

ORDINANCE NO. 298

EAST NORRITON TOWNSHIP  
MONTGOMERY COUNTY, PENNSYLVANIA

AN ORDINANCE AMENDING THE CODE OF EAST NORRITON TOWNSHIP, SPECIFICALLY, THE EAST NORRITON TOWNSHIP SUBDIVISION AND LAND DEVELOPMENT ORDINANCE BY INCREASING THE ADMINISTRATIVE HANDLING FEE INVOLVED IN COLLECTING AND PAYING FEES OF TOWNSHIP CONSULTANTS FROM THREE PERCENT (3%) TO FIVE PERCENT (5%) AND BY ADDING PROVISIONS REQUIRING CASH ESCROWS TO BE ESTABLISHED FOR PAYMENT OF FEES OF TOWNSHIP CONSULTANTS RELATED TO THE REVIEW AND APPROVAL PROCEDURE OF LAND DEVELOPMENT AND SUBDIVISION PLANS; BY SETTING FORTH SPECIFIC STANDARDS FOR PAVING DRIVEWAYS, ALLEYS AND PARKING AREAS; PROVIDING FOR THE LOCATION OF DRIVEWAYS; SETTING FORTH A LIMIT OF TWENTY (20) PARKING SPACES IN A CONTINUOUS ROW; PROVIDING FOR THE ARRANGEMENT OF PARKING AREAS AND THEIR LIGHTING; SETTING FORTH THE GENERAL LIMIT OF A 2 TO 1 EXCAVATION AND FILL SLOPE EXCEPT AS SET FORTH IN THIS AMENDMENT; SETTING FORTH REQUIREMENTS FOR SITE GRADING PLANS; PROVIDING FOR INSPECTION OF GRADING ACTIVITIES; AND SETTING FORTH THE REQUIREMENT OF PREPARING TRANSPORTATION IMPACT STUDIES AND THE INFORMATION TO BE CONTAINED THEREIN.

THE BOARD OF SUPERVISORS OF EAST NORRITON TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA UNDER AND BY VIRTUE OF AUTHORITY GRANTED BY THE SECOND CLASS TOWNSHIP CODE DOES HEREBY ENACT AND ORDAIN:

SECTION 1.

The Code of East Norriton Township, Chapter 175, being the East Norriton Township Subdivision and Land Development Ordinance is hereby amended as follows:

Section 175-51C is amended by deleting the reference to "three per centum (3%)" and substituting therefore the following, "five per centum (5%)".

Section 175-51D is amended by deleting the existing paragraph and substituting the new paragraph as follows:

Section 175-51D. At the time of submission of preliminary plans, the applicant or developer shall deposit a cash escrow with the Township to cover costs, fees, and expenses (for purposes of

this section, "review fees"), including but not limited to, engineering and legal fees incurred during the review and approval process of subdivision and land development plans and through the final completion of the subdivision or land development and expiration of the improvements maintenance period. The amount of such escrow shall be as set forth and established by resolution of the Board of Supervisors and as amended from time to time. Failure to post the cash escrow at the time of application for preliminary plan review shall result in rejection of the application as being incomplete. The Township may draw upon the cash escrow as necessary to reimburse itself for review fees of the Township related to the review and approval of subdivision or land development plans. A copy of the invoice for review fees shall be sent by the Township to the applicant/developer and such invoice shall be paid by the Township from the cash escrow unless the applicant disputes the amount of the review fees and notifies the Township of such dispute within ten (10) days of the billing date. In case of a dispute over review fees, the procedures set forth in the Pennsylvania Municipalities Planning Code shall be applied. Upon each draw on the cash escrow by the Township, the Township shall send the developer an invoice marked "Paid" for the amount drawn, specifying the particular review fee for which the Township has drawn payment or reimbursement. Within ten (10) days of the developer's receipt of notice from the Township that the balance of the escrow required by this Section is inadequate to cover the reasonable costs and expenses likely to be incurred by the Township in review and approval of the land development or subdivision plans, the developer shall post such additional monies as have been specified in the notice, subject to dispute resolution set forth in Section 175-53.1D. In the event that the developer or applicant shall fail to make payment within ten (10) days of receipt of notice from the Township, and such failure shall result in insufficient funds in escrow to pay any bill for engineering, legal or other services related to the review and approval procedure within thirty (30) days of its due date, whether before or after the final approval of the subdivision or land development, interest shall be added to the bill of the applicant/developer at the rate of one and one-half percent (1 1/2%) per month until paid.

Section 175.53 is amended by adding new paragraph A(13) as follows:

(13) No plan shall be finally approved until the applicant or developer shall have deposited a cash escrow with the Township to be drawn upon by the Township to reimburse the Township for fees, costs and expenses which the Township may incur in connection with the applicant's or developer's subdivision or land development. The amount to be deposited in escrow with the Township shall be ten

percent (10%) of the total construction cost of the required improvements as determined in Section 175-53A(7) or elsewhere in the Subdivision and Land Development Ordinance unless, in the judgment of the Township Engineer, a greater or lesser amount is necessary to secure the payment of the expenses the Township is likely to incur in connection with the subdivision or land development. Upon each withdrawal from the escrow by the Township, the Township shall send the developer or applicant an invoice marked "Paid" for the amount drawn, specifying the particular fee, cost or expense for which the Township has drawn payment or reimbursement.

Within ten (10) days of the developer's receipt of notice from the Township that the balance of the escrow required by this Section is inadequate to cover the reasonable costs and expenses likely to be incurred by the Township with regard to the subdivision or land development, the developer or applicant shall post such additional monies as have been specified in the notice, subject to dispute resolution set forth in Section 175-53.1D. In the event that the developer or applicant shall fail to make such payment within ten (10) days of receipt of notice from the Township, and such failure shall result in insufficient funds in escrow to pay any bill for engineering, legal or other services related to the land development or subdivision within thirty (30) days of its due date, interest shall be added to the bill of the applicant/developer at the rate of one and one-half percent (1 1/2%) per month until paid.

Section 175-53D is amended by deleting the reference to "three per centum (3%)" and substituting therefore the following: "five per centum (5%)".

Sections 175-38D and 175-51A(5) are amended by deleting from each "Section 175-53.1G" and substituting therefore the following: "Section 175-53.1D".

Section 175-19A(1) is amended by deleting the existing section and substituting therefore the following:

(1) Paving.

(a) All driveways for single family units must use the following minimum standards:

(i) A crushed aggregate base course shall be installed to a compacted depth of six (6) inches.

(ii) A bituminous concrete binder course (ID-2) to a compacted depth of one (1) inch.

(iii) A bituminous wearing course (ID-2) to a compacted depth of one (1) inch.

(b) Alleys, driveways and parking areas for uses other than single family units must use the following minimum standards:

(i) A crushed aggregate base course should be compacted to a depth of eight (8) inches. The base course shall be choked at both the top and the bottom with fines.

(ii) A bituminous concrete base course (ID-2) to a compacted depth of two (2) inches. A bituminastic tack coat shall be applied to the binder course prior to the final paving.

(iii) A bituminous wearing course (ID-2) to a compacted depth of one (1) inch.

Section 175-19B(1) shall be amended by deleting that paragraph and substituting the following therefore:

(1) Location. Except for common or shared driveways, all driveways to single family lots shall be located at least five feet from any side or rear property lot line. All driveways shall be designed and constructed to provide sight distance in accordance with the following minimum sight distance diagram chart:

Table 1 - Safe Sight Distance for passenger cars and single unit trucks exiting from driveways onto two-lane roads.

Posted Speed (mph)	Safe Sight Distance - Left <sup>1</sup> (feet)	Safe Sight Distance - Right <sup>1</sup> (feet)
25	250	195
25	250	195
35	440	350
45	635	570
55	845	875

<sup>1</sup> Measured from a vehicle ten feet back of the pavement edge.

**Table 2 - Safe Sight Distance for buses and combinations exiting from driveways onto two-lane roads.**

Posted Speed (mph)	Safe Sight Distance - Left <sup>1</sup> (feet)	Safe Sight Distance - Right <sup>1</sup> (feet)
25	400	300
25	400	300
35	675	625
45	1225	1225
55	2050	2050

<sup>1</sup>Measured from a vehicle ten feet back of the pavement edge.

**Table 3 - Safe Sight Distance for passenger cars and single unit trucks exiting from driveways onto four and six-lane roads.**

Posted Speed (mph)	Safe Sight Distance - Left <sup>1</sup> (feet)	Safe Sight Distance - Right <sup>2</sup> (feet)
25	175	195
25	175	195
35	300	350
45	500	570
55	785	875

<sup>1</sup> Measured from a vehicle ten feet back of the pavement edge to a vehicle approaching in the outside lane.

<sup>2</sup> Measured from a vehicle ten feet back of the pavement edge to a vehicle approaching in the median lane.

**Table 4 - Safe Sight Distance for buses and combinations exiting from driveways onto four and six-lane roads.**

Posted Speed (mph)	Safe Sight Distance - Left <sup>1</sup> (feet)	Safe Sight Distance - Right <sup>2</sup> (feet)
25	300	300
25	300	300
35	625	625
45	1225	1 2 2 5
55	2050	2050

<sup>1</sup> Measured from a vehicle ten feet back of the pavement edge to a vehicle approaching in the outside lane.

<sup>2</sup> Measured from a vehicle ten feet back of the pavement edge to a vehicle approaching in the median lane.

**Table 5 - Safe Sight Distance for passenger cars and single unit trucks entering driveways by left turns.**

Posted Speed (mph)	Safe Distance in Feet <sup>1</sup>		
	2-Lane	4-Lane	6-Lane
25	190	205	220
35	300	320	345
45	445	470	500
55	610	645	680

<sup>1</sup> Measured from the point where a left-turning vehicle stops to the vehicle in the outside lane.

**Table 6 - Safe Sight Distance for buses and combinations entering driveways by left turns.**

Posted Speed (mph)	Safe Distance in Feet <sup>1</sup>		
	2-Lane	4-Lane	6-Lane
25	330	360	390
35	485	530	575
45	690	750	810
55	905	990	1075

<sup>1</sup> Measured from the point where a left-turning vehicle stops to a vehicle in the outside lane.

1. In using Tables 1 through 6 the following additional requirements shall apply:

(i) Tables 2, 4, and 6 shall be used in lieu of Tables 1, 3, and 5 only when combination traffic exceeds 5.0% of the total traffic using the proposed driveway.

(ii) Posted speeds shall be used unless operating speeds vary from the posted speed by more than ten miles per hour, in which case the Township may require that operating speeds be used.

(iii) The sight distances in Tables 1 through 4 apply only when highway grades are zero to 3.0%, either up or down.

(A) When the highway grade in the section to be used for acceleration, after leaving the driveway, ascends at 3.0 - 5.0%,

the sight distance in the direction of approaching ascending traffic may be increased by a factor of 1.4.

(B) When the highway grade ascends at greater than 5.0%, sight distance may be increased by a factor of 1.7.

(C) When the highway grade in the section to be used for acceleration after leaving the driveway descends at 3.0 - 5.0%, sight distance in the direction of approaching descending highway traffic may be reduced by a factor of 0.6.

(D) When the road descends at greater than 5.0%, sight distance may be reduced by a factor of 0.5.

(iv) The sight distance values in Tables 1 through 6 are desirable for safe operation of the driveway. Sight distance values less than desirable will be accepted only if it is impossible to achieve the desirable value by locating the driveway at any point within the property frontage boundaries. The minimum acceptable sight distance values shall be computed from the following formula:

$$SSSD = 1.47 Vt + \frac{v^2}{30(f+g)}$$

SSSD = Minimum safe stopping sight distance (feet).

V = Velocity of vehicle (miles per hour).

t = Perception time of motorist (average = 2.5 seconds).

f = Wet friction of pavement (average = 0.30.).

g = Percent grade of roadway divided by 100.

(2) If sight distance requirements as specified in this chapter cannot be met, the Township may:

- (i) prohibit left turns by exiting vehicles;
  - (ii) restrict turning movements to right turns in and out of a driveway;
  - (iii) require installation of right turn acceleration lane or deceleration lane;
  - (iv) require installation of a separate left run standby lane;
  - (v) alter the horizontal or vertical geometry of the roadway;
- or
- (vi) deny access to the highway.

(i) Grade of access driveway. Grade of access driveway shall be constructed in the following manner:

(1) All driveways shall be constructed so as not to impair drainage within the right-of-way, alter the stability of the improved area, or change the drainage of adjacent areas.

(2) Where a drainage ditch or swale exists, the permittee shall install adequate pipe under the driveway in accordance with Form 408. Drainage pipe installed under driveways shall be at least 15 inches in diameter.

(3) The side slopes for driveway embankments within the right-of-way shall not be steeper than ten to one. See Figure 6.

(4) Grade requirements in uncurbed shoulders within the right-of-way shall conform to Figure 1.

Section 175-19D is amended by adding new Sections (12), (13), (14) and (15) as follows:

(12) No more than twenty (20) parking spaces shall be permitted in a continuous row, without being interrupted by a ten (10) feet wide landscape island. This island shall be planted with either shrubs or appropriate buffer planting.

(13) All dead-end parking areas shall be designed to provide sufficient area for vehicles to back up out of parking within the end stalls of the parking area.

(14) All public parking areas shall be well lighted during the after-dark operating hours. All light standards shall be located on the raised parking islands on pedestals and not on the parking surface.

(15) All artificial lighting used to illuminate any parking space or spaces shall be so arranged so that direct glare from any such light shall not fall upon any neighboring property or streets, nor shall any high brightness surface of the luminaries be visible from neighboring residential properties or from any public street.

Section 175-22B(5) is amended by deleting the existing Section and adding the following new section:

(5) Excavation. No excavation shall be made with a cut face steeper in slope than two (2) horizontal to one (1) vertical, except under one or more of the following conditions:

(a) The excavation is located so that a line having a slope of two (2) horizontal to one (1) vertical and passing through any portion of the cut face will be entirely within the property lines of the property on which the excavation is made.

(b) The material from which the excavation is made is sufficiently stable to sustain a slope steeper than two (2) horizontal to one (1) vertical and a written statement from a civil engineer, licensed by the Commonwealth of Pennsylvania and

experienced in erosion control, to that effect, is submitted to and approved by the Township Engineer. The statement shall set forth that the site has been inspected and that the deviation from the slope specified hereinbefore will not result in injury to persons or damage to property.

(c) A concrete or stone masonry wall constructed according to present or future designs of the Township of East Norriton is provided to support the face of the excavation.

Section 175-22B(6) is amended by deleting the reference to a slope of one and one-half (1 1/2) horizontal to one (1) vertical and substituting the following therefore: "two (2) horizontal to one (1) vertical".

Section 175-22B(10) is amended by deleting the existing paragraph and substituting the following therefore:

(10) Site Grading Plan. The Township Engineer shall require a site grading plan in conjunction with a plan of subdivision or land development in order to insure compliance with the standards contained in Section 175-22.

A. In addition to the above listed standards, it shall be the responsibility of the applicant or developer to submit a detailed site grading plan showing at least the following information:

1. An area plan or plans describing existing and proposed features of the 100 feet surrounding the site of the work, including topography, existing vegetation, water courses, manmade features, and the effects of watersheds and other important natural features.

2. A topographic survey of the site at a suitable scale of no less than one inch equal to forty feet (1" = 40'), and a contour interval of no more than two (2) feet, prepared by a registered surveyor or engineer, including a boundary line survey, the location, description of vegetative cover, including trees over ten (10) inches in diameter, two (2) feet above the ground, and other natural and manmade features. This plan shall be a minimum size of eight and one-half inches by eleven inches (8 1/2" x 11").

3. An improvement plan of the same size and scale as set forth in subparagraph 2 above, showing and describing all proposed changes to the site, including but not limited to, cuts, fills, structures, paving, description of all trees to be removed and utilities (this may be combined with a topographical survey for simple projects upon request to and approval by the Township).

4. A grading plan of the same scale as subsection 2 above, showing and describing all proposed changes to the site, including but not limited to, cuts, fills, structures, paving, utilities, and rights-of-way of easements.

5. A time schedule stating the anticipated starting and completion dates of the development sequence, and the expected date of the completion of construction of each of the activities referred to in Section 175-22.

B. The Township Engineer shall inspect grading activities. Inspections shall be carried out on a random basis, except as stated hereafter. A final inspection shall be conducted by the Township Engineer to certify compliance with this Ordinance. The applicant or developer shall notify the Township Engineer and submit an as-built grading plan (showing all changes in the final grading plan) within fourteen (14) days of the completion of all activities for which a permit was issued thereunder. The Township Engineer shall then conduct an inspection to insure that satisfactory compliance with requirements has been accomplished. If the subject property, as finally graded and constructed, does not satisfactorily conform to the final grading plan filed with the permit applications hereunder, then the Township Engineer shall note changes required on the as-built grading plan. The applicant or developer shall correct all noted deficiencies and submit a revised as-built grading plan for reinspection. When the Township Engineer is satisfied that the finally graded parcel of real property complies with all Township requirements, he shall notify the Township Zoning Officer or such other authorized personnel as the Township shall from time to time designate, that the subject lot is in compliance with this Section. No occupancy permit (temporary or permanent) shall be issued until such time as the Township Engineer certifies that all grading and/or stabilization has been completed in accordance with the final grading plan.

Chapter 175, Article V is amended by adding Section 175-17.1 as follows:

Section 175-17.1 Transportation Impact Study.

A. A transportation impact study shall be undertaken for all subdivision and land developments meeting the criteria of paragraph C below to:

1. Enable the Township to assess the impact of a proposed development on the local transportation system;

2. Ensure that proposed developments do not adversely affect the transportation network and to identify any traffic problems associated with access from the site to the existing transportation network;

3. Delineate solutions to potential problems;
4. Present improvements to be incorporated into the proposed development; and
5. Protect air quality, conserve energy, and encourage use of public transportation.

B. The transportation impact study shall be prepared by a qualified traffic engineer and/or transportation planner with previous traffic study experience. The procedures and standards for the traffic study are set forth in paragraph D of this section utilizing the terminology contained in the Transportation Research Board Highway Capacity Manual, Special Report 209, 1985, as may be hereafter revised (hereinafter referred to as "Highway Capacity Manual").

C. A transportation impact study shall be required for all subdivisions and land developments that meet one or more of the following criteria:

Residential: Ten (10) or more dwelling units.

Commercial: A commercial building(s) consisting of ten thousand (10,000) square feet or more of gross leasable floor space.

Office: A development consisting of ten thousand (10,000) square feet or more gross leasable floor space.

Industrial: Any development of such nature.

Institutional: Any development of such nature.

NOTE: For other types of development or where special conditions exist, the supervisors may request the preparation of a transportation impact study for any other subdivisions or land development. Special conditions include, but are not limited to, development generating 100 new trips into or out of the site at either AM or PM peak hour, using Institute of Transportation Engineers standards.

D. The transportation impact study shall contain but not be limited to the following information:

1. GENERAL SITE DESCRIPTION

The site description shall include the size, location, proposed land uses, construction staging and completion date of the proposed subdivision or land development. If the development is residential, types of dwelling units and number of bedrooms shall also be included. The general site description shall also include

probable socioeconomic characteristics of potential site users to the extent that it may affect the transportation needs of the site (i.e., number of senior citizens).

The description shall also contain a full documentation of the proposed internal transportation system. This description shall include proposed internal vehicular, bicycle and pedestrian circulation, all proposed ingress and egress locations, all internal roadway widths and rights-of-way, parking conditions, traffic channelization, and any traffic signals or other intersection control devices within the site. The site design shall be shown to maximize potential public transportation usage to and from the development, such as providing adequate turning radii at all access points to allow a bus to enter the development. Bus shelter and sign locations shall be designated where appropriate.

## 2. AREA CONDITIONS

The size of the study area shall extend one-half (1/2) mile from all property boundary lines of the proposed subdivision or land development. Care should be taken to include in the study all known congested locations that may be impacted by the proposed development. A brief description of other existing and proposed subdivisions and land developments within the study area shall be provided.

The report shall describe the entire external roadway system within the study area. Major intersections in the study area shall be identified and sketched. All existing and proposed public transportation services and facilities within a one-mile radius of the site shall also be documented. All proposed future highway improvements, including proposed construction and traffic signalization shall be noted. This information shall be obtained from the Twelve-Year Highway Capital Program for the Delaware Valley Region, the East Norriton Township Comprehensive Plan, from the Montgomery County Planning Commission, and from the Pennsylvania Department of Transportation. Any proposed roadway improvements resulting from proposed surrounding developments shall also be recorded.

## 3. EXISTING TRAFFIC CONDITIONS

Existing traffic conditions shall be measured and documented for all major streets and intersections identified in the study area. Intersection traffic counts shall include traffic volumes during the peak highway and peak development hours and for average daily conditions.

Intersection capacity analyses shall be conducted at all intersections examined for existing conditions according to the Highway Capacity Manual, published by the Transportation Research Board. Levels of service shall be determined at all intersections.

This analysis will determine the adequacy of the existing roadway system to serve the current traffic demand. Roadways and intersection approaches experiencing levels of service E or F shall be noted as congestion locations and improvements shall be recommended to accommodate existing traffic conditions.

#### 4. BASE CONDITIONS

The selection of a horizon year for which study results are to be characterized may be directly related to (a) local plan horizons, (b) development phasing (for this and other projects), or (c) major transportation system changes. Table 1 sets forth the appropriate study horizon, based on the number of trips generated by the development during the peak hour.

Base conditions, that is, horizon year conditions without the subject site being developed, shall be determined for all peak hours examined. Base condition traffic will consist of the existing traffic expanded to the horizon year using an annual background growth factor, and traffic generated by other proposed developments in the study area. All sources used in developing the background growth factor should be stated. The traffic generated by other developments in the area should be determined from the manual, Trip Generation, fourth edition, 1987, or as may be amended, an Institute of Transportation Engineers Informational Report.

Capacity analyses for the base condition peak hour volumes should be conducted according to the Highway Capacity Manual. Levels of service shall be determined at all intersections. This analysis will determine the adequacy of the horizon year roadway system to serve the base condition traffic demand. Roadways and intersection approaches experiencing levels of service E or F shall be noted as congestion locations and improvements will be recommended to accommodate the horizon year traffic conditions.

#### 5. TRANSPORTATION IMPACT OF THE DEVELOPMENT

The traffic generated by the proposed development shall be determined according to the manual, Trip Generation, fourth edition, 1987, or as may be amended, an Institute of Transportation Engineers Informational Report. Where the appropriate data is not available for the proposed subdivision and land development use, the developer shall provide the rates applied and document the source of the rate applied. If the developer requests to use significantly different rates than those given, he/she shall submit the rates and specific justification to the Township Engineer prior to submission of the transportation impact study for approval or denial. Trip generation shall be conducted for average daily traffic, highway peak hours and the land development or subdivision peak hours. These generated volumes shall be distributed to the

study area and assigned to the existing streets and intersections throughout the study area. Documentation of all assumptions used in the distribution and assignment phase shall be provided. Traffic characteristics of the site that will cause unusual trip generation rates and/or traffic flows shall be noted.

The total future traffic demand in the study area based on full occupancy of the proposed development, shall be calculated. This demand shall consist of the combination of the base condition volumes and the development-generated traffic.

Pedestrian volumes shall also be calculated, if applicable. If school crossings are to be used, pedestrian volumes shall be assigned to each crossing.

An intersection capacity analysis shall be conducted for projected conditions. If staging of the proposed development is anticipated, calculations for each stage of completion shall be made. This analysis shall be performed using the peak highway hour(s) and peak development-generated hours(s) for all intersections examined in the study area. Levels of service shall be determined at all intersections. This analysis will determine the adequacy of the horizon year roadway system to serve the projected traffic demand. Roadways and intersection approaches experiencing levels of service E or F shall be noted as congestion locations and improvements shall be recommended to accommodate the projected traffic conditions.

All pedestrian crossings, and access points and unsignalized intersection approaches operating at a level of service E or F, shall be examined as to the feasibility of installing traffic signals. This evaluation shall examine the feasibility of installing a traffic signal according to both PADOT<sup>1</sup> and U.S. DOT<sup>2</sup> standards.

## 6. CONCLUSIONS AND RECOMMENDED IMPROVEMENTS

All roadways or intersection approaches operating at a level of service of E or F shall be considered deficient, and specific recommendations for the elimination of these problems shall be listed. This listing of recommended improvements shall include, but not be limited to the following elements: internal circulation design, site access location and design, external street and intersection design and improvements, traffic signal

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<sup>1</sup>Pennsylvania Department of Transportation Publication 201, Engineering and Traffic Studies, Subchapter D, "Traffic Control Restrictions".

<sup>2</sup>Manual on Uniform Traffic Control Devices, U.S. Department of Transportation, Federal Highway Administration.

installation and operation, including signal timing, and transit design improvements.

Existing and/or future public transportation shall also be addressed. A listing of all actions to be undertaken to increase present public transportation usage and improve service, if applicable, shall be included.

The listing of recommended improvements for both streets and transit shall include, for such improvement, the party responsible for the improvement, the cost and funding of the improvement, and the proposed completion date for the improvement.

The planning agencies having jurisdiction, including but not limited to, the Township Planning Commission, and/or the Montgomery County Planning Commission, shall review the transportation impact study to determine its adequacy in solving any traffic problems which may occur due to the land development or subdivision and make recommendations to the supervisors.

The Township may decide that certain improvements contained in the study on or adjacent to the site are required for application plan approval and may attach these conditions to the preliminary approval.

The improvement plans shall not be submitted to PADOT and/or the Montgomery County Permits Office until such plans are approved by the Township. This submittal shall be accompanied by comments of the Township and the Montgomery County Planning Commission.

Section 175-26 is amended by deleting that Section in its entirety and substituting the following therefore:

Section 175-26. Stormwater Management.

A. General: The developer shall construct and/or install such drainage structures as necessary to:

1. Prevent erosion damage and to satisfactorily carry off or detain and control the rate of release of surface waters.
2. Encourage all runoff control measures to percolate the stormwater into the ground to aid in the recharge of ground water.
3. Carry surface water to the nearest adequate street, storm drain, detention basin, natural watercourse or drainage facility.

4. Take surface water from the bottom of grades, to lead water away from springs, and to avoid excessive use of cross gutters at street intersections and elsewhere.

5. Control the anticipated peak discharge from the property being subdivided or developed, and the existing runoff contributed from all land at higher elevation in the same watershed.

6. Maintain the adequacy of the natural stream channels. Accelerated bank erosion shall be prevented by controlling the rate and velocity of runoff discharge to these water courses, so as to avoid increasing occurrence of stream bank overflow.

7. Preserve the adequacy of existing culverts and bridges by suppressing the new flood peaks created by new land development.

8. If, in the course of preparing or reviewing the Stormwater Management Plan the Township determines that offsite improvements are necessary to satisfactorily control the stormwater from the proposed development, the developer shall be responsible for the offsite improvements.

9. All stormwater detention/retention facilities and erosion and sedimentation control measures shall be in place and functioning prior to the creation of any impervious surface.

10. Any term not specifically in this Section 175-26 or elsewhere in the Subdivision and Land Development Ordinance of East Norriton Township shall have the meaning set forth in the latest edition of Urban Hydrology for Small Watersheds, Technical Release 55, and National Engineering Handbook Section 4, Hydrology.

B. Retention of Existing Watercourses and Natural Drainage Features:

1. Whenever a watercourse, stream, or intermittent stream is located within a development site, it shall remain open in its natural state and location and shall not be piped. However, if the stream banks are of excessive slope (steeper than 3:1), it shall be the responsibility of the developer to improve the stream banks along the watercourse.

2. The existing points of natural drainage discharge onto adjacent property shall not be altered without the written approval of the affected landowners in form satisfactory to the Township Solicitor.

3. No stormwater runoff or natural drainage shall be so diverted as to overload existing drainage systems, or create flooding or the need for additional drainage structures on other private properties or public lands.

C. Requirements for Drainage Structures and/or Pipes

1. Drainage Easements: Drainage easements to accommodate all storm drainage requirements shall be a minimum of twenty (20) feet in width and shall be offered for dedication to the Township. Easements shall be provided for all improved watercourses and storm drainage piping that are not located within street rights-of-way.

2. Storm Drainage Pipe: The minimum diameter of all storm drainage pipe shall be eighteen(18) inches or an equivalent with equal area. No storm drainage piping shall be permitted under buildings. The minimum grade of piping shall be reinforced concrete and conform to Pennsylvania Department of Transportation Specifications. All joints shall be mortared.

3. Stormwater Detention/Retention: The following criteria shall be used for design of retention/detention areas. Any reference to detention basin shall also include retention basin.

a. Design of stormwater detention areas shall be based upon criteria set forth in the latest edition of Urban Hydrology for Small Watersheds, Technical Release 55, and National Engineering Handbook Section 4, Hydrology as published by the U.S. Department of Agriculture, Soil Conservation Service, as revised.

b. Detention areas shall be designed so that the time and rate of runoff from the site, when developed at its maximum potential use or development, will not exceed the runoff from the site that existed before development, except where deemed necessary by the Township. Further limitation of predevelopment runoff may be required due to offsite conditions. A plan shall be submitted showing the maximum development potential of the site.

c. Discharge piping from detention areas shall be designed to control the time and rate of runoff as referred to in Section 175-26C(3)(b) for a two (2) through one-hundred (100) year frequency, 24-hour storm.

d. If permanent ponds are used, the developer shall demonstrate by a report to be submitted by a Commonwealth of Pennsylvania registered certified professional engineer that such ponds are designed to protect the public health and safety.

e. Prior to the granting of final approval of any subdivision or land development plan, the Township must be satisfied through contractual arrangements that all stormwater facilities will be properly maintained.

f. When detention basins are provided, they shall be designed to utilize the natural contours of the land wherever possible. When such design is impracticable, the construction of the basin shall utilize slopes as flat as possible to blend the structure into the terrain. All basins shall have slopes 4 horizontal to 1 vertical or less.

g. Detention basins shall be designed so that they return to normal conditions within twelve (12) hours after the termination of the storm, unless the Township Engineer finds that downstream conditions may warrant other design criteria for stormwater release.

h. Emergency overflow facilities (emergency spillway) shall be provided for all detention facilities.

i. If the land of the proposed subdivision or land development will be conveyed to two or more separate owners, the developer shall provide written assurance and deed restrictions to the Township that the detention basins will be properly maintained by the owners.

j. The detention basin area will be enclosed by a four foot high chain link fence (green) or an equal approved by the Township Engineer constructed along the berm of the basin. A double gate shall be provided for access of maintenance equipment.

k. In all cases the bottom of the detention basin shall be provided with a pipe underdrain and outletted from the basin.

D. Stormwater Management Plan: A Stormwater Management Plan for the proposed subdivision or land development shall be submitted to the Township and shall contain at least the following:

1. Mapping of the watershed area or areas in which the proposed subdivision or land development is located (U.S.C. & G.S. Quadrangle Map or similar).

2. The results of a study of the watershed in which the subdivision or land development is located to assess the impact the proposal will have on downstream conditions. The Stormwater Management Plan shall identify all impacts and the extent or scope of such impacts.

3. Computations of the stormwater runoff for all points of runoff concentration before, during and after development, including all supporting data.

4. Complete drainage systems for the subdivision or land development. All existing drainage features which are to be incorporated in the design shall be so identified with an explanation of the operations of the facilities.

5. Plans showing all existing and proposed drainage facilities affecting the subject property.

6. Plans of the proposed stormwater drainage systems including storm drain pipes and inlets, runoff control devices, and drainage channels.

7. Plan of the proposed grading.

8. Design computations for the sizing of the outlet device.

9. A stage-storage curve for said detention/retention basin.

10. Flood routing and/or storage requirement calculations.

11. A plan showing the berm embankment and outlet structure. The plan shall indicate top of berm elevation, top width of berm, side slopes, emergency spillway elevation, elevations of the outlet structure including riser, dimensions and spacing of anti-seep collars.

12. A cross section diagram through the outlet structure, emergency spillway, and berm embankment.

13. A detailed plan of the trash rack and anti-vortex device.

14. An overall plan of the basin area, at a scale of one (1) inch equals forty (40) feet or less, showing all grading and landscaping.

15. A detailed plan of all required offsite drainage improvements.

#### E. Design Criteria

1. All plans and designs for stormwater management facilities shall determine stormwater peak discharge and runoff by use of Soil Cover Complex Method as set forth in the latest edition

of Urban Hydrology for Small Watersheds, Technical Release 55, and National-Engineering Handbook Section 4, Hydrology as published by the U.S. Department of Agriculture, Soil Conservation Service, as revised. Stormwater shall not be transferred from one watershed to another, unless (1) the watersheds are sub-watersheds of a common watershed which join together within the perimeter of the property (2) the effect of the transfer does not alter the peak discharge onto adjacent lands, (3) easements from the affected land owners are provided.

2. The following rainfall intensities shall be used for the 24 hour, Type II distribution storm with average antecedent moisture conditions for the frequencies shown:

1. 2 year - 3.30 inches
2. 5 year - 4.20 inches
3. 10 year - 5.00 inches
4. 25 year - 5.80 inches
5. 50 year - 6.40 inches
6. 100 year - 7.20 inches

3. All developments shall limit that rate of stormwater runoff, so that no greater rate of runoff is permitted than that of the site in its natural condition for the same frequency storm. Meadow shall be used as the starting base for all such calculations, regardless of the actual condition.

4. The increased runoff which may result from subdivision or land development shall be controlled by permanent runoff control measures. All runoff control measures will be evaluated for their effectiveness to maintain the above standard for all storms with a return period of up to one hundred (100) years.

5. An overflow system shall be provided to carry runoff to the detention basin, when the capacity of the storm drainage pipe system is exceeded. The overflow system shall have sufficient capacity to carry runoff difference between the one hundred (100) year storm peak flow rate and the capacity of the storm drain pipe. The 100 year storm peak shall be calculated by the Soil Cover Complex Method or by equal method as may be approved by the Township Engineer.

6. Detention basins shall be designed to facilitate regular maintenance, moving and periodic desilting and reseedling. Basins shall not be located within flood plains or flood plain soils. In residential subdivisions and residential developments, shallow broad basins shall be used. The area of basins which may have more than fifty percent (50%) of the perimeter of its sides in slopes of greater than ten percent (10%) or basins that retain stormwater for more than twenty-four (24) hours shall not be included in the open space requirement.

7. The maximum slope of the earthen detention embankments shall be four (4) to one (1). The top or toe of any slope shall be located a minimum of five (5) feet from any property line. Whenever possible the side slopes and basin slope shall conform to the natural topography.

8. The minimum top width of the detention basin berm shall be ten (10) feet. A cutoff trench (key-way) comprised of impervious material shall be provided under all embankments that require fill material. The cutoff trench shall be a minimum of eight (8) feet wide, two (2) feet deep, and have side slopes of 1:1.

9. In order to insure proper drainage on the floor of the basin, a minimum grade of two percent (2%) shall be maintained for grassed areas. For concrete channel flow, a minimum grade of one percent (1%) shall be maintained.

10. All detention/retention basin embankments shall be placed in maximum of eight (8) inch concrete lifts to a minimum of 95% of maximum dry density as established by the American Society of Testing Materials D-1557. Prior to proceeding to the next lift, the compaction shall be checked by the Township Engineer or Soils Engineer. Compaction test will be run on the leading and the trailing edge of the berm as well as the top of the berm.

11. Whenever possible, the emergency spillway for detention basins shall be constructed on undisturbed ground. In situations where the spillway is constructed within a fill area, the emergency spillways shall be constructed of reinforced concrete checker blocks. All emergency spillways shall be constructed so that the detention basin berm is protected against erosion. The minimum capacity of all emergency spillways shall be peak flow rate from the one hundred (100) year design storm after development. The construction material of the emergency spillway shall extend along the upstream and downstream berm embankment slopes. The upstream edge of the emergency spillway shall be a minimum of three (3) feet below the spillway crease elevation. The downstream slope of the spillway shall as a minimum extend to the toe to the berm embankment. The emergency spillway shall not discharge over earth fill and/or easily erodible material.

12. The minimum freeboard shall be one (1) foot. Freeboard is the difference between the design flow elevations in the emergency spillway and the top of the settled detention basin embankment.

13. Anti-seep collars shall be installed around the pipe barrel within the normal saturation zone of the detention basin berms. The anti-seep collars and their connections to the pipe

barrel shall be watertight. The anti-seep collars shall extend a minimum of two (2) feet beyond the outside of the principal pipe barrel. The maximum spacing between collars shall be fourteen (14) times the minimum projection of the collar measured perpendicular to the pipe. A minimum of two (2) anti-seep collars shall be installed on each pipe outlet.

14. All outlet pipes through the basin berm shall be reinforced concrete pipe having O-ring joints. All joints shall be mortared.

15. Energy dissipating devices (including but not limited to riprap and endwalls) shall be placed at all basin outlets.

16. During construction, a perforated riser pipe shall be provided at each outlet of all detention basin for sediment control. The riser shall be constructed of metal or concrete. The riser shall extend to a maximum elevation of two (2) feet below the crest elevation of the emergency spillway. The perforated riser shall be designed so that the rate of outflow is controlled by the pipe barrel through the basin berm when the depth of water within the basin exceeds the height of the riser. Circular perforations with a maximum diameter of one and one-half (1 1/2) inch shall be spaced eight (8) inches vertically and twelve (12) inches horizontally on the upper two-thirds (2/3) of the pipe. The perforations shall be cleanly cut and shall not be susceptible to enlargement. All metal risers shall be coated to prevent rust. A trash rack or similar appurtenances shall be provided to prevent debris from entering the riser. All risers shall have a concrete base attached with a watertight connection. The base shall be of sufficient weight to prevent flotation of the riser. An anti-vortex device, consisting of a thin vertical plat normal to the basin berm, shall be provided on the top of the riser.

17. All drainage channels shall be designed to prevent erosion of the bed and banks. The maximum permissible flow velocity shall not exceed those outlined in the following table. Suitable stabilization shall be provided where required to prevent erosion of the drainage channels.

#### ALLOWABLE WATER VELOCITIES

Material	Allowable Velocities Feet Per Second
1. Well established grass on good soil	
a. Short pliant bladed	5-6
b. Bunch grass-soil exposed	2-4
c. Stiff stemmed grass	2-3

- 2. Earth without vegetation
  - a. Fine sand and silt 1-2
  - b. Ordinary firm loam 2-3
  - c. Stiff Clay 3-5
  - d. Clay and gravel 4-5
  - e. Coarse gravel 4-5
  - f. Soft shale 5-6
  
- 3. Shoulders
  - a. Earth See 2 above
  - b. Stabilized 6
  - c. Paved 10-15

18. All vegetated drainage channels shall have a maximum side slope grade of three (3) horizontal to one (1) vertical.

19. Because of the critical nature of vegetated drainage channels, the design of all vegetated drainage channels shall, as a minimum, conform to the design procedures outlined in the Pennsylvania Department of Environmental Resources Erosion and Sediment Control Handbook (April 1990 or as further revised).

20. Access ramps (for maintenance equipment) shall be 12' in width and have a maximum slope of 12 1/2% for all detention/retention basins. These ramps shall be constructed of concrete checker blocks on a 6" compacted layer of 2A modified aggregate or approved equal.

#### F. Storm and Surface Drainage - General

1. All subdivisions and land development plans shall include methods to withhold and release stormwater at a controlled rate onto adjacent property.

2. Lots shall be laid out and graded to provide positive drainage away from buildings

3. Storm sewers, culverts, and related installations shall be provided:

- a. To permit unimpeded flow of natural watercourses and in such a manner as to protect the natural character of the water courses and to provide regulated discharge;

- b. To insure adequate drainage of all low points along the line of streets; and,

- c. To intercept stormwater runoff streets at intervals reasonably related to the extent and grade of the area drained and to prevent substantial flow of water across intersections.

4. Storm sewers, are required, shall be placed in the right-of-way, parallel to the roadway. When located in undedicated land, they shall be placed within an easement not less than twenty (20) feet wide.

5. Manholes shall be spaced not more than three hundred (300) feet apart on pipe sizes up to and including twenty-four (24) inches in diameter, and not more than four hundred fifty (450) feet apart for pipe sizes greater than twenty-four (24) inches in diameter. Inlets may be substituted for manholes, on approval by the Township Engineer at the same spacing as required for manholes. In no case shall inlets be spaced more than four hundred fifty (450) feet apart. Manholes or inlets shall be provided at all changes of direction of storm sewer piping.

6. Inlets and manhole cover frames shall conform to Pennsylvania Department of Transportation Specifications. At street intersections, inlets shall be placed in the tangent and not in the curved portion of the curbing. Manhole covers shall have the word "STORM" cast in two (2) inch high letters on the top of the cover.

7. Stormwater roof drains and sump pumps shall not discharge water directly onto a sidewalk or a street, and shall be constructed to discharge wholly to a storm sewer system.

8. Drainage structures which drain watershed areas in excess of one-half (1/2) square mile (320 acres), or which have a span of eight (8) feet or more, shall be designed for a maximum expected runoff as calculated using the Soil Conservation Service Technical Release 55 "Urban Hydrology for Small Watersheds (less than 2,000 acres)". The design storm shall be a minimum 100 year storm. A Water Obstruction and Encroachment Permit shall be obtained from the Pennsylvania Department of Environmental Resources or a waiver from Pennsylvania Department of Environmental Resources for all waterway openings prior to final plan approval. The cartway width over a structure shall be as wide as the widest road connecting with the structure, or if the character of the road is expected to change for the future planning, the cartway over the structure shall be made to anticipate this condition.

#### G. Storm Sewer Design

##### 1. Storm Frequency

a. Design Flow Rate - The storm drain system shall be designed to carry fifty (50) year peak flow rate. The design fifty (50) year peak flow rate into each inlet shall be indicated on the stormwater drainage plan. The 50 year flow rate shall be determined by the rational formula  $Q=CIA$ .

WHERE:

Q = Peak runoff rate measured in cubic feet per section (CFS)

C = Runoff Coefficient - The Coefficient of storm-water runoff includes many variables such as: ground slope, ground cover, shape of drainage area, etc.

I = Intensity - Average Rainfall Intensity in inches per hour for a time equal to the time of concentration

A = Area - Drainage area in acres

b. Overflow System - An overflow system shall be provided to carry flow to the detention basin when the capacity of the storm drain pipe system is exceeded. The overflow system shall be sufficient capacity to carry the difference between the one hundred (100) year and fifty (50) year peak flow rates.

H. Storm Duration

1. A five (5) minute storm duration shall be used if the duration does not result in a maximum expected discharge that exceeds the capacity of a thirty (30) inch pipe.

2. If a five (5) minute storm duration results in a pipe size exceeding thirty (30) inches, the time of concentration approach shall be used in determining storm duration.

3. If a five (5) minute storm duration results in a pipe size exceeding thirty (30) inches, within any run of pipe, the time of concentration approach may be used for sizing of pipes from that point on by adjusting the time of concentration.

I. Additional Design Criteria

Additional design criteria for specific drainage facilities are required as follows:

1. Shoulders in Cut Areas (without swales)

Water flowing in the shoulder shall not encroach more than two-thirds (2/3) the shoulder width during a ten (10) year frequency storm of five (5) minute duration.

The maximum velocity as determined by Manning' equation shall not exceed the allowable velocities as shown in Section 175-26E(17) for the specific type of shoulder material.

Inlets shall be provided to control the shoulder encroachment and water velocity.

#### J. Swales Adjacent to Shoulders

When swales are provided in cut areas, the water shall not encroach upon the roadway area during a ten (10) year frequency storm of five (5) minute duration.

The maximum velocity as determined by Manning's equation shall not exceed the allowable velocities as shown in Table 1 for the specific type of swale material.

#### K. Curbed Sections

The maximum encroachment of water on the roadway pavement shall not exceed three (3) inches in depth at the curb line or one-half (1/2) of a vehicular travel lane during a ten (10) year frequency storm of five (5) minute duration.

Inlets shall be provided to control the encroachment of water on the pavement.

#### L. Inlets

1. When there is a change in pipe size in the inlet, the elevation of the top of pipes shall be the same or the smaller pipe higher. A minimum drop of two (2) inches shall be provided at the inlet pipe invert elevation and the outlet pipe invert elevation.

2. If the capacity of the shoulder, swale, curb section, or depressed median section is less than the inlet capacity, the shoulder, swale, curb section or depressed medial section capacity shall govern inlet spacing.

3. Inlet capacities shall be based on a maximum flow of 5.0 cfs.

#### M. Storm Pipes

1. To facilitate the solution of Manning's Equation as applied to storm pipes, charts are presented in "Design Charts for Open Channel Flow" prepared by the U.S. Department of Commerce, as last revised, which permit a direct determination of the capacity of circular pipes.

2. Where headroom is restricted, equivalent pipe arches may be used in lieu of circular pipe.

3. The minimum diameter of storm pipe shall be eighteen (18) inches.

4. Inlets or manholes shall be placed at changes in vertical or horizontal direction of pipe.

5. Pipe shall be designed with a slope such that the minimum velocity of 2.5 fps will be attained however, the slope shall not be less than 0.5%.

6. All inlets, manholes, and piping shall be designed to provide a minimum of 1.0 feet of freeboard at all inlets and manholes. The stormwater piping system shall be designed to meet inlet and outlet control.

7. All pipes shall be designed to have a minimum of eighteen (18) inches of cover over the bell of the pipe.

8. Sub-base and U-drains in combination with 6" pipe U-drains and/or combination storm sewers and U-drains shall be installed on roadways where the finished roadway grade is within 1' of the seasonal high water table as designated for the soils by the Montgomery County Soil Survey.

9. All plans showing the proposed storm sewer construction must be accompanied by complete design submitted by the Registered Engineer.

10. When subdivisions or land development are submitted to the Township for approval in sections a complete storm sewer design for the proposed subdivision and land development shall be submitted. The proposed design must include the entire tract and not a portion.

11. If only a section of a subdivision or land development is contemplated for construction the engineer shall show how he proposes to handle storm water from this section in order to prevent damage to adjacent properties. If temporary construction is required the engineer shall include such structures in the plans submitted.

12. In the event that such temporary measures cannot ensure protection to adjacent properties then the main outfall line of the storm sewer shall be included as part of the construction for the proposed section.

## SECTION 2. Severability.

If any Section, subsection, sentence, clause, phrase or portion of this Ordinance is for any reason held invalid or unconstitutional by any Court of competent jurisdiction, such

provisions shall be separate, distinct and independent, and such holding shall not affect the validity of the remaining portions of this Ordinance.

SECTION 3. Ratification.

This Ordinance shall in no other way affect, amend or modify the said Subdivision and Land Development Ordinance contained in Chapter 175 of the Code of East Norriton Township.

ENACTED AND ORDAINED by the Board of Supervisors of East Norriton Township, Montgomery County, Pennsylvania, this *13TH* day of *MAY*, 19*91*.

BOARD OF SUPERVISORS  
EAST NORRITON TOWNSHIP

By: *John W. Kubik*

ATTEST:

*Helmut S. Baeuwald*  
Secretary