P.E., Consulting Engineers Council of Illinois, et. al., Standard Specifications for Water and Sewer Main Construction in Illinois, as adopted May, 1996, Fifth Edition. These specifications are hereinafter referred to in these village standard specifications as State Standard Specifications for Water and Sewer Main Construction.

In the event of conflict between the contents of these documents and the existing Village Codes, the former will supersede the latter and the Village Engineer’s decision will prevail.

STORM SEWER CONSTRUCTION STANDARDS

SECTION 200 - GENERAL: The standards and requirements found in this article are for the materials and constructing of storm sewer systems within the Village of East Dundee.

SECTION 200.1 - SPECIFICATIONS: These specifications cover materials, construction and all appurtenances normally used for the construction of a storm sewer system. Storm sewer systems shall be installed in accordance with Sections 550,551,552, and 601 thru

605, inclusive of State Standard Specifications for Road and Bridge Construction unless as modified herein or as shown in the Village of East Dundee Standards. All storm manhole, catch basin, and inlet structures shall be provided with a continuous layer of preformed bituminous mastic material at all joints. When adjustments are necessary, they shall be constructed with a maximum of two (2) precast concrete rings set in a continuous bed of mortar to a maximum height of six inches (6"). No bricks shall be used. Joint material will be applied to the full circumference of the pipe joint.

SECTION 200.2 - MATERIALS: All storm sewer pipe materials shall conform to the requirements set forth in Section 1000 - Materials of the State Standard Specifications for Road and Bridge Construction as follows:

Reinforced Concrete Culvert, Storm Drain and Sewer Pipe (RCCP), Class A Materials:
Article 1040.03

Reinforced Concrete Elliptical Culvert, Storm Drain and Sewer Pipe, Class A Materials:
Article 1040.05

Class IV RCCP pipe shall be provided for all storm sewers less than fifteen (15) feet in depth over the top of the pipe. For depths greater than fifteen (15) feet, but less than twenty (20) feet, Class V RCCP pipe shall be provided. For storm sewers greater than 60 inches in diameter or for depths greater than twenty (20) feet, the storm sewer material class for the RCCP pipe shall be as provided in Section 550.03 of the State Standard Specifications for Road and Bridge Construction.

Alternate pipe materials may be utilized for installations not within a public right of way or street for installations which will not be the maintenance responsibility of the village. The alternate pipe material shall meet the requirements for Class B materials set forth in Sections 550.02 and 550.03 of the State Standard Specifications for Road and Bridge Construction.

The Village reserves the right to specify a particular kind of material for any installation.

SECTION 200.3 - CONSTRUCTION REQUIREMENTS: Construction shall be in strict conformance with the following articles contained in the State Standard Specifications for Road and Bridge Construction:

- Article 550.04 - Excavation and Foundation
- Article 550.05 - Plugging Existing Sewers and Drains
- Article 550.06 - Laying Sewer Pipe
- Article 550.07 - Backfilling

SANITARY SEWER CONSTRUCTION STANDARDS

SECTION 300 – GENERAL: The standards and requirements found in this article are for materials and construction of sanitary sewers within the Village of East Dundee, Illinois.

SECTION 300.1 - SPECIFICATIONS: These specifications cover pipe for sanitary sewers and service connections, sewer fittings, manholes and all appurtenances normally used for sanitary sewer collection systems. Special considerations shall be covered in the detailed plans and special provisions covering the proposed construction. Sanitary sewers shall be installed in accordance with the “State Standard Specifications for Water and Sewer Main Construction”, and applicable standards of the Village of East Dundee. In case of conflict, the Village of East Dundee Sanitary Sewer Construction Standards and other applicable ordinances of the Village of East Dundee shall take precedence and shall govern.

SECTION 300.2 - REGULATIONS: Additional rules and regulations governing the construction of sanitary sewers in the Village of East Dundee are:

- (a) The East Dundee Municipal Code.
- (b) The restriction, policies, and instructions that may be adopted from time to time by the Village of East Dundee.
- (c) The Illinois Pollution Control Board Regulations.
- (d) The Illinois Environmental Protection Act.

SECTION 301 - SANITARY SEWERS: All sanitary sewage consisting of domestic and other water-borne wastes shall be collected and conveyed in a sanitary sewer pipe system to a point of discharge into an existing sanitary sewer system, Village of East Dundee interceptor, or sewage treatment plant. No sanitary sewage shall be allowed to enter any storm sewer system or be discharged onto the ground or into receiving streams without first being treated.

SECTION 301.1 - PIPE MATERIALS: All sanitary sewer pipe materials shall conform to the latest applicable A.S.T.M., A.S.A., A.W.W.A., A.A.S.H.T.O. or other nationally accepted standards. Only the following sanitary sewer pipe and joint materials are approved for use in the Village of East Dundee.

- | | <u>Materials</u> | <u>Joints</u> |
|-----|---|---|
| (a) | Extra Strength Vitrified Clay (A.S.T.M. C700) with factory-applied PVC collar for 10" diameter or smaller. For installations less than 15 feet in depth. | A.S.T.M. C425 and A.S.T.M. D1784 Class 12454-B for P.V.C. Bell and Collar |
| (b) | Reinforced Concrete Sewer Pipe (A.S.T.M. C76) for 12" diameter or greater. Class of pipe, coating and lining of the pipe as recommended by the pipe manufacturer and approved by the Village Engineer will be required. | A.S.T.M. C443 |

<u>Materials</u>	<u>Joints</u>
(c) Standard Polyvinyl Chloride (PVC) Sewer Pipe A.S.T.M. D3034, Type PSM and SDR shall not exceed 26 (SDR, or standard dimension ratio, is the ratio of the pipe outside diameter to the minimum wall thickness; $SDR=D/t$) for 12" diameter or less and for depths less than 15 feet.	A.S.T.M. D3212 for gasket joints with elastomeric seal (A.S.T.M. F477).
(d) Ductile Iron Pipe ANSI A21.51 (AWWA C-151), Cement Lined per ANSI A21.4 (AWWA C-104) class thickness designed per ANSI A21.50 (AWWA C-150).	Push-on rubber gasket per ANSI 21.11 (AWWA C111 and C600).
(e) Heavy wall Polyvinyl Chloride (PVC) Pressure Pipe ANSI/AWWA C-900 or A.S.T.M. D2241 and SDR as defined under c) above shall not exceed 21.	A.S.T.M. D3139 for rubber gasket joints conforming to A.S.T.M. F477.

Ductile iron pipe, PVC pressure pipe or reinforced concrete pipe will be required by the Village of East Dundee for all installations greater than fifteen feet in depth.

Nothing herein shall constitute or imply an endorsement by the Village of East Dundee of any one material over another or an opinion by the Village regarding equality or superiority or the performance qualities of any of the materials.

SECTION 302 - PROTECTION OF WATER MAINS: Water mains shall be protected in accordance with the applicable Illinois Pollution Control Board Regulations and the Illinois Environmental Protection Agency, Division of Public Water Supplies, Technical Policy Statements. Wherever the sanitary sewer main, building service sewer, or any storm drain crosses a water main, a minimum eighteen (18) inches vertical separation shall be provided between the top of the lower pipe and the bottom of the upper pipe, and the water main shall be protected as specified on Standard Drawings No. 10 and 20 of the State Standard Specifications for Water and Sewer Main Construction. If an eighteen (18) inches vertical separation cannot be maintained, the water main shall be protected as specified on Standard Drawings No. 21, 22, 23, and 24 of the State Standard Specifications for Water and Sewer Main Construction.

SECTION 303 - SURVEY LINES AND GRADES: Survey lines and grade hubs shall be provided by the owner's engineer at a maximum spacing of one hundred (100) feet intervals and at all changes in line and grade regardless of whether a laser beam is used.

SECTION 303.1 - DEPTH OF PIPE COVER: All pipe shall be laid to a minimum depth of six (6) feet measured from the existing or proposed ground surface to the top of the pipe barrel unless specifically allowed otherwise in special circumstances by the Village Engineer.

SECTION 303.2 - PIPE CRADLE (BEDDING): Granular pipe cradle material shall be required on all sanitary sewers installed in the Village of East Dundee. Granular pipe cradle shall be a minimum of four (4) inches thick below the pipe in earth or gravel excavation and a minimum of six (6) inches in rock excavation for the trench. The cradle shall extend up to the mid-point (springline) of the pipe. For clay or PVC pipe, the trench must be backfilled with granular material to a minimum of twelve (12) inches over the top of the pipe per the applicable East Dundee Standard. The embedment granular material shall conform to Class 1A meeting Gradation CA-7 set forth in Article 1004.01 of the State Specifications for Road and Bridge Construction.

SECTION 305 - LAYING OF PIPE: Sanitary sewer pipe shall be laid true to line and grade as set forth in Section 31, Paragraph 31-1.02 of the State Standard Specifications for Water and Sewer Main Construction. Dirt or other foreign material shall be prevented from entering the pipe or pipe joint during handling or laying operations and any pipe or fitting that has been installed with dirt or foreign material in it shall be removed, cleaned, and relaid. At times when pipe laying is not in progress, the open end of the pipe shall be closed with a water-tight plug or by other means approved by the Village Engineer to ensure absolute cleanliness inside the pipe.

SECTION 305.1 - LAYING OF PIPE ON CURVES: The curvature of sanitary sewers is not allowed unless, in the opinion of the Village Engineer, special circumstances would allow otherwise. Pipe required to be laid on curved alignment shall be joined in straight alignment and then deflected, joint by joint. Special care shall be taken in blocking the pipe and in no case shall the degree of deflection exceed manufacturer's recommendations for the respective pipe size, material, and barrel length.

SECTION 305.2 - SANITARY SEWER SERVICES: Sanitary sewer services shall be a minimum of six (6) inches in diameter and connected to the sewer main with a manufactured wye or tee and a forty-five (45) degree bend as shown on the applicable East Dundee Standard. Sanitary sewer services shall be extended to the property line or building at a minimum gradient of one (1) percent. Sanitary sewer service connections to sewer mains twelve (12) feet or more in depth shall be constructed with a six (6) inch tee and riser and backfilled with select granular material. On a temporary basis, sanitary services may be terminated with a manufactured plug, in which case the location shall be staked and an accurate record kept of the distance from the nearest downstream manhole along the sewer main. Sanitary sewer service connections to existing sewer mains shall be made with a tapping machine and saddle tightly secured to the existing sanitary sewer or by other methods approved by the Village Engineer.

SECTION 306 - SANITARY SEWER MANHOLES: Manholes for sanitary sewers shall have a minimum inside diameter of forty-eight (48) inches for twelve (12) inch mains and a sixty (60) inches diameter for greater than twelve (12) inch but equal to or less than twenty-four (24) inch main sizes. Manholes shall be constructed of precast reinforced concrete units or cast-in-place Portland Cement concrete in accordance with Section 32 of the State Standard Specifications for Water and Sewer Main Construction and shall comply with the East Dundee Sanitary Sewer Standards.

SECTION 306.1 - MANHOLE LOCATION: Manholes shall be located at the junction of two sanitary sewer mains or at any change in grade, alignment, or size of pipe. The maximum spacing of manholes shall be three hundred (300) feet for sanitary sewers fifteen (15) inches and smaller and four hundred (400) feet for sanitary sewers larger than 15 inches in size.

SECTION 306.2: Precast concrete manholes shall be provided for this improvement conforming to the applicable portions of Division III, Section 32 of the State Standard Specifications for Water and Sewer Main Construction and Village of East Dundee Standards. The manhole bottom shall be precast with the first riser section. A flexible type joint shall be furnished at points of entry into and exit from manhole structures of design approved by the Village Engineer prior to installation. This flexible joint may consist of a sleeve of high quality synthetic rubber with a substantial serrated flange which is cast directly into the wall of the manhole base to form a tight waterstop and protrudes outside of the manhole wall to connect with the pipe entering/exiting the manhole. When this type of flexible joint is used, the sleeve shall slip over the end of the pipe adjacent to the manhole base and shall be secured by means of a stainless steel strap clamp equipped with a draw bolt and nut. The Contractor may elect to utilize a modular mechanical type joint consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and wall opening. The links shall be loosely assembled with bolts to form a continuous rubber belt around the pipe with a pressure plate under each bolt head and nut. After the seal assembly is positioned in the sleeve, tightening of the bolts shall cause the rubber sealing elements to expand and provide an absolutely water-tight seal between the pipe and manhole wall opening.

SECTION 306.3 - CONNECTIONS TO EXISTING MANHOLES: A machine cored opening in the wall of existing manholes shall be provided to accommodate a flexible connector system. The system should consist of three component positive seal gasketing system similar in design to Press-Seal Gasket Corporation of Fort Wayne, Indiana (46852) PSX: SERIES SIX, POSITIVE SEAL. This connection system will enable the contractor to provide a flexible, water-tight connection to existing manholes. The three components should include a power sleeve, a gasket, and a take-up clamp. The sleeve is to be mechanically expanded to compress the gasket against the cored receptacle hole surface in the manhole wall. After adequate compression of the gasket is achieved, the ends of the power sleeve should interlock to insure against any loss of compression. The gasket system should be secure in the manhole ready to accept pipe of the class and diameter specified.

SECTION 306.4 - MANHOLE APPURTENANCES: The following items shall apply to all manhole structures:

- (a) Manholes shall be furnished with a water-tight frame and solid cover (Neenah Foundry R-1077-B, East Jordon Works 1022 HD or approved equal) with the word "SANITARY" imprinted on the cover in raised letters.
- (b) Both the manhole frame and cover shall have machined horizontal and vertical

bearing surfaces.

- (c) Pick holes shall not create openings in the manhole cover.
- (d) Manholes located in areas subject to inundation shall be furnished with waterproof, bolt-down frames and covers (Neenah Foundry R-1916-F, East Jordan Iron Works 1045 ZPT or approved equal) with the word "SANITARY" imprinted on the cover in raised letters.
- (e) Manhole frames shall be adjusted to proper grade utilizing reinforced, pre-cast concrete rings; brick or concrete blocks will not be allowed.
- (f) Adjusting rings shall be securely sealed to the cone section or top barrel section of the manhole using an approved resilient, flexible, non-hardening, pre-formed bituminous mastic material. This mastic shall be applied in such a manner that no surface water or ground water inflow can enter the manhole through gaps between the top barrel section or cone section and the first adjusting ring, between adjusting ring, or between the last adjusting ring and the manhole frame. Up to six inches (6") of adjusting rings may be installed on a given manhole.
- (g) An exterior joint collar meeting A.S.T.M. C877-91 shall be used to provide a water-tight seal between manhole barrel sections, cone barrel section, and the cone section to frame and cover. The joint collar shall be joint sealer system as manufactured by Mar-Mac Manufacturing Company of McBee, South Carolina 29101 or an approved equal and shall be installed according to the manufacturer's recommendations. The collar shall consist of a band 7" wide. The band shall have an outer layer of polyethylene with an under layer of rubberized mastic that is reinforced with a woven polypropylene fabric. There shall be a peelable protective paper against the mastic that is removed when the collar is applied to the joint. Within the collar two steel straps 5/8" wide shall be located 3/4" from each edge of the band. The straps shall be in tubes that isolate them from the mastic and allow them to slip freely when tightened around the pipe. The collar shall be designed so that when it is applied around the joint, the ends shall overlap at least 6" and when the straps are secured a layer shall completely cover the straps protecting them from moisture and rust. A bell hole shall be dug under the joint. After removing the protective paper, the band shall be placed around the pipe, mastic side to the pipe and spanning the joint, with the overlap at the top of the pipe. The steel straps shall be secured with the proper tools. The closing flap shall cover all remaining exposed strap.
- (h) Hydraulic cement shall be used on all manhole interior joints (dress up).
- (i) Manhole steps on maximum sixteen inches (16") centers shall be furnished with each manhole, securely anchored in place true to vertical alignment, in

accordance with the East Dundee Standard.

SECTION 306.5 - DROP MANHOLE ASSEMBLIES: Drop manhole assemblies shall be provided at the junction of sanitary sewers where the difference of grade of the inverts of the pipes exceeds two feet (2'). The entire drop assembly shall be cast in concrete monolithically with the manhole barrel section for proposed manhole construction or constructed of ductile iron pipe strapped to the outside of existing manholes, if Village of East Dundee permits, or of concrete encased drop assembly tied to the exterior wall of existing manholes by a method approved by the Village.

SECTION 307 - TESTING FOR ACCEPTANCE OF SANITARY SEWERS: All sanitary sewers twenty-one inches (21") and smaller including service lines shall pass a low pressure air test before acceptance. The Village may, at their discretion, require in addition to or in lieu of the low pressure air test an exfiltration test as described in Article 307.2 which follows prior to final acceptance. Sanitary sewers twenty-four inches (24") and larger shall pass an exfiltration test described in Article 307.2 and be subject to a physical inspection by the Village. Additionally, manholes are subject to physical inspection and vacuum testing described in Article 307.4.

SECTION 307.1 - LOW PRESSURE AIR TEST PROCEDURES AND REQUIREMENTS: The procedure for low pressure air testing shall follow that set forth in Section 31, Paragraph 31-1.11B(3) of the State Standard Specifications for Water and Sewer Construction. All plugs including those in the upstream end of sanitary services must be carefully braced to prevent leakage and blowout. The line being tested shall be deemed acceptable when the time taken for the one pound pressure drop is not less than that shown in the Air Test Table which follows at the end of Section 300 - Sanitary Sewer System.

SECTION 307.2 - EXFILTRATION TEST PROCEDURES AND REQUIREMENTS: The exfiltration test shall be performed in the absence of ground water in accordance with the procedures set forth in Section 31, Paragraph 31-1.11B(1) of the State Standard Specifications for Water and Sewer Construction.

The amount of exfiltration shall not exceed 200 gallons per inch of pipe diameter per mile per day, including all manholes and service lines. The Village Engineer shall be the sole judge of the results.

SECTION 307.3 - DEFLECTION TESTING OF PVC PIPE: All main sewers shall be tested for excess deflection by pulling a "go-no go" mandrel through the pipe from manhole to manhole. The outside diameter of the test mandrel shall be equal to ninety-five percent of the original inside diameter of the pipe being used. The main sewers shall be so tested no sooner than thirty (30) days after they have been installed. Wherever possible and practical, the testing shall initiate at the downstream lines and proceed towards the upstream lines. Where deflection is found to be in excess of 5% of the original pipe diameter, 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.

SECTION 307.4 – VACUUM TESTING MANHOLES: All new manholes shall be subject to a vacuum test. The test is applicable for new manholes. The vacuum test shall be performed after backfilling is completed. The testing agency is to comply with the following guidelines:

1. Use manufactured vacuum test equipment meeting the Engineer’s approval and should follow equipment manufacturer’s recommended procedures throughout the test, unless directed otherwise required by this specification.
2. Use extreme care and follow safety precautions during testing operations. Keep personnel clear of manholes during testing.
3. Seal all openings except manhole top access using pneumatic plugs rated for test pressures. Install plugs according to test equipment manufacturer’s recommendations.
4. Brace pipe inverts if connecting pipes have not been backfilled.
5. Install vacuum tester head assembly on manhole top access, and Inflate seal.
6. Evacuate manhole to 10 inches Hg (mercury) or 5 psi, close isolation valve and start test. The start time of the test should be recorded.
7. Maintain vacuum in manhole for the time indicated in table for the diameter and depth of manhole being tested.
8. Allowable vacuum loss: 1 inch Hg.
9. Test failure is indicated by vacuum loss greater than allowable within the minimum test time indicated in table for the size of manhole being tested.

Minimum Test Times for Various Manhole Diameters					
Depth, Feet	Diameter, inches				
	48	54	60	66	72
	Time, Seconds				
8	20	23	26	29	33
10	25	29	33	36	41
12	30	35	39	43	49
14	35	41	46	51	57
16	40	46	52	58	67
18	45	52	59	65	73
20	50	53	65	72	81
22	55	64	72	79	89
24	59	64	78	87	97
26	64	75	85	94	105
28	69	81	91	101	113

SECTION 307.5 - TEST RESULTS: If the sanitary sewer installation fails to meet the test requirements specified, the contractor shall determine the cause or causes of the defect and shall, at his own expense, repair or replace all materials and workmanship as may be necessary to comply with the test requirements.

SECTION 308 - CERTIFICATION: It shall be the responsibility of the pipe manufacturers to certify that pipe and joint materials furnished are capable of meeting the low pressure air test, infiltration test, and exfiltration test and are manufactured in conformance with the A.S.T.M., A.N.S.I., A.W.W.A., or A.A.S.H.T.O. test(s) specified.

AIR TEST TABLE

Based on Equations from ASTM C 828

SPECIFICATION TIME (min:sec) REQUIRED FOR PRESSURE DROP FROM
3 ½ TO 2 ½ PSIG WHEN TESTING ONE PIPE DIAMETER ONLY

PIPE DIAMETER, INCHES

LENGTH OF LINE, FEET	4	6	8	10	12	15	18	21	24
25	0:04	0:10	0:18	0:28	0:40	1:02	1:29	2:01	2:38
50	0:09	0:20	0:35	0:55	1:19	2:04	2:58	4:03	5:17
75	0:13	0:30	0:53	1:23	1:59	3:06	4:27	6:04	7:55
100	0:18	0:40	1:10	1:50	2:38	4:08	5:56	8:05	10:34
125	0:22	0:50	1:28	2:18	3:18	5:09	7:26	9:55	11:20
150	0:26	0:59	1:46	2:45	3:58	6:11	8:30		
175	0:31	1:09	2:03	3:13	4:37	7:05			
200	0:35	1:19	2:21	3:40	5:17				12:06
225	0:40	1:29	2:38	4:08	5:40			10:25	13:36
250	0:44	1:39	2:56	4:35			8:31	11:35	15:07
275	0:48	1:49	3:14	4:43			9:21	12:44	16:38
300	0:53	1:59	3:31				10:12	13:53	18:09
350	1:02	2:19	3:47			8:16	11:54	16:12	21:10
400	1:10	2:38			6:03	9:27	13:36	18:31	24:12
450	1:19	2:50			6:48	10:38	15:19	20:50	27:13
500	1:28			5:14	7:34	11:49	17:01	23:09	30:14

STREET PAVEMENTS, CURB AND GUTTER CONSTRUCTION STANDARDS

SECTION 400 - GENERAL: The standards and requirements found in this article are for the materials and construction of street pavements within the Village of East Dundee, Illinois. Both rigid and flexible pavement construction are permitted in the Village.

SECTION 401 - MATERIALS AND SPECIFICATIONS FOR STREETS

SECTION 401.1 - GENERAL REFERENCES: It is intended that all public streets shall be constructed in accordance, as far as applicable, with the most recently adopted edition of the State of Illinois, Department of Transportation, “STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION”, including current Highway Standards, Special Provisions, and Supplemental Specifications as issued by said Department. These shall be referred to as the “State Specifications for Road and Bridge Construction”.

SECTION 401.2 - SUBGRADE: The subgrade of all public streets shall be prepared in accordance with Section 300 of the State Standard Specifications for Road and Bridge Construction. It is required that the soil composing the subgrade have a minimum soil support value of 3.0 as determined by the IBR (Illinois Bearing Ratio) Test procedures used by the Illinois Department of Transportation. When, in the opinion of the Village Engineer, evaluation of the suitability of the subgrade to support the proposed pavement is warranted, a competent Soils Engineer approved by the Village Engineer and engaged by the developer at his expense shall perform the necessary soil tests to insure that a stable subgrade as specified is being provided.

SECTION 401.3 - DESIGN OF PAVEMENT: PROCEDURE: The required thickness of the pavement shall be determined in accordance with the current Illinois Department of Transportation Bureau of Local Roads and Streets, “Administrative Policies: Flexible Pavement Design for Local Agencies (Attachment 5-8L) or Rigid Pavement Design for Local Agencies (Attachment 5-8M).

The anticipated traffic volumes, the composition of the traffic, and the subgrade support strength provided by the roadbed soils shall be considered in the design of the pavement. This information is subject to the review and approval of the Village Engineer.

VILLAGE OF EAST DUNDEE MINIMUM DESIGN CRITERIA: Not less than the minimum requirements listed below shall be permitted in the design of streets.

<u>STREET CLASSIFICATION</u>	<u>MINIMUM STRUCTURAL NO. (dt)</u>
Primary or Major Street	
*ADT over 15,000	5.5
*ADT over 7,000 - 15,000	5.0
*ADT under 7,000	4.0
<u>STREET CLASSIFICATION</u>	<u>MINIMUM STRUCTURAL NO. (dt)</u>

Secondary or Collector Street	3.3
Minor or Local Street	2.7
Cul-de-Sac	2.7
Industrial Park Streets	3.5

*Average Daily Traffic anticipated 10 years beyond completion of subdivision.

SECTION 401.4 - MINIMUM PAVEMENT THICKNESS REQUIREMENT: For Flexible Pavements, the minimum requirements for surface course, base course, and subbase course shall be in compliance with those given in Figure 5-4, Minimum Thickness and Material Requirements in the Attachment 5-8L and in Figure 3-1, Minimum Structural Design Requirements in the Attachment 5-8M defined previously in Article 401.3 of these standards.

SECTION 401.5 - REVIEW OF PAVEMENT DESIGN: The Village of East Dundee shall be furnished with copies of the soils report when a soil support IBR value of three (3) or greater is used in the pavement design, a list of proposed street classifications, the anticipated traffic volumes which will be generated, and traffic factors based on preceding data. The Village Engineer shall review this design information and report the evaluation of same to the Plan Commission and/or Village Board prior to their consideration of the Engineering Plans.

SECTION 401.6 - STAGE CONSTRUCTION REQUIREMENT FOR BITUMINOUS PAVEMENTS: For subdivision streets, the installation of the final one and one-half (1-1/2) inch of bituminous concrete surface of the proposed pavement shall be delayed for one winter. After May 1st of the year following the initial construction of the pavement or a later year mutually agreed upon between the owner and Village Engineer, the Contractor and the Village Engineer shall inspect and mark all distressed or damaged areas. These areas shall be removed and repaired to the satisfaction of the Village Engineer. The entire surface of the

existing pavement shall then be cleaned; primed at a minimum rate of 0.05 gallons per square yard; sanded, if the street is open to traffic, at the minimum rate of two (2) pounds per square yard; and surfaced with the final layer of bituminous concrete as required.

SECTION 401.7 - MATERIALS INSPECTION: Subgrade compaction and all materials incorporated into the roadway section shall be tested for compaction when being placed by a competent testing laboratory engaged by the owner at his expense. Tests shall be made in compliance with current State of Illinois standard testing recommendations, except that plant inspectors will not be required in concrete or asphalt plants continuously during production provided plants have previously been approved for furnishing materials by the Illinois Department of Transportation. However, one random test shall be made daily on all material used. Results of all tests conducted shall be forwarded to the Village Engineer for his review and approval. Work will not be accepted without the test results being first submitted to the Village.

The Owner shall provide a pavement core for every 1,000 square yards of pavement to determine the thickness, strength and/or density of the pavement when requested by the Village Engineer, to determine their compliance with the contract specifications.

SECTION 401.8 - PROTECTIVE COATING APPLICATION: All concrete pavement in the Village of East Dundee shall receive a protective coat regardless of the time of the year constructed in accordance with applicable portions of Section 420.21 and 503.19 of the State Standard Specifications for Road and Bridge Construction.

WATER DISTRIBUTION SYSTEM CONSTRUCTION STANDARDS

SECTION 500 - GENERAL: The standards and requirements found in this article are for materials and construction of water mains within the Village of East Dundee, Illinois. Specification references made herein for manufactured materials such as pipe, hydrants, valves and fittings refer to designations for the American Water Works Association (AWWA) or the American National Standard Institute (ANSI). Nothing herein shall constitute or imply an endorsement by the Village of East Dundee of any one material over another.

SECTION 500.1 - SPECIFICATIONS: These specifications cover pipe fittings and accessory items normally used for water distribution systems. Special considerations will be covered in the plans and special provisions. Water distribution systems shall be constructed in accordance with the most current edition of the Standard Specifications for Water and Sewer Main Construction in Illinois.

SECTION 501 - PIPE:

SECTION 501.1 - DUCTILE CAST IRON PIPE: Ductile cast iron pipe shall conform to the most current ANSI A21.51 and AWWA C151 specifications requirements. Class 52 thickness designation, casting, marking, testing, etc. shall be provided in accordance with applicable ANSI or AWWA standards.

SECTION 501.2 - LINING: Cement lining shall be included in accordance with the most current ANSI A21.4 (AWWA - C104) specification requirements.

SECTION 501.3 - Pipe Fittings: All cast iron fittings shall conform to the latest ANSI A21.10 and AWWA C110 specification requirements for cast iron fittings. Lining or other special items shall be specified in the special provisions for a project.

SECTION 502 - PROTECTION OF WATER MAINS:

SECTION 502.1 - GENERAL: Wherever pipelines designated to carry potable water supplies cross or are laid less than ten (10) feet horizontally from existing or proposed drains or sewer lines, or cross house service sewers, storm drains, or sanitary sewers, special precautions shall be taken as follows:

SECTION 502.2 - PARALLEL WATER MAINS AND SEWERS:

(a) Should conditions prevail which prevent a lateral separation of ten (10) feet, the pipeline may be laid closer than ten (10) feet to a storm or sanitary sewer, provided the water main is laid in a separate trench and at such an elevation that the bottom of the water main is at least eighteen (18) inches of clear separation above the crown of the sewer.

(b) If it is impossible to obtain a horizontal separation of at least ten (10) feet, and a vertical separation of at least eighteen (18) inches as stipulated above, the sewer shall be constructed or reconstructed of mechanical or slip-on joint ductile iron pipe, of PVC pipe equivalent to water main standards of construction, or of concrete pressure pipes specified herein, and be pressure tested to assure water tightness.

SECTION 502.3 - WATER MAIN CROSSING SEWERS:

(a) Whenever the water main crosses over house sewers, storm drains or sanitary sewers, the water main shall be laid at such an elevation that the bottom of the water main is at least eighteen (18) inches above the top of the drain or sewer. This minimum vertical separation shall be maintained for that portion of the water main located within ten (10) feet to be measured from the centerline of the drain or sewer normal to the water main centerline.

(b) Under conditions that the minimum vertical separation set forth in the above paragraph cannot be maintained or it is necessary for the water main to pass under a sewer or drain, the water main shall be protected as specified on Standard Drawings No. 21, 22, 23, and 24 of the State Standard Specifications for Water and Sewer Main Construction.

(c) Where a water main must cross under a sewer or drain, in addition to the above, a vertical separation of eighteen (18) inches between the sewer and water main shall be maintained. The sewer shall be supported to prevent its settling as directed by the Village Engineer or Superintendent of Public Works.

SECTION 502.4 - POLYETHYLENE ENCASEMENT: Where, in the opinion of the Village Engineer the conditions warrant, a study shall be made at the expense of the Owner to determine if polyethylene encasement of the ductile iron water main is advisable. The encasement shall meet the requirements of ANSI A21.5 and AWWA C104 standards.

SECTION 503 - PIPE INSTALLATION FOR WATER MAINS:

SECTION 503.1 - GENERAL: Ductile iron water main shall be installed in accordance with the specifications and instructions for installing ductile iron pipe contained in AWWA C600 standards.

SECTION 503.2 - EXCAVATION AND BACKFILL: Excavation and backfill for water mains shall conform to the provisions of Section 20, 21, and 22 and other applicable sections of the Standard Specifications for Water Main and Sanitary Sewer.

SECTION 503.3 - DEPTH OF PIPE COVER: Unless otherwise shown on the plans or indicated in the special provisions, all pipe shall be laid to a minimum depth of five feet six inches (5'-6") measured from the existing ground surface or established finish grade to the top of the barrel of the pipe. In areas subject to subsequent excavation or fill, the mains shall be laid to grades shown on the plans.

SECTION 503.4 - PIPE FOUNDATIONS: To ensure that adequate and uniform support is provided under the water main and to avoid differential settlement of the pipe, all water main shall be laid on a bed of sand, gravel, or crushed stone to a depth of 4 inches minimum thickness according to Laying Condition Type 4 set forth in ANSI A21.50 and AWWA C150 standards. The initial backfilling of the main to a minimum of 6 inches over the pipe shall be with approved fine material free of rocks or clods larger than 2 inches in diameter. This backfill material should be free of cinders, ashes, refuse, vegetable or organic material, boulders or other material not suitable as determined by the Village Engineer. The backfill shall be tamped into place to provide a firm support all along the pipe.

SECTION 503.5 - DEWATERING OF TRENCH: Where water is encountered in the trench, it shall be removed during pipe laying and jointing operations. Provisions shall be made to prevent floating of the pipe. Trench water shall not be allowed to enter the pipe at any time.

SECTION 504 - HANDLING OF PIPE:

(a) All types of pipe shall be handled in such a manner as will prevent damage to the pipe or coating. Damaged pipe, specials and other accessories shall be rejected and replaced to the satisfaction of the Village. The methods of handling shall be corrected to prevent further damage when called to the attention of the Contractor.

(b) Threaded pipe ends shall be protected by caps or other means until laid.

(c) The pipe and fittings shall be inspected by the Contractor for defects while suspended above grade.

(d) Dirt or other foreign material shall be prevented from entering the pipe or pipe joint during handling or laying operations, and any pipe or fitting that has been installed with dirt or foreign material in it shall be removed, cleaned and relaid. At times when pipe laying is not in progress, the open ends of the pipe shall be closed by a water-tight plug or by other means approved by the Village Engineer or Director of Public Works to ensure absolute cleanliness inside the pipe.

SECTION 505 - LAYING OF PIPE:

SECTION 505.1 - LAYING OF PIPE ON CURVES:

(a) Long-radius curves, either horizontal or vertical, may be laid with standard pipe by deflections at the joints. If the pipe is shown curved on the plans and no special fittings are shown, the Contractor can assume that the curves can be made by deflection of the joints with standard lengths of pipe. If shorter lengths are required, the plan will indicate maximum lengths that can be used.

(b) Where field conditions require deflection with curves not anticipated by the plans, the Village Engineer will approve the methods to be used.

(c) Maximum deflections at pipe joints and laying radius for various pipe lengths are as found in the following standards:

Ductile Cast Iron Pipe Mechanical Joints	AWWA C600
Ductile Iron Pipe Push-On Joints	AWWA C600

(d) When rubber-gasketed pipe is laid on a curve, the pipe shall be jointed in a straight alignment before the deflection is introduced.

SECTION 505.2 - JOINTS FOR DUCTILE CAST IRON PIPE: Joints for cast iron pipe shall consist of one of the two following types, unless otherwise provided in the special provisions:

- Mechanical Joints
- Push-On Rubber Gasket Joints

SECTION 505.3 - JOINTING MECHANICAL JOINT PIPE (AWWA C111):

(a) The outside of the spigot and inside of the bell of mechanical joint pipe shall be thoroughly cleaned to remove all foreign matter from the joint. The cast iron gland shall then be slipped onto the spigot end of the pipe with the lip extension of the gland toward the socket or bell end. The rubber gasket shall be placed on the spigot end with the thick edge toward the gland. The pipe shall be pushed forward to completely seat the spigot end in the bell. The gasket shall then be pressed into place within the bell, being careful to have the gasket evenly located around the entire joint. The cast iron gland shall then be moved along the pipe into position and bolted. Mechanical joint restraint shall be Megalug Series 1100 produced by EBAA Iron Inc. or approved equal.

(b) Nuts spaced 180 degrees shall be tightened alternately to AWWA C600 standards in order to produce an equal pressure on all parts of the gland.

SECTION 505.4 - JOINTING RUBBER GASKET JOINT PIPE (AWWA C111):

(a) The inside of the bell shall be thoroughly cleaned to remove all foreign matter from the joint. The circular rubber gasket shall be inserted in the gasket seat provided.

(b) A thin film of gasket lubricant shall be applied to the inside surface of the gasket. Gasket lubricant shall be a solution of vegetable soap or other solution supplied by the pipe manufacturer and approved by the Village Engineer.

(c) The spigot end of the pipe shall be cleaned and entered into the rubber gasket in the bell, using care to keep the joint from contacting the ground. The joint shall then be completed by forcing the plain end to the seat of the bell.

(d) All pipe shall be furnished with a depth mark to assure that the spigot end is inserted to the full depth of the joint.

(e) Field-cut pipe lengths shall be beveled to avoid damage to the gasket and facilitate making the joint.

SECTION 505.5 - BELL AND SPIGOT PIPE WITH LEAD JOINTS: This type is allowed only when required by special conditions. Details of such installations shall be specifically approved by the Village Engineer.

SECTION 505.6 - THRUSTING BLOCKING:

(a) Blocking to prevent movement of lines under pressure at bends, tees, caps, valves and hydrants shall be with minimum 3000 psi Portland cement concrete, a minimum of 12" thick, placed between solid ground and the fittings and shall be anchored in such a manner that pipe and fitting joints will be accessible for repairs. A mechanical joint restraint may be used as an alternative to thrust blocking. Mechanical joint restraint shall be Megalug Series 1100 produced by EBAA Iron Inc. or approved equal

(b) All bends of 11-1/4 degrees or greater, and all tees and plugs shall be thrust protected to prevent movement of the lines under pressure as per the East Dundee Standards.

SECTION 505.7 - CONNECTIONS TO EXISTING MAINS: Connections to existing water mains shall be accomplished without interruption of service unless otherwise authorized by the Village Engineer or Director of Public Works. Tap and gate valves will be provided at the point of connection to the existing system.

SECTION 506 - PRESSURE TESTING AND FLUSHING OF WATER MAINS:

SECTION 506.1 - HYDROSTATIC TEST:

(a) The newly laid water mains or any valves sections of it shall be subject to a hydrostatic pressure test of no less than one hundred and fifty (150) pounds per square inch (PSI).

(b) Duration of each pressure test shall be for a period of not less than two (2) hours for pipes with uncovered joints and not less than six (6) hours for pipes which have been backfilled before tests are made.

SECTION 506.2 - PROCEDURE FOR TEST: Each valved section of pipe shall be slowly filled with water and the specified test pressure shall be applied by means of a pump connected to the pipe in a satisfactory manner. The pump pipe connection and all necessary apparatus, including gauges and meters, shall be furnished by the Contractor. Before applying the specified test pressure, all air shall be expelled from the pipe. To accomplish this, taps shall be made, if necessary at points of highest elevation, and afterwards tightly plugged. All exposed pipes, fittings, valves, hydrants, and joints shall be carefully examined during the open trench test. All joints showing visible leaks shall be repaired until tight. Any cracked or defective pipes, fittings, valves, or hydrants discovered as a consequence of this pressure test shall be removed and replaced by the Contractor with sound material, and the test shall be repeated until satisfactory to the Village Engineer.

SECTION 506.3 - PERMISSIBLE LEAKAGE:

(a) Suitable means shall be provided by the Contractor for determining the quantity of water lost by leakage. The leakage test shall be conducted after satisfactory completion of the pressure test before being acceptable.

(b) Allowable leakage shall not be greater than that computed by the following table. (Allowable leakage is shown in Gal./hr/1000 ft.)

<u>Diameter of Pipe</u>	<u>Allowable Leakage</u>	<u>Diameter of Pipe</u>	<u>Allowable Leakage</u>
6"	0.55	18"	1.66
8"	0.74	20"	1.84
10"	0.94	24"	2.21
12"	1.10	30"	2.76
14"	1.29	36"	3.31
16"	1.47	42"	3.86

(c) Leakage is defined as the quantity of water to be supplied in the newly laid pipe and any valved section of it necessary to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled. The test pressure shall be maintained on the hourly basis minimally or at intervals directed by the Engineer.

(d) Flanged pipe shall be "bottle tight".

SECTION 507 - FLUSHING:

(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. A hydrant shall be installed at the end of the main. One two-and-one-half (2-1/2) inch hydrant opening will, under normal pressure, provide this velocity in pipe sizes up to and including twelve (12) inch.

(b) All taps required by the Contractor for chlorination or flushing purposes, or for temporary or permanent release of air, shall be provided by him as a part of the construction of water mains.

SECTION 508 - REQUIREMENT OF CHLORINE: Before being placed into service, all new mains and repaired portions of or extensions to existing mains shall be chlorinated so that a chlorine residual of not less than twenty-five (25) parts per million remains in the water after standing twenty-four (24) hours in the pipe.

SECTION 508.1 - FORM OF APPLIED CHLORINE: Chlorine shall be applied by one of the methods which follow, subject to approval by the Village Engineer.

(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 - In certain instances, when the usage of chlorine gas is not practical, such as in congested or confined areas, upon approval of the Village Engineer, a chlorine-bearing compound of known chlorine content, prepared in solution form, may be substituted for chlorine gas.

SECTION 508.2 - POINT AND RATE OF APPLICATION:

(a) 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. The water injector for delivering the chlorine-bearing water into the pipe should be supplied from a tap made on the pressure side of the gate valve controlling the flow into the pipeline extension. Alternate points of application may be used when approved or directed by the Village Engineer.

(b) Rate of Application - Water from the existing distribution system or other approved source of supply shall be controlled to flow very slowly into the newly laid pipeline during application of the chlorine. The rate of chlorine mixture flow shall be in such proportion to the rate of water entering the newly laid pipe that the dosage applied to the water will be at least fifty (50) parts per million unless otherwise directed by the Village Engineer.

(c) Retention Period - Treated water shall be retained in the pipe at least twenty-four (24) hours. After this period, the chlorine residual at pipe extremities and at other representative points shall be at least twenty-five (25) parts per million.

(d) Chlorinating Valves and Hydrants - In the process of chlorinating newly laid pipe, all valves or other appurtenances shall be operated while the pipeline is filled with the chlorinating agent and under normal operating pressure.

(e) Preventing Reverse Flow - Valves shall be manipulated so that the strong chlorine solution in the line being treated will not flow back into the line supplying the water. Check valves may be used if desired.

SECTION 509 - FINAL FLUSHING AND TESTING:

(a) Following chlorination, all treated water shall be thoroughly flushed from the newly laid pipe at its extremity until the replacement water throughout its length shows, upon test, the absence of chlorine. In the event chlorine is normally used in the source of supply, then the tests shall show a residual not in excess of that carried in the system.

(b) After flushing, water samples collected on two (2) successive days from the treated piping system, and directed by the Village Engineer, shall show satisfactory bacteriological results. Bacteriological analysis must be performed by a laboratory approved by the Director of the Illinois Department of Public Health and the Village Engineer.

(c) Should the initial treatment result in an unsatisfactory bacterial test, the original chlorination procedure shall be repeated by the Contractor until satisfactory results are obtained.

SECTION 511 - VALVE VAULTS AND BOXES FOR WATER MAINS AND WATER SERVICES

SECTION 511.1 - GENERAL:

(a) This section shall apply to the construction of standard or special valve vaults, cast iron valve boxes and curb boxes, all in accordance with the East Dundee Standard.

(b) Only 4" gate valves for service lines may be provided with cast iron valve boxes. Such valves must be located in grassed areas not less than 6 feet in diameter and with additional land available for repair machinery to operate. All other valves larger than 4" in size and 4" valves located in pavement shall be placed in vaults as described in these specifications.

SECTION 511.2 - MATERIALS:

(a) Ring and Cover and Valve Box Castings - Castings for cast iron ring and cover and/or cast iron parts of valve boxes shall conform to the requirements of Standard Specifications for Gray Iron Castings, ASTM Designation A-18.

(b) Materials for Valve Vaults - Portland Cement, masonry units, mortar and other materials necessary for the construction of valve chambers and boxes shall meet the

requirements of Section 32 of the Standard Specifications for Water and Sewer Main Construction in Illinois.

SECTION 511.3 - VAULT APPURTENANCES: The following items shall apply to all vault structures:

(a) Vaults shall be furnished with a water-tight frame and solid cover (Neenah Foundry R-1077-B, East Jordan Iron Works 1022 HD or approved equal) with the word "WATER" imprinted on the cover in raised letters.

(b) Both the vault frame and cover shall have machined horizontal and vertical bearing surfaces.

(c) Pick holes shall not create openings in the vault cover.

(d) Vault frames shall be adjusted to proper grade utilizing reinforced, precast concrete rings; brick or concrete blocks will not be allowed.

(e) Adjusting rings shall be securely sealed to the cone section or top barrel section of the vault using resilient, flexible, non-hardening, preformed, bituminous mastic material (Ram-Nek, or approved equal). This mastic shall be applied in such a manner that no surface water or ground water inflow can enter the vault through gaps between the top barrel section or cone section and the first adjusting ring, between adjusting rings, or between the last adjusting ring and the vault frame. Up to six inches (6") of adjusting rings may be installed on a given vault. However, no more than two (2) rings in total shall be used.

(f) Ram-Nek or approved equal shall also be used to provide a water-tight seal between vault barrel sections, cone to barrel section, and the cone section to frame and cover.

(g) Hydraulic cement shall be used on all vault interior joints (dress up).

(h) Seal-tight valve vaults may be either pre-cast or cast in place with a minimum diameter of forty-eight inches (48").

SECTION 511.4 - CAST IRON VALVE BOXES FOR GATE VALVES:

(a) Cast iron valve boxes as per the East Dundee Standard are placed for enclosing gate valves of small size in lieu of gate valve vaults at locations acceptable to the Village.

(b) Adjustable cast iron valve boxes shall be set to position during backfilling operations so they will be in a vertical alignment to the gate valve operating stem. The lower casting of the unit shall be installed first in such a manner as to be cushioned and to not rest directly upon the body of the gate valve or upon the water main. The upper casting of the unit shall then be placed in proper alignment into such an elevation that its top will be a final grade.

Backfilling around both units shall be placed and compacted to the satisfaction of the Village Engineer.

(c) The valve boxes shall be of a two-piece, screw-type, adjustable design as manufactured by Tyler Pipe, 6850 Series, Item 664-S or approved equal of a pattern of design acceptable to the Director of Public Works. The lids shall be furnished with "Water" embossed or cast in the top surface.

SECTION 511.5 - CURB BOXES: Curb boxes shall be of the buffalo type, with a two and one-quarter (2-1/4) inch minimum shaft which sets over the curb stop, and of such construction that it shall be capable of extension to finished grade to conform to the depth of bury of the service line as provided in the East Dundee Standards. The curb boxes shall be adjustable, screw type cast iron as manufactured by Tyler Pipe, 6500 Series, Item 95-E or approved equal of a pattern of design acceptable to the Director of Public Works. Lids shall be of a bolted down design with "Water" cast in the top surface. An enlarged base shall be provided for services larger than 1-1/2" but less than 2". Valve boxes shall be provided for services larger than 2".

SECTION 512 - FIRE HYDRANTS

SECTION 512.1 - DESCRIPTION: These specifications are to be used in conjunction with the latest AWWA Standard C502 for fire hydrants for ordinary water works service.

SECTION 512.2 - MATERIALS:

(a) All materials used in the production of fire hydrants for ordinary service shall conform to the specifications designated for each material listed in AWWA Standard C502.

(b) For reasons of standardization, the hydrants shall be 5 1/4" Waterous Pacer, Model WB-67-250 and of a pattern approved by the Director of Public Works. The name or mark of the manufacturer and the size of the valve opening shall be plainly cast in raised letters and so placed on the hydrant barrel as to be visible after the hydrant has been installed.

(c) As a minimum requirement, all hydrants shall be designed for a working pressure of 250 pounds per square inch and in workmanship, design, and material shall conform to the AWWA Standard C502. The hydrant bodies shall be ductile iron, fully mounted with approved non-corrodible metals. All wearing surfaces shall be either bronze or some other approved non-corrodible material, and there shall be no moving bearing or contact surfaces of iron in contact with iron or steel. All contact surfaces shall be finished or machined in the best workmanlike manner and all wearing surfaces shall be easily renewable.

(d) The design of the hydrant shall be such that all working parts may be removed without excavating through the top of the hydrant and shall have the required AWWA specified number of turns of the stem to open the gate an area equal to the area of the valve opening. Any

change in area of the water passage through the valve must have an easy curve, and all outlets must have round corners of good radius. The nozzle section shall be designed for easy 360 degree rotation by the loosening of no more than four bolts.

(e) The main valve closure shall be of the compression type, opening against the pressure and closing with the pressure.

(f) Lugs, if required for harnessing the hydrant to the connecting pipe from the main in the street, shall be provided on the bell of the elbow or on the hydrant casting. A drawing of the lug construction shall be submitted for approval on request of the Village Engineer or Director of Public Works.

(g) Hydrants shall be provided with a sidewalk flange. Breaking devices shall be at the sidewalk flange which will allow the hydrant barrel to separate at this point with a minimum breakage of hydrant parts in case of damage. There shall also be provided at this point a safety stem coupling on the operating stem that will shear at the time of impact. Unless otherwise specified, all hydrants shall be equipped with O-Ring stem seals.

SECTION 512.3 - HYDRANT DETAILS:

(a) The dimensions and details of hydrant and nozzles, unless otherwise noted, shall be as follows:

Hydrant 6-inch Connection

Hydrant connection pipe size inside diameter	6 inches
Standpipe, minimum inside diameter	7 inches
Length of hydrant from bottom of hydrant near connection to sidewalk ring	5 feet 8 inches minimum
Valve opening, minimum seat diameter	5-1/4 inches
Size of auxiliary gate valve	6 inches
Hose Nozzles, number and size	Two 2-1/2" and One 4-1/2"

The threading geometrics of the hose nozzles shall match existing hydrants in the village.

(b) All nozzles shall be fitted with ductile iron threaded caps with the operating nut of the same design and proportions as the hydrant stem nut. Caps shall be threaded to fit the corresponding nozzles and shall be fitted with suitable gaskets for positive water tightness under test pressures.

(c) The operating nuts on hydrant stem and nozzle caps shall be the same for all sizes of hydrants. Dimensions shall be as follows:

Pattern of Nut	Tapered Pentagonal
Height	1-1/16 inch
Size of Pentagon	1-3/8 inch at bottom of nut; 1-1/4 inch at top of nut (Measured from point to flat)

(d) The hydrants shall be furnished with flanged or mechanical joint end connections.

(e) The hydrant valves shall open by turning to the left (counter-clockwise).

SECTION 512.4 - FACTORY HYDROSTATIC TEST: Before the hydrant is painted at the factory, it shall be subjected to an internal hydrostatic test of 500 pounds per square inch with the hydrant valve in a closed position and again with the hydrant valve in an open position.

SECTION 512.5 - PAINTING: All iron parts of the hydrant both inside and outside shall be thoroughly cleaned and painted. All inside surfaces and outside surfaces below the ground line shall be covered with two coats of asphalt varnish. The first coat shall have dried thoroughly before the second is applied.

The outside of the hydrant above the finished ground line shall be thoroughly cleaned and thereafter painted with one coat of paint of a durable composition, and one additional coat of gloss red paint. This last coat shall be field applied after installation and immediately before final acceptance of the water system improvements.

ARTICLE 512.6 - CONSTRUCTION DETAILS: Hydrants shall be plumb and shall be set so that the lowest hose connections are at least eighteen (18) inches above the surrounding finished grade. All hydrants shall be inspected in the field upon delivery to the job to insure proper operation before installation. A minimum of one cubic yard of coarse stone, gravel or like porous material shall be placed at and around the base of the hydrant to ensure proper drainage of the hydrant after use. The blocking of the hydrant shall consist of a wedge of 3000 psi minimum P.C. Concrete of not less than ½ cubic yard of volume extending from the hydrant to undisturbed soil and shall be so placed to form a barrier adjacent to the hydrant base to counteract the pressure of water exerted thereon. Care shall be taken to insure that weep holes are not covered by concrete. The hydrant shall be set on a concrete block to insure a firm bearing for the hydrant base. The hydrant valve and tee shall be interconnected by steel rods if required by special provision. The resetting of existing hydrants and moving and reconnection of existing hydrants shall be handled in a manner similar to a new installation. The hydrant setting shall follow the East Dundee Standards.

SECTION 513 - GATE VALVES

SECTION 513.1 - DESCRIPTION: These specifications are to be used in conjunction with the latest AWWA Standard C509 for ordinary waterworks service.

SECTION 513.2 - MATERIALS: All materials used in the production of gate valves shall conform to the latest AWWA Standards C509, C550, and C153 for valve stem construction, protective interior coatings, and wall thickness respectively.

The valves shall be of the resilient wedge design with a ductile iron wedge fully encapsulated in nitrite rubber except for guide and nut areas and with the body of the valve being ductile iron. The wedge rubber shall be molded and bonded to the ductile iron gate.

For reasons of standardization, valves shall be American Flow Control, Series 2500 Ductile Iron Resilient Wedge valves. Non-rising type stems are required.

End connection configurations shall be either mechanical joints or flanged joints.

The valve body and bonnet shall be epoxy coated, inside and out.

SECTION 514 - SERVICE LINE CONNECTIONS

SECTION 514.1 - GENERAL: The minimum size of service lines shall be a pipe size of 1" inside diameter.

SECTION 514.2 - COPPER SERVICE PIPE: For connections to mains where service lines are less than 3" in diameter, copper pipe, soft temper, Type K meeting the requirements of ASTM B88 standards shall be required.

The maximum size of a tap in the main shall not exceed one-fourth the nominal inside diameter of the main. Where multiple taps are required due to tap size limitations, the taps shall be made a minimum of 12 inches apart.

A tapping saddle is required at each point of connection to the main. The service saddle shall be a nylon-coated, double strap (stainless steel) manufactured by Smith-Blair Clamp and Coupling Products, Product 317 or approved equal.

The corporation stop shall be a ball style valve manufactured by A.Y. McDonald Manufacturing Company, series 4701B or approved equal.

The curb stop shall be a ball style valve manufactured by A.Y. McDonald Manufacturing Company, series 6100 or approved equal.

SECTION 514.3 - DUCTILE IRON SERVICE PIPE: For connections to mains where service lines are 3" or greater in diameter, ductile iron pipe, Class 52 meeting all of the requirements of Section 501 set forth above shall be provided. The connection to the main shall be by providing the appropriate manufactured and cutting-in fittings for the service line in the main where at all possible. Where, in the opinion of the Director of Public Works, disruption of the existing main is not advisable, a tapping valve inserted under system pressure will be required.

SIDEWALKS

SECTION 600 - GENERAL: The standards and specifications stated in this Article for materials and construction pertain to sidewalk construction within the Village of East Dundee as part of a Village-wide sidewalk replacement program, public sidewalks funded by adjoining property owners, and in areas of new subdivisions or other development. In all the areas except park areas, Portland cement concrete sidewalk shall be the standard requirement. Even though asphalt sidewalks are encouraged in park areas for economics, concrete sidewalks are permitted.

SECTION 601 - MATERIALS AND CONSTRUCTION METHODS: The sidewalk shall be constructed of Portland cement concrete placed on a prepared sub-grade in accordance with Section 424 of the State Standard Specifications for Road and Bridge Construction and as shown in the East Dundee Standards.

SECTION 602 - SIDEWALK REQUIREMENTS:

(a) Sidewalks shall be required on both sides of the street in residential subdivisions and for all commercial lots. Sidewalks may be required for industrial lots and elsewhere if considered necessary by the Plan Commission for public safety. All sidewalks shall be constructed of Portland cement concrete unless another material is approved by the Village. Depressed curbs at all intersections shall be required. Any other provisions for the elderly or the handicapped may be required if considered necessary by the Village Engineer.

(b) Location: Unless otherwise directed by the Village Engineer, sidewalks shall be located within the dedicated right of way and shall be laid offset one (1) foot from the property line of abutting lots and along such line as extended at intersections.

(c) Class of Concrete: Class SI Portland cement concrete per the State Standard Specifications for Road and Bridge Construction shall be furnished for sidewalk construction, except where bituminous sidewalks have been authorized.

(d) Dimensions: Sidewalks in residential subdivisions and within industrial developments where required by the Plan Commission shall be not less than five (5) feet in width and not less than five (5) inches in thickness. Sidewalks for commercial lots shall be not less than eight (8) feet in width and not less than five (5) inches in thickness. Sidewalks shall not be less than six (6) inches of Portland cement concrete thick where they intersect a driveway.

SECTION 603 - CURING: The surface of the newly laid sidewalks shall be cured and protected in a manner as set forth in Article 1020.13 of the State Standard Specifications for Road and Bridge Construction and satisfactory to the Village Engineer or Director of Public Works. The material used for curing shall conform with the concrete curing materials per Section 1022 of the specifications noted previously.

Special attention is required for the protection of fresh concrete against cold weather which should follow the measures discussed in Article 1020.13 (c) of State Standard Specifications for Road and Bridge Construction.

A minimum of three (3) days curing period is required for all newly constructed concrete sidewalks. All freshly poured, exposed surfaces shall be adequately protected against wash by rain. Traffic shall not be allowed on the sidewalk until the curing period has elapsed.

SECTION 604 - BACKFILL: After the concrete has been cured, the spaces along the edges of the sidewalk shall be backfilled to the finished level of the sidewalk with approved topsoil material. The material shall then be compacted until firm and the surface neatly graded to receive grass cover with either seeding or sod.

DRIVEWAYS

SECTION 700 - GENERAL: All new drive approaches within the Village of East Dundee shall be constructed of Portland cement concrete (Class SI) or bituminous concrete, Class I or B (Modified) over an aggregate base course in accordance with the East Dundee Standards.

SECTION 700.1 - MATERIALS AND CONSTRUCTION METHODS: The concrete driveway approaches shall be constructed on a prepared subgrade in accordance with Section 423 of the State Standard Specifications for Road and Bridge Construction, hereinafter referred to as “SSSRBC”, and shall be constructed of concrete having a minimum thickness of six (6) inches for private access driveways. For commercial and industrial driveways where heavy truck use is anticipated, increasing the minimum thickness and/or including reinforcement of the Portland cement concrete slab is required.

The bituminous driveway approaches shall be constructed on a prepared sub-grade in accordance with the applicable portions of Sections 351, 405, and 406 of the “SSSRBC” and shall be constructed of a minimum of eight inches (8") of compacted crushed gravel, having a gradation conforming to CA-6, as a base course and with two inches (2") minimum compacted thickness of

bituminous concrete, Class I or Class B (Modified) as a surface course. Increasing these thicknesses for entrances in commercial and industrial areas where heavy truck use is anticipated will be required as specified by the Village Engineer or Director of Public Works.

SECTION 700.2 - CURING OF CONCRETE: The surface of the newly laid concrete pavement shall be cured as set forth in Article 1020.13(a) of the “SSSRBC” and by a method satisfactory to the Village Engineer or Director of Public Works. The material used for curing shall conform with the material specifications per Section 1022 of the “SSSRBC”.

Special attention is required for the protection of fresh concrete against cold weather, which should follow the measures discussed in Article 1020.13(c) of the “SSSRBC”.

A minimum of three (3) days curing period is required for all newly constructed concrete pavements. All freshly poured, exposed surfaces shall be adequately protected against wash by rain.

SECTION 700.3 - BACKFILL: After the concrete has been cured, the spaces along the edges of the driveway shall be backfilled to the finished level with approved topsoil. The topsoil shall then be compacted until firm and the surface neatly graded to receive grass cover with either seeding or sod.

SECTION 700.4 - PROTECTION AND PROTECTIVE COATING: Vehicles shall be kept off of new concrete during the entire curing period.

SECTION 705 - PARKING LOT IMPROVEMENTS

SECTION 705.1 - GENERAL: All private parking lots to be constructed within the Village of East Dundee shall be designed according to the following requirements. All improvements shall be governed by Sections 200, 400, 600, applicable portions of this section, the State Standard Specifications for Road and Bridge Construction, and the Ordinances of the village.

SECTION 705.2 - PARKING LOT ENTRANCES: Entrances to parking lots primarily intended for passenger cars across public street or alley right of ways shall not exceed twenty-four (24) feet in width at the property line. Where entrances are proposed near the intersection of public streets or alleys, the centerline of the entrance to the parking lot shall be a minimum of seventy (70) feet from the point of intersection of the centerlines of the streets or alleys measured along the centerline of the street providing access to the parking lot.

SECTION 705.3 - GEOMETRIC SPACE AND AREA REQUIREMENTS: Off-street parking spaces shall be at least nine (9) feet wide and eighteen (18) feet in length for a 90 degree parking angle. Aisles between 90 degree parking spaces, whether single-loaded or double-loaded parking to the sides(s), shall be a minimum of twenty-four (24) feet in width.

Where angle parking is desired, spacing dimensions of the parking stalls and aisles shall be in accordance with the large car design standards as set forth in “The Dimensions of Parking”, Third Edition as adopted under the joint effort of the Urban Land Institute (ULI) and the National Parking Association or subsequent editions thereto. When covered or enclosed, such parking spaces shall have a vertical clearance of at least seven feet 6 inches (7'-6").

Parking lots shall meet all requirements of the village’s zoning ordinances. The impervious area ratio of the parking lot including access driveways shall not exceed 0.85 or 85% coverage of the area contained within the extreme limits of the curb lines which border the parking area. Pervious island areas or gaps shall be provided at intervals of ninety (90) feet (10 parking stalls) or less to accommodate landscaping and lighting for the parking lot. No credit shall be allowed due to parking restrictions in front and side yards adjoining streets as established in the Zoning Ordinance.

Refer to Article XI, Section B, Paragraph 9c of the Zoning Ordinance for screening and landscaping of parking lots and SECTION 1100 of these standards.

SECTION 705.4 - PAVEMENT DESIGN: Parking lot pavements shall be designed as set forth in Section 400, Street Pavements, Curb and Gutters of these standard specifications. The minimum structural number (Dt) of the pavement design for the stall area and lightly traveled aisles of parking lots shall be 2.25 and for the main circulation aisles and entrance shall be 2.75. In commercial and industrial parking lots which will be subjected to single and multi-unit truck traffic, a pavement having a minimum (Dt) of 3.25 shall be provided.

SECTION 705.5 - MINIMUM PAVEMENT THICKNESS REQUIREMENTS FOR PARKING LOTS: For flexible-type pavements, a minimum of 8 inches compacted of crushed gravel (IDOT Gradation CA-6) and a minimum of 3 inches compacted of bituminous concrete, placed in two equal lifts is required for stall areas and lightly traveled aisles. Twelve (12) inches minimum of compacted crushed gravel (IDOT Gradation CA-6) and three (3) inches compacted of bituminous concrete, placed in two equal lifts is required for the main circulation aisles and entrances. Other pavement designs which meet the structural number requirements will be considered, subject to the Village Engineer’s review and approval.

For rigid pavements no less than 6 inches of Portland cement concrete is acceptable. Jointing and reinforcement of concrete pavements shall meet with the Village Engineer’s approval.

Prior to the installation of the parking lot base coarse materials, the parking lot subgrade shall be compacted to a minimum of 95 percent Standard Proctor Density. In addition, the subgrade shall be proof rolled and inspected by the developer’s Engineer prior to the installation of the base course materials. The Village reserves the right to witness this test and approve the placing of the base course materials.

SECTION 705.6 - CURB AND GUTTER: Portland cement concrete barrier curbs (Type B) or combination concrete curb and gutter (Type B-6.12) shall be required around the entire border of all paved areas and accessways within parking lots. The design of the curb and gutter improvements must conform to the State Standard Specifications for Road and Bridge Construction and village Standard Details for these items.

SECTION 705.7 - DRAINAGE: All parking lots having more than six (6) parking spaces must be provided with a drainage system to prevent surface water runoff from the parking lot to discharge uncontrolled onto adjacent properties or onto public right-of-ways. An on-site storm sewer system including storm water detention is required. Prior to the connection of the on-site storm sewer system to the receiving sewer, a catch basin shall be provided to catch residue, silt, or foreign materials prior to entering the receiving system.

The minimum gradient of a parking lot to insure positive drainage shall be 1.0 percent. The maximum parking lot surface gradient shall not exceed 6.0 percent.

The engineering plans for all parking lot designs shall include and clearly define all pavement swales and shall be identified with drainage flow arrows and the gradients along said swales. If concrete swales for drainage within parking lots are provided, the minimum gradient can be reduced to 0.5 percent.

Storm water detention is required for all developments including parking facilities within the Village. The maximum depth of ponding on parking lots shall not exceed six (6) inches. In addition, storm water detention can be provided in underground conduits or grass detention areas within or immediately adjacent to the parking lot. The design of detention facilities within parking lots shall conform to the requirements as set forth in the Kane County Stormwater Ordinance which has been adopted by the village.

MAINTENANCE OF TRAFFIC AND RESTORATION OF AREAS

SECTION 800 - GENERAL: The requirements included in the following articles pertain to the maintenance of traffic along public streets and roadways during construction activities and the restoration of the pavements and public parkways within the Village of East Dundee.

SECTION 800.1 - SPECIFICATION FOR TRAFFIC MAINTENANCE: All existing village streets and roadways shall remain open to two-way traffic during construction activities unless a detour routing has been previously approved by the Director of Public Works and proper notification has been given to the Police and Fire Departments. For short-term disruptions of less than six (6) hours, one lane of traffic may be approved by the Director provided proper traffic control, including signing and flagging, is implemented for the duration of construction activities within the public right of way.

It shall be the responsibility of the contractor performing work within the village in or along public streets and roadways to provide the proper repair of the pavements disturbed by construction activity and to keep the pavement free of debris, including mud, stones, dust, etc. The Director of Public Works shall have the sole authority in determining the adequacy and extent of repairs and maintenance of traffic which are necessary.

The contractor shall also be subject to SECTION 107, LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC as set forth in the State Standard Specifications for Road and Bridge Construction as it applies to work being done.

SECTION 800.2 - SPECIFICATIONS FOR RESTORATION OF THE WORK AREA: Contractors doing work within the Village of East Dundee, whether on public right of ways or easements, shall be required to restore all areas disturbed by construction activity to its original or better condition to the satisfaction of the Director of Public Works.

All grassed areas shall be restored with a minimum of 4" of compacted topsoil and seeded with Class 1 Lawn Mixture with Mulch, Method 2 as set forth in SECTION 250 and SECTION 251 of the State Standard Specifications for Road and Bridge Construction.

Refer to SECTIONS 400, 600, and 700 of these STANDARD SPECIFICATIONS and the DESIGN STANDARDS, therein for requirements for the replacement of street pavements, curb and gutters, sidewalks, and driveways disturbed by construction activity.

VILLAGE FORESTRY STANDARDS AND SPECIFICATIONS

SECTION 900 – AUTHORITY: Pursuant to authority granted under “An Ordinance Regulating the Planting, Maintenance, and Removal of Trees, Shrubs, and Other Plants; Creating a Tree Committee; and Establishing the Position of Village Forester of the Village of East Dundee, Illinois”, adopted by the Board of Trustees of the Village of East Dundee in February, 1994, the Village Forester, having had the advice and assistance of the Tree Committee, established in the said Ordinance, hereby promulgates the following as the Village Forestry Standards and Specifications for the Village of East Dundee, Illinois, herein after called the Village Forestry Standards and Specifications.

SECTION 901 – POLICY

(a) All work on public trees shall comply with the “Tree Ordinance” of the Village of East Dundee, Illinois, and the Village Forestry Standards and Specifications.

(b) The Village Forestry Standards and Specifications shall be adhered to at all times, but it may be amended at any time that experience, new research, or laws indicate that improved methods or circumstances make it advisable, and only then with the advice and assistance of the East Dundee Tree Committee, all as provided for in the above said Ordinance.

(c) The policy of the East Dundee Tree Committee and the Village Forester shall be to cooperate at all times with the public, property owners, other municipal departments, and with appropriate not-for-profit organizations.

SECTION 902 – SPECIES, CULTIVARS OR VARIETIES

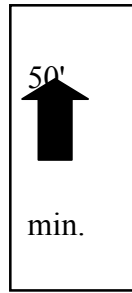
(a) The following Table I contains a list of tree species of the varieties acceptable and approved for planting on village property.

(b) Unacceptable tree species or their varieties contained in the following Table II shall not be planted on village-owned property, except in special locations where because of characteristics of adaptability or landscape effect they can be used to public advantage.

LARGE TREES

SPACING: 40' MINIMUM

PARKWAY WIDTH: 8' MINIMUM

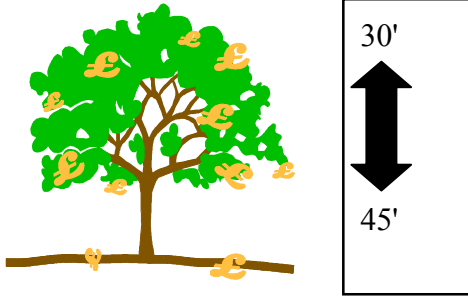


SCIENTIFIC NAME	COMMON NAME	CULTIVARS
Acer saccharum	Sugar Maple	'Green Mountain' 'Fairview' 'Goldspire'
Alnus incana	Tag Alder	
Celtis occidentalis	Hackberry	
Celtis laevigata	Sugar Hackberry	
Fagus grandifolia	American Beech	
Fagus sylvatica	European Beech	
Fraxinus americana	White Ash	'Autumn Applause' 'Autumn Purple' 'Champaign County'
Fraxinus pennsylvanica	Green Ash	'Honeyshade' 'Marshall Seedless' 'Summit'
Fraxinus quadrangulata	Blue Ash	
Ginkgo biloba	Ginkgo (male)	
Gymnocladus dioicus	Kentucky Coffee (male)	
Liquidamber styraciflua	Sweetgum	
Liriodendron tulipifera	Tuliptree	
Magnolia acuminata	Cucumber Tree	
Platanus acerifolia	London Plane	
Quercus alba	White Oak	
Quercus bicolor	Swamp White Oak	
Quercus imbricaria	Shingle Oak	
Quercus macrocarpa	Bur Oak	
Quercus coccinea	Scarlet Oak	
Quercus robur	English Oak	
Quercus rubra	Red Oak	
Quercus shumardii	Shumard Oak	
Quercus muehlenbergii	Chinquapin Oak	
Sassafras albidum	Sassafras	
Taxodium districhum	Bald Cypress	
Tilia americana	Basswood	
Tilia heterophylla	Beetree Linden	
Tilia cordata	Littleleaf Linden	'Chancellor' 'Greenspire'
Tilia euchlora	Crimean Linden	
Tilia platyphyllos	Bigleaf Linden	
Tilia tomentosa	Silver Linden	
Tilia petiolaris	Pendent Silver Linden	

MEDIUM TREES

SPACING: 35' MINIMUM

PARKWAY WIDTH: 6' MINIMUM



SCIENTIFIC NAME	COMMON NAME	CULTIVARS
Acer platanoides	Norway Maple	
Acer rubrum	Red Maple	‘Autumn Flame’ ‘October Glory’ ‘Red Sunset’ ‘Schlesinger’ ‘Scarlet Sentinel’ ‘September Song’ ‘Armstrong’ ‘Bowhall’
Alnus glutinosa	Black Alder	
Betula nigra	River Birch	
Carpinus betulus	European Hornbeam	
Cercidiphyllum japonicum	Katsuratree	
Cladrastic lutea	Yellowwood	
Corylus colurna	Turkish Filbert	
Eucommia ulmoides	Hardy Rubber Tree	
Maclura pomifera	Osage Orange (male)	
Magnolia kobus	Kobus Magnolia	
Nyssa sylvatica	Black gum	
Phellodendron amurense	Amur Cork Tree	
Prunus sargentii	Sargent Cherry	
Pyrus calleryana	Bradford Pear	‘Aristocrat’ ‘Chanticleer’ ‘Redspire’
Quercus acutissima	Sawtooth Oak	
Sophor japonica	Pagodatree	
Zelkova serrata	Zelkova Tree	

Medium-sized trees are better suited for planting on normal village parkways than their larger counterparts. Large trees require more living space, and for this reason it is recommended that they be planted on the private side of the sidewalk whenever possible. The overall objective of proper tree selection is to select the right tree for the right location in order that one may benefit from the tree without being subject to future maintenance liabilities or hazards.

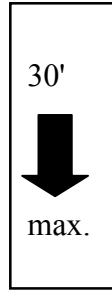
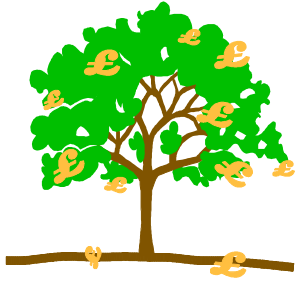


TABLE 1 – PAGE 3

SMALL TREES

SPACING: 25' MINIMUM

PARKWAY WIDTH: 5' MINIMUM

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>	<u>CULTIVARS</u>
Acer ginnala	Amur Maple (tree form)	
Acer Palmatum	Japanese Maple	
Acer Pennsylvanicum	Striped Maple	
Amalanchier canadensis	Shadblow Serviceberry (tree form)	
Amlanchier grandiflora	Apple Serviceberry (tree form)	
Amalanchier laevis	Alleghany Serviceberry (tree form)	
Carpinus caroliniana	American Hornbeam	
Cercidiphyllum japonicum	Katsura Tree	
Cornus florida	Flowering Dogwood	
Cornus kousa	Japanese Dogwood	
Crataegus sp.	Hawthorn (Thornless) (Disease resistant)	
Halesia carolina	Carolina Silverbell	
Koelreuteria paniculata	Goldenrain Tree	
*Malus sp.	Flowering crab	See Appendix A
Ostrya virginiana	Ironwood	
Syringa Japonica	Japanese Tree Lilac	

Small trees are appropriate in parkway locations where due to space limitations larger trees cannot be properly utilized without creating spacing conflicts with existing trees. Height limitations imposed by overhead utilities also necessitate the use of appropriate small trees in order to avoid line conflicts and the necessity of excessive utility trimming that results in disfigured trees. On the whole, small trees which tend to be more ornamental than their larger counterparts can create an added aesthetic dimension to the streetscape.

*Selected cultivars or varieties of suitable form and resistant to scab disease (see Appendix A for listing of recommended crabs for local use).

APPENDIX A

The following selections or cultivars of flowering crabs are recommended for local use based on adaptability and resistance to foliar disease. Not all are suitable as parkway or street trees because of growth habits or characteristics that pose visibility or other obstruction problems. However, most selections listed may also be used to good landscape advantage on the home grounds, provided that a local source is available.

Malus Cultivar	Flower	Fruit	Form	Size	Comments
M. 'Adams'	carmine to pink	5/8" red	rounded, dense	20-25'	persistent fruit
M. baccata Jackii	slight pink to white	1/2" purplish red	upright, spreading	30-40'	large size
M. 'Baskatong'	reddish purple	1" reddish purple	spreading, arching	25'	
M. 'Beverly'	dark red to white	1/2"-3/4" bright red	upright, spreading	15-25'	good street tree
M. 'Bob White'	pink to white	5/8" yellow	rounded	15-20'	persistent fruit
M. 'Calloway'	deep pink to red	1" red	rounded	15-20'	
M. 'Candied Apple'	red to pink	5/8" bright red	horizontal, weeping	10-15'	
M. 'Centurian	red to rose red	5/8" glossy red	narrow, upright	25'	good narrow tree
M. 'Coralburst'	rose pink	1/2" bronze	rounded	8'	dwarf habit
M. 'David'	pink to white	1/2" scarlet red	compact	15-20'	good foliage
M. 'Dolgo'	pinkish to white	1-1/4"—1-1/2" bright red	open	40'	fruit makes jelly
M. 'Donald Whyman'	pink to white	3/8" bright red	compact, rounded	15-20'	good bird food
M. 'Floribunda'	deep pink to white	3/8" red and yellow	rounded, dense	25'	Japanese Crab
M. 'Golden Hornet'	white	1" yellow	compact	15-20'	persistent fruit
M. 'Harvest Gold'	white	3/8" golden	upright	20'	good street tree
M. 'Henry Kohankie'	white and pinkish	1-1/4" red	rounded	20'	
M. hupehensis	white	3/8" red	vase shape	25'	picturesque
M. 'Indian Magic'	red to rose pink	1/2" glossy red	rounded	15-20'	outstanding fruit
M. 'Katherine'	pink to white	2/5" yellow	loose open	20'	double flower
M. 'Liset'	crimson to rose red	5/8" glossy crimson	rounded	15-20'	excellent red
M. 'Mary Potter'	pink to white	3/8" yellow	rounded	10'	shrub-like
M. 'Milton Baron'	white	red	rounded	15-20'	
M. 'Ormiston Roy'	apple-pink to white	3/8" yellow	rounded, dense	25-30'	persistent fruit
M. 'Pink Spire'	pink	1/2" maroon	upright, oval	15'	
M. 'Prince George'	rose pink	no fruit	upright, dense	15-20'	double flower
M. 'Profusion'	purplish red	1/2" oxblood red	upright, spreading	25'	
M. 'Red Baron'	dark red	dark red	columnar upright		compact grower
M. 'Red Jewel'	white	1/2" cherry red	horizontal branching	15'	good fruiting
M. 'Red Splendor'	pink	1/2" red	upright, spreading	20'	persistent fruit
M. 'Robinson'	deep pink	3/8" glossy dark red	upright	20-25'	vigorous grower
M. sargentii	white	1/4" dark red	horizontal	8'	shrub-like
M. 'Snowdrift'	red to white	3/8" orange-red	oval, dense	15-20'	good street tree

Malus Cultivar	Flower	Fruit	Form	Size	Comments
M. 'Sugar Tyme'	pink to white	1/2" rich red	upright, oval		persistent fruit
M. 'Tschonoski'	white	1" dull, yellow-brown	upright, oval	30'	good foliage
M. 'Veitchii'	White	1/2" purple-brown	upright, narrow	20'	
M. 'White Angel'	white	1/2" scarlet red	rounded	20-25'	good flower, fruit
M. 'White Cascade'	white	1/4" lime-yellow	pendulous	12-15'	weeping
M. 'Winter Gold'	carmine to white	1/2" yellow	broadly pyramidal	20'+	outstanding fruit
M. Zumi 'Calocarpa'	white	E/8" brilliant red	rounded	25'	one of the best

Table II

The following is a listing of trees more or less common to our area that are not suitable as street or parkway trees. Their lack of suitability is based upon undesirable growth habits, fruiting habits, form, susceptibility to serious diseases, propensity to storm damage, and a host of other limitations too numerous to mention. The limitations listed for each tree or species group are not all-inclusive and mention only the more serious problems encountered locally. In essence, there are far too many superior street or parkway trees listed in Table I to warrant the use of any of the trees listed in Table II except under special circumstances.

Though many of the trees listed in Table II are presently growing on our parkways as a result of previously unrestricted plantings, they do constitute a maintenance liability to the village and as such should be replaced on removal with species listed in Table I.

<u>Scientific Name</u>	<u>Common Name</u>	<u>Problem or Limitation</u>
Abies sp.	Fir	Form – visibility hazard
Acer negundo	Boxelder	Fast growing, weak wooded
Acer Platanoides	Norway maple	Local problem, verticillium w
Acer saccharinum	Silver/Soft Maple	Subject to rot/storm damage
Aesculus sp.	Horsechestnut	Foliar diseases, leaf blotch
Ailanthus altissima	Tree of Heaven	Weak wooded, aggressive
Albizzia sp.	Mimosa	Not hardy, disease prone
Betula sp.	Birch	Environmental stress, borers
Catalpa sp.	Catalpa	Littering fruit
Diospiros	Persimmon	Littering fruit
Gleditsia sp.	Honeylocust	Serious disease/insect problem
Juglans sp.	Walnut	Littering fruit
Juniperus sp.	Juniper	Form – visibility hazard
Malus sp.	Common Apple	Littering fruit, disease prone
Morus sp.	Mulberry	Littering fruit
Picea sp.	Spruce	Form – visibility hazard
Pinus sp.	Pine	Form – visibility hazard
Platanus occidentalis	Sycamore (Amer.)	Disease – twig blight
Populus sp.	Poplar	Fast growing, weak wooded
Prunus sp.	Cherry and Plum	Littering fruit, disease prone
Pyrus sp.	Common Pear	Littering fruit
Quercus palustris	Pin Oak	Iron chlorosis
Robinia sp.	Black Locust	Shallow rooted, borers
Salix sp.	Willow	Weak wooded, storm damage
Thuja sp.	Arbor-vitae	Form – visibility hazard
Ulmus sp.	Elm	Serious disease, Dutch Elm

1. Other tree species or their varieties not listed in the foregoing Table I may be planted on Village-owned property, but only desirable trees of good appearance, beauty and adaptability that are generally free from injurious insect, diseases or other limitations may be planted.
2. Where certain planting sites have been assigned a particular species or variety, only the designated species or variety shall be planted on such sites, unless the plan is reviewed by the Village Forester with the advice and assistance of the East Dundee Tree Committee.
3. The Tree Committee, in conjunction with the Village Forester, shall review, at least once every two years, the species, cultivars and varieties listed on Table I to determine whether any should be removed or whether certain new species, cultivars or varieties of proven adaptability and value should be added; and the Tree Committee shall similarly review the trees listed in Table II to determine whether any should be removed or whether certain new species, cultivars or varieties should be added thereto.

SECTION 903 – PLANTING STOCK REQUIREMENTS

(a) Size:

(1) Unless otherwise specified by the Village Forester, all medium to large deciduous trees and their cultivars or varieties shall conform to the American Association of Nurserymen Standards, shall be free of branches to a point not more nor less than sixty (60) percent of their height, be at least 1-1/4 to 1-1/2 inches in diameter at a point six (6) inches above ground level, and be at least eight (8) to ten (10) feet in height when planted.

(2) All small deciduous trees and their cultivars or varieties shall be at least five (5) feet in height and have at least six (6) branches on the upper half of the trunk.

(b) Grade: Unless otherwise allowed for specific reasons, all trees shall have comparatively straight trunks, well-developed leaders and tops, and the roots shall not only be characteristic of the species, cultivar or variety, but also shall exhibit evidence of proper nursery pruning practices. They shall have acceptable balance between top and root. At the time of planting, all trees must be free of mechanical injuries and other objectionable features that tend to affect the future form and beauty of the plant.

(c) Location and Spacing

(1) Based on a 40 year cycle, no tree which will attain a trunk diameter greater than fifteen (15) inches shall be planted in a treelawn less than five (5) feet in width. In treelawns less than five (5) feet in width, or where overhead lines or building setback presents a

special problem, the selection of planting site and species shall be determined by the Village Forester.

(2) Trees shall be planted at least fifteen (15) feet from driveways and alleys, and at street intersections the planting shall not interfere with the required sight distance determined by the Village Engineer.

(3) No tree shall be planted closer than ten (10) feet to a utility pole to allow room for line maintenance.

(4) Spacing of trees shall be determined by the Village Forester in accordance with local conditions; the species, cultivars and varieties used; and their mature height, spread and form. Generally, all large trees, at maturity, shall be spaced forty (40) to sixty (60) feet, center-to-center; all medium-sized trees shall be spaced a minimum of thirty-five (35) feet, center-to-center; and all small trees shall be spaced a minimum of twenty-five (25) feet, center-to-center.

(5) All planting on unpaved streets without curbs or sidewalks must have approval of the Village Forester, who shall determine the location of the tree so that it will not be injured or destroyed when the street is curbed and paved or when sidewalks are constructed.

(d) Methods of Planting and Support

(1) Most small deciduous trees and shrubs may be moved bare-rooted unless otherwise indicated. Roots of bare-rooted trees and shrubs must be protected against drying out.

(2) All coniferous trees shall be moved balled and burlaped. Balled roots should be prevented from drying out at the surface of the ball, and they should be protected against freezing.

(3) Pits for the planting of bare-rooted plants shall be at least twelve (12) inches larger in diameter than the diameter of the root system in order to accommodate the roots without crowding. For balled trees, the pits should be a minimum of twelve (12) inches larger than the diameter of the ball of soil to allow proper backfill.

(4) Plants shall be planted no deeper than previously grown with due allowance for settling.

(5) In poorly drained soil, artificial drainage shall be provided the root system of any species intolerant of wet sites, or a species tolerant of wet sites shall be used.

(6) Top soil, compost, peat moss, or an acceptable soil mixture shall be placed about the roots of bare-root stock or in the backfill around balled stock. When the planting is completed, the entire root area shall be thoroughly saturated with water and burlap wrappings

shall be cut.

(7) Although pruning should be done to develop a balance with the root system, excessive pruning at the time of transplanting should be avoided.

(8) Tree trunks shall be suitably wrapped and guyed, or supported in an upright position, according to accepted arboricultural practices. The guys or supports shall be installed so that they will neither girdle or cause serious injury to the tree nor endanger public safety.

SECTION 904 – EARLY MAINTENANCE

(a) General: Newly planted trees, shrubs and other plants require special maintenance for one or two growing seasons following planting. All maintenance practices shall follow approved arboricultural standards.

(b) Watering: Ample soil moisture shall be maintained following planting. A thorough watering once in five (5) to ten (10) days, depending on soil type and drainage provisions, is usually adequate during the growing season. A soil auger can be used to check the adequacy of moisture in the soil ball and/or backfill.

(c) Fertilization: Adequate quantities of the essential nutrient elements should be available after new root growth starts. However, provision of good drainage and adequate moisture of the backfill, or the soil ball on balled plants, is more important than fertilization immediately following planting.

(d) Insect and Disease Control: Frequent and thorough inspections shall be made to determine when measures for the control of insects and diseases shall be taken. Plants are in a weakened condition following transplanting, and they are more susceptible to insects, especially borers, and disease than are vigorously growing trees. Where it is necessary, proper insecticides or fungicides shall be used that are labeled for the purpose intended.

(e) Pruning

(1) Pruning newly planted trees shall consist of removing dead or injured branches. The suppression of rank, uneven growth affects form. Water sprouts shall be removed when they reach the diameter of a pencil.

(2) Pruning shall be practices as often thereafter as needed for sturdy crotch development.

(3) Tree crowns should be elevated as growth characteristics dictate. Newly planted trees need not have lower branches removed until they are well-established.

SECTION 905 – GENERAL MAINTENANCE

(a) Pruning and Removal

(1) No topping or dehorning of trees shall be permitted except by written permission of the Village Forester. Proper cabling and bracing shall be substituted for this practice wherever possible.

(2) All large established trees shall be pruned to allow free passage of pedestrians and vehicular traffic at least seven (7) feet over sidewalks and a minimum clearance of fourteen (14) feet over all streets.

(3) It shall be the policy of the Village Forester to cooperate with the Village Engineer and vice versa regarding placement and selection of lighting standards and the selection of a system of tree pruning that will give effective sight elimination.

(4) All cuts shall be made with a saw or pruner and only at collars or crotches. No stubs shall be left. No spurs or claws shall be used in the trees.

(5) All dead branches shall be removed.

(6) All wounds over three (3) inches in diameter shall be covered with a suitable tree-wounding dressing.

(7) To prevent the spread of infectious diseases, all pruning tools must be disinfected before being used on a new tree.

(8) Whenever streets are to be blocked off to public service, all police and fire departments shall be notified of the location and length of time the street will be blocked. Notifications shall be given these departments upon the removal of such barriers or if such barriers are to remain longer than originally expected.

(9) To protect the public from danger, suitable street and sidewalk barriers, highway cones, or signs shall be used when pruning a tree. Signals, flares or flasher lights shall be placed on all barriers or obstructions remaining in the street after dark.

(10) The stumps of all removed trees shall be cut to at least six inches below the ground level. The soil cavity shall be filled with soils and the area leveled.

(b) Spraying

(1) Suitable precautions shall be taken to protect and warn the public that spraying is being done.

(2) Spraying shall be done only for the control of specific diseases or insects with the proper materials in the necessary strength and applied at the proper time to obtain the desired control. All spraying practices shall conform to federal and state regulations.

(3) Dormant oil sprays shall not be applied to sugar maple, Japanese maple, beech, flowering dogwood, hickory, walnut, and most crabapple trees. Dormant oil sprays shall be applied only when the air temperature is at least 40 degrees for a period of twenty-four (24) hours after spraying.

(c) Fertilization

(1) Fertilization of public trees shall follow the recommendations of the Natural History Survey or other accepted arboricultural standards.

(2) Methods of application of fertilizers shall be specified by the Village Forester.

(d) Cavities: Extensive cavity work should be performed on trees only if they are of sufficiently high value to justify the cost. All cavity work shall conform to the National Arborist Association or other acceptable arboricultural standards.

(e) Cabling and Bracing

(1) As a general rule, cables should be located above the crotch at a point approximately two-thirds (2/3) of the distance between the crotch and the tops of the branch ends. Rust-resistant cables, thimbles, and lags should be used. The ends of a cable should be attached to hooks or eyes or lags or bolts inserted near the ends of the branches. Thimbles must be used in the eye splice in each end of the cable. In no instance shall cable be wrapped around a branch.

(2) All cabling and bracing practices with screw rods shall follow National Arborist Association or other accepted arboricultural standards.

SECTION 906 – TREE PROTECTION

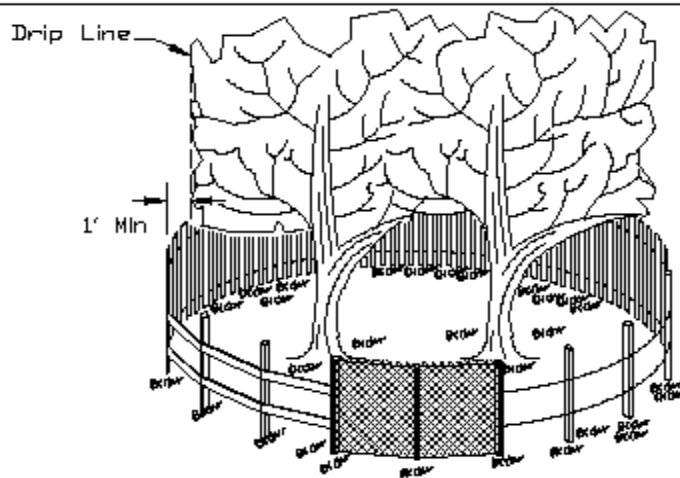
(a) Construction Zone

(1) It is the responsibility of the permit holder, as a condition of the permit, to protect all public trees located on the adjacent public right of way that may reasonably be expected to be affected or damaged by construction activities. Existing trees subject to construction damage shall be boxed, fenced, or otherwise protected before any work is started.

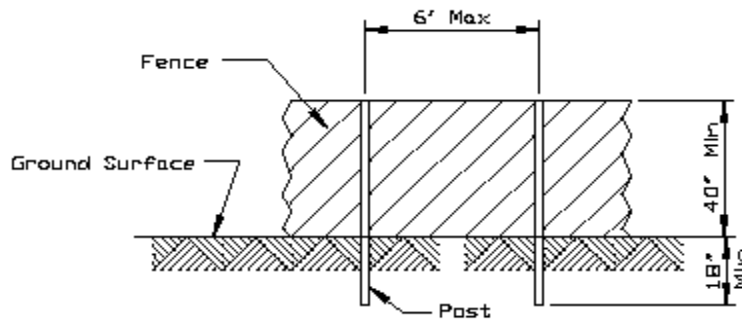
The trees to be protected, the method of protection, and the dimensions involved shall be determined by the Village Forester conjunctly with the permit holder or his/her agent. Once assembled, no boxing, fencing or other protection device shall be removed without prior approval of the Village Forester, and there will be no construction activity or material within the enclosure.

(2) Dimensions: Small trees as determined by the Village Forester shall be boxed or fenced in such a manner as to encompass the entire drip line area of the tree (Figure 1). In no case shall the enclosure be less than two (2) feet from the centerline of the tree. Medium to large trees shall be boxed or fenced in a manner determined by the Village Forester based on sound arboricultural practices. In no case shall the protective device be closer than ten (10) feet from the centerline of the tree except in those portions bordered by the public sidewalk or curb, in which case the protective device shall be offset one (1) foot wherever possible.

TREE PROTECTION - FENCING



SIDE VIEW



POST AND FENCE DETAIL

NOTES:

1. The fence shall be located a minimum of 1 foot outside the drip line of the tree to be saved and in no case closer than 5 feet to the trunk of any tree.
2. Fence posts shall be either standard steel posts or wood posts with a minimum cross sectional area of 3.0 sq. in.
3. The fence may be either 40' high snow fence, 40' plastic web fencing or any other material as approved by the engineer/inspector.

REFERENCE	
Project	_____
Designed	_____ Date _____
Checked	_____ Date _____
Approved	_____ Date _____



STANDARD DWG. NO.	IL-690
SHEET	1 OF 1
DATE	4-7-94

FIGURE 1

(b) Utility Installations (Underground)

(1) All installations or underground utilities upon the public rights of way are subject to approval by the village. Any and all installations that impact on public trees due to underground conflicts (roots) are specifically subject to the review and approval of the Village Forester before the project starts.

(2) Trenching Small Trees: Open trenching in the root zone area of a public tree is prohibited except in cases where the trenching falls outside the dripline of the tree involved. In some instances, exceptions may be allowed if in the opinion of the Village Forester the impact of trenching upon the tree will be negligible.

Specifications for Trenching and Tunneling
for the Installation of Public Utilities

Tree Diameter (a)	Distance of Tunnel from Face of Tree Trunk – Each Side (b)	Recommended Depth of Tunnel or Trench (c)
5 - 9"	6'	2-1/2'
10 - 14"	10'	3'
15 - 19"	12'	3-1/2'
20" or more	15'	4'

(3) Trenching and Tunneling – Medium to Large Trees: When the dripline of trees becomes extensive or overlapping, the only reasonable means of utility installation on the public right of way is a combination of trenching and tunneling. This applies particularly to trees in excess of five (5) inches in diameter. All trees in excess of five (5) inches in diameter where there is insufficient space to bypass the dripline by trenching must be tunneled. In no case shall the tunnel be less than two feet in depth. The tunneling procedure is determined by the diameter of the trees four and one-half (4-1/2) feet from the ground line. Unless specified otherwise by the Village Forester, all dimensions apply as provided in the above table.

(4) Since cutting of larger roots is unavoidable in a trenching operation, all roots over two (2) inches in diameter must be cut cleanly and painted with an appropriate tree-wound dressing. All trenches should not stay open longer than necessary and must be properly barricaded.

SECTION 907 – CONTAINER PLANTING

(A) Installation Requirements

(1) No container may be placed in a manner which violates the visibility triangle, nor may any container be placed on public property where such would constitute a visibility hazard.

(2) The planting medium shall be of sufficient volume to support and sustain plant materials, and the design and construction details shall be approved by the Village Forester.

(B) Maintenance of Containers

(1) Containers, plants and their maintenance become the responsibility of the abutting property owner.

(2) All costs arising from the establishment, maintenance or removal of plants or plant containers are to be borne by the abutting property owner.

(3) Containers, plants and their contents must be maintained in the condition specified by original design at all times. Any planter not serving its designed aesthetical function shall be replanted or removed.

(C) Notice to Replant or Remove: Any container and/or plant material not maintained to quality and design standard, as required by the Village Forester, is hereby declared a nuisance. Anyone failing to abate such a nuisance after notice is given shall be guilty of a misdemeanor, and the Village Forester may remove such nuisance.

SECTION 908 – REMOVAL POLICY

(A) It is the objective and the responsibility of the Village Forester to promote and protect the health, safety and general welfare of the public by providing for the regulation of the planting, maintenance and removal of trees, shrubs and other plants within the Village. As specified by Ordinance, the only person who may authorize the planting or removal of a village tree is the Village Forester or his/her designated agent. Accordingly, a village tree may be considered for removal if it is deemed by the Village Forester to constitute a public nuisance (hazard) as defined in the following ways:

(1) Any dead or dying tree.

(2) Any otherwise healthy tree which harbors insects or diseases which could reasonably be expected to seriously injure or harm any other tree.

(3) Any tree which, by reason of location or condition, constitutes an eminent danger to the health, safety or welfare of the general public. In the category of dangerous or hazardous trees are those with observable, critical structural defects that could cause the tree to fail during periods of stress (i.e. wind or ice storms). Included are extensive rot or cavity formations, weak forks or crotches, and/or other characteristics that would impose an immediate liability on the village.

(B) Not included in the definition of a tree as a public nuisance or immediate hazard, as defined, are the following:

(1) Species of trees currently classified as undesirable and thereby prohibited from being planted on village-owned property, as listed in Table II of these standards and specifications, with the following exceptions:

(a) Any individual tree listed in Table II that is declared a public nuisance by the Village Forester that meets the specification for removal as previously identified.

(b) Any individual or species of tree listed in Table II that is designated by the Village Forester as being part of a scheduled village-wide replacement program designated to upgrade the village's tree population.

(2) Individual trees, regardless of species or kind, that pose either an imminent or potential hazard for which corrective action can be taken.

(3) Trees that constitute an inconvenience to the public by virtue of leaf, twig or fruit drop; that act as sources of allergies; that cause root blockage in sanitary or storm tiles; that are subject to diseases or insect problems which cause only minor harm to trees.

(4) Trees that constitute an inconvenience to the public by virtue of their location, except those public trees that pose serious obstruction problems in terms of egress or access to private property or new construction projects or the alteration of established private facilities. The removal of a public tree for purposes of accommodating private facilities will not be sanctioned unless the following conditions have been satisfied:

(a) There are no other reasonable design alternatives.

(b) The value of the tree(s) in question has been determined by the Village Forester in accordance with the latest revision of "A Guide to the Professional Evaluation of Landscape Trees, Specimen Shrubs and Evergreens" as published by the International Society of Arboriculture.

(c) The Village must be compensated for the loss of the tree(s) by the property owner before removal is undertaken by the village.

SECTION 909 – STREET CLOSURE AND REOPENING PROCEDURE

(A) Notify all police and fire departments of street closure and duration of closure.

(B) Close street and sidewalk with proper signs, barriers, barrier tape and cones.

(C) Remove street-closure barriers in this order: barrier tape, cones, barriers and signs.

(D) Notify all police and fire departments of street reopening.

(E) Remove all warning signs. When temporarily leaving work site, always leave one lane clear of obstruction for emergency traffic.

SECTION 910 – TREE DAMAGE POLICY

(A) Immediately upon receiving information indicating damage to a village tree, the Village Forester, or a qualified agent of the Village Forester, is to inspect the tree and complete a “Tree Evaluation” to determine the dollar value of the damages incurred to the tree.

(B) The information is to be forwarded to the Collections Department with a copy of the “Employee Report of Property Damage”. Responsible parties will be billed for damages incurred as determined by the procedures established by the International Society of Arboriculture and published as a “Guide for Establishing Values of Trees and Other Plants”.

AMENDMENTS

The Village Forester shall have the authority to modify, amend, or extend, with the advice and consent of the East Dundee Tree Committee, the Village Forestry Standards and Specifications at any time that experience indicates improved methods or whenever circumstances make it advisable.

VILLAGE OF EAST DUNDEE STREET AND PARKING LOT LIGHTING STANDARDS

SECTION 1000 - GENERAL:

All development shall include the design and construction of street lighting facilities for the illumination of all roadways, public or private, which lie in or border the development and all parking lots within the development. Street lighting to be accepted by the Village shall be constructed within the public right of way or in easements dedicated to the Village.

SECTION 1000.1 - SPECIFICATIONS:

(A) Street lights and appurtenances shall be designed and installed according to: The American Standard Practice for Roadway Lighting, latest edition, the National Electric Code, latest edition, as amended by the Village of East Dundee Electric Code, and these Engineering Standards.

(B) Manufacturer's information including catalog cuts for all materials not specifically approved on the plans but required to install said street light(s) into a working lighting system acceptable to the Village shall be submitted to the Village for approval. All manufacturer's information and catalog cuts must be approved by the Village Engineer prior to the commencement of any portion of said work.

(C) The contractor shall confirm the location of the service drop and connection with Commonwealth Edison and submit for approval to the Village Engineer a plan or sketch of said electrical service to the proposed street light(s) prior to the beginning of any street lighting construction. The plan or sketch should also include the name and approval signature of the person at Commonwealth Edison Company who has approved the plan.

(D) When requested by the Village, a printout of illumination levels point-by-point throughout the area to be lighted shall be submitted by the developer's engineer or contractor to the Village Engineer for review and approval of the proposed lighting system.

(E) Upon completion of the installation of the street light(s), the contractor shall furnish "Record Drawings" of the work to the Village Engineer.

SECTION 1000.2 - STREET LIGHT LOCATIONS:

(A) Residential, Commercial and Industrial Districts:

Poles shall be located at all intersections and spaced at a distance not exceeding three hundred feet (300') from one another along the street. Poles shall also be located at the ends of cul-de-sacs and curves in the roadway as required by the Village Engineer. Poles shall be set in the parkway a minimum of two feet (2') clear distance from the back of curb. Where the distance between the sidewalk and the curb is such that this location is impractical or where the sidewalk is adjacent to the curb, the Village Engineer shall be consulted for an acceptable alternate location for the pole.

Unless otherwise directed by the Village Engineer, the direction of the support arm shall be at right angles to the centerline of one of the intersecting streets at a four-legged intersection with location preference to the higher classification roadway, if applicable. At "T" intersections, a pole shall be provided on the centerline extended of the terminating street at the top of the "T" with the support arm extending toward the center of the intersection. In cul-de-sacs, light poles shall be placed in the center median or if no center median is to be constructed, at the end of the cul-de-sac along the centerline extended.

(B) Arterials and Collector Streets:

Poles shall be located at all intersections and spaced such that the illumination meets the following criteria given in Tables 1 thru 4 below:

TABLE 1. RECOMMENDATIONS FOR ROADWAY AVERAGE MAINTAINED HORIZONTAL ILLUMINATION

Vehicular Roadway Classification	URBAN								
	Commercial			Intermediate			Residential		
	fc	lux		fc	lux		fc	lux	
Freeway	0.6	6		0.6	6		0.6	6	
Expressway		1.4	15		1.2	13		1.0	11
Major		2.0	22		1.4	15		1.0	11
Collector		1.2	13		0.9	10		0.6	6
Local		0.9	10		0.6	6		0.4	4
Alley		0.6	6		0.4	4		0.4	4

TABLE 2. RECOMMENDED AVERAGE-TO-MINIMUM UNIFORMITY RATIOS

For Roadways in:	Recommended Ratios	
	ANSI	FHWA/AASHTO
Commercial Areas	3:1	4:1
Intermediate Areas	3:1	4:1
Residential Areas	6:1	6:1

TABLE 3. RECOMMENDED MOUNTING HEIGHT

MOUNTING HEIGHT			
SIZE	RECOMMENDED	ACCEPTABLE	
		MINIMUM	MAXIMUM
70W 100W 150W	25 FT.	22 FT.	30 FT.
250W 400W 1000W	30 FT.	25 FT.	35 FT.

TABLE 4. RECOMMENDATIONS FOR PARKING AREAS

TYPE OF AREA	AVERAGE MAINTAINED FOOT CANDLES (F.C.)
ACTIVE ENTRANCES, SECURITY LIGHTING, PEDESTRIAN OR VEHICULAR	5.0 F.C.
HIGH ACTIVITY PARKING	3.6 F.C.
LOW ACTIVITY OR INACTIVE ENTRANCES, BUILDING SURROUNDS	1.0 F.C.

The average maintained foot candles in the above table are recommended by the IESNA. Light levels represent illumination levels that attempt to provide safety, economy, security and also meet community expectations. The illumination level should be maintained at a minimum of 2.0 foot candles in a surface parking lot.

SECTION 1000.3 - LIGHT POLE REQUIREMENTS:

(A) All poles shall be round tapered seamless designed with satin ground finish, fabricated from aluminum alloy 6063-T6. Poles shall be provided with bolt-down anchor bases and handholes. Anchor bases and handhole frames shall be manufactured from aluminum alloy 356-T6.

(B) Bracket arms shall be single member design manufactured from aluminum alloy 6063-T6. Bracket arm shall taper to two and three-eighths inches (2-3/8") at luminaire end.

(C) Poles shall be designed and fabricated to withstand 90 miles per hour winds and associated wind gusts and vibrations. The light poles shall be able to support a luminaire panel up to 1.5 square feet. All poles shall be designed in conformance with AASHTO's standard specifications for structural supports for highway and traffic signals.

(D) In residential areas, the lighting standards shall have bolt-down bases and shall be constructed of spun aluminum with a twenty-five foot (25') mounting height. The lighting standard shall be General Electric Type RRTA or approved equal. In cases where bronze finish is desired, the finish shall be anodized duranotic dark bronze finish on spun aluminum. Painted steel poles shall not be allowed. Alternate poles and mounting height may be considered by the Village upon receipt of a formal request with adequate justification for departing from the recommended standards other than strictly cost savings.

(E) Electrical materials shall be new and of the type and kinds listed by the Underwriters Laboratory and meeting AASHTO criteria. Before any work is started, the contractor shall obtain written approval from the Village. At least thirty (30) days prior to starting construction, he shall submit three copies of drawings showing each type of pole and

bracket arm and including for both the types of materials, dimensions, thickness of material, method of fabrication, and description of details of items to be incorporated into the work meeting with the Village's approval.

(F) The contractor shall be fully responsible for the plumbness of the poles. One of the following methods is recommended:

(1) The pole shall be considered plumb when a forty-eight inch (48") or larger spirit level, with offsets at the top equal to the pole taper, indicates when used at eye level, that the center line of the pole is within one-half inch ($\frac{1}{2}$ ") per ten feet (10') of true vertical in any direction.

(2) The pole shall be considered plumb when the center of the top is directly over the center of the base as determined by viewing the pole through a tripod mounted, accurate, quality transit from two (2) angles at least sixty degrees (60) apart. Deviation shall not exceed one-half inch ($\frac{1}{2}$ ') in ten feet (10').

(G) The foundation shall be installed with its axis plumb so that the light pole may be installed plumb without the use of shims, grout or other leveling devices.

SECTION 1000.4 - LIGHT POLE FOUNDATIONS:

(A) The street light foundation shall be air entrained Class SI, Portland cement concrete, with a three inch (3") maximum slump and a minimum fourteen (14) day compressive strength of 3500 psi, using an IDOT approved mix for this class of concrete, when possible. The foundations shall be constructed in accordance with the following requirements:

(1) The foundation shall be set so that the top six inches (6") remain above the finished grade line. A minimum of the top twenty-four inches (24") shall be formed with rigid forms firmly held to accurate level and grade. These forms shall include a template for the anchor rods and wireway. Before pouring concrete, the bottom of the foundation cavity shall be free from debris, loose earth, and water. The portion of the foundation below the formed portion required shall be poured against the undisturbed earth sides of the hole. The minimum depth of foundation shall be forty-eight inches (48") below grade and meet pole manufacturers' minimum specifications.

(2) The exposed portion of the foundation shall be finished smooth. The top shall be level within one-sixteenth inch ($\frac{1}{16}$ ") from side to side and flat within plus or minimum one-sixteenth inch ($\frac{1}{16}$ "). Shims and grout shall not be permitted to plumb the pole.

(3) The Village Engineer shall be notified at least twenty-four (24) hours prior to the pouring of the foundations. No concrete will be placed until the Village Engineer has inspected and has approved the depth of the excavation, the character and condition of the foundation material and the reinforcement steel in place.

(4) The foundation shall be allowed to set and cure for fourteen (14) days before the pole is set, during which time the anchor bolt ends and exposed concrete shall be protected from mechanical and weather damage.

SECTION 1000.5 - LUMINARIES AND LAMPS:

The luminaries shall consist of a housing, reflector, reflector holder, lamp socket, slipfitter and three terminal photoelectric cells. The luminaires shall have high-pressure sodium lamps in commercial or industrial zones. In residential zones, lamps other than high-pressure sodium may be considered, subject to Village Board and Commonwealth Edison's approval.

All fixture components shall be designed to operate under all environmental conditions. All luminaires shall be designed and wired to operate on sixty (60) hertz alternating current with a (90+% PF) auto regulator type CWA ballast. All lens shall be heat resistant polycarbonate. All fixtures shall be designed to operate at minus twenty degrees (-20 F) minimum starting temperature. HPS fixtures should be designed for satisfactory lamp starting at -40 F.

The high-pressure sodium luminaire may be either the conventional horizontal flat lens cobra head type or the decorative shoe box type, either of which shall be the appropriate cutoff-type fixture for the particular application..

(A) The cobra head type shall have die-cast aluminum housing, removable ballast assembly, a photoelectrical cell receptacle and cell, an auto regulator ballast and universal slipfitter receptacle. Acceptable units include General Electric M-Powr/Door or approved equal.

(B) The high-pressure sodium decorative type fixture shall have a die-cast aluminum housing, removable ballast assembly, a photoelectric cell receptacle and cell, and an auto regulator ballast. Acceptable units are General Electric Area Luminaires or approved equal and will be approved and accepted by the Village Engineer.

SECTION 1000.6 - WIRE/CABLE REQUIREMENTS:

(A) All wire and cable installed under this Section from the power source to the lighting standards shall be contained in either conduit manufactured as U.L. listed plus 40 heavy wall EPC, rigid non-metallic conduit or heavy-walled galvanized steel conduit. Direct burial of all wire and cable under this Section is prohibited.

All cable, conductor and duct shall be new, having been manufactured within twelve (12) months

of the date of installation. The size, type of insulation, voltage and manufacturer's name shall be permanently marked on the outer covering at regular intervals. It shall be delivered in complete coils or reels with identifying Underwriter's Laboratories (UL) tags and labels attached and shall be in first-class condition when installed.

Materials shall be packaged by the manufacturer and delivered with identifying UL tags and labels attached. All UL labels and tags shall be permanently removed from the reels and cartons by the Village representative for his records.

Cables and conductors will be subject to inspection for acceptance as to quality, conditions, and installation during final inspection. The conduit material shall be subject to inspection for acceptance as to installation during construction.

All underground conductors shall be a minimum No. 6 or No. 8 A.W.G. XLP-RHH copper, soft and annealed and shall conform to ASTM Specification for stranded conductors. The conductor sizes used for the supply voltage runs are determined by the maximum voltage drops allowed in the circuits. All pole wiring shall be solid No. 10 A.W.G. XLP-RHH. Copper conductor insulation shall be heat and moisture resistant plastic suitable for use at ninety (90) degrees Celsius in wet locations at six hundred (600) volts. The wiring system shall be a parallel system with a minimum of three (3) insulated conductors: black, red and neutral colored white. The maximum voltage drop between the controller or fuse box and the furthest light pole of the system shall not exceed two percent (2%). Calculations must be provided by the contractor or the developer's engineer.

Cable conduit shall be a minimum of two inches (2") in diameter.

All wire and cable installed under this Section shall be heat and moisture resistant, Type XLP-RHH, and be suitable for use at ninety (90) degrees Celsius and shall have insulation rated at 600V.

The bare ground wire shall be #8AWG stranded copper wire.

(B) All wire shall be subject to an insulation test to ground after installation. The minimum acceptable resistance to ground shall be two hundred fifty thousand (250,000) ohms. Any section of wiring failing to pass the minimum insulation test for any reason or showing an obvious short circuit shall be rejected. All wire, cable and unit duct to be furnished shall be buried not less than twenty-four inches (24") below finished grade.

(C) All runs shall be continuous without splice in cable from pole handhole or to control cabinet.

(D) Adequate slack shall be provided such that the service connection can be made without splices other than at the power source. In the case of aerial service, an insulating bushing shall be provided for the steel conduit service pole riser.

(E) When passing under concrete or asphalt surfaces, rigid galvanized steel conduit not less than two inches (2") in diameter with bushing shall be provided for raceways.

(F) A splice connection in handholes only for copper conductors shall be made with spiral spring wire, lug type, or approved equal connectors. Splices in handholes below grade level shall be Scotchcast kits or equivalent equal.

(G) Rigid galvanized metal conduit shall be two inches (2") in diameter minimum and comply with Underwriter's Laboratories, Inc. Standard U.L. 6, WW-C-581a and ASA Specification C80-1. Each length of conduit shall bear an Underwriter's Laboratories label. Conduit may be either pushed or trenched depending on location. Rigid galvanized metal conduit shall be required for:

(1) Street light foundation raceways.

(2) Control cabinet foundation raceways.

(3) All pavement crossings. Conduit shall also extend two feet (2') beyond the curb and shall be pushed or augured under pavement.

(4) The conduit between the street light control cabinet and the Commonwealth Edison connection shall be three inch (3") rigid steel.

(H) Concrete handholes shall be constructed at all street intersections and wherever there is change in alignment of the cable greater than twenty (20) degrees. No handhole will be required where the cable is installed with a radius of twenty feet (20') or greater. Heavy duty handholes shall be required in areas subject to motor vehicle traffic.

Street lighting handholes shall be air entrained Class SI Portland cement concrete with a maximum three inch(3") slump and a minimum fourteen (14) day compressive strength of 3500 psi using an IDOT approved mix for this class of concrete, when possible. All conduit shall extend into the handhole a minimum of four inches (4") with a minimum of six feet (6') of cable pulled into the handhole for splices per conductor run. All handholes shall contain a frame and lid with the designation "STREET LIGHTING" cast therein.

(I) All installation of the cable and conduit between poles shall be placed in trenches a minimum of six inches (6") wide and twenty-four inches (24") below design subgrade elevation.

There shall be no sharp bends where the conduit enters the trench, compacted approved fill shall be built up to half-fill the opening in the conduit so that emerging cable conduit will have a smooth bed at this critical point. If the trench depth is less than twelve inches (12") because of obstructions, the contractor shall cut a groove in such obstruction so the trench is a minimum of twelve inches (12") deep. The cable conduit shall be laid in this groove, anchored to prevent floating and covered to grade. Where trench depth exceeds twelve inches (12") but is less than twenty-four inches (24") deep, any material excavated from the trench, which in the opinion of the Village Engineer is satisfactory backfilling material, may be used. Cinders, frozen earth, or other deleterious materials will not be permitted in the backfill. Stone used in backfill shall be less than two inches (2") in any dimension.

Backfilling shall be completed as soon as possible after inspection. Backfill shall be deposited in uniform layers not to exceed six inches (6") thick loose measure. The material in each layer shall be mechanically compacted in a manner approved by the Village Engineer.

The Village reserves the right to make inspections of the trench construction and at any other stage it designates.

(J) Wiring Test:

The tests outlined in this section are field tests to be performed in the presence of the Village Engineer's representative. They shall be performed by the contractor's personnel and their equipment. Defects shall be corrected and testing repeated until all sections of the installation are sound. Splicing or repairing of insulation below grade is not permissible except in a handhole.

All construction shall be completed before tests are made. The poles shall be erected, with ballasts and lamps in place. Trenches shall be backfilled and all connections shall be made.

Insulation resistance shall be measured with a megger generating not less than five hundred (500) or more than one thousand (1000) volts. A multimeter is not acceptable because it applies only a few volts which will permit some insulation defects to go undetected. Erratic behavior of the megger during the test indicates an intermittent weakness which must be corrected. Only the lower value indicated shall be considered or recorded.

The Village Engineer's representative shall log the serial number and voltage rating of the megger used by the contractor. He shall then confirm the calibration of the megger by connecting the two leads of the megger together so that the resistance to be measured by the megger when it is turned at full speed is zero. Unless this is true, the megger will give false reading under all other circumstances as well.

Each circuit shall be permanently tagged for identification and then tested at the control centers. The full voltage of the megger shall be applied between ground and each insulated wire in each

circuit. The ground shall consist of a driven, copper-clad rod 8' x 5/8" or larger connected by #8 wire to the ground terminal in the control cabinet. Circuits shall be isolated from each other by opening the circuit breakers.

The minimum, acceptable resistance to ground shown by the megger shall be 250,000 ohms. The tests shall be conducted as follows:

(1) Test at each pole location from handhole to the last light in a string of lights. Locate any faults in underground cable before connecting lamps.

(2) Test each lamp assembly at handhole using the #10 downwire in each of the lamp poles. Correct any faults.

(3) Test the complete system with all connections made except the fuses will not be installed in the switch box. Test the system from fuse output lug to ground at the switch box.

If a service center, check each circuit at the breaker output in the control center.

(4) All tests shall be conducted in the presence of a representative of the Village of East Dundee or the Village Engineer.

With all lamps "on" for a minimum of 5 minutes, measure the voltage at the fuse output lug in the safety switch box. Then using the same meter, measure the voltage to the last light in the string at the handhole connection in the base of the pole for that lamp. The % voltage drop from the supply fuse to the lamp shall not be more than 2%.

A test log shall be used during the test noting all results and identifying all meters used. Test logs will be signed by the contractor's representative and the Village Engineer's witness.

(K) Service and Control Center:

Service centers, if used, shall be established at such points as are found feasible for the area to be serviced. The final selection of a service and control center shall be approved by the Village Engineer and the Commonwealth Edison Co. At each service center, the service switch and circuit breaker shall be mounted in a weather-proof cabinet made of rust-resistant metal or aluminum and shall be marked "Street Lighting". This cabinet shall be equal to Crouse Hinds #27394 adapter.

The cabinet shall be mounted on an 18" diameter concrete base 4'-0" deep cast in place consisting of four vertical rods and #3 rings 12" and on center for reinforcing. The top of the base shall be 2-1/2" (+1/2") above finished grade. The base shall include a 2" feeder conduit with standard radius and 1-1/2" service conduit connected directly to the meter socket as required by

Commonwealth Edison Co. All feeder and supply conduit shall enter the cabinet from the bottom.

The service center distribution cabinet shall be securely grounded by driving into the ground a 3/4" x 10' copperweld ground rod inside concrete base of a cabinet and connected to control panel ground terminal. On the back of the control center shall be mounted the meter socket for the mounting of the service meter. The control center cabinet shall be provided with a secure locking facility and duplicate keys must be provided for same.