

ARTICLE 7

DESIGN STANDARDS

700 APPLICATION

- 701 The design standards and requirements outlined in this section will be utilized in determining the adequacy of all plans for proposed subdivisions and land developments.
- 702 Development shall be planned, reviewed and carried out in conformance with all Township, County, State, Federal and other applicable laws and regulations.
- 703 Whenever other ordinances and regulations impose more restrictive standards and requirements than those contained herein, the more restrictive standards and regulations shall apply. Whenever the standards and requirements contained herein are more restrictive than those imposed in other ordinances and regulations, the more restrictive standards and regulations herein shall apply.

710 GENERAL STANDARDS

- 711 Land shall be suited for the purpose for which it is to be subdivided. Land with unsafe, environmentally sensitive, or hazardous conditions such as may have been identified in the Lower Nazareth Township Comprehensive Plan, though not limited to those features or mapping therein shall not be subdivided unless adequate mitigation measures eliminate or protect against these conditions.
- 712 Consideration shall be given to applicable provisions of the Township and County Comprehensive Plans, emphasizing future school sites, recreation sites, water supply and sewage treatment systems, highway alignments, and other public facilities. However, consideration must be given to the need for the facilities and utilities mentioned above whether or not they are proposed as part of a comprehensive plan.

720 BLOCK DESIGN STANDARDS

721 Block Layout

- 721.1 The length, width and shape of blocks shall be determined with due regard to:
- 721.11 Provision of adequate sites for buildings of the type proposed.
 - 721.12 Township zoning requirements.
 - 721.13 Topography.
 - 721.14 Requirements for safe and convenient vehicular and pedestrian circulation, including the reduction of intersections with arterial streets.

722 Block Length

722.1 Residential blocks shall be no less than five hundred (500) feet in length or no more than sixteen hundred (1,600) feet in length.

722.2 Where practical, blocks along arterial and collector streets shall not be less than one thousand (1,000) feet long.

723 Block Depth

723.1 Residential blocks shall be of sufficient depth to accommodate two tiers of lots, except;

723.11 Where reverse frontage lots are required; or

723.12 Where prevented by the size, topographical conditions or other inherent conditions of the property.

724 Commercial, Industrial and Planned Industrial Commercial Development Blocks

724.1 Blocks in commercial, industrial and planned industrial commercial developments may vary from the elements of design detailed above if required by the nature of the use. In all cases, however, adequate provision shall be made for traffic circulation, off-street parking and loading area.

730 LOT DESIGN STANDARDS

731 General Standards

731.1 Within the requirements of the Zoning ordinance, the size, shape and orientation of lots shall be appropriate for the type of development and use contemplated.

731.2 Side lot lines shall be at right angles to street lines or radial to curved street lines.

731.3 Lot lines shall follow municipal boundaries rather than cross them, in order to avoid jurisdictional problems.

731.4 The depth of residential lots shall be not less than one (1) nor more than three (3) times their width, except as otherwise required by the current Zoning ordinance.

731.5 Depth and width of parcels intended for non-residential uses shall be adequate for the use proposed and sufficient to provide satisfactory space for on-site parking, loading and unloading, setbacks, landscaping, etc.

731.6 If, after subdividing, there exists remnants of land, they shall be either:

731.61 Incorporated in existing or proposed lots, or

731.62 Legally dedicated to public use, if acceptable to the Township.

732 Lot Frontage

732.1 All lots shall have direct access to a public street or to a private street which is built to the street standards of this Ordinance.

732.2 Double or reverse frontage lots may be required to provide separation of residential development from collector or arterial streets or to overcome specific disadvantages of topography or other natural features of the proposed subdivision tract.

732.3 All residential reverse frontage lots (and all corner lots with a lot line along a street where reverse frontage is required) shall have a rear yard with a minimum depth of seventy-five (75) feet, measured along the shortest distance from the proposed dwelling unit to the ultimate right-of-way and shall, with such rear yard and immediately adjacent to the right-of-way, have a planting screen easement of at least ten (10) feet in width, across which there shall be no right of access. A landscape plan, showing a double row of mixed evergreen plantings within this easement, shall be prepared and submitted for all reverse frontage lots. The landscape plantings shall be in accordance with the buffer requirements of the Township Zoning Ordinance.

733 Lot Access (Other than PennDOT Roadways)

733.1 Where direct access to an arterial or collector street cannot be avoided, adequate turnaround space shall be provided behind the right-of-way line.

733.2 Driveways or access roads shall intersect streets at right angles, where practicable, and in no case less than seventy-five (75) degrees.

733.3 Widths of private access roads or driveways as measured within the public right-of-way shall be in accordance with the following standards:

733.31 All private access roads or driveways intended for one-way use shall have a minimum width of twelve (12) feet and a maximum width of fifteen (15) feet.

733.32 Single family residential driveways intended for two-way use shall have a maximum width of twenty (20) feet.

733.33 Two-way access roads and driveways for multi-family residential and all non-residential uses shall have a minimum width of twenty-four (24) feet and a maximum width of thirty (30) feet.

- 733.4 To provide safe and convenient ingress and egress, access road and driveway entrances shall be constructed as follows:
 - 733.41 Access road entrances for multi-family residential developments, mobile home parks, and all non-residential subdivisions shall be rounded at a minimum radius of ten (10) feet.
 - 733.42 Single family residential driveway entrances shall be rounded at a minimum radius of five (5) feet.
- 733.5 Access road grades and driveway grades shall not exceed twelve (12) percent between the future street right-of-way line and any other point within the confines of the lot area being served.
- 733.6 The centerline of an access road or driveway, at the point of access to a street, shall not be located closer to the centerline of a street intersection than the following distances, unless the lot is entirely within the prescribed distances (in which case the driveway shall be separated from the intersection by the greatest distance possible).
 - 733.61 For single family dwellings:
 - 733.611 One hundred fifty (150) feet if either intersection street is an arterial street.
 - 733.612 One hundred (100) feet if either street is a collector street.
 - 733.613 Seventy-five (75) feet if both streets are local streets.
 - 733.62 For all other development:
 - 733.621 Three hundred (300) feet if either street is an arterial street.
 - 733.622 Two hundred (200) feet if either street is a collector street.
 - 733.623 One hundred fifty (150) feet if both streets are local streets.
- 733.7 On corner lots that have frontage on streets of different classifications, the access to such lots shall be from the street of lower classification.

734 Access on PennDOT Roadways

- 734.1 All lot driveways accessing onto State roadways shall be designed in accordance with Pennsylvania Department of Transportation standards.
- 734.2 PennDOT Highway Occupancy Permits will be required for all lot driveways accessing onto State roadways.

740 **STREET DESIGN STANDARDS**

741 General Requirements

- 741.1 Proposed streets shall be properly related to the road and highway plans of PennDOT and the Township Comprehensive Plan. Streets shall be designed to provide adequate vehicular access to all lots or parcels and with regard for topographic conditions, projected volumes of traffic, and further subdivision possibilities in the area.
- 741.2 The street system of a proposed subdivision or land development shall be designed to create a hierarchy of street functions which includes collector and local streets.
- 741.3 The street system of a proposed subdivision or land development shall be designed so as to minimize street intersections and pedestrian-vehicular conflict points.
- 741.4 Proposed local streets shall be designed so as to discourage through traffic and excessive speeds. However, the developer shall give adequate consideration to provision for the extension and continuation of arterial and collector streets into and from adjoining properties.
- 741.5 Where it is desirable to provide for street access to adjoining property, streets shall be extended by dedication to the boundary of such property. The streets shall meet the requirements of Section 747.2.
- 741.6 Where a subdivision or land development abuts an existing road with a right-of-way and/or cartway width not meeting the requirements of Section 742.1, sufficient right-of-way should be dedicated so that the distance between the edge of the right-of-way and the road centerline equals one-half of the required width, and/or the cartway will be widened as per the specifications of this Ordinance so that the distance between the edge of the cartway and road centerline equals one-half of the required width. Where a subdivision or land development abuts an existing road not meeting the requirements of Section 743 or 746, sufficient right-of-way to correct the alignment deficiency should be dedicated. A deed covering the land to be dedicated shall be provided along with an opinion of title from a title insurance company or an attorney, which indicates that clear title exists for the land being dedicated.
- 741.7 Where a subdivision or land development abuts or contains an arterial road, the use of marginal access streets, reverse frontage lots, or other such treatment as will provide protection for abutting properties, reduction in number of intersections with the arterial street, and separation of local and through traffic shall be required.
- 741.8 Private streets (streets not to be offered for dedication) shall meet the street design and improvement standards set forth in this Ordinance. In addition, when a private street is proposed, the developer shall indicate on the plan of record the proposed deed covenants obliging the owners of all lots to be served by the street to provide, at their expense, perpetual street maintenance including timely snow removal.

741.9 If the lots in the development are large enough for resubdivision, or if a portion of the tract is not subdivided, suitable access and street openings for such an eventuality shall be provided. The openings shall be at intervals consistent with the Block Length Standards of Section 722.

741.10 Where a Subdivision or Land Development abuts an existing collector, arterial or expressway classified street, the applicant will be required to install curbing along the street side abutting the Subdivision or Land Development, unless otherwise waived by the Township Board of Supervisors.

742 Street Right-of-Way and Cartway Width

742.1 Street right-of-way as per the Township Zoning Ordinance and cartway width in proposed subdivisions shall conform to the standards in the following table:

Type of Road	Local		Collector	Arterials and Expressways
Land Use	Single Family Detached Dwellings	All Other Uses	All Uses	All Uses
Cartway Width	32 Feet	32 Feet	36 Feet	American Association of State Highway Transportation officials (AASHTO) and PennDOT design standards may be required.

743 Horizontal Curves

743.1 Street centerlines shall not be deflected without the use of horizontal curves.

743.2 Horizontal curves shall have the following minimum centerline radii:

743.21 Local streets - two hundred (200) feet.

743.22 Collector streets - three hundred (300) feet.

743.23 Arterial streets and expressways - as per current American Association of State Highway and Transportation officials (AASHTO) standards.

743.3 A minimum tangent of one hundred (100) feet shall be required between reverse curves on all streets. A minimum tangent of seventy-five (75) feet shall separate horizontal curves from intersections, as measured from the point of intersecting centerlines.

744 Street Grades

- 744.1 There shall be a minimum centerline grade on all streets of one (1.00) percent.
- 744.2 Centerline grades shall not exceed the following:
 - 744.21 Local streets - twelve (12) percent.
 - 744.22 Collector streets seven (7) percent.
 - 744.23 Arterial streets as per current AASHTO standards.
- 744.3 Intersections shall be approached on all sides by leveling areas. Such leveling areas shall have a minimum length of seventy-five (75) feet (measured from the intersection of the center lines), within which no grade shall exceed a maximum of four (4) percent.
- 744.4 Cross-slopes for roadways and parking lanes shall be two (2) percent and cross-slopes for paved shoulders shall be six (6) percent.

745 Vertical Curves

- 745.1 Vertical curves shall be used in changes of grade exceeding one (1) percent.
- 745.2 Vertical curves shall be designed to produce the following minimum sight distances:
 - 745.21 Local streets - two hundred (200) feet.
 - 745.22 Collector streets - four hundred (400) feet.
 - 745.23 Arterial streets and expressways - as per current AASHTO standards.

746 Street Intersections

- 746.1 Streets shall intersect at right angles whenever practicable. However, in no instances shall the angle of intersection at the street centerlines be less than seventy-five (75) degrees.
- 746.2 Intersections involving the junction of more than two streets shall be prohibited.
- 746.3 Two streets intersecting a third street from opposite sides shall either intersect with a common centerline or their centerlines shall be offset according to the following standards.
 - 746.31 The two streets shall be separated by a distance of one hundred fifty (150) feet between centerlines measured along the centerline of the street being intersected when all three streets involved are local streets.

- 746.32 The two streets shall be separated by a distance of four hundred (400) feet between centerlines measured along the centerline of the street being intersected when one or more of the streets involved is a collector street.
- 746.33 The two streets shall be separated by a distance of one thousand (1000) feet between centerlines measured along the centerline of the street being intersected when one or more of the streets is an arterial street.
- 746.4 Street intersection pavement shall be rounded by a tangential arc with a minimum radius of:
 - 746.41 Thirty-four (34) feet for intersections involving only local streets.
 - 746.42 Thirty-seven (37) feet for all intersections involving a collector street.
 - 746.43 Forty (40) feet for all intersections involving an arterial street.
- 746.5 Street right-of-way lines, whenever possible, shall be parallel to (concentric with) pavement radii at intersections.
 - 746.51 Street right-of-way lines at intersections shall be rounded by a tangential arc with a minimum radius of twenty-five (25) feet.
- 746.6 Sight distances at intersections (clear sight triangles) shall be established in accordance with the regulations within the Township zoning ordinance.
- 746.7 Wherever a portion of the line of the clear sight triangles occurs within the proposed building setback line, such portion shall be shown on the Final Plan of the subdivision, and shall be considered a building setback line. Signs and landscaping which would obscure vision shall not be placed within the clear sight triangle area.
- 746.8 The record plan shall contain a note stating that nothing shall be erected, placed or planted within a clear sight triangle that will impede vision between a height of two (2) feet to ten (10) feet above the centerline grades of the intersecting streets.

747 Cul-De-Sacs, Dead End Streets and Stub Streets

- 747.1 Dead-end streets are prohibited except those meeting the standards of Section 747.2.
- 747.2 Stub streets may be constructed for future access to an adjoining property or a subsequent section of the development. Stub streets shall be built to the standards of Section 742.1. The length of stub streets shall not exceed the depth of one lot. No more than one lot shall front on each side of the stub street. These lots shall also have full frontage along another public street.

- 747.3 Cul-de-sacs (temporary and permanent), loop roads, and other street networks which have a single point of access to the surrounding road network shall not serve more than twenty-five (25) dwelling units and shall not exceed a total length of more than one thousand (1,000) feet as measured from the centerline of the intersection at the single point of access to the farthest point served.
- 747.4 All cul-de-sac streets, whether permanently or temporarily designed as such, shall be provided at the closed end with a fully paved turnaround. The turnaround may be concentric or offset to the left, but turnarounds offset to the right shall be prohibited.
- 747.41 The minimum radius to the pavement edge or curb line shall be fifty (50) feet, and the minimum radius of the right-of-way line shall be sixty (60) feet.
- 747.42 The radius of the right-of-way line return between the bulb and stem of cul-de-sacs shall be a minimum of one hundred fifty (150) feet. The curb line or pavement edge radius shall be a minimum of one hundred sixty (160) feet.
- 747.5 Islands, whether containing plantings or not, shall be prohibited within the bulb of the cul-de-sac.
- 747.6 The grade of the cul-de-sac bulb shall not exceed five (5) percent as measured from the center of the cul-de-sac bulb to any perimeter point of the bulb. The minimum cross-slope shall be two (2) percent.
- 747.7 There shall be a minimum centerline grade on all cul-de-sac streets of one (1) percent.
- 747.8 All cul-de-sac streets intended for dedication to the Township shall be provided with an easement at the end of the bulb and designated for snow plowing use. The easement beginning at the edge of cartway, shall have a minimum width of thirty (30) feet, (measured fifteen (15) feet on either side of the street centerline extended). The easement shall extend radially from the edge of pavement to a depth of thirty (30) feet. The record plan shall contain a note stating that no driveways, landscaping, mailboxes or other structures shall be placed within the limits of this easement.
- 747.9 Temporary cul-de-sacs may be permitted to allow connection to an adjoining property or a subsequent section. Temporary cul-de-sacs shall meet the following standards.
- 747.91 The lots along the bulb of the cul-de-sac shall meet the lot width and lot size requirements of the zoning ordinance, after the bulb has been removed and the road has been extended.
- 747.92 The temporary cul-de-sac shall extend to the edge of the adjoining property to which future access is to be provided.

748 Street Names

- 748.1 Proposed streets, which are in alignment with others already existing and named, shall bear the names of existing streets.
- 748.2 In no case shall the name of a proposed street duplicate an existing street name in the municipality and in the postal district, irrespective of the use of a suffix such as street, road, avenue, boulevard, driveway, place, court, lane, etc.
- 748.3 All street names shall be subject to the approval of the Township Supervisors and local Post Office. The developer shall be responsible for the submission of proposed street names to the local Post Office for their approval. A copy of the local Post Office's approval of the proposed names shall be provided to the Township prior to recording of the plan.

749 Sidewalks and Curbs

- 749.1 In subdivisions or land developments where curbing and sidewalks are required, they shall be provided on both sides of all streets. Sidewalks and curb shall be required adjacent to parking areas in multi-family developments.
- 749.2 Sidewalks shall be located within the street right-of-way, no closer than one (1) foot from the right-of-way line, and shall be a minimum of four and one half (4 ½) feet wide, except along collector and arterial streets, and adjacent to shopping centers, schools, recreation areas, and other community facilities, where they shall be a minimum of five (5) feet wide.
- 749.3 Generally, a grass planting strip a minimum of four (4) feet in width should be provided between the curb and sidewalk.

750 SANITARY SEWER DISPOSAL STANDARDS

Each proposed building lot or proposed land development shall be provided with sanitary sewage disposal in accordance with the following requirements.

751 Public Sanitary Sewage Systems

751.1 Existing Public Sanitary Sewage Systems

- 751.11 Each subdivision, not a minor subdivision, any portion of which is within one thousand (1,000) feet of an existing public sanitary sewage system, shall be connected by the developer to such system, unless such connection is not technically feasible, or the subdivision is located in an area not designated for public sanitary sewer service in the Township's Sewage Facility Plan.
- 751.12 Any such connection shall be in accordance with the provisions of the controlling Sewer Authority, and the sanitary sewer disposal regulations of the Pennsylvania Department of Environmental Protection.

751.13 In the event a public sewer connection is not required under Section 751.11, each proposed building lot shall instead be provided with an on-lot sewage disposal system in accordance with Section 752 of this Ordinance.

751.2 Proposed Public Sanitary Sewage Systems

751.21 Each proposed subdivision, not a minor subdivision, or proposed land development any portion of which is within one thousand (1,000) feet of:

751.211 Any proposed public sanitary sewage system for which the Controlling Sewer Authority has indicated in writing to the developer its intention to extend any portion thereof to within one thousand (1,000) feet of any lot or portion thereof within five (5) years.

751.212 Any portion of any proposed public sanitary sewage system in the Lower Nazareth Township Sewage Facility Plan, or

751.213 Any portion of any other public sanitary sewage system proposed by the Lower Nazareth Township Board of Supervisors to be constructed within five (5) years;

751.22 Shall, unless ultimate connection to the proposed public sanitary sewage system would be technically unfeasible, be connected to a "dry" sanitary sewage system, including lateral connectors as will be necessary to provide service to each lot, suitably capped until connection to the public sanitary sewage system can be made.

751.23 Any such connection shall be in accordance with the standards of:

- a. The Subdivision Improvements Agreement (see Article 9 of this Ordinance).
- b. Section 425.8 of this Ordinance.
- c. The sanitary sewage disposal regulations of the Pennsylvania Department of Environmental Protection.

751.24 In the event a "dry" sewer connection is required under Section 751.22, each proposed building lot shall, until ultimate public sewer connection, be provided with an on-lot sewage disposal system in accordance with Section 752 of this Ordinance.

752 On-Lot Sewage Disposal Systems

- 752.1 An on-lot sewage disposal system shall be provided for each lot that:
- 752.11 Is not required to be connected to an existing public sanitary sewage system under Section 751.11 or to a proposed sanitary sewage system under Section 751.22.
 - 752.12 Will be connected to a "dry capped" sanitary sewage system under Section 751.22, but only until connection to the public sanitary sewage system can be made.
- 752.2 Any such on-site sewage disposal system shall be in accordance with the standards of:
- 752.21 The Subdivision Improvements Agreement (see Article 9 of this Ordinance).
 - 752.22 Section 425.9 of this Ordinance.
 - 752.23 The sanitary sewage disposal regulations of the Pennsylvania Department of Environmental Protection.
- 752.3 Certification of a percolation test for each proposed building lot, satisfying the requirements of the Pennsylvania Department of Environmental Protection for the on-lot sewage disposal system, shall be submitted as part of the Preliminary Plan. (See also Section 425.9).
- 752.4 Each Preliminary and Final Plan shall include an annotation expressly imposing a covenant running with the land, respecting each proposed building lot for which an on-lot sewage disposal system is proposed, stating that:
- 752.41 Lower Nazareth Township makes no warranty or representation that on-lot sewage disposal will be available for such lots.
 - 752.42 No construction upon the property or occupancy of the property will be permitted until sewage disposal facilities complying with Sections 751 or 752 of this Ordinance are provided to such lots.

760 WATER SUPPLY SYSTEMS

Each proposed building lot or proposed land development shall be provided with water supply in accordance with the following requirements:

761 Public Water Supply Systems

- 761.1 Each subdivision, not a minor subdivision, any portion of which is within one thousand (1,000) feet of an existing public water supply system, shall be connected by the developer to such system. In any situation where the public water supply is extended to a project, the water main shall be extended to the furthest point of the

subdivision away from the point where the main enters said subdivision. The final termination point of the main extension shall be to the satisfaction of the Township and the water system owner.

761.2 Any such connection shall be in accordance with the provisions of:

761.21 Applicable conditions of The Easton Suburban Water Authority or other governing authority;

761.22 Section 425.8 of this Ordinance;

761.23 The water quality regulations of the Pennsylvania Department of Environmental Protection.

761.3 In the event a public water supply connection is not required under Section 761.2, each proposed building lot shall instead be provided with an on-lot water supply system in accordance with Section 762 of this ordinance.

761.4 Fire hydrants with water supply for fire protection, within three hundred (300) feet of all structures and on the same side of the road if a collector or arterial road, shall be provided in all subdivisions and land developments connected to a public water supply system. The connecting threads used on the hydrants shall be compatible with the equipment of the Hecktown Volunteer Fire Department.

761.5 All proposed building lots for all multifamily residential, commercial and industrial uses shall be provided, by the developer, with an adequate public water supply.

762 On-Lot Water Supply Systems (Wells)

762.1 An on-lot water supply system (well) shall be provided only for each lot that cannot feasibly be connected to an existing public water supply system under Section 761.1.

762.2 Any such on-site water supply system shall be in accordance with the standards of:

762.21 The Subdivision Improvements Agreement (see Article 9 of this ordinance).

762.22 Section 425.8 of this Ordinance; and

762.23 Any water quality regulations of the Pennsylvania Department of Environmental Protection.

762.3 Each Preliminary and Final Plan shall include an annotation expressly imposing a covenant running with the land, respecting each proposed building lot for which an on-lot water supply system is proposed, stating that:

762.31 Lower Nazareth Township makes no warranty or representation that on-lot water supply will be available for such lots; and

762.32 Occupancy of the property will not be permitted until water supply facilities complying with Section 762 of this ordinance are provided to such lots.

770 STORM DRAINAGE SYSTEMS

771 Storm drainage systems shall be provided in order to:

- 771.1 Permit unimpeded flow of natural watercourses, except as may be modified by storm water detention pond requirements in Section 774 or open channels pursuant to Section 772.7.
- 771.2 Ensure adequate drainage of all low points along the line of streets.
- 771.3 Intercept storm water runoff along streets at intervals related to the extent and grade of the area drained.
- 771.4 Provide positive drainage away from on-site sewage disposal systems.
- 771.5 Take surface water from the bottom of vertical grades, to lead water from springs and to avoid excessive use of crossgutters at street intersections and elsewhere.
- 771.6 Prevent overloading of downstream drainage systems, closed depressions, and watercourses as a result of increased rate of runoff caused by the proposed development.
- 771.7 Ensure that the extent of ponded water is not increased within downstream closed depressions as a result of additional runoff volume.

772 General Requirements

- 772.1 A site drainage plan for the proposed subdivision or land development tract shall be prepared which illustrates the following information:
 - 772.11 Mapping of the watershed area or areas in which the proposed subdivision or land development is located.
 - 772.12 Calculations of runoff for all points of runoff concentration.
 - 772.13 Complete drainage systems for the subdivision. All existing drainage features which are to be incorporated in the design shall be so identified. If the subdivision or land development is to be developed in stages, a general drainage plan for the entire subdivision shall be presented with the first stage and appropriate development stages for the drainage system shall be indicated.
 - 772.14 Sufficient mapping of existing offsite drainage features located downstream from the proposed subdivision or land development points of runoff

discharge. Mapping features shall include closed depressions, streams, watercourses and storm sewer systems on the downstream properties.

772.2 The existing points of natural drainage discharge and the mode of drainage conduct onto adjacent property shall not be altered, unless:

772.21 Written consent of affected landowner is obtained by the applicant; or

772.22 The applicant demonstrates that no damage to any adjacent landowner or infringement of the public safety for conditions up to and including a 100 year storm event will result.

772.3 No storm water 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, without safe and adequate provisions being made by the developer for properly handling such conditions, and the applicant obtaining the written consent of the downstream landowners.

772.4 Where a subdivision is traversed by watercourses other than permanent streams, there shall be provided on the subdivision plan, a drainage easement conforming substantially with the line of such watercourse which shall be offered to the Township for dedication. The width of the easement shall be adequate to provide for unimpeded flow of storm runoff based on calculations made in conformance with Section 773 and to provide a freeboard allowance of one-half (0.5) foot above the design water surface level.

772.5 Drainage structures that are located on State highway rights-of-way shall be approved by the Pennsylvania Department of Transportation and a letter from that office indicating such approval shall be obtained prior to final plan approval.

772.6 All streets shall be so designed as to provide for the discharge of surface water from their rights-of-way.

772.7 When natural drainage swales on the site cannot adequately provide for drainage, open channels may be constructed conforming substantially to the line and grade of such natural drainage swales. Capacities shall be calculated using the Manning equation as explained in Appendix A.

772.8 Storm drainage facilities and appurtenances shall be so designed and provided as to minimize erosion in watercourse channels and at all points of discharge as per the requirements of the Pennsylvania Department of Environmental Protection and the Northampton County Conservation District.

773 Calculation of Storm Runoff and Design Storm Frequency

773.1 Storm drainage systems required by this Ordinance shall be designed to provide protection from a two (2) to one hundred (100) year storm as determined by the Township. If the site of the subdivision or land development is within a watershed

with an approved Storm Water Management Plan enacted pursuant to Act 167, the criteria in the applicable plan shall be used.

- 773.11 A twenty-five (25) year design storm is appropriate where a storm in excess of the design storm will cause major inconvenience to people and traffic in high use areas such as business districts and along local collector or arterial roads.
- 773.12 A one hundred (100) year design storm is appropriate where a storm in excess of the design storm will cause damage to existing or future structures or their contents.
- 773.13 The design or analysis of all major natural or man-made overland drainage systems shall have adequate capacity for the twenty-five (25) to one hundred (100) year return storm, and shall further consider the two (2) year storm event for velocity. Permissible velocities are as indicated in SCS criteria.
- 773.2 Storm water runoff from watersheds of two hundred (200) or less acres shall be calculated by the Rational Method as described in Manual Number 37 of the American Society of Civil Engineers, except as the watershed size criteria may be modified by an approved Act 167 Storm Water Management Plan. The rational method of runoff calculation is explained in Appendix A.
- 773.3 Storm water runoff from watersheds of more than two hundred (200) acres shall be calculated using the soil cover complex method developed by the Soil Conservation Service or other appropriate method acceptable to the Township Engineer.
- 773.4 The design of any detention facility shall be verified by routing the proposed post-development hydrograph through the basin using a storage-indication technique.
- 773.5 The Manning equation explained in Appendix A shall be used in calculating capacities of watercourses and storm sewers, except culverts which shall be designed using methods acceptable to the Township Engineer.
- 773.6 Complete detailed drainage calculations and applicable charts and nomographs certified by the design engineer shall be submitted to the Township Engineer.

774 Storm Water Detention

- 774.1 Stormwater shall be governed by the following provisions:
 - 774.21 Post-development rates of runoff for the two (2) through one hundred (100) year storm events shall not exceed pre-development rates.
 - 774.22 Within watersheds for which there is an approved Act 167 Storm Water Management Plan, the detention facilities shall at minimum be designed to discharge post-development peak runoff rates consistent with the Plan criteria.

774.23 Within watersheds for which there is not an approved Act 167 Storm Water Management Plan, the detention facilities shall be designed to provide that the peak rate of runoff at all points of discharge from the site, when developed, will not exceed the peak rate of runoff at each of those points prior to development.

774.3 Where detention facilities are included as part of the storm drainage system, the following provisions will apply:

774.31 Detention ponds shall be designed so that they return to normal conditions within approximately twenty-four (24) hours after the termination of the storm, unless the Township Engineer finds that downstream conditions may warrant other design criteria for storm water release;

774.32 The developer shall demonstrate that such ponds are designed, protected and located to assure that public safety is maximized and health problems are prevented. The following minimum criteria shall apply:

- a. Top berm width shall be a minimum of six (6) feet;
- b. On all ponds having a maximum total depth of four (4) feet, the side slopes shall be four (4) horizontal to one (1) vertical or flatter. On all ponds having a maximum total depth greater than four (4) feet, the side slopes shall be five (5) horizontal to one (1) vertical or flatter.
- c. All ponds shall incorporate an impervious clay liner having a minimum depth of one (1) foot or an impermeable geosynthetic liner. The design analysis of the required pond liner shall be incorporated into the required geologic/karst features report.
- d. Ponds shall be designed with a minimum freeboard of one (1) foot above the maximum water elevation.
- e. All ponds shall be designed with a minimum bottom slope of one (1) percent.
- f. In all detention ponds having surface discharge, the outfall end section and outside toe of berm shall be located a minimum of twenty (20) feet from the adjoining, downstream property line.
- g. The maximum depth of water, based on the one hundred (100) year storm event, shall not exceed eight (8) feet.

774.33 The developer shall verify that the operation of the detention facilities will not aggravate potential downstream peaking conditions;

- 774.34 Emergency overflow facilities shall be provided for detention facilities to handle runoff in excess of design flows;
- 774.35 A drainage easement, described by bearings and distances, shall be provided around all detention basins. The easement shall encompass the limits of the pond berm and the 100 year water surface elevation plus the basin outflow to the point of offsite discharge.
- 774.36 Since the detention pond will remain in common ownership, the developer shall provide an annotation on the Record Plan imposing a covenant running with the land requiring perpetual maintenance and repair of the detention pond and all appurtenances, by the respective lot owner(s). The covenant shall also state that no structures, fences, trees or other landscaping materials (other than grass) shall be placed or planted within the detention pond.

775 Stormwater Collection and Conveyance Systems

- 775.1 Inlets. The placement of inlets shall be governed by the following design criteria:
- 775.11 Inlets shall be placed at points of abrupt changes in the horizontal or vertical directions of storm sewer pipes and drainage swales and on both sides of a street at all designed low points.
- 775.12 On streets with centerline grades of two (2) percent or less, inlets shall be spaced at a maximum distance of four hundred (400) feet apart. On streets with centerline grades greater than two (2) percent, inlet spacing shall not exceed six hundred (600) feet.
- 775.13 Inlets shall be depressed two (2) inches below the grade of the gutter or ground surface, and shall be provided with bicycle-safe grates.
- 775.14 Capacity calculations shall be provided for all inlets. The calculations shall account for all by-pass surface runoff from upstream inlets, where applicable.
- 775.15 Storm sewer manholes may be substituted for inlets at locations where inlets are not required to handle surface runoff.
- 775.16 (Moved to Section 775.39) Inlets shall be placed at street intersections to limit the cross-gutter flow from upstream areas.
- 775.2 Roadside Drainage Swales. The construction of roadside drainage swales shall be in accordance with the following requirements:
- 775.21 On all non-curbed streets, drainage swales will be required along both sides of the street.

- 775.22 On all local collector and arterial streets, the roadside swales shall be designed to convey the runoff from a twenty-five (25) year storm event.
- 775.23 As a minimum, the depth of all roadside swales shall be six (6) inches. The swales shall be designed to convey the runoff from the required storm event within the street right-of-way.
- 775.3 Storm Sewer Pipe. The design of storm sewer pipe systems shall be in accordance with the following requirements:
- 775.31 All storm sewer lines shall be designed with a minimum 0.005 ft/ft (0.50%) slope.
- 775.32 Storm sewer lines within street rights-of-way shall be parallel to the centerline as far as practical. A sufficient number of structures (inlets or manholes) shall be provided to eliminate unnecessary crossings of other utility lines and passage beneath curbs.
- 775.33 Storm sewer shall be designed on the basis of inlet or outlet control, as applicable, unless a more detailed backwater analysis is deemed necessary by the Township Engineer.
- 775.34 No storm sewer headwalls or endwalls shall be constructed within any street right-of-way.
- 775.35 Safety grating shall be installed across the openings of all storm sewer pipe inlet headwalls.
- 775.36 All storm sewer lines shall be televised after installation. Televising event shall be recorded on a medium acceptable to the Township. Recording shall be labeled and presented to the Township along with documentation clearly identifying location of said lines. All work shall be per township specifications.
- 775.37 All stormwater within street cartway areas shall be reinforced concrete pipe, Class III or better, with "O"-ring gasket joints. Stormsewer located outside street cartway areas shall be either reinforced concrete pipe, Class III or better, with "O"-ring gasket joints or high density polyethylene pipe, smooth interior, with water-tight couplings.
- 775.38 When there is a change in pipe size within a stormsewer structure, the elevation for the top of pipes shall be the same, or the top elevation of the inflow pipe(s) can be set higher as necessary.
- 775.39 Underdrain pipe systems shall be required.
- 775.4 Curbed Street Drainage. On streets constructed with curbing, the surface runoff collection system shall be in accordance with the following requirements:

775.41 On local streets, the inlet spacing and gutter capacities shall be designed to convey the runoff from a twenty-five (25) year storm event.

775.42 On collector and arterial streets, the inlet spacing and gutter capacities shall be designed to convey the runoff from a fifty (50) year storm event.

775.43 The maximum encroachment of water on the roadway pavement shall not exceed one-half of a traffic lane during the design year storm event.

780 UNDERGROUND UTILITIES AND EASEMENTS

781 Electric/Utility Easement Lines

In accordance with a Pennsylvania Public Utility Commission order of July 8, 1970, all electric utility distribution lines shall be installed underground in subdivisions or land developments of five (5) or more dwelling units. In addition, the following design standards shall be observed:

- 781.1 Whenever practicable, telephone and cable TV utilities shall also be installed underground. When telephone and cable TV utilities are placed underground, all cable TV providers authorized to operate in Lower Nazareth Township shall have access to the open trench. Each cable provider shall be afforded the opportunity to provide service in any subdivision.
- 781.2 Whenever practicable, underground electric and communication utility lines shall be installed within the same utility trench.
- 781.3 All utility lines servicing commercial and industrial developments shall be installed underground.

782 Utility Easements

- 782.1 Utility easements shall be provided for wire, conduits, sanitary and storm sewers, gas and water mains and/or other utility lines intended to service the abutting lots. No structures shall be placed within such easements, except structures associated with the utilities.
- 782.2 Utility easements shall be located at all of the following:
 - 782.21 Abutting the street right-of-way. In this case, a minimum easement width of ten (10) feet shall be required.
 - 782.22 Along rear or side lot lines. In this case, a minimum easement width of twenty (20) feet, ten (10) feet on each side of the lot line, shall be provided. Where the lot line coincides with the subdivision or land development boundary, a minimum easement width of ten (10) feet is required.

783 Petroleum Transmission Lines

783.1 No company intending to install any petroleum, petroleum products or natural gas transmission lines shall be allowed to construct the line on less than a fifty (50) foot right-of-way, such line to be installed in the center of the right-of-way, and shall comply with the applicable standards imposed by State and Federal laws and regulations.

783.2 There shall be a minimum distance of twenty-five (25) feet between any proposed dwelling unit and any petroleum, petroleum products or natural gas transmission right-of-way line which traverses the subdivision, but in no event less than fifty (50) feet from any petroleum or natural gas transmission line.

784 Easement Maintenance

All surface and subsurface easements required by this ordinance or shown on the record plan shall be kept clear of any and all structures and obstructions including, but not limited to, buildings, trees, shrubs, driveways and berms. On surface drainage swale easements, fences shall not be constructed within the limits of the 100 year storm water surface elevation. Grades, once established on the approved plan, shall not be altered without approval by the Board of Supervisors. A covenant shall be added to the Record Plan which contains the above maintenance note. Please refer to section 533.11(J) for additional requirements for individual lot grading plans.

790 ENVIRONMENTAL PROTECTION

791 Erosion and Sediment Control

791.1 General Standards

791.11 No changes shall be made in the contour of the land; no grading, excavating, removal or destruction of the topsoil, trees or other vegetative cover of the land shall be commenced within a proposed subdivision or land development tract until such time that a plan for sedimentation control and minimizing erosion has been reviewed and found satisfactory by the Northampton County Soil and Water Conservation District and reviewed and approved by the Township, or there has been a determination by the Township, upon recommendation by the Northampton County Soil and Water Conservation District, that such plans are not necessary.

791.12 Measures used to control erosion and reduce sedimentation shall meet the standards and specifications of the Pennsylvania Department of Environmental Protection Erosion and Sediment Pollution Control Program Manual, as amended. The Township Engineer, or other officials as designated, shall ensure compliance with the appropriate specifications, copies of which are available from the Northampton County Conservation District.

- 791.2 Performance Principles: The following measures are effective in minimizing erosion and sedimentation and shall be included where applicable in the control plan:
- 791.21 Stripping of vegetation and grading shall be kept to a minimum.
 - 791.22 Development plans shall preserve significant natural features, keep cut and fill operations to a minimum, and ensure conformity with topography so as to create the least erosion potential and adequately handle the volume and velocity of surface water runoff.
 - 791.23 Whenever feasible, natural vegetation shall be retained, protected and supplemented.
 - 791.24 The disturbed area and the duration of exposure shall be in accordance with the Pennsylvania Department of Environmental Protection Erosion and Sediment Pollution Control Program Manual.
 - 791.25 Disturbed soils shall be stabilized by permanent vegetation and/or by mechanical erosion control and drainage measures as soon as practicable in the development process.
 - 791.26 Temporary vegetation and/or mulching shall be used to protect exposed critical areas during development.
 - 791.27 Provisions shall be made to effectively accommodate the increased runoff caused by soil and surface conditions during and after development. Where necessary, the rate of surface water runoff will be mechanically retarded.
 - 791.28 Sediment in the runoff water shall be trapped until the disturbed area is stabilized by the use of debris basins, sediment basins, silt traps, or similar measures.
- 791.3 Grading for Drainage: In order to provide more suitable sites for building and other uses, improve surface drainage and control erosion, the following requirements shall be met:
- 791.31 All lots, tracts or parcels within a proposed subdivision or land development shall provide proper drainage away from buildings and dispose of surface water without ponding, except where an alternative drainage system is approved. Natural drainage patterns shall be preserved wherever possible.
 - 791.32 Cut and fill slopes shall not be steeper than 3:1 unless stabilized by a retaining wall or cribbing.
 - 791.33 Adequate provisions shall be made to prevent surface water from damaging the cut face of excavations or the sloping surfaces of fills.
 - 791.34 Cut and fills shall not endanger adjoining property.

- 791.35 Fill shall be placed and compacted so as to minimize sliding or erosion of the soil.
- 791.36 All cuts and fills within 100 year floodplain areas must be in accordance with the Township's Floodplain ordinance. Fills placed adjacent to constructed channels shall have suitable protection against erosion during periods of flooding.
- 791.37 Grading will not be done in such a way as to divert water onto the property of other landowners without the written consent of the landowners.
- 791.38 During grading operations, necessary measures for dust control will be exercised.
- 791.39 No equipment shall alter or damage the bed and banks of any stream, unless approved by the Pennsylvania Department of Environmental Protection. Equipment shall cross streams only at approved crossings utilizing culverts or bridges.

792 Natural Feature Preservation

The design and development of subdivisions and land developments shall be in harmony with the natural features of the site and shall respect the development limitations of the natural features. Subdivision and land development design shall be integrated with the natural terrain of the site, wooded areas, large trees, natural watercourses, rock outcroppings and scenic views.

792.1 Areas with Development Limitations

- 792.11 The filling or development of wetlands and areas of hydric soils shall conform to the regulations of the Zoning Ordinance, and shall not proceed until relevant U.S. Army Corps of Engineers and PA Department of Environmental Protection permits have been granted.

792.2 Tree Preservation and Planting

- 792.21 Trees six (6) inches or more in diameter (measured at a height of four (4) feet above grade) shall not be removed unless they are located within the proposed cartway, driveway, or sidewalk portion of a street right-of-way, or within twenty-five (25) feet of the foundation area of a new building. Areas in which trees are retained shall remain at original grade level and undisturbed wherever possible.
- 792.22 All existing trees six (6) inches or more in diameter (measured at a height of four (4) feet above grade) shall be located and identified on the plan. The Township may waive this requirement in densely wooded areas and tree rows.

- 792.23 In all subdivisions and land developments containing property line tree rows, a minimum ten (10) foot wide easement shall be established along the lot lines having existing tree rows. A protective covenant shall be added to the plan stating that no trees shall be removed nor grades altered within these easements without approval by the Board of Supervisors.
- 792.24 In subdivisions or land developments where street trees are proposed, they shall be planted outside of street right-of-way lines, with underground utilities being located a minimum of 10 feet from the trees.
- 792.25 In particular, but not in limitation, approved trees for street planting include the following:
- 792.25a *Acer rubrum* - Red Maple
 - 792.25b *Acer saccharum* - Sugar Maple
 - 792.25c *Fraxinus americana* - White Ash
 - 792.25d *Fraxinus pennsylvanica lanceolata* - Green Ash
 - 792.25e *Gleditsia tricanthos inermis* - Moraine Locust
 - 792.25f *Ginkgo biloba* - Ginkgo (male)
 - 792.25g *Liquidambar styraciflua* - Sweet Gum
 - 792.25h *Liriodendron tulipifera* - Tulip Tree
 - 792.25i *Phellodendron amurense* - Amur Cork Tree
 - 792.25j *Quercus alba* - White Oak
 - 792.25k *Quercus borealis* - Red Oak
 - 792.25l *Quercus coccinea* - Scarlet Oak
 - 792.25m *Quercus phellos* - Willow Oak
 - 792.25n *Tilia*-Linden - All species hardy to the area
 - 792.25o *Zelkova Serrata* - Japanese Zelkova
- 792.26 For all land developments and for all subdivisions not a minor subdivision, a Landscape Plan shall be developed. The plan shall show the plant cover which exists, and on the same or separate sheet, that which will exist when the landscaping is completed.

792.3 Topsoil Protection

792.31 Topsoil shall be removed from the areas of construction and stored separately.

792.32 The topsoil shall be stabilized to minimize erosion during storage. upon completion of the construction, the topsoil must be uniformly redistributed on the site.

792.4 Stream Frontage Maintenance

792.41 An easement for maintenance purposes, a minimum of twenty (20) feet in width, shall be provided along all stream banks.

792.42 Any grading, excavation or other work within these easements shall be in accordance with the Township Floodplain Ordinance or Zoning Ordinance, as applicable.

793 Open Space and Recreation Areas

The establishment, maintenance and protection of open space and recreation areas shall be in accordance with the guidelines contained within "The Comprehensive Plan of Lower Nazareth Township."

793.1 Recreation Areas

793.11 Areas meeting the criteria for recreation lands as set forth in the definitions shall be offered for dedication to the Township, subject to the approval of the Board of Supervisors. The Board of Supervisors shall consider the offer relative to the following factors:

793.11a The suitability of the size, shape and landform of the tract for appropriate recreational facilities. No recreation area shall measure less than two (2) acres in size.

793.11b Accessibility.

793.11c Conformity with the parks and recreation element of the Comprehensive Plan.

793.11d Ability of nearby recreation facilities to serve the subdivision.

793.12 Access to recreation areas dedicated to the Township pursuant to Section 793.11 shall be as follows:

793.12a At least one (1) side of the recreation area shall front on a public street. Frontage on two (2) or more public streets is preferred. The above requirements are not necessary if the area proposed

for dedication adjoins lands currently utilized by the Township for recreation purposes.

793.12b Additional access may be provided by rights-of-way connecting the recreation area with public streets.

793.12c Rights-of-way providing access to a recreation area shall have a minimum width of fifty (50) feet. Each right of-way shall be part of the dedicated recreation area and contain at least one (1), eight (8) foot wide macadam path, constructed to Township standards, connecting the recreation area to the public street.

793.13 Cash in lieu of recreation land dedication may be offered, subject to the approval of the Board of Supervisors.

794 Karst Hazards

794.1 Purpose

The purpose of this section is to recognize the potential for damage to public and private improvements, human injury or death, and the disruption of vital public services which may arise by the potential for sinkholes and/or subsidence within areas of carbonate geology. A further purpose of this section is to minimize the potential for such sinkhole and/or subsidence occurrence and to protect the ground water resource. Should the regulations of this and other applicable regulations conflict, the most stringent regulations shall apply.

794.2 Disclaimer of Liability

Whereas the exact occurrence of sinkholes and/or subsidence is not predictable, the administration of these regulations shall create no liability on behalf of the Township, the Township Engineer, Township employees, or Township agencies as to damages which may be associated with the formation of sinkholes or subsidence. That is, compliance with these regulations represents no warranty, finding, guarantee, or assurance that a sinkhole and/or subsidence will not occur on an approved property. The municipality, its agencies, consultants and employees assume no liability for any financial or other damages which may result from sinkhole activity.

794.3 Procedures

794.31 As part of the Preliminary Plan requirements for all subdivisions and land developments, the applicant shall engage a qualified professional to review the existing aerial photos, soils geological and related data available to him as it may pertain to the subject inspection of the property.

794.32 A site inspection by the applicant's professional, using all available data and with such assistance as is needed, shall determine the presence or absence of Karst surface features of the site, and locate the same if present on a site plan

at a scale no smaller than 1" = 100'. In particular, the following features shall be located, if present, on the site:

794.32a Closed depressions;

794.32b Open sinkholes;

794.32c Seasonal high water table indicators;

794.32d Unplowed areas in plowed field;

794.32e Surface drainage into ground;

794.32f Quarries or borrow pits;

794.32g Rock outcrops and other Karst features

794.33 The applicant must provide the Township with a map at a scale of 1" = 100' that show the Karst features listed in Section 794.32.

794.34 Based upon the site inspection, the applicant's professional shall determine what further testing should be done by the applicant to ensure compliance with the performance standards set forth in Section 794.4. Testing methodology shall be reasonable under the circumstances, including (1) the scale of the proposed development; and (2) the hazard revealed by examination of available data and site inspection.

794.35 The applicant shall cause the additional testing, if any, to be effected and shall submit test results to the Township Engineer.

794.36 The Township Engineer shall report to the Planning Commission, with a copy to the applicant, his opinion concerning the adequacy of the report submitted based upon the scale of the development and the hazards revealed by the report, and shall make recommendations to the Planning Commission based upon the report submitted concerning site development, including storm water management, the layout of utility lines, and building location. The Township Engineer may require the applicant to perform such additional testing as may be appropriate.

794.4 Performance Standards

794.41 All applicants for subdivisions or land developments shall comply with the requirements of this ordinance regarding Karst hazards.

794.42 No storm water detention facility shall be placed within one hundred (100) feet of the features listed in Section 794.32, unless a detailed geotechnical solution to the subsidence, pollution and safety problems of the Karst feature has been presented by a competent professional in carbonate geology.

- 794.43 No storm water swale with design flows in excess of ten (10) cubic feet per second for the ten (10) year flood may be constructed within one hundred (100) feet of the features listed in Section 794.32, unless a detailed geotechnical solution to the subsidence, pollution and safety problems of the Karst feature has been presented by a competent professional in carbonate geology.
- 794.44 No storm sewer pipe shall be constructed within one hundred (100) feet of the features listed in Section 794.32 unless it is concrete pipe utilizing O-ring joints.
- 794.45 No principal or accessory building, no structure, and no impervious surface shall be located closer than one hundred (100) feet from the edge of the features listed in Section 794.32, unless a detailed geotechnical solution of the subsidence, pollution and safety problems of the Karst feature has been presented by a competent professional in carbonate geology.
- 794.46 No septic system or tile field, no swimming pool, no solid waste disposal area, transfer area or facility, no oil, gasoline, salt or chemical storage area, and no blasting for quarrying or well enhancement activities shall occur within one hundred (100) feet of the features listed in Section 794.32 unless a detailed geotechnical solution to the subsidence, pollution and safety problems of the Karst feature has been presented by a competent professional in carbonate geology.
- 794.47 Soil Erosion and Sedimentation Control plans filed with the Northampton County Conservation District shall detail safeguards to protect identified Karst features.
- 794.48 All storm sewer lines located in a Karst area shall be so constructed as to not permit the flow of water along the utility line trench, and shall be imperviously diked at thirty (30) foot intervals.
- 794.49 When a proposed public water or sanitary sewer line is located in an identified Karst area, the applicant shall demonstrate to the Township that the appropriate utility authority has been notified of this fact and that the applicant will comply with the authority's recommendations concerning provisions to prevent the flow of water along the utility line trench.