CITY OF MIDDLETOWN, OHIO

MANUAL OF DESIGN FOR PUBLIC IMPROVEMENTS

March 2007

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FOREWARD

This manual is intended to serve as a guide for developers, engineers, and surveyors who are involved with the preparation of plans for subdivisions, utility installations, drainage improvements, roadways, planned unit developments, etc. built within the jurisdiction of the City of Middletown.

The standards and requirements are presented with the realization that every case will not be covered. As with most guides, there will be instances where the standards cannot be applied. Special conditions and new techniques may also preclude the practical application of the standards. Adjustments or deviation from the standards for individual special cases may be made with the approval of the Director.

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Engineering & Environmental Services Director
City of Middletown

ENGINEERING DRAWING STANDARDS

Engineering drawings shall be submitted on 22"x34" sheets. Each sheet, excepting the Title Page, shall contain a title block depicting the location of subdivision or development, name of subdivision or development, name of street within subdivision or development, portion of street shown on sheet (e.g., stations), description of sheet (e.g., plan and profile), scale, and revision number & date.

Plans shall include the following sheets in the order listed:

1. **Title Page.** The title page shall include the following items:

    a. Name of subdivision in letters of one-inch height or greater.

    b. Name, signature, and Ohio Registration Number of Professional Engineer responsible for design. Date of signature shall also be listed.

    c. Location map at minimum scale of one-inch equaling 500 feet. Show on-site bench mark(s) location on map by symbol.

    d. Index to drawings

    e. Approval blanks for signature of Director and others as required.

    f. Revision number or date.

    g. The following statement: "All work shall comply with the Ohio Department of Transportation Construction and Material Specifications, latest edition; and City of Middletown Standard Drawings and Utility Rules and Regulations. Where conflicts among these sources exist, the more stringent shall apply."

2. ***General Notes***. General notes and miscellaneous details shall include any pertinent notes and details that are not covered in the standard drawings or the plan and profile. (Example: Reference to bench mark data.) This sheet shall also include the Construction Inspection statements on page 8 of this manual.

3. ***Final Plat.*** An 18" x 24" or 24"x36" Mylar copy of the signed and recorded plat shall be submitted to the Engineering Division. The plat shall include the signature and Ohio Registration Number of Surveyor responsible for the preparation of the plat. If the recorded copy is unavailable, include the copy to be recorded with the construction plans and submit the recorded copy with or prior to the submittal of the Record Drawings. This will require that duplicate mylar copies be submitted for signatures.

4. ***Utility Plan.*** The plan will include a master plan drawn at a scale of 1-inch not greater than 50-feet which will show the location of all proposed and existing underground mains and services including storm, sanitary, electric, water, gas, telephone, and traffic conduit; and plan sheets showing all of the above drawn to a scale of 1 inch = 20 feet unless otherwise approved by the Engineer. These plans will also include the street lighting infrastructure locations per design standards indicated in this manual.

5. ***Plan and Profile Sheets.*** Plan and profile shall include all proposed and existing ground lines, street lines, waterways, structures, underground utilities and appurtenances, etc., in both plan and profile sections. Right-of-way lines, property lines, easement lines, slope limit lines, overhead utility lines, match lines, etc. shall be included on plan. Plan and profile shall be drawn to a scale of one inch equaling 20 feet horizontal and 5 feet vertical unless otherwise approved by the Engineer.

    Plan and profile shall extend to a minimum of 300 feet beyond either the construction or the plat limits, whichever dimension is greater. Datum elevations shall be given as follows:

a. Finished centerline of all proposed streets at minimum intervals of 50 feet (25-feet in vertical curves), at all P.V.C. and P.V.T. stations, and at all centerline intersections with other streets.

b. P.V.I., low/high P.T. stations and elevations of all vertical curves.

c. Any other location needed to adequately describe proposed construction.

6. ***Site Grading Plan***. Site grading plan at minimum scale of one inch equaling 50 feet shall show existing ground contours and final graded surface contours for all areas outside of street right-of-way within plat. The contours shall extend beyond the limits of the plat a distance sufficient to determine the impact of work on adjacent developments, swales, and/or drainage structures. Site grading plan shall also show any areas within a minimum of 150' from the subdivision boundary or further if determined necessary by the Engineering Division. The City's GIS data and/or USGS data is acceptable as best available information for any preliminary drainage study. Note that the maximum unsewered length of a rear yard swale shall be 500 feet or 2.5 acres drainage area, whichever is less, unless approved by the Engineer.

7. ***Intersection and Cul-de-sac Grading Plan.*** A contoured intersection and cul-de-sac grading plan is required for all intersections and with cul-de-sacs proposed for new subdivisions and City street improvement projects. The plan is to be shown at 1"=20-feet maximum with contour intervals sufficient to show adequate drainage.

8. ***Cross Sections***. In general, cross-sections for new subdivision streets will not be required. Exceptions may be in areas where an unusual amount of cut and fill are proposed, storage basin areas, etc.

9. ***Standard Drawings***. Digital copies of standard drawings may be obtained from the Engineering Division.

10. ***Erosion Control Plan***. The plan must meet the requirements of the Ohio EPA NPDES Storm Water Phase II Plan.

11. ***Traffic Control Plan.*** All traffic control devices (signals, signs, striping, etc.) are to be located on the plans.

12. ***Lighting Plan.***

13. ***Summary of Quantities***. Quantity take-off shall be tabulated and shall include a breakdown of developer and City share quantities. The City may require submission of the quantity calculations.

Requirement for submission of any portion of the above plans may be waived by the Engineering & Environmental Services Director.

PRESERVATION OF NATURAL FEATURES

Subdivisions should be planned to (a) take advantage of the topography of the land, (b) to minimize the destruction of trees and topsoil, and (c) preserve such natural features as water courses, large trees, sites of historical significance and other assets which, if preserved, would add attractiveness and value to the subdivision and the community.

The arrangement, character, extent, size, grade, construction, and location of all improvements shall conform to the City's design criteria. The subdivider must provide, within the boundaries of the subdivision plat, the necessary right-of-way for the widening and continuance of arterial and collector streets in accordance with the City's Master Plan.

Consideration should be given to (a) the relationship of proposed streets to existing streets and other planned future streets, (b) topographical conditions, and (c) public conveniences and safety. The street pattern should discourage through traffic on local streets.

SUBDIVISION/DEVELOPMENT PLAN REQUIREMENTS

The plan shall clearly show the following features and information:

1. The proposed name of the subdivision or development. (Names shall not duplicate or closely approximate any existing subdivision or development names in Middletown or surrounding counties, except extensions of existing subdivisions.)

2. The tract designation according to real estate records or the County Recorder.

3. The names and addresses of the owner or owners of record, the developer, and the engineer or surveyor who prepared the plan.

4. Vicinity sketch at a scale of 1" = 400' to 1" = 1000'.

5. North point, scale and date.

6. The boundary lines of the plat, accurate in scale and dimension.

7. The area of the tract to be subdivided to the nearest hundredth of an acre.

8. The names of adjoining subdivisions and the names of owners of adjoining undeveloped parcels of land.

9. The location, right-of-way and pavement widths, and names of all existing or platted streets or public ways in or adjacent of the plat and within 200 feet thereof.

10. The location of other important existing features such as buildings, major trees, water courses, railroad lines, zoning boundaries, section corners, City Corporation lines, and County or Township lines.

11. The location of existing roads, intersections, and driveways opposite the subdivision or development with sufficient detail to evaluate the alignment of the proposed roadways in relation to existing infrastructure, and the intersection sight distance where new roads/drives intersect existing.

12. Existing and proposed contours, at an interval of 1 foot for grades less than 10%, 2 feet for grades exceeding 10%, referenced to USGS datum.

13. The location, type (local, collector, etc.), right-of-way and pavement widths, and proposed names of all proposed streets; location and dimension of all sidewalks and easements; the layout, approximate dimensions, and numbers of all proposed lots. (Names shall not duplicate or closely approximate any existing street names in Middletown or surrounding counties, except extensions of existing streets.)

14. Minimum building setback lines as set by to the applicable zoning ordinance or as may be established by Planning Commission policy, and those which may be stipulated by deed restriction or protective covenants.

15. All parcels of land intended to be dedicated or reserved for public use, or to be reserved in deeds for the common use of property owners in the subdivision.

16. Improvements to be constructed shall be stated on plat.

17. The location of existing and proposed sewers, water mains, culverts, traffic conduit, and other utilities above or below ground, in the tract and within 200 feet thereof shall be shown, together with pipe sizes, graded and type. All public utilities are required to be extended to the limits of the subdivision or development where required by the Engineering Division.

18. Preliminary street profiles including centerline curve radii shall accompany the plan submission, drawn to a scale not less than 1" = 40' horizontal and 1" = 10' vertical.

19. Drainage Study as provided in this manual.

20. Traffic Impact Study as provided in this manual.

In addition to the above requirements, the following items are required for Development Plans only. The Director of Planning may require other information for proper review of plan proposals:

1. Political boundary lines within the tract.

2. All natural barriers or buffers located on or within 200 feet of the tract along with a plan to replace such should they be disturbed.

3. Location and dimensions of proposed fences or buffer strips.

4. A copy of the restrictive covenants set forth in the tract's deed.

5. Location and sizes of proposed buildings and recreation areas, together with proposed façade elevations or perspectives to indicate general character.

6. Proposed landscape treatment, natural or artificial screening, walls, or fences shall be shown and noted as to size and material.

7. Proposed statistics including: site area (streets may be included if part of development construction), building area, net floor area (all enclosed floor area less vertical circulation spaces), number of parking spaces and automobile parking and driveway area, number and size of units, recreation area (See section 1262.03 (f) for dwelling group statistics).

8. Location and sizes of any proposed signs.

9. The following statement shall be shown on plat: "APPROVED DEVELOPMENT PLAN: This final development plan has been approved by the City of Middletown as meeting the requirements of Chapter 1264 of the Middletown, Ohio Zoning Ordinance." A date and signature line for the Secretary to the City Planning Commission shall be provided directly beneath this statement.

FINAL PLAT REQUIREMENTS

The final plat shall clearly show the following features and information:

1. Name of subdivision or development, and the name or lot number(s) of the largest subdivision or tract of which the area being subdivided forms a part.

2. Names of the owner or owners of record, the subdivider, and the registered surveyor who prepared the plat, with appropriate space for the authorization.

3. Name and location of the adjoining subdivisions, and location and ownership of adjoining undeveloped property.

4. Statement dedicating land offered for public use or property to be reserved for the common use of property owners in the subdivision.

5. Any restrictions and boundaries of each type of restriction.

6. Statement that any lot transferred will have a minimum width and area substantially the same as shown on the plat and that only one principal building will be permitted on any such lot.

7. Lots shall be numbered as follows:

    a. Within the corporate limits, the numbers shall be assigned by the County Auditor.

    b. In the County, lots shall be numbered as per county standards.

8. Minimum building setback lines as established by the applicable Zoning Ordinance, setback lines established by the Planning Commission or these stipulated in the deed restrictions or protective covenants.

9. All plat boundaries, with lengths of courses to hundredths of a foot and bearings to the nearest second. These boundaries shall have been determined by an accurate field survey, the closure thereof not to be less than 1 to 10,000. This survey shall be balanced and closed, and all computations (survey closure, balanced closure, and final boundary closure) to be submitted. Show area on plat.

10. The plat boundaries shall be tied to existing monuments, street lines, section corners or other survey lines, by bearings and distances and shall be accurately described or located on the plat.

11. The exact locations and widths along the property lines of all existing or recorded streets, easements, rights-of-way, or any other land dedicated for public use, intersecting or paralleling the boundaries of the tract or within 200 feet of the tract.

12. Permanent markers, right-of-way monuments, and reference monuments as required under the Surveyor's Markers section of this manual.

13. The platting shall be as follows:

    a. All bearings and angles shall be to the nearest second and all distances shall be to one-hundredth of a foot.

    b. Street and other right-of-way lines, their names, bearings and widths, (including widths along the line of any obliquely intersecting street, lot, or tract boundary line).

    c. Street intersection corners shall have the radius, central angle, arc length and tangent given.

d. Curve data shall be given for each lot or parcel (radius, arc length, central angle, and chord).

e. The purpose of any easement, right-of-way, or land reserved or dedicated for public use shall be designated.

14. Reference meridian and source thereof (deed, magnetic, true north, etc.) data, scale, and graphic scale (scale to be not less than 1" = 100').

15. Certification by the registered surveyor preparing the plat that (1) the plat represents a survey made by him, that all monuments, indicated therein actually exist or will be placed at the completion of construction, and that their size, location, and material are correctly shown, and (2) that all requirements of the zoning and subdivision ordinances and these regulations have been met.

16. Acceptance of streets statement to be included on all plats within the corporation limits.

17. After recording with the County, a mylar copy of the signed plat shall be filed with the Engineering Division and shall be either 18" x 24" or 24" x 36" sheets.

18. Minimum opening elevations, floodway locations, and 100-year flood routes through the development as appropriate.

19. The following note shall be placed on the plat:

    The City does not accept any open channel drainage easements, and is not obligated to maintain or repair any channels or installations in said easements. The easement area of each lot and all improvements in it shall be maintained continuously by the owner of the lot. Within these easements, no structure, planting, fencing, culvert, or other material shall be placed or permitted to remain which may obstruct, retard or change the direction of flow of water through the drainage channel on the easement.

20. Where appropriate, provisions for a legal body such as a Home Owners Association responsible for certain maintenance activities.

CONSTRUCTION INSPECTION

Inspection services will be provided by the City for all subdivisions within the City Corporation. City inspection services will be provided on water lines and sanitary sewers outside the Corporation limits when connected into the Middletown water and sewer systems. Charges for the inspection provided during standard operating hours are included in the review and inspection fees provided in 1206.19 of the Codified Ordinances. Inspection fees during non-standard hours will be billed as outlined in Chapter 1206.19.e.

The following statements are to be Included in the General Note of the engineering drawings:

The Engineer or inspectors designated by them shall inspect the work performed and materials used in constructing and installing the improvements to ascertain if they are in accordance with the approved plans and specifications. The developer or their contractor shall notify the City at least 24 hours in advance of any construction.

The City reserves the right to retain a construction inspection firm for the inspection of developments when specialized technical expertise is necessary. The Owner/Developer shall be responsible for reimbursement to the City for the costs of the construction inspections above and beyond that portion of the plan review and inspection fee dedicated for inspection in Section 1206.19 the City Codified Ordinances. Full reimbursement shall be required prior to final plat approval unless approved otherwise.

A Pre-Final Inspection will be made upon completion of all improvements and punch list items, except the surface course of asphalt, submittal of the completed Record Drawings, and Mylar copy of the signed and recorded final plat.

A Final Inspection will be made prior to acceptance by the City after all improvements are completed. The Final Inspection will be made upon written request of the Owner/Developer to the City stating that all improvements are complete and all corrections have been made. All sanitary and storm manholes or access openings shall be opened and all pipes, conduits, and detention/retention basins shall be cleaned of all dirt, mud, and other foreign matter. All water valve boxes shall be opened, cleaned of all mud and debris and inspected for proper alignment. The Owner/Developer shall provide personnel as required to aid in the performance of the Final Inspection.

COMPLETION OF IMPROVEMENTS

1. ***Changes to Work.*** No construction of improvements shall be done in any manner different from that indicated on the approved plans unless such change shall first have been approved by the Director. For subdivisions outside of the City Limits, changes to the water and sewer main design shall be approved by the County Sanitary Engineer as well as the Director.

2. ***Time of Completion.*** The construction of all improvements required shall be completed within two (2) years from the date of approval of the commencement of the work unless otherwise approved in writing by the City.

3. ***Permits and Certificates*.** Permits for water and/or sanitary sewer service installation will not be issued until the main lines are built, inspected, and approved by the Director.

4. ***Submission of Completed Drawings.*** At the completion of construction and prior to the Pre-Final Inspection, the plans shall be changed where necessary to provide Record Drawings. This work shall be done by the subdivider's Engineer who set grades and did the layout work for the improvements and stamped by a professional surveyor. Record Drawings shall include exact stations, elevations, and locations of all manholes, catch basins, valve chambers, and fire hydrants as well as flow line elevations for all manholes and catch basins. The Record Drawings shall be provided on 22"x34" Mylar sheets. Additionally, digital files shall be provided for incorporating the information into the cities GIS system. The digital files shall be provided in one of two formats: 1) A corrected copy of the construction drawings showing actual field locations of the items listed above in a current AutoCAD format with each infrastructure item on a separate layer (storm sewer, sanitary sewer, water main, electric, gas, traffic, etc.). The drawing must be tied to known USGS, State, County, or City monuments to facilitate proper insertion and orientation into the cities GIS system OR 2) in tabular form showing GPS locations of the items listed above. The tabular format to be used shall be provided by the City.

5. ***Acceptance of Streets on Public Ways***. The approval of final plat by the Planning Commission shall not be deemed to be an acceptance of the dedication of any public street, road or highway dedicated in the plat. Such streets and highways and the improvements therein shall be accepted as public ways and public improvements under the provisions of Section 711.091, Ohio Revised Code.

6. ***1-Year Maintenance Period***. A one-year maintenance period shall commence after the Final Inspection and completion of any punch list items and the street has been dedicated as public. During this time, a maintenance bond in the amount of 10% of the cost of the improvements shall be held by the City to cover any defects in construction of the improvements as determined by the City. After this period, the bond may be released to the Owner/Developer.

7. ***Plat Approval.*** Before the final plat is approved, the subdivider must either (1) complete all improvements, or (2) furnish Performance Bond in form and amount detailed in 1206.02 of the Codified Ordinances.

8. ***Occupancy Certificates.*** The Chief Building Official shall not issue a certificate of occupancy until the subdivider has satisfactorily graded the right-of-way, and installed water mains, storm drainage facilities, sanitary sewers, curbs, gutters, sidewalk and roadway asphalt pavement to within 1-inch of the final grade.

9. ***City Share (Within Corporate Limits of City of Middletown Only).*** Upon submittal, the Engineering Division will review the plans, and based upon the land use, will make a determination of the minimum size of water mains, sanitary sewer mains, and pavement width required for such a development. The City may share in the cost of infrastructure required by the City in addition to what is required for the development according to Chapter 1206.20 of the Codified Ordinances. Where the City has agreed to share in the cost of extra infrastructure the City will reimburse the developer following the Pre-Final inspection provided that all required record drawings, final plat, and drawing files have been received and approved by the City.

EASEMENTS

All easements that are included within the boundary limits of the subdivision shall be shown on the final plat. All easements that are necessary for the development of the subdivision, but are outside the boundary limits of the subdivision, must be conveyed by separate document (other than by dedication on the final plat). Said easements (whether temporary or permanent) must be conveyed directly from the property owner to the City of Middletown. "Assignments" of easements will not be accepted. For all easements proposed outside of the subdivision limits, the Developer shall submit a recordable copy of the easement deed with all required legal descriptions, signatures, etc. Following City approval of the documents, the developer shall record the easements and provide the City with a copy of the recorded documentation with the as-built drawings for the subdivision.

Easement widths shall be per the following table:

MINIMUM EASEMENT WIDTH –	20'
MINIMUM EASEMENT WIDTH – Invert depth 9-feet to 12-feet	25'
MINIMUM EASEMENT WIDTH – Invert depth 12-feet to 15-feet	30'

SURVEYOR'S MARKERS

Surveyor markers shall be installed for each subdivision as per OAC 4733-37. When a subdivision is created from a piece of property or several adjoining pieces, all newly created lots, blocks, rights-of-way, angle points, points of curvature and points of tangency shall be monumented. Additionally, street rights-of-way shall be monumented with railroad spikes on the centerline. Centerline monuments shall be set at all intersections, angle points, points of curvature, and points of tangency and shall be shown on the final plat.

The surveyor shall set boundary monuments so that, upon completion of the survey, each corner of the property and each referenced control station will be physically monumented. At least four 1" iron pin markers shall be set at the primary subdivision corners, or at least four of the primary 5/8" iron pin markers shall be set in 4"x4"x30" of concrete. Additionally, at least two benchmarks shall be established with each development. When it is impossible or impracticable to set a boundary monument on a corner, the surveyor shall set a reference monument, similar in character to the boundary monument and preferably along one of the property lines which intersect that corner. When such a reference monument is used, it shall be clearly identified as a reference monument on the plat of the property and in any new deed description which may be written for the property. Every boundary monument and-or reference monument set by the surveyor shall, when practicable:

1. Be composed of durable material;
2. Have a minimum length of thirty (30) inches;
3. Have a minimum cross-section area of material of 0.21 square inches;
4. Be identified with a durable marker bearing the surveyor's Ohio registration number and/or name or company name;
5. Be detectable with conventional instruments for finding ferrous or magnetic objects.

When a case arises due to physical obstructions such as pavement, large rocks, large roots, utility cables, etc., so that neither a boundary monument nor a reference monument can be conveniently or practicably set as stated above, then alternative monumentation, which is essentially as durable and identifiable shall be established for the particular situation.

All markers and monuments must be set prior to Final Inspection of the subdivision.

STORM WATER

DRAINAGE PLAN

A drainage plan shall be submitted with the engineering drawings. The plan must evaluate existing water courses, channels, storm sewers, culverts and proposed improvements pertaining to drainage and flood control in regards to their ability to handle the anticipated flows and the 100-year flood routing through the development.

Storm sewer systems will typically be designed for a 10-year design storm and open channels for a 25-year design storm in minor systems; 25-year and 50-year respectively for storm sewers and channels in major drainage systems (200-acres drainage area is the threshold for minor vs. major system). The Engineering Division may require more stringent design standards in situations where potential damage to future/existing developments is anticipated. The plan must indicate what happens to excess runoff during a 100-year design storm and show flood routing through the proposed development.

The drainage plan shall be compatible with area-wide drainage plans and drainage plans for adjacent areas.

Generally, the storm sewers will be in the street area. However, in certain cases the route of the sewers may be through private property (easements to be provided) because of the topography of the land.

Where a storm sewer of 48” or larger is required, and where the location is outside of the right-of-way, drainage may be provided by means of open ditches in drainage easements.

The maximum time of concentration to a catch basin in a residential subdivision is 20-minutes. The acceptable post-developed time of concentration will not be greater than the pre-developed.

All proposed developments within an area identified as a flood hazard area shall comply with the provisions of the City floodplain ordinance.

An acceptable drainage plan will generally include the following:

1. The existing peak runoff rates for 10, 25, 50, and 100-year events for the entire drainage basin draining to the development.

2. The pre-developed and post-developed design runoff rates from the development itself.

3. The capacity of proposed storm sewer outfalls; existing downstream storm sewers, swales or channels proposed to receive discharge from the development.

4. A topographic map of the area with contour interval acceptable to the Engineering Division.

5. Any apparent pollution of water courses or ditches.

6. 100-year design flood overflow routes.

Depending on the results of a drainage analysis, the Engineering Division may require any or all of the following:

- HEC-RAS analysis of streams on or adjacent to the subdivision may be required for watersheds consisting of more than 400-acres drainage area.
- Design for a less frequent storm event (i.e., a 100-year storm design in lieu of a 25-year design).
- Existing or proposed minimum opening elevations for adjacent structures.
- Cross-sections of a channel adjacent to or downstream of the development.
- Design of storm water storage basin(s) as detailed in this manual.

The developer of a subdivision may relocate or rechannel a natural drainage course to better lot conditions provided there is no water diversion created beyond the limits of his property and that the developer obtains any required state and federal permits.

Where two parcels of land belonging to different owners lie adjacent to each other, and one parcel naturally lies lower than the other, the lower parcel owes a servitude to the higher.

The City does not accept any open channel drainage easements, and is not obligated to maintain or repair any channels or installations (culverts, bridges, etc.) in said easements. The easement area of each lot and all improvements in it shall be maintained continuously by the owner of the lot or legal homeowners' association. Within these easements, no structure, planting, fencing, culvert, or other material shall be placed or permitted to remain which may obstruct, retard or change the direction of the flow of water through the drainage channel in the easement.

STORAGE BASIN DESIGN REQUIREMENTS

The City policy on detention basins will be to primarily use regional basins. Smaller basins may be required on-site due to the surrounding drainage features (Section 1206.06). However, single residential lots and/or total areas disturbed equaling less than 7500 square feet are exempt from detention/retention requirements.

Runoff and volume calculations shall be performed by the methods of the Soil Conservation Service Technical Release 55 (TR-55), latest version.

TR-55 curve numbers for fully developed conditions shall be determined assuming Type "C" soil regardless of undeveloped soil types with the theory being that the soil characteristics of Type A and B soils more closely resembles Type C after mass grading and compaction from heavy equipment.

The maximum time of concentration to a catch basin in a residential subdivision is 20-minutes. The post-developed time of concentration shall not be greater than the pre-developed.

Detention/retention basins shall be sized for post-development runoff as required to provide the greater of the 25-year volume plus one foot to the emergency spillway or the 50-year storage volume at or below the emergency spillway. The storage requirements may be increased for a less frequent design storm if there is a potential for property drainage downstream.

A. Allowable Release Rates:

For Design Storm	**The Release Rates May Not Exceed**
10, 25, 50-year post-developed	10-year predeveloped
5-year post-developed	5-year predeveloped
2-year post-developed	2-year predeveloped

B. Curve number SCS TR-55 Manual
The appropriate curve numbers for the predeveloped runoff rates shall be determined from Tables 2.2 (a, b, c) using the existing hydrologic soil groups and cover types.

The post-developed runoff volumes shall be based on curve numbers for hydrologic soil group "C" in Table 2-2(a) unless otherwise directed by the Engineering Division.

C. A geotechnical investigation may be required to determine if the existing soil conditions are suitable for proposed storage basins.

Detention Basin Construction Requirements:

The following items shall be provided where applicable.

a. 3:1 maximum (4:1 preferred) side slopes.

b. Bar screen over the orifice (lower orifice if multi-staged outflow).

c. Bolted-down grate on top of outlet structure.

d. The basin outlet structure will consist of either a headwall fitted with an orifice plate for single staged discharge or a 4' min. x 4' min. concrete outlet structure for multi-staged discharge. Standpipes are not permitted.

e. A grating, rebar or concrete divider shall be provided such that no window openings exceed one square foot except in cases where the minimum opening dimension does not exceed 6".

f. Privately maintained basins shall be situated a minimum of 100-feet from the right-of-way line to the top/slope unless otherwise approved by the Engineer.

g. A twenty-foot (20') access easement shall be provided to the basin outlet structure.

h. 1 percent minimum grade for grass areas of basin.

i. One-half percent minimum grade for paved gutters.

j. The minimum opening elevations (M.O.E.) for proposed structures on lots adjacent to detention basins or emergency overflow channels shall be the lesser of 1.5 feet above the emergency spillway elevation or 2.0' above the overflow channel flow line perpendicular to the opening. The M.O.E. shall be labeled on the final plat.

k. Record Drawings including a topo (one-foot contour interval) of the detention basin(s) and volume calculations.

l. A delineating fence may be required.

m. Provisions for a legal body such as a Home Owners Association responsible for maintenance activities (if appropriate).

Retention Basin Construction Requirements:

The following shall apply where applicable:

a. 2:1 maximum (3:1 preferred) side slopes.

b. Items, b, c, d, e, g, j, k, l, of the Detention Basin Design Requirements.

c. Privately maintained basins shall be located 100-feet from the right-of-way line to the top of bank unless the basin is designed to be an amenity to the development and acceptable to the City.

REDEVELOPED PARCELS

Detention/retention plans for redeveloped parcels shall meet the criteria outlined above for new construction with the following clarifications/modifications:

a. For redeveloped parcels that drain to a combined sewer system or that contribute to a known problem drainage area, the pre-developed condition shall be considered as if the entire drainage area was pervious with the exception of asphalt parking lots that are to be resurfaced only. Existing asphalt parking areas that are to be resurfaced only shall be considered impervious for pre-developed calculations.

b. For redeveloped parcels not meeting the requirements of (a) above, the pre-developed condition shall be considered as existing.

CULVERTS

Culverts shall be designed to carry a predetermined peak discharge without the depth of water at the entrance, or the velocity of the water at the outlet exceeding allowable limits. Use the Ohio Department of Transportation Location and Design Manual, Volume Two, Chapter 1105, and nomographs therein, as the basis for design.

The allowable headwater is the most conservative of the following:

1. 50-year 1-foot below the edge of pavement.

2. 1.5-foot below the minimum 100-year opening elevation of residence.

3. The elevation of which an upstream sewer system begins to surcharge out of the curb inlets after calculating head loss for a 10-year design storm through the sewer system with the sewer system conveying the 10-year design flow.

4. If the proposed culverts are to be installed on a zero slope, (level), for purposes of computations use:

   A. A slope of 0.002 feet/foot for concrete pipes.

   B. A slope of 0.004 feet/foot for corrugated metal pipes or pipe arches.

   C. A slope of 0.010 feet/foot for structural plate pipe or pipe arches.

5. If the mean outlet velocity is less than 5 feet/second, no slope protection is required downstream from the culvert outlet. If the mean velocity is between 5 feet/second and 18 feet second, use dumped rock channel protection as per Fig. 1107-1 of the ODOT Location and Design Manual Vol. II. If the mean outlet velocity is greater than 18 feet/second, special designed protection is required.

OPEN DITCHES

Design to handle estimated runoff for 25-year frequency storm for a minor drainage system (less than 200 acres) and 50-year for a major system so that it meets *all* of the following criteria:

1. Minimum free board of 1-foot.

2. The design flood elevation in the channel does not surcharge upstream sewer system out of curb inlets assuming sewer system conveys a 10-year design storm.

3. The 100-year flood elevation of 1.5-foot minimum below the minimum opening elevations.

4. Drainage easement includes 50-year flood area.

For drainage areas less than 400 acres, base channel design on Manning Formula ($V = 1.486/n \times R^{2/3} \times S^{1/2}$). For drainage areas greater than 400 acres, a HEC-RAS Study may be required.

MINIMUM SIDE SLOPES	GRASSED (SOD)	PAVED (CONCRETE)
Desired	4:1	4:1
Maximum	3:1	2:1

In grassed channels, require paving (or rip rap) at all channel curves and all channel junctions with other channels. Open ditches are permitted outside of the public right-of-way where a storm sewer 48-inch or larger is required to convey the design flow.

STORM SEWER DESIGN CRITERIA

Design flowing full to handle estimated runoff for 10-year frequency storm.
Estimate runoff by Rational Method (Q = CIA) for draining areas less than 100 acres.

Base design on Manning Formula: $Q = (1.486/n) R^{2/3} S^{1/2} A$

MINIMUM SIZE	12”	
MINIMUM COVER	1.0’ below subgrade	
MINIMUM SLOPE (INLET LEADS)	0.50%	
MINIMUM MEAN VELOCITY	3.0 fps	
MAXIMUM MEAN VELOCITY	10.0 fps	
MAXIMUM MANHOLE SPACING	350’ (36” and under)	
MANHOLE PLACEMENT	Intersections; termini of sewers, changes in size and/or slope; changes in alignment (36” and under)’ at points where inlet leads are to be connected.	
INLET SPACING (EACH SIDE OF STREET)	250’ maximum	
INLET PLACEMENT (EACH SIDE OF STREET)	All pockets; dead end of descending streets at P.C. and P.T. of all intersection radius curves where curb and gutter grade descends toward radius curve. (Locate on property line extended or at mid-lot.)	
INLET TIME	First 300 feet – Determine from Overland Flow Chart (Max. = 20 Min.) For shallow unchannelized flow use Fig. 3.1 of SCS Tr-55 manual. For channelized flow, estimate velocity using Manning’s Formula.	
INTENSITY OF PRECIPITATION	Frequency/Years 2 5 10 25 50 100	Formulas I = 106/(Tc+17) I = 131/(Tc+19) I = 170/(Tc+23) I = 230/(Tc+30) I = 250/(Tc+27) I = 300/(Tc+31)
ROUGHNESS COEFFICIENTS (“n”)	Corrugated Metal Pipe, Aluminized Corrugated Ultra-Flo Corrugated Plastic Concrete Pipe Smooth Flo Plastic	Per manufacturer’s specs 0.013 Per manufacturer’s specs 0.012 0.011

STORM SEWER DESIGN CRITERIA (Cont'd)

TIME OF SELECTING CONCENTRATION	Maximum 20 minutes to first catch basin in residential area. Maximum unsewered length of rear/side yard swale 500' or 2.5 acres drainage area, whichever is less. (2% minimum slope or 1% minimum slope with underdrains extended under swale flow line at least one lot width – in both directions if necessary - from drainage structure)		
RUNOFF COEFFICIENTS ("C")	Business	Downtown Areas	0.70 to 0.95
Description of Area		Neighborhood Areas	0.60 to 0.75
	Residential	Single-family areas	0.40 to 0.50
		Multi-family areas	0.60 to 0.75
	Parks, Playgrounds		0.25 to 0.40
	Cemeteries		0.25 to 0.40
	Railroad yard areas		0.35 to 0.45
Character of Surface	Streets	Asphaltic	0.90
		Concrete	0.90
	Drives and walks		0.90
	Roofs		0.85
	Lawns	Flat 2%	0.20 to 0.25
		Average, 2 to 7%	0.25 to 0.35
		Steep, 7%	0.35 to 0.40
INLET TYPES			
Single grate catch basins	For all street grades up to and including 3%.		
Double grate catch basins	Use for all low points and street grades in excess of 3%.		

Spacing shall be governed by (a) the 2" allowable depth of gutter flow based upon a 10-minute time of concentration and a 10-year storm, or (b) a 250' interval, whichever is smaller.

For Middletown Type 4 catch basins, 12" storm sewers will be permitted to be installed from catch basin to catch basin. For 15" and larger sewers, the catch basins will outlet to manholes connected by the trunk line.

SANITARY SEWERS

SANITARY SEWER DESIGN CRITERIA

Design flowing full at maximum estimated rate of flow plus ground water infiltration allowance.
Volume Base Rate on Manning Formula.
$Q = (1.486/n)\ R^{2/3}\ S^{1/2}\ A$

MINIMUM SIZE		Main -- 8" Diameter Service – 6" Diameter		
MINIMUM DEPTH		Sufficient to drain basements, prevent freezing, and maintain vertical clearance of 18" beneath water main (bottom of water main to top of sewer)		
SLOPES (Based on "n" = 0.013)		Size	Minimum	Maximum
		6"	2.08%	
		8"	0.40%*	22.0%
		10"	0.28%	15.0%
		12"	0.22%	11.5%
		15"	0.16%	7.0%
		18"	0.12%	6.5%
		21"	0.1%	5.0%
		24"	0.08%	4.2%
PIPE MATERIALS	Sewer Main (15" Dia. or smaller)	Truss Pipe (Contech), or approved equal		
	Sewer Main (Over 15" Dia.)	A 2000 (Contech), or approved equal		
	Service Laterals	SDR 35, Extra Strength, Solid Wall		
MINIMUM MEAN VELOCITY		2.0 fps		
MAXIMUM MEAN VELOCITY		15.0 fps		
AVERAGE DAILY FLOW		100 gallons per capita		
POPULATION DENSITY (R-1 ZONE)		4 capita per lot		
PEAKING FACTOR (Peak Hourly to Design Average)		Q (Peak) / Q (Design) = $(18 + \sqrt{P}) / (4 + \sqrt{P})$, where P = population in thousands		
INFILTRATION ALLOWANCE		25 (Gal. x inch diameter) / (Acre x day x mile sewer)		
MAXIMUM MANHOLE SPACING		400' (15" and under), 500' (18" and over)		
MAXIMUM VERTICAL FALL IN NON-DROP MANHOLE		2' (Measured invert to invert)		
MANHOLE PLACEMENT (36" and under)		Intersections; termini of sewer; changes in size And/or slope; changes in alignment.		
MINIMUM HORIZONTAL SEPARATION WATER LINE		10'		
MINIMUM VERTICAL SEPARATION FROM WATER LINE		1.5' **		

* For terminal mains on cul-de-sacs or dead end streets, the minimum slope for an 8-inch sewer is 1.00%.

** Where 1.5 feet separation between a water main over a sanitary lateral cannot be obtained or all cases where a sanitary lateral crosses over all water mains, the sanitary lateral shall consist of an 18' to 20' length of ductile iron Cl. 350 pipe centered over / under the water main.

No roof drains, foundation drains, sump lines, and other clean water connections shall be connected to the sanitary sewer system.

WATER MAINS

WATER LINE DESIGN CRITERIA		
Design for estimated <u>maximum</u> <u>day</u> rate of flow, or <u>fire</u> <u>flow</u> *<u>plus</u>* estimated <u>average</u> <u>day</u> rate of flow, whichever is more demanding. **Base design on Hazen-Williams formula: $V = 1.32CR^{0.63}S^{0.54}$(ft/s)**		
PIPE MATERIAL	Main Service	Ductile Iron Pipe, Pressure Class 350 Copper (Type K) to Curb Stop)
ROUGHNESS COEFFICIENT	Main Service	140 130
MINIMUM SIZE	Main System Loop Service	8" Dia. 6" Dia. ¾" Dia.
MINIMUM DEPTH (TO TOP OF PIPE)	Main Service	4' 3½'
MAXIMUM DEPTH (TO TOP OF PIPE) (Except where utilities must be underpassed)	Main Service	5' 5'
POPULATION DENSITY (R-1 ZONE)	4 Capita Per Lot	---
CURRENT DEMAND RATE (AVG. DAY)	100 gpd/c	---
FUTURE MAX. DAY/AVG. DAYRATIO (Based on 1990)	1.8	---
FUTURE MAX. HR./MAX. DAY RATIO	2.5	---
MINIMUM PRESSURE (NO FIRE)	Main	40 psi
MINIMUM FIRE DEMAND (AT HYDRANT)	600 gpm over 75' between residences 800 gpm less than 75' between residences	---
MAXIMUM FIRE HYDRANT SPACING	500' (residential)	(For new subdivisions, all residential structures shall be located within 250 feet of a fire hydrant.)
MAXIMUM CONTROL VALVE SPACING	500'	---
INTERSECTION CONTROL VALVES	Cross-Intersection Tee-Intersection	4 3
MAXIMUM VELOCITY	8.5 fps	---
MAXIMUM MAIN LENGTH WITHOUT PURITY TEST STATION	1200'	---
Fire hydrants shall be located at all intersections.		

NOTE: These tables are included for general information only. See the City of Middletown Utility Rules and Regulations for more detail.

WATER SERVICES AND METERS

SERVICES & METERS MINIMUM SIZE				
RESIDENTIAL			COMMERCIAL – INDUSTRIAL	
FAMILIES	SERVICE	METER	MAX. FLOW DEMAND (GPM)**	METER
1	0.75"*	5/8" x 0.75"	20	0.625" x 0.75"
2 – 5	1"	1"	30	0.75"
6 – 8	1.5"	1.5"	50	1"
9 – 12	2"	1.5"	100	1.5"
13 – 20	2"	2"	160	2"
21 – 50	4"	3"	320	3"
51 – 115	4"	4"	500	4"
* Wherever the distance from water main to meter exceeds 100 feet, the minimum size of service shall be 1 inch.			** The service demands determined by future units.	
FIRE LINES				
Services shall be 6-inch minimum, but may not exceed size on water main.				

WATER SERVICE TAPS MAXIMUM SIZE				
Pipe Size	6	8	10	12
Tap Size	2	1.25	1.5	2
If larger size services are required (up to and including 2-inch), the connection must be made with a pipe saddle. If larger size services are requested (over 2-inch), a tapping sleeve and valve must be installed.				

NOTE: These tables are included for general information only. See the City of Middletown Utility Rules and Regulations for more detail.

ROADWAY

TRAFFIC IMPACT STUDY

A Traffic Impact Study (TIS) shall be submitted with the site, subdivision, or development plan if the development is expected to generate more than 50 peak-hour trips or 500 daily trips. One of the three formats outlined below shall be used, depending on the characteristics of the site. A change in zoning of a site may also prompt a traffic study even if the criteria below are not met. Large developments that are phased over time may be required to submit a traffic study addressing the total volume generated from the site, in addition to volume at each phase of the development. The need for a Traffic Impact Study will ultimately be determined by the Director.

A site access evaluation which addresses sight-distance and traffic control at all access points is required of all new developments and major alterations of existing developments, even if a Traffic Impact Study is not required.

The Institute of Transportation Engineers, *Trip Generation*, latest edition, shall be used to calculate the number of trips generated by the development.

TIER 1 (Abbreviated):

When Required:

(a) The development produces 50-100 peak-hour trips or 500-750 daily trips

(b) The development will affect another mode of travel

Examples: Small church, car wash

Includes:

1. Evaluation of site access, including layout of access points, turning lanes, opposing driveways, and sight-distance.

2. Traffic generation analysis, including the number of daily trips generated by the site, the number of peak-hour trips generated, and the trip distribution shown on a diagram.

3. Consideration of the following: pedestrians, bicycle traffic, accommodation of school buses, and inclusion in city bus routes.

TIER 2 (Standard):

When Required:

(a) The development produces more than 100 peak-hour trips or more than 750 daily trips

(b) The development is expected to reduce the LOS to below a “C”

(c) A LOS lower than “C” already exists on an adjacent roadway

(d) The site is within 500’ of a high-crash location

(e) A proposed access is within 500’ of an intersection or 250’ of a high-volume generator

(f) The traffic generated will increase the ADT by 25% or more

(g) Volumes of 10,000 ADT or more exist on adjacent roadways

(h) Other conditions exist that may be negatively impacted by the development

Examples: Elementary school, medical office building, restaurant, gas station, bank

Includes:

1. Evaluation of site access, including layout of access points, turning lanes, opposing driveways, and sight-distance.

2. Traffic generation analysis, including the number of daily trips generated by the site, the number of peak-hour trips generated, and the trip distribution shown on a diagram. A table shall be provided to show each category of land use within the site, corresponding trip generation rates for each, and the resulting traffic generated from each.

3. Determination of study area. This area should include all access points, nearby intersections, roadway segments, and any other point deemed critical by the Director. "Nearby intersections" may be limited to any intersection in which site-generated traffic accounts for at least 5% of the total intersection volume.

4. Analysis of present traffic conditions (without the development) within the study area, including traffic volume, capacity analysis, level of service, and signal warrant analysis.

5. Analysis of present traffic conditions within the study area, with the addition of site-generated traffic. The analysis should include traffic volume, capacity analysis, level of service, and signal warrant analysis if applicable. The analysis should address traffic at every major phase of the development, as well as completion year.

6. Analysis of future traffic conditions (without the development) within the study area, including traffic volume, capacity analysis, level of service, and signal warrant analysis. An appropriate growth factor should be used to calculate the future volume twenty years after build-out.

7. Analysis of future traffic conditions within the study area, with the addition of traffic from the site at full build-out. The analysis should include traffic volume, capacity analysis, level of service, and signal warrant analysis. An appropriate growth factor should be used to calculate the future volume in twenty years after the project completion date.

8. Mitigation identification and evaluation

9. Consideration of the following items: pedestrians, bicycle traffic, accommodation of school buses, and inclusion in city bus routes.

TIER 3 (Expanded):

When Required:

(a) The development is expected to have widespread impacts on the traffic system, affecting multiple signals and/or a major corridor

(b) The Director requires that a computer analysis and simulation be used to identify traffic impacts

Examples:

Shopping center, industrial park, major retail development

Includes:

1. Tier 2 Traffic Impact Study

2. Computer simulation/model to aid in traffic management mitigation. The developer is responsible for utilizing software that is compatible with that used by the city's Engineering Division for traffic analysis.

3. Analysis of accident history and safety improvement strategy.

Additional information may be required by the Director, and alternate traffic routing plans may be necessary to alleviate congestion and improve safety at access points. The City of Middletown encourages the use of joint access between adjacent developments to simplify ingress/egress movements.

ACCESS MANAGEMENT

Functional Roadway Classification. Functional roadway classification is the most important step towards access management and control. It defines and regulates the development and assignment of access levels. The roadway classifications in the city are based primarily upon traffic volumes and capacity, operating speeds, and trip distances. The classifications also take into consideration the functions performed by the roadway; traffic flow intensity and characteristics; linkages between activity centers, land usage and areas served; and system continuity and design features. The classifications are as follows:

(a) Freeways. Freeways typically carry high volumes of traffic at high speeds over long distances. For freeways, maximum priority is assigned to mobility and minimum priority is assigned to access functions. Freeways are complete access-controlled roadways with access at interchanges only.

(b) Major arterials. Major arterials carry a significant amount of through traffic. They also serve as the primary access channels for traffic originating from the City to the interstates and vice-versa. Direct property access may be provided if no reasonable alternate access from an intersecting street is available. Development patterns in the City suggest a significant amount of development in and around these roadways, with direct property access having been granted from these roadways. However, when granting future access permits, it is important that the stipulations mentioned in these guidelines are followed, assuring that such grants do not interfere with the primary function of providing efficient (if possible, uninterrupted) through traffic movement.

(c) Minor arterials. The primary distinguishing features between major and minor arterial roadways are the volume of through traffic, operating speeds, and the respective priorities assigned to providing through traffic movement and access to abutting developments. The priority assigned to providing through traffic movement is marginally lower for minor arterials when compared with that assigned to major arterials. Also, minor arterial roadways are not necessarily the primary carriers of traffic to and from the city. They either serve as connectors between major arterial roadways and collector streets, or act as auxiliary channels for carrying through traffic to and from remote locations and from major arterial roadways. Essentially, minor arterial roadways perform the role of a major arterial roadway in cases where the trip distances are significantly lower.

(d) Collectors (Major/Minor). Collector streets serve as connectors for traffic flow between the arterial roadways and the local streets. Collector streets are vital links for collection and distribution of traffic to and from the local streets, with equal priorities assigned to the functions of providing through traffic flow and access to abutting land developments. Hence it is important that the City focuses its attention on preserving the functional integrity of existing collector streets, and also prevent the future roadways (designated as collectors) from losing the balance between through traffic flow and access functions. It is essential that collector streets do not carry excessive volumes of through traffic. This would defy their purpose as well as increase the risk of accidents due to excessive speed differentials at intersections.

(e) Local/Private streets. The purpose of local streets is to provide direct access to abutting properties and land developments. The most important function for these streets is access provision, while through traffic movement on these streets is secondary. Any access restrictions imposed on local streets will be only for safety purposes. All streets in the City that are not otherwise classified are local streets.
Private streets provide access to individual private properties that are located within a large tract of private property (e.g., condominiums and business parks.)

(f) Alleys. An alley provides access to the rear or sides of lots or buildings. Alleys are not intended to provide access for through traffic.

FUNCTIONAL ROADWAY AND ACCESS CLASSIFICATION

Roadway Type	Posted Speed Limit (mph)	Traffic Characteristics and Roadway Function	Direct Property Access	General Design Features	Operational Standards	Public Access Provision
Freeway: Category 1	Min: 55	High volumes of traffic at high speeds over long distances. Serves major interstate and intrastate travel demand	Not permitted	Multi-lane; median	All opposing traffic movements physically separated by grade separations and medians	Only through interchange
Major arterial: Category 2	Min: 50 in areas without signals, 45 in areas with signals (may be lower in highly developed sections)	High volumes of traffic at relatively high speeds over long distances. Serves interstate, interregional, intercity, and some intra-city travel demand	Not permitted or restricted; when permitted see note (a)	Multi-lane with median preferred	Signalized intersection spacing; urban areas: 1/2 mile (1/4 mile when no other reasonable access). Rural area: 1 mile (1/2 mile when no other reasonable access)	At-grade public street intersections
Minor arterial: Category 3	Min: 45 in areas without signals, 35 in areas with signals (may be lower in highly developed sections)	Moderate to high volumes of traffic at moderate to high speeds over moderate distances. Serves interregional, intercity, and intra-city travel demand	Not permitted or restricted; when permitted see note (a)	Multi-lane with median preferred	Signalized intersection spacing; urban areas: 1/2 mile (1/4 mile when no other reasonable access). Rural area: 1 mile (1/2 mile when no other reasonable access)	At-grade public street intersections
Collector: Category 4/5	Min: 35 - 55 in undeveloped areas, 25 – 45 in developed areas (may be lower in highly developed sections)	Moderate volumes of traffic at low to moderate speeds over short to moderate distances. Serves intercity, intra-city, and local travel demand	See notes (b) and (c)	3-lane with turning movements	Signalized intersection spacing; urban areas: 1/2 mile (1/4 mile when no other reasonable access). Rural area: 1 mile (1/2 mile when no other reasonable access)	At-grade public street intersections
Local street: Category 6	Max: 25	Provides access to and from local developments, to and from collectors	Permitted	2-lane	All standards subject to case-by-case safety requirements	At-grade public street intersections
Alleys: Category 7	Max: 15	Provide access to rear or sides of lots or buildings. Not for through traffic	Permitted	1- or 2-lane	All standards subject to case-by-case safety requirements	At-grade public street intersections
Private street	Max: 25	Provides access to and from local developments, to and from collectors	Permitted	2-lane	All standards subject to case-by-case safety requirements	At-grade street intersections

(a) When direct property access is provided to major arterials or minor arterials, it is limited to right in entry and right out exit only. Left turn movements may be considered on a case-by-case basis, taking into account the Traffic Impact Study (TIS), existing and future access spacing and any other relevant criteria the Director deems appropriate.

(b) Residential driveways are not permitted and commercial driveways are restricted by number, sight distance, and spacing.

(c) Restricted by volume, speed, sight distance, and spacing.

Access spacing regulations establish standards of access spacing for the different access levels. Different sets of standards apply to signalized intersections, unsignalized intersections, driveways, and lateral accesses.

(a) Interchanges and Signalized Intersections. The very nature of the access spacing guidelines for interchanges and signalized intersections makes it impossible to require that all spacing distances be exact. Roadway and access designs should conform to the specifications in this manual as closely as possible. When a new interchange or signalized intersection is proposed, the applicant shall provide justification for the proposed location. Final approval shall be obtained from the Director.

(b) Unsignalized Intersections and Driveways. Minimum spacing regulations have been set for unsignalized driveways and roadways. The intent of these regulations is to avoid significant delays and/or accidents caused by frequent access points along a given roadway. The spacing regulations are based upon the type of traffic volume generated or land use, and its location along a given roadway, and the roadway classification.

(c) Lateral Access. Lateral access regulations have been developed to regulate the distance between the first driveway or unsignalized street on either side of an intersection. Lateral access regulations are intended to:

(1) Provide for sufficient vehicle stacking distance at intersections so that vehicles backed up at a traffic signal will not block the use of the driveway.
(2) Ensure that vehicles turning left through an intersection and into the lateral access do not back up into the intersection and block through movements.
(3) Ensure that vehicles turning out of driveways have sufficient time to either cross the traffic lanes with a left turn movement; or turn right and accelerate sufficiently, without risk of conflict from a car coming around the corner.

ACCESS SPACING REGULATIONS – INTERSECTIONS AND DRIVEWAYS [(a)]					
Roadway Type	**Posted Speed Limit (mph)**	**Minimum Spacing for Roadways and Non-Residential Driveways (feet)**			
		Distances based on Roadway Types, Speed Limits, and Safe Sight Distances			
		Driveway Spacing (b)(c)(d)	**Unsignalized Intersections**	**Signalized Intersections**	
Major arterials	55	To be determined by ODOT and/or TIS	To be determined by ODOT and/or TIS	To be determined by ODOT and/or TIS	
	50				
	45				
	40				
Minor arterials (e)(f)	50	450	1000	2000	
	45	400		2000	
	40	350		1500	
	35	200		1500	
	30	250		1000	
Collectors	45	400	750	1500	
	40	350		1500	
	35	300		1500	
	30	250		1000	
	25	200		750	
Local	25	150	250		

(a) Any spacing variations are subject to the findings of the TIS and approval of the Director.

(b) A full service drive will not be permitted within 150' of an area striped for turn lanes or the short diverging taper for the turn lanes unless TIS determines that a different value is appropriate.

(c) High volume drives that do not meet signal warrants shall be restricted to right in/right out movements from the driveway if traffic volumes and conditions would make full movement operation unsafe.

(d) The lateral access (first drive access from the nearest roadway intersection) spacing shall be the driveway spacing for the speed limit above the posted speed limit for a specific roadway.

(e) Spacing for high volume driveways shall be determined through the TIS.

(f) No direct property access shall be permitted if property has other reasonable access or opportunity to obtain such access. If allowed, access will generally be restricted to right in/right out only.

ROADWAY DESIGN CRITERIA				
	LOCAL	**COLLECTOR**	**MINOR ARTERIAL**	**MAJOR ARTERIAL**
MINIMUM STREET PAVEMENT WIDTH (BACK OF CURB TO BACK OF CURB)	29’	41’ ~ 2 lanes with parking or 3 lanes	By Design	By Design
MINIMUM CENTERLINE GRADE (Attempt to keep Centerline grades divisible by 4)	0.50%	0.50%	0.50%	0.50%
MAXIMUM CENTERLINE GRADE	8.00%	6.00%	5.00%	4.00%
MAXIMUM CENTERLINE GRADE APPROACHING MINIMUM CENTERLINE RADIUS	6% 190.99’	4% 409.26’	2% 636.63’	2% 1432.40’
MINIMUM DEGREE WITHOUT SUPER ELEVATIONS	PER ODOT LOCATION & DESIGN MANUAL			
MINIMUM LENGTH OF VERTICAL CURVE (Vertical curve lengths shall be multiplies of 50. Should be decreased approaching intersections.)	PER ODOT LOCATION & DESIGN MANUAL			
MAXIMUM ALGEBRAIC DIFFERENCE IN RATE OF GRADES WITHOUT REQUIRING VERTICAL CURVE	1.00%	1.00%	0.75%	0.50%
MINIMUM SPACING OF BREAKS IN CENTERLINE GRADE	200’	300’	350’	400’
MINIMUM BACK-OF-CURB RADIUS AT INTERSECTION (FOR 90º INTERSECTION OF CENTERLINE)	30’	50’	60’	70’
	(If intersection occurs at angle other than 90º, it shall be rounded with a curve of a radius acceptable to the Engineering Division.)			
MINIMUM INTERSECTING ANGLE OF CENTERLINES AT INTERSECTIONS (NON-SIGNALIZED)	70º	80º	80º	80º
MINIMUM HORIZONTAL SIGHT DISTANCE (Measured on centerline)	PER ODOT LOCATION & DESIGN MANUAL			
MINIMUM VERTICAL SIGHT DISTANCE	PER ODOT LOCATION & DESIGN MANUAL			
MINIMUM RIGHT-OF-WAY LINE RADIUS AT STREET INTERSECTIONS	20’	35’	40’	50’
MINIMUM DIAMETER OF CUL-DE-SAC, RIGHT-OF-WAY	100’	---	---	---
MINIMUM DIAMETER OF CUL-DE-SAC, PAVEMENT BACK TO BACK OF CURB	80’	---	---	---

PAVEMENT THICKNESS

The minimum pavement thickness for local and collector streets shall be the following: (In inches)

ODOT SPEC	LOCAL	COLLECTOR
448 TYPE 1 SURFACE	1.25	1.25
448 TYPE 2 INTERMEDIATE	1.75	1.75
301 ASPHALT CONCRETE BASE	5	7
TOTAL	**8**	**10**

4" of 304 aggregate base is required under all pavement unless otherwise approved by the Engineer.

The City reserves the right to increase the pavement thickness or require additional subgrade preparation as typical traffic loadings are anticipated or if poor soils are encountered. For arterials, the pavement thickness shall be determined as outlined in the Ohio Department of Transportation Location and Design Manual Vol. 1.

STREET INTERSECTIONS

The primary safety consideration at intersections should be for vision. The inevitable conflict between vehicles approaching on a collision course requires that drivers see each other far enough in advance to yield.

Intersections should be at approximately right angles. Skewed or Y intersections have obvious disadvantages, in that sight distances at half of the corners are reduced to unsafe minimums. Thus, it is desirable that, regardless of the overall line of the new street, it be turned to approach the intersection at approximately ninety degrees.

Longer radii may be required in locations where truck or bus traffic may be anticipated, or if the street to be entered is unduly narrow.

Handicapped-accessible ramps shall be constructed at all intersections having sidewalks, and shall meet ADA specifications. In new subdivisions, handicapped-accessible ramps shall be installed with the initial construction of the curb and shall include all associated sidewalk necessary to achieve the required slope from the normal sidewalk section.

STREET LIGHTING

These street lighting standards are intended to serve as a guide for plan preparation and cost estimating for typical conditions. Adjustments or deviations from the standards may be required by the City or proposed by the developer with the approval of the Director. Owner/Developer will install raceway as part of development and pay for Duke Energy's cost (labor and equipment) to install lights. The City will be responsible for the cost of perpetual maintenance and energy consumption.

Lighting Pattern: Type III

Design: The proposed street lighting design, including pole and luminaire types, location of primary and secondary electric, transformers, etc. shall be submitted on approved roadway construction plans. All poles and luminaries shall conform to Duke Energy standards for their perpetual maintenance.

Luminaries Type: Local – Gaslight Replica luminaries shall be 175W Metal Halide (14,500 lumens).

Collector - Luminaries shall be 100W – 150W High Pressure Sodium (9,500 – 16,500 lumens) or 175W Metal Halide (14,500 lumens), but must be consistent with already established lighting on the street.

Arterial – Luminaries shall be 100W – 150W High Pressure Sodium (9,500 – 16,500 lumens).

Location: Street lights shall be located as follows:

- Within 60 feet of the beginning/end of the proposed roadway(s).
- A minimum of 2-feet and a maximum of 5-feet behind the curb.
- A minimum of one light shall be placed beyond the throat of a cul-de-sac.
- Lighting at intersections (must allow for ADA ramp(s) in sidewalk):
  - For wooden poles located at an intersection, the aluminum truss arm shall be extended toward the middle of the intersection.

  Cross-Intersections -
  - One light shall be placed on any corner for intersecting streets of 29-feet width.
  - Two lights shall be placed on opposite corners where either or both of the intersecting streets are greater than 29-feet wide.

  Tee-Intersections -
  - One light within either radius. Where the street lighting pole line is proposed on the side of the street opposite of the intersecting tee street, one light shall be placed within the extended width of the pavement for the intersecting tee street.

STREET LIGHT SPACING VS. ROADWAY WIDTH			
POLE TYPE	**29'**	**29' to 41'**	**> 41'**
Post Top, Hamilton Base Style, Direct Imbedded (12' mounting height)	100' - 125' one side or staggered on opposite sides	100' - 125' staggered on opposite sides	By design
Aluminum with 15' aluminum truss arm, Direct Imbedded (28-ft mounting height)	200' – 225'	200' – 225'	By design
Wood with 15' aluminum truss arm (28' to 33' mounting height)	200' - 225'	200' - 225'	By design

APPENDIX

APPENDIX A
CHAPTER 1026: TRAFFIC IMPACT STUDY, ACCESS MANAGEMENT, AND CURB CUT REGULATIONS

1026.01 Definitions.
1026.02 Traffic Impact Study.
1026.03 Improvement Costs.
1026.04 Access Management.
1026.05 Curb Cuts.
1026.06 Promulgation of Rules and Regulations.
1026.99 Penalty.

§ 1026.01 DEFINITIONS.

As used in this chapter:

(a) ***ACCESS*** *or* ***ACCESS CONNECTION*****.** Any driveway or other point of entry and/or exit such as a street, road or thoroughfare, that connects to the general street system. Where two public roadways intersect, the secondary roadway shall be considered the access.

(b) ***ACCESS CONTROL*****.** The regulation of the number, type and frequency of access points along a given roadway, and the design standards to which they should conform.

(c) ***ACCESS LEVEL*****.** A numerical designation which defines the magnitude of access control.

(d) ***ACCESS MANAGEMENT PLAN***. A roadway design plan which designates access locations and their design for the purpose of bringing public roadways into conformance with their access classification to the extent feasible.

(e) ***ADT*****.** The annual average two-way daily traffic volume.

(f) ***ALLEY***. A narrow roadway intended to provide access to the rear or sides of lots or buildings and not intended for through traffic.

(g) ***ARTERIAL, MAJOR*****.** A multi-lane roadway, usually divided by a raised median, that allows for access at at-grade public street intersections; provides mobility to traffic at moderate to high speeds, volumes and distances; and serves interregional, intercity and intracity travel demands.

(h) ***ARTERIAL, MINOR***. A multi-lane roadway that allows for access at at-grade public street intersections; restricts direct property access; provides access and mobility at moderate to high speeds and volumes in rural areas and low to moderate speeds and volumes in urban areas; and serves intercity, intracity and intracommunity travel demands.

(i) ***COLLECTOR*****.** A multi-lane roadway that allows for access at at-grade public street intersections, restricts direct property access, provides access and mobility at moderate speeds, and connects local or second class collector streets to arterial roadways.

(j) ***COORDINATED SIGNALS*****.** Two or more signalized intersections that are timed to improve the quality of progression from one signal to the next.

(k) ***CURB CUT*****.** The area where a curb is level with the roadway to provide vehicular access from the roadway to an adjoining property.

(l) ***DIVIDED ROADWAY***. A roadway with separated areas for traffic in opposite directions, such separation being indicated by depressed dividing strips, raised curbing, traffic islands or other physical barriers so constructed as to prevent or discourage crossover vehicular traffic; or otherwise indicated by standard pavement markings or other official traffic control devices as prescribed in the Ohio Manual of Uniform Traffic Control Devices.

(m) ***DRIVEWAY*** *or* ***PRIVATE ROAD***. Every way or place in private ownership used for vehicular travel by the owner and those having express or implied permission from the owner, but not by other persons.

(n) ***FREEWAY***. A divided multi-lane roadway that allows for access at interchanges only; provides for through movement of traffic at high speeds, over long distances; and serves interstate, intrastate, interregional, intercity, and intracity (in urbanized and metropolitan areas) travel demands.

(o) ***FUNCTIONAL ROADWAY CLASSIFICATION.*** A classification system that defines a public roadway according to its purposes and hierarchy in the local or statewide roadway system.

(p) ***GRADE SEPARATION.*** A crossing of two roadways, a roadway and a railroad, or roadway and a pedestrian walkway or bike path; where neither facility interferes with the operation of the other because of their differences in elevation.

(q) ***INTERCHANGE***. A facility that provides ramps for access movements between intersecting roadways that are separated in grade. The ramps and any structures used to accomplish the movement of traffic between the roadways are considered part of the interchange.

(r) ***LATERAL ACCESS***. The first access point on a given street, in relation to its nearest street intersection.

(s) ***LATERAL ACCESS REGULATIONS.*** The rules which regulate the minimum distance of the first driveway on either side of an intersection.

(t) ***LEVEL OF SERVICE (LOS)***. A qualitative measure describing a range of traffic operating conditions such as travel speed and time, freedom to maneuver, traffic interruptions, and comfort and convenience as experienced and perceived by motorists and passengers. Six levels are defined from A to F, with A representing the best range of conditions and F the worst.

(u) ***LOCAL STREET***. A roadway that allows for access at at-grade public street intersections, permits direct property access, and carries traffic at low speeds to and from collector streets.

(v) ***MANUAL OF DESIGN.*** The *Manual of Design for Public Improvements* for the City.

(w) ***MEDIAN.*** That portion of a roadway separating the opposing traffic flows.

(x) ***PRIVATE ROAD.*** See "Driveway" as defined in this section.

(y) ***RIGHT-OF-WAY***. A general term denoting land, property, or the interest therein, usually in the configuration of a strip acquired for or devoted to transportation purposes. When used in this context, right-of-way includes the roadway, shoulders or berm, ditch, and slopes extending to the right-of-way limits under the control of the State or City.

(z) ***ROAD***. A roadway.

(aa) ***ROADWAY.*** The paved area between the edges of the right-of-way bounding every public way and that is to be used for vehicular traffic. Unpaved and paved shoulders are included in a roadway.

(bb) ***ROUTE.*** A roadway.

(cc) ***SIGNAL***. A traffic control signal.

(dd) ***SIGNALIZATION***. Installing or modifying a traffic control signal.

(ee) ***SIGNAL PROGRESSION.*** The progressive movement of traffic at a planned rate of speed, without stopping, through adjacent signalized locations within a traffic control system.

(ff) ***STREET***. A roadway.

(gg) ***THOROUGHFARE***. A roadway.

(hh) ***TRAFFIC IMPACT STUDY (TIS).*** A study that is required to be completed according to the conditions specified in this Section. The purpose and need for the TIS is to determine more precisely the impacts of the access usage; to mitigate these impacts through the proper location, design, and construction of access connection(s); and to ensure the continued functional and operational integrity of the roadway.

§ 1026.02 TRAFFIC IMPACT STUDY.

(a) A Traffic Impact Study for a proposed development shall be submitted with the site plan, preliminary plat, or Preliminary Development Plan. One of three formats shall be used for the TIS, depending on the characteristics of the site, and it shall meet the requirements outlined in the *Manual of Design*. The Engineering & Environmental Services Director shall ultimately determine which type of TIS shall be used.

(b) Formats.

(1) A TIER 1 (Abbreviated) TIS is required when a development meets the following criteria:

a The development is expected to alter the flow of traffic, either within the site or on adjacent roadways, or change the number of trips entering and exiting the site.

b The development will affect another mode of travel (bicycle, pedestrian, busses, etc.).

(2) A TIER 2 (Standard) TIS is required when a development meets the following criteria:

a The development produces 100 or more peak hour trips or 750 or more daily trips.

b The development is expected to reduce the level of service on adjacent roadways and/or intersections to below a level of service of C.

c A level of service lower than C already exists on an adjacent roadway.

d The development is within 500 feet of a high-accident intersection or section of roadway, as identified by the City or the Ohio Department of Transportation.

e One or more of the proposed access drives to the development is within 500 feet of a public roadway intersection or within 250 feet of a drive that is a high traffic volume generator.

f The traffic generated by the development will increase the ADT by 25% or more on roadways in adjacent neighborhoods, as determined by the Engineering & Environmental Services Director.

g Traffic volumes of 10,000 ADT or higher exist on roadways adjacent to the development.

h The Engineering & Environmental Services Director determines that other conditions exist in the vicinity of the proposed development that may be negatively impacted by the development.

(3) A TIER 3 (Expanded) TIS is required when a development meets the following criteria:

a The development is large enough to have widespread impacts to the traffic system, affecting multiple signals and/or a major corridor.

b The Engineering & Environmental Services Director deems it necessary that a comprehensive computer analysis and simulation be used to effectively identify traffic impacts.

(c) The minimum study area shall include all proposed and existing site access locations and major intersections (signalized and unsignalized) adjacent to the site. Depending on the overall size of the development, as well as the nature of the development, the Engineering & Environmental Services Director may require that additional areas be included in the study, based upon, but not limited to, local or site-specific issues, local policy, and impacts that are likely to occur to residential areas. Final determination of the study area shall be agreed upon by the City and the developer.

(d) The internal design of the development shall provide sufficient traffic capacity and queuing space, and shall provide for distribution of automobiles to and from parking spaces, pick-up/drop-off points, and drive-through lanes. Such internal design has a direct bearing on the adequacy of site access points. The identification and design of access points between the site and the external roadway system is directly related to both the directional distribution of site traffic and the internal circulation of the facility. Simply providing access to a site by means of curb cuts does not necessarily mean that access to the development has been adequately addressed. The quality of the internal site circulation and design has a direct impact on the quality of traffic flow in and around the site development and on public safety.

(e) In determining the amount of traffic to be generated by the proposed development, trip generation rates or equations from the Institute of Transportation Engineers “Trip Generation” Manual, latest edition, shall be used. The proposed development shall be categorized by the specific land use classification contained in the Trip Generation. If specific trip rates are not available for a particular development, the method of trip rate determination shall be agreed upon by the City and the developer.

(f) The Traffic Impact Study shall include recommendations for improvements to maintain capacity, provide signal capacity, and improve safety to, from, and within the development. These may include, but are not limited to intersection recommendations, site driveway recommendations, and acceleration and deceleration lanes.

§ 1026.03 IMPROVEMENT COSTS.

The cost for infrastructure improvements, new traffic signals, modification of existing traffic signals, traffic signs, and pavement markings which are necessitated by the new development shall be borne by the developer.

§ 1026.04 ACCESS MANAGEMENT.

(a) Access management provides or manages access to land while simultaneously preserving the flow of traffic on the surrounding road systems in terms of safety, capacity and speed. Every roadway in a transportation network has a specific function which can be broadly stated as either to provide direct access to abutting land or to provide for through traffic movement. In this context, it can be stated that the effects of access management become significant in the case of freeways, arterial streets and collector streets, where there needs to be a balance between through traffic movement and the access functions performed by the roadway.

In order to promote safe and reasonable access between public roadways and adjacent land, improve the convenience and ease of movement of travelers on public roads, and permit reasonable speeds and economy of travel while maintaining the capacity of the roadway, the location and design of access points shall be in accordance with the access management regulations as outlined in the *Manual of Design*. These regulations shall apply to all existing, planned, or proposed roadways within the jurisdiction of the City. New or proposed roadways within the City not identified on the adopted Street Master Plan shall interconnect with the existing roadway network in a uniform and efficient manner.

Even though existing roadways and their accesses do not comply with the respective access restrictions in their class, for the prevention of the future breakdown of the balance between mobility and access functions, it is required that the City follow the regulations for all future access permits.

When direct property access (wherever allowable) is permitted to any roadway, the developer shall bear the cost of the corresponding roadway improvements required to meet the restrictions defined by the access level of the respective roadway.

The Engineering & Environmental Services Director shall be responsible for the uniform administration of the regulations.

(b) The following are the key components of the access management regulations:

(1) Roadway Classification. Location-based and functional classification of roadways.

(2) Access Classification. Classification of different access levels and their assignment to the roadways in the City.

(3) Access Spacing Regulations. Spacing guidelines for different access features at different levels of access.

(4 Traffic Impact Study Guidelines. Regulations as to when a traffic impact study is needed and determination of the necessary components.

(5) Driveway Approach and Curb Cut Regulations. Regulations for the placement and construction of driveway approaches and curb cuts.

(c) The roadways of the City are classified based on their location, function and desired level of access control. The classifications are described in the *Manual of Design*.

(d) Access spacing regulations establish standards of access spacing for the different access levels. Different sets of standards apply to interchanges and signalized intersections, unsignalized intersections and driveways, median openings and to lateral access restrictions, as described in the *Manual of Design*.

§ 1026.05 CURB CUTS.

(a) Application Procedure.

(1) All driveway approaches and curb cuts are subject to the regulations in this chapter.

(2) Determination of Application Procedure. Any owner or subdivider intending to apply for the placement of a new roadway, driveway approach, or curb cut within the City shall first inquire of the Engineering Division as to the type of application procedure required. The Engineering & Environmental Services Director shall consider street classification, access type, configuration of the access point, and the zoning of the property in order to determine that either a right-of-way permit is required, or that the application for such roadway, driveway approach or curb cut shall be submitted as part of the subdivision process, a site plan process, or as part of the PUD process.

(3) Right-of-Way Permit. If, according to division (b) of this section, the Engineering & Environmental Services Director determines that a permit to work in the right-of-way is required, such permit shall be filed according to that chapter.

(b) No person, corporation or firm shall construct a driveway approach connecting to a public street or right-of-way, or cut, break out or remove any curb along any street or other public way without

first obtaining a permit. Applications for such curb cut permits shall be made in the Engineering Division, according to the application procedures in this chapter. The Engineering & Environmental Services Director or his or her designate may require such construction plans or drawings with the permit application as he deems necessary to:

(1) Permit all reviewing authorities to make an intelligent and conclusive review of the application;

(2) Enable the contractor to construct the proposed facility in accordance with the terms of the permit;

(3) Enable the individual responsible for inspection to ensure that the facility is constructed in accordance with the terms of the permit; and

(4) Serve as a record of the construction authorized by the permit.

(c) The Engineering & Environmental Services Director may impose conditions in the permit upon the construction of the driveway approach/curb cut, which conditions are designed to facilitate the safe movement of pedestrian traffic and the safe and expeditious movement of motor vehicles on the public streets or ways affected by the driveway approaches/curb cuts. The conditions imposed upon driveway approaches/curb cuts under this section shall take into consideration the designed speed limit and sight distance at the location and may include, but are not limited to, the following:

(1) Limitations of the number, size and location of driveway approaches/curb cuts for any premises to which the permit applies;

(2) Requiring the use of alternative means of access such as service or private drives or frontage roads, to run parallel to the public street or way, rather than direct connection to the public street or way where such alternate means are accessible to the premises to which the permit applies and/or requiring that direct connection of driveway approaches/curb cuts to the public street or way be limited and used only until alternative means of access such as service or private drives or frontage roads are made accessible to the permit premises;

(3) Limiting the construction of driveway approaches/curb cuts to only one public street or way where the premises to which the permit applies abuts more than one public street or way;

(4) Requiring that driveway approaches/curb cuts be marked and/or constructed to allow only entrance to or only exit from the permit premises;

(5) Requiring the construction of safety islands to separate two driveway approaches/curb cuts;

(6) Requiring the construction of right hand and/or left hand deceleration/ acceleration and/or storage lanes, which shall be required to be a minimum of 200 feet each way with a 100-foot taper, or longer as determined by the Traffic Impact Study. Such lanes may be permitted to be decreased, based on the physical conditions, characteristics and use of the property. Such lanes shall meet the requirements of the *Manual of Design* and include the appropriate traffic control devices, including, but not limited to, signals, as necessary;

(7) Requiring the construction of driveway turnaround facilities so that vehicular traffic can change direction on the permit premises and enter the roadway in a forward direction;

(8) Requiring the consolidation of access points. Major access points on opposite sides of roadways shall be located opposite each other. If not so located, turning movement restrictions may be imposed as determined necessary by the Engineering & Environmental Services Director. In addition, in order to maximize the efficient utilization of access points,

access drives shall be designed, located, and constructed in a manner to provide and make possible the coordination of access with and between adjacent properties developed (present or future) for similar or compatible uses. As a condition of approval for construction, use, or reuse of any access point, the Engineering & Environmental Services Director may require that unobstructed and unencumbered access, in accordance with the provisions of this chapter, be provided from any such access point to adjacent properties;

(9) Requiring the consolidation of existing access points. Whenever the use of a parcel of land changes, or two or more parcels of land are assembled under one purpose, plan, entity, or usage, the existing driveway permits shall become void and the new permit shall be based upon the owner/developer's plans to use some existing driveways and/or close or relocate other driveways. Any such new or reauthorized access point must be in compliance with all applicable sections of this regulation.

(d) The conditions for the construction of driveway approaches/curb cuts specified by the Engineering & Environmental Services Director under this chapter shall be provided in writing to the applicant at the time the permit is issued.

(e) The Engineering & Environmental Services Director may require a bond from the applicant or property owner to assure compliance with the conditions imposed.

(f) In any case in which an application for a building permit includes a change in the primary use of the premises, or in any case in which there is construction, reconstruction, enlargement or expansion for larger and essentially commercial construction which must comply with the formal administrative procedures for a zoning certificate, the existing driveway approaches/curb cuts for the premises may be reviewed in accordance with the provisions of this chapter.

(g) The Engineering & Environmental Services Director may establish general conditions applicable to the construction of all driveway approaches/curb cuts for premises within specific land use categories.

(h) When a proposed driveway approach/curb cut or any facilities required to be constructed in conjunction with any driveway approach/curb cut interferes with street light poles or posts, traffic signal standards, signs, storm water inlets, hydrants, utility poles, fire alarm supports, underground ducts or pipes, drainage facilities or other necessary street structures, the owner of the parcel of land served by the driveway approach/curb cut shall pay the expense of moving and/or altering such structure as determined to be necessary by the Engineering & Environmental Services Director.

(i) Proposed driveway approaches and curb cuts or improvements to existing driveway approaches and curb cuts shall comply with the Street Master Plan, the design and improvement standards under the *Manual of Design*, and with the purpose and restrictions of the Zoning Ordinance before a permit is issued. Whenever a driveway approach and/or curb cut or improvements to existing driveway approaches and/or curb cuts embraces any part of a roadway, such part of the public way shall be platted by the owner or subdivider in the location and at the width indicated by the aforementioned documents.

§ 1026.06 PROMULGATION OF RULES AND REGULATIONS.

The Engineering & Environmental Services Director is hereby authorized to establish the Manual of Design for administering the provisions of this chapter.

§ 1026.99 PENALTY.

Whoever violates or fails to comply with any of the provisions of this chapter is guilty of a minor misdemeanor and shall be fined not more than one hundred dollars ($100.00). A separate offense shall be deemed committed each day during or on which a violation or noncompliance occurs or continues.

APPENDIX B
CHAPTER 1206: SUBDIVISION IMPROVEMENTS

1206.01 Definitions.
1206.02 Completion of improvements or bond in lieu thereof.
1206.03 Street right-of-way; Traffic Impact Study, Access Management Plan.
1206.04 Improvement of parcels reserved for streets.
1206.05 Sidewalks.
1206.06 Storm water sewer or drainage system; detention/retention basins.
1206.07 Water distribution system.
1206.08 Sanitary sewer system.
1206.09 Poles and underground conduits.
1206.10 Permanent monuments.
1206.11 Street name signs.
1206.12 Street lights.
1206.13 Submission of construction plans.
1206.14 Approval of construction plans; construction changes; inspection.
1206.15 Completion of improvements.
1206.16 Acceptance of streets as public ways.
1206.17 Modification or waiver of requirements; Technical Advisory Committee.
1206.18 Issuance of certificates of occupancy.
1206.19 Fees for approval and processing of plats, plan reviews and construction inspections.
1206.20 Costs paid by City.
1206.21 Promulgation of Rules and Regulations
1206.99 Penalty.

§ 1206.01 DEFINITIONS.

For the purpose of this chapter, the following terms, phrases, words and their derivations shall have the meaning given herein. When not inconsistent with the context, words used in the present tense include the future tense, words in the plural number include the singular number and words in the singular number include the plural number. The word “shall” is always mandatory.

(a) ***ARTERIAL STREET.*** A heavy traffic street of considerable continuity and used primarily as a traffic artery for intercommunication among large areas.

(b) ***COLLECTOR STREET.*** A street which carries traffic from local streets to arterial streets.

(c) ***DEAD-END STREET.*** A local street with only one outlet.

(d) ***DETENTION/RETENTION BASIN.*** A storage facility designed to contain excess storm water while controlling storm water discharge at a predetermined rate.

(e) ***DEVELOPMENT PLAN.*** A comprehensive plan for site development as defined in the Zoning Code and outlined in Chapters 1260, 1262, 1264 and 1266.

(f) ***FINAL PLAT.*** The final map, drawing or chart on which the subdivider’s plan of subdivision is presented to the Planning Commission for approval and which, when approved, will be submitted to the County Recorder for recording.

(g) ***LOCAL STREET.*** A street, not a freeway, arterial or collector street, intended to provide access exclusively to the properties abutting thereon.

(h) ***MANUAL OF DESIGN.*** The *Manual of Design for Public Improvements* for the City.

(i) ***MASTER PLAN.*** A comprehensive plan prepared by the Planning Commission which indicates the general locations recommended for the various functional classes of public works, places and structures and for the general physical development of the City. It includes maps of the Street Master Plan, showing the freeways, arterial, collector and local streets, theretofore laid out, the Park Plan, showing the official plan of parks, playgrounds or other open public grounds, and the School Plan,

showing the official plan of public schools, all as adopted by the Planning Commission for the areas within its jurisdiction.

(j) ***PLANNING COMMISSION.*** The Planning Commission of the City of Middletown.

(k) ***PRELIMINARY PLAN.*** The preliminary drawings indicating the proposed layout of the subdivision including all utilities and construction requirements.

(m) ***REGIONAL DETENTION/RETENTION BASIN.*** A detention/retention basin designed for storm water runoff from the entire drainage area contributing runoff to the basin. A regional basin will be deeded to the City and perpetually maintained by the City. Detention basins are dry during dry weather and retention basins are partially filled with water during dry and wet weather.

(n) ***STORAGE BASINS.*** See ***REGIONAL DETENTION/RETENTION BASIN*** or ***DETENTION/RETENTION BASIN***.

(o) ***SUBDIVIDER.*** Any individual, firm, corporation or other legal entity commencing proceedings under this chapter to effect a subdivision of land for himself or herself or for another.

(p) ***SUBDIVISION.*** The division of land as defined in Ohio R.C. 711.001.

§ 1206.02 COMPLETION OF IMPROVEMENTS OR BOND IN LIEU THEREOF.

(a) As a condition precedent to the approval of a plat of a subdivision of land or a development plan within the jurisdiction of the Planning Commission, all of the improvements required by this chapter shall be completed prior to the filing with the Commission of the final or record plat of any such subdivision. Such improvements shall be in accordance with the requirements of this chapter and under the supervision of the officials herein designated and, except as otherwise provided in this chapter, shall be at the subdivider's cost. The proposed subdivision shall conform to the Master Plan of the City.

(b) In lieu of completing the improvements as required in division (a) hereof, the subdivider may furnish the City with security for completion of the improvements in the form of cash, an irrevocable letter of credit, a property bond or a bond of a recognized surety company acceptable to the Commission sufficient to cover the cost, as estimated by the Engineering & Environmental Services Director, of all of the improvements required to be installed by the subdivider. The bond shall secure the actual construction and installation of such improvements after approval of the final plat and within the time stated in § 1206.15. Such bond shall be subject to the approval of the Director of Law and shall be filed with the Clerk of City Council.

(c) If the subdivider furnishes a property bond as security, as set forth in division (b) hereof, then he or she shall submit a recorded copy of the bond, having no expiration date; a certificate of title examination of the subject real property completed by a qualified attorney; and an appraisal by a State certified appraiser.

(d) If the subdivider furnishes a declining balance letter of credit, the initial balance shall be sufficient to insure 130 percent of the City's approved cost estimate of all of the improvements required of the subdivision, and it shall not have an expiration date prior to two years of the date of issuance. Should the improvements not be complete, the City will initiate proceedings to draw upon the letter of credit 28 calendar days prior to its expiration date.

(e) Upon completion of all improvements as per the pre-final inspection, submittal of as-built drawings, and a Mylar copy of the signed and recorded subdivision plat, the performance bond or declining balance letter of credit may be reduced to an amount sufficient to cover the cost of outstanding improvements as approved by the City. Additionally, the subdivider shall furnish a maintenance bond sufficient to cover the cost of completed improvements.

(f) Upon completion of the final inspection, the subdivider shall furnish a one-year maintenance bond in the amount of 10% of the cost of improvements.

§ 1206.03 STREET RIGHT-OF-WAY; TRAFFIC IMPACT STUDY; ACCESS MANAGEMENT PLAN.

(a) The Engineering & Environmental Services Director shall establish widths of rights-of-way of streets as follows:

(1) Local streets shall be at least 50 feet wide.

(2) All other streets shall be at least 60 feet wide, but final determination shall be made based on the functional roadway classification.

(b) A traffic impact study and/or access management plan shall be performed by the developer, as required by the Engineering & Environmental Services Director, in accordance with the requirements of the *Manual of Design*.

§ 1206.04 IMPROVEMENT OF PARCELS RESERVED FOR STREETS.

If the improvement of a parcel reserved for future street purposes on a previous subdivision plat is presently needed in order to serve a proposed subdivision, the City will share in the cost of improvements of such parcel as set forth in § 1206.20.

§ 1206.05 SIDEWALKS.

Sidewalks of at least five feet in width, having a minimum overhead clearance of ten feet, shall be installed on both sides of all streets. Where unusual or exceptional factors or conditions require a modification of this section, such sidewalks may be waived, in whole or in part, by the Planning Commission after prior recommendation by the Subdivision Technical Advisory Committee, as outlined in § 1206.17. No such waiver shall be effective unless and until confirmed by the City Council.

§ 1206.06 STORM WATER SEWER OR DRAINAGE SYSTEM; DETENTION/ RETENTION BASINS.

(a) Every subdivision shall be provided with a storm water sewer or drainage system which is adequate to serve the platted area and which otherwise meets standards and specifications of the City.

(b) Where feasible, and where a storm sewer of 48 inches or larger would otherwise be required, storm water drainage may be provided by means of ditches in drainage courses, either of grass or paved concrete, approved by the Engineering & Environmental Services Director, provided that such type of drainage is not located within a street right-of-way.

(c) The determination of the necessity for storage basins will be based upon, but not limited to, existing storage basins and existing storm sewer and open channel capacities. Where deemed necessary by the City, the developer shall provide storm water storage basins in accordance with the *Manual of Design*. Where detention/retention is required, the basin(s) must be:

(1) Constructed on-site; and

(2) Privately maintained by an individual, up to four lot owners, a private company, an association or some other private organization. A maintenance plan shall be included in the subdivision protective covenants and recorded with the subdivision plat.

(d) The subdivider may request that the City accept a regional detention/retention basin for perpetual ownership and maintenance by the City, predicated upon guidelines as stated in the *Manual of Design*. Conditions of such acceptance include, but are not limited to, the subdivider paying for all costs

associated with:

(1) The design and construction of all items associated with the basin, including inlet/outlet structures, sewers and other appurtenances; and

(2) The transfer of required deeds for land ownership and access easements to the City.

§ 1206.07 WATER DISTRIBUTION SYSTEM.

(a) Where, in the opinion of the Engineering & Environmental Services Director, suitable water service mains are reasonably accessible and of adequate capacity to supply the extended area without impairing the service to others already served from the existing water system, every subdivision shall be provided with a complete water distribution system adequate to serve the area being platted, including a connection for each lot and appropriately spaced fire hydrants.

(b) After a determination has been made as to the size water mains necessary to serve the subdivision, larger mains may be required in order to adequately supply subsequently developed areas. In such case, the City shall pay the difference in cost as provided in § 1206.20.

(c) Where it is necessary to extend a main through an undeveloped area, or an area already served by another system, in order to reach and serve a new subdivision, the City shall share in the upsizing cost as provided in § 1206.20

§ 1206.08 SANITARY SEWER SYSTEM.

In every subdivision, provision shall be made for the satisfactory disposal of sanitary sewage as follows:

(a) (1) Where, in the opinion of the Engineering & Environmental Services Director, a public sanitary sewer is reasonably accessible and of adequate design and capacity to service the extended area without impairing the sewer service in any part of the already existing sewer system, the subdivision shall be provided with a complete sanitary sewer system connected to such sewer main, including a lateral connection for each lot. The design and installation of the sewer system shall meet the approval of the City.

(2) After a determination has been made as to the size sewer mains necessary to serve the subdivision, larger mains may be required in order to adequately serve subsequently developed areas. In such case, the City shall pay the difference in cost as provided in § 1206.20.

§ 1206.09 POLES AND UNDERGROUND CONDUITS.

Poles and underground conduits for electric lines or telephone lines or other utilities shall be placed in easements, where practicable. Prior to installation of non-City utilities (i.e. gas, electric, phone, cable television or telecommunications), the approved construction plans shall be updated to indicate the proposed locations of all such utilities. Construction of these utilities may begin following approval of the plans. Utility locations, as constructed, shall be shown in the as-built drawings. Utilities constructed within the rights-of-way during subdivision construction shall be included in the overall cost estimate and shall be covered by the subdivision review/inspection fees. Utility construction within the rights-of-way following subdivision completion shall be subject to applicable permit fees as defined in other chapters of the City Codified Ordinances.

§ 1206.10 PERMANENT MONUMENTS.

Accurately located monumentation shall be placed in accordance with the requirements of the *Manual of Design*.

§ 1216.11 TRAFFIC CONTROL DEVICES; STREET NAME SIGNS.

The Developer shall furnish and install, at its cost, all necessary street signs and traffic control devices (signs, markings, signals, etc.) in accordance with the Manual of Design.

§ 1206.12 STREET LIGHTS.

Street lights shall be installed by the developer and shall meet the requirements of the *Manual of Design*. Overhead wiring may be used with lights located at intersections and at such other points as are required.

§ 1206.13 SUBMISSION OF CONSTRUCTION PLANS.

Construction plans of all required improvements shall be submitted in the form and number of copies required by the Engineering & Environmental Services Director. Construction plans shall also be submitted in digital.dxf format and shall meet the requirements outlined in the *Manual of Design*.

§ 1206.14 APPROVAL OF CONSTRUCTION PLANS; CONSTRUCTION CHANGES; INSPECTION.

(a) Prior to starting any of the work contemplated by the plans submitted under § 1206.13, all copies of such plans shall be approved and endorsed by the Engineering & Environmental Services Director. For subdivisions outside the corporate limits of the City, the plans shall also be endorsed by the County Engineer. No construction of improvements listed herein shall be done in any manner different from that indicated on the approved plans, unless such change has first been approved by the same endorsements required in this section, on quadruplicate copies of amended construction plans. Minor changes caused by construction conditions, however, may be approved by the Engineering & Environmental Services Director and by the County Sanitary Engineer if the subdivision is making a connection to that system, and shall be recorded on the copy of the plans in the files of the City, and in the files of the County if the subdivision is outside the City limits.

(b) Prior to starting any of the work covered by the plans approved as set out in this section, arrangements shall have been made to provide for inspection of the work which are sufficient, in the opinion of the Engineering & Environmental Services Director, to insure compliance with the plant and specifications as approved. The signature of the Director on the title sheet of the plans shall constitute approval of the construction plans. Construction activities may commence upon receipt of written notification from the Director to proceed, to be issued after a preconstruction meeting of the subdivider's contractor and the Engineering & Environmental Services Director.

§ 1206.15 COMPLETION OF IMPROVEMENTS.

(a) (1) The construction of all improvements required under this chapter shall be completed before the earlier of:

A. Two years from the date of the notification to proceed, as specified in § 1206.14; or

B. The expiration date of the performance bond or letter of credit.

(2) The only exception shall be the completion of sidewalks which shall be completed in accordance with § 1206.18(b).

(b) After completion of all improvements, except for the final course of asphalt, the Engineering Division will perform a pre-final inspection at the request of the subdivider. The construction of sidewalks throughout the subdivision is not required prior to the pre-final inspection.

§ 1206.16 ACCEPTANCE OF STREETS AS PUBLIC WAYS.

The approval of a final plat by the Planning Commission shall not be deemed to be an acceptance of

the dedication of any public street, road or highway dedicated in the plat. Such streets, roads and highways and the improvements therein shall be accepted as public ways and public improvements under the provisions of Ohio R.C. 711.091. Written notice shall be served by the Engineering & Environmental Services Director to the subdivider at the time of final acceptance.

§ 1206.17 MODIFICATION OR WAIVER OF REQUIREMENTS; TECHNICAL ADVISORY COMMITTEE.

(a) In any case where the subdivider can show that, by reason of exceptional topographic or other physical conditions, strict compliance with the provisions of this chapter would cause practical difficulty or exceptional or undue hardship, the Planning Commission may relax the requirements to the extent deemed just and proper so as to relieve such difficulty or hardship, provided that such relief may be granted without detriment to the public good and without impairing the intent and purpose of this chapter or the desirable general development of the neighborhood and the community in accordance with the Master Plan.

(b) For this purpose, there is hereby established a Technical Advisory Committee to be comprised of the Public Works Director, the Planning Director the Engineering & Environmental Services Director, and the Fire Chief, Chief Building Official or their appointed representatives. Any requested modification of the provisions of this chapter shall first be referred to this Committee for its consideration, report and recommendation. No modification contrary to the recommendation of such Committee shall be granted unless at least five of the members of the Planning Commission vote affirmatively for such modification. Any modification granted shall be entered in the minutes of the Planning Commission setting forth the reasons which, in the opinion of the Planning Commission, justified the modification. In no case, however, shall the requirements of § 1206.02 be waived or modified.

§ 1206.18 ISSUANCE OF CERTIFICATES OF OCCUPANCY.

(a) For a subdivision within the City, the Chief Building Official shall not issue a certificate of occupancy until the Engineering & Environmental Services Director has signed the application for the certificate of occupancy as evidence that granting of the proposed street right-of-way has been completed and that water mains, storm and sanitary sewers, curbs, gutters, street base and at least one course of asphalt have been installed to City standards.

(b) Sidewalks for any individual lot shall be installed before a certificate of occupancy is issued. Subdivisions having uncompleted sidewalks will be reviewed annually by the City for possible inclusion into the City of Middletown Sidewalk, Curb and Gutter Program. If either 80% of the lots in the development have been issued a certificate of occupancy or three years have passed since the performance of the pre-final inspection, any sidewalk not yet constructed will be installed as part of the above said program and the current owners of the lot will be assessed in accordance with Ohio R.C. Chapter 729. When severe weather has significantly delayed construction, the Chief Building Official may authorize occupancy of a structure, provided that the developer submits suitable plans for construction of the sidewalks to be installed a maximum of 120 days after occupancy.

(c) When a certificate of occupancy has been issued as provided in division (a) hereof, the City shall have the right to permit connection of other sanitary sewers, water mains and storm sewers to those of the subdivision for which the certificate has been issued, whether such other sanitary sewers, water mains and storm sewers are owned by the City at the time or are in the process of being installed in other subdivisions by other subdividers under this chapter. Before receiving a permit for such connection, the connecting subdivider shall file a bond conditioned upon his or her repair of any damage done to the sanitary sewer, water main or storm sewer to which the connection is made, or for other damage caused by reason of such connection, and upon his or her indemnification of the owner of the latter sanitary sewer, water main or storm sewer for any liability arising on account of such connection.

§ 1206.19 FEES FOR APPROVAL AND PROCESSING OF PLATS, PLAN REVIEWS AND CONSTRUCTION INSPECTIONS.

To defray the cost to the City for processing and reviewing plats and improvement drawings and plans received pursuant to this chapter, the following fees shall be assessed:

(a) On the submittal of a preliminary plan for the Planning Commission's consideration, three hundred dollars ($300.00);

(b) On the final approval of the record plat required by this chapter, seventy-five dollars ($75.00) per lot;

(c) On lot-splits under Ohio R.C. 711.131 where a new building site is created, seventy-five dollars ($75.00) per new building site and twenty-five dollars ($25.00) per split where no new building site is created; and

(d) For plan review and construction inspection, one and one-half percent of the construction cost for the development, as estimated by the Engineering & Environmental Services Director. Payment of the review and inspection fee will be collected as follows:

(1) Seven hundred fifty dollars ($750.00) with the submission of the preliminary plat;

(2) One and one-half (1½) percent of the construction cost minus seven hundred fifty dollars ($750.00) prior to approval by the Director of the construction plans; and

(e) The inspection fees provided for in division (d) hereof comprise of one percent (1%) of the total fee. Any third-party inspection required as part of the development approval process is not included in the one percent fee will be billed separately to the developer. In addition, inspection fees shall include all inspection services provided during standard operating hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, with the exception of official holidays for City employees. The cost for inspection services beyond the nonstandard operating hours shall be billed monthly at a rate of fifty dollars ($50.00) per work hour.

§ 1206.20 COSTS PAID BY CITY.

(a) Where provision is made for the payment of a part of the cost of improvements by the City, such payment shall apply only to subdivisions within the territorial limits of the City. Before the City pays any cost for materials, the subdivider shall provide invoices, affidavits or such other evidence as the City may require to establish the correctness of such cost. Before the City pays the cost for any materials and labor, the cost shall be determined and agreed upon by the subdivider and the City prior to installation.

(b) Upon submission of the preliminary plan and Traffic Impact Study, the Engineering & Environmental Services Director will review the plan, and, based upon the land use, will make a determination of the minimum size water mains, sanitary sewer mains, street width, pavement cross-section and traffic signalization required to serve such a development. In no case will the minimum requirement be less than that required in the *Manual of Design*.

(c) Where the City requires infrastructure development beyond that determined above, the City shall share in the cost as set forth below:

(1) *Street Widths.*

A. Extra width pavement required beyond the development requirements;

(2) A. *Water mains.*

1. The City Engineer's estimate of the additional labor and material cost (per linear foot of mains and fittings, per unit cost of valves) associated with a water main diameter required by the

City in excess of the diameter (eight-inch minimum) required for the development.

B. In no case shall the City share in the cost of water mains connected to a water system other than that of the City.

(3) *Sanitary sewer mains.* The City Engineer's estimate of the additional labor and material cost associated with a sanitary sewer main diameter required by the City in excess of the diameter (eight-inch minimum) required for the development, unless excess diameter was required to meet minimum velocity requirements due to grade.

§ 1206.21 PROMULGATION OF RULES AND REGULATIONS.

The Engineering & Environmental Services Director is hereby authorized to establish the Manual of Design for administering the provisions of this chapter.

§ 1206.99 PENALTY.

Whoever violates or fails to comply with any of the provisions of this chapter is guilty of a minor misdemeanor and shall be fined not more than one hundred dollars ($100.00) for each offense. A separate offense shall be deemed to be committed each day during or upon which a violation or noncompliance occurs or continues.

APPENDIX C

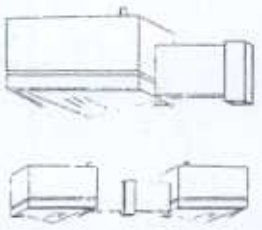
OUTDOOR LIGHTING POLICIES AND GUIDELINES

EQUIPMENT AVAILABLE FOR STANDARD LIGHTING PROJECTS

GALLERIA STYLE LUMINAIRE

DRG. 15210

DARK BRONZE HOUSING



STOCK CODE	DESCRIPTION	LUMENS
0050110565	250W, HPS, III	30,000
0050110570	400W, HPS, III	50,000
0050110568	400W, HPS, AS	50,000
0050110566	250W,HPS,FT	30,000
0050110567	400W, HPS, FT	50,000
0050110562	250W, MH, III	30,000
0050110564	250W, MH. FT	20,500
0050110563	400W, MH, III	36,000
0050108156	400W, MH, AS	36,000
0000806741	400W,MH, FT	36,000
0000802712	1000W, MH, AS	110,000
0000806740	1000W, MH, FT	110,000

DIRECTIONAL FLOODLIGHT LUMINAIRE

DRG. 15410

DARK BRONZE HOUSING

STOCK CODE	DESCRIPTION	LUMENS
0050104992	250W,HPS,7X6	30,000
0050104992	400W,HPS,7X6	50,000
0050105015	250W,MH,7X6	20,500
0050105015	400W,MH,7X6	36,000
0000802690	1000W,MH 7X7	110,000

GALLERIA – TYPE III BEST FOR STREETS AND NARROW PARKING AREAS

GALLERIA – AREA SQUARE (AS) –
BEST FOR LARGE PARKING LOTS WITH POLES LOCATED IN THE MIDDLE

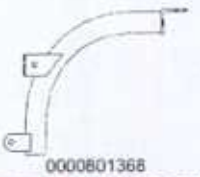
GALLERIA – FORWARD THROW (FT)
BEST FOR PARKING LOTS WHERE LIGHT TREPASS IS NOT WANTED AND POLES ON THE PERIMETER OF SITE

FLOODLIGHT – BEAM PATTERN AT 60 DEG. TILT IS SHOWN
THROWS LIGHT TOWARD A BUILDING OR OTHER SURFACE. PRODUCES GLARE AND LIGHT TREPASS.

MOUNTING

DRG. 15210
ATTACH THE LUMINAIRE TO ARM, THEN TO THE HUB AND FINALLY TO THE 3" TENON ON THE POLE
ARM & HUB CAN BE ORDERED SEPARATELY

DRG. 15410
FLOODLIGHT MOUNTING BRACKET FOR WOOD POLES



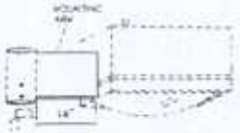
0000801368

THESE FLOODLIGHTS ARE MOUNTED ON WOOD POLES

MOUNTING ARM

- ORDER ARM SEPARATELY FOR GALLERIA LUMINAIRE
- HUB WILL MOUNT TWIN 180 DEG LIGHTS OR ONE LIGHT
- ORDER MOUNTING BRACKET FOR MORE THAN ONE FLOOD

STD. 15210 DRG



LT MOUNT GAL ARM
0000807015 BRONZE

STD. 15210 DRG

LT MOUNT GALLERIA HUB – DK BRONZE

0000807020 – TWIN/SGL

Anchor Base and Direct buried pole both need a ground.
GRD UG STREET LIGHT

POLE STD. I.D CU
LTPOLE GALLERIA AB
LTPOLE GALLERIA DI
LTPOLE SQ STEEL
BRONZE AB

STD. 15210 DRG

ANCHOR BASE
STEEL, SQR. DK BRONZE

STOCK CODE	DESCRIPTION
0000807262	20 FT.
0000807266	30 FT.
0000807296	35 FT.

Anchor Bolt Cover (20-30') Pole
0000807972 BRZ
Cover for (35')
0050095584 BRZ

NON STANDARD-REPLACEMENT
DIRECT IMBEDDED
0000807261 30 FT. DK BRZ
0000807264 35 FT. DK BRZ.

CONCRETE

STD DRG. 75753

0000802490 5 FT
75750 25_40ANC

0050094809 8 FT.
75752 25_40ANC

ST LT FUSE - FUSELINK STD I.D. DRG 19155 (used for ALL luminaires with underground wiring)

OUTDOOR LIGHTING POLICIES AND GUIDELINES

EQUIPMENT AVAILABLE FOR STANDARD LIGHTING PROJECTS

GASLIGHT REPLICA
DRG. 15100
LT PT GASLIGHT REPLICA

STOCK CODE –DESCRIPTION
0050103711 100W HPSIII
0050110507 150W HPSIII
0050105661 175W MH III

TRADITIONAIRE
DRG. 15101 and DRG. 15102
LT PT TRADITIONAL

STOCK CODE –DESCRIPTION
0050110442 100HPS III
0050110443 150HPS III
0050110441 175MH III

NON-STANDARD-REPL
0000802633 200W,HPS, II
0000802634 200W, HPS V
0000802614 250W, HPS II
0000802700 250W, MH, III

GRANVILLE ACORN
DRG 15102
LT PT ACORN

STOCK CODE –DESCRIPTION
0050105652 100W,HPS
0050110444 150W, HPS
0050105663 175W, MH

0000800015 - GLOBE
0050119865- FULL CUTOFF GLOBE

TYPE III, SEMI CUTOFF LIGHTING PATTERN

ALL THREE POST TOP LUMINAIRES ABOVE HAVE A TYPE III LIGHTING PATTERN WHERE THE LIGHT ILLUMINATES THE GROUND.

INITIAL LUMENS FOR THE ABOVE LIGHTS
100W HPS 9,500 lumens
150W HPS 16,500 lumens
175W MH 14,500 lumens

THE DIFFERENCE IN LUMINAIRE STYLES IS IN THE 'UPLIGHT' (LIGHT LOST IN THE SKY), THAT IS PRODUCED BY THEM. THE GASLIGHT REPLICA AND TRADITIONAIRE PRODUCE LESS UPLIGHT THAN THE GRANVILLE, BUT THEY ARE ALL RATED AS SEMI CUTOFF.

ONE LUMINAIRE IS MOUNTED DIRECTLY ON TO THE TOP OF EACH POLE ON A - 3" DIAMETER TENON

POLE(S)

STD I.D. DRAWINGS

15100, 15101 & 15102

ALUMINUM ANCHOR BASE WASHINGTON
Or similar Styles
FLUTED, 4" SHAFT

12 FT MOUNTING HTG
BLACK FINISH
0050110511

(6-15-05)
12 FT FBG FLUTED POLE
DIRECT IMBEDDED
0050116432
HAMILTON SHROUD
0050116467
WASHINGTON SHROUD
0050119224

ALUMINUM ANCHOR BASE HAMILTON
Or similar Styles
FLUTED,4" SHAFT

12 FT MOUNTING HTG
BLACK FINISH
0000801683 – 4"

0050110510 – 5"

DIRECT IMBEDDED

FIBERGLASS - BLACK
NATURAL FINISH
12 FT. MTG. HT.

0000807274

DRG 19155 IS A FUSELINK USED FOR ALL LUMINAIRES WITH AN UNDERGROUND FEED. (ST LT FUSE)

POLE BASE OR FOUNDATION TYPES

STD I.D. DRG 75750, 75752, & 75754

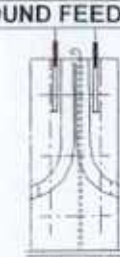
CONCRETE

STEEL HELIX BASE
0000802490 -
5 FT LG

LTFOUND WASH
75750 25_40ANC

STEEL HELIX BASE FOR HAMILTON POLE
0050100981 - 56" LG
0050100988 -HRDW

LTFOUND HAM
75750_20ANC



PRE-FORMED CONCRETE FOR HAMILTON ANCHOR BASE

LTFOUND HAM
75754 HAM

NONE FOR DIRECT IMBEDDED

LAMPS FOR ALL LIGHTING STANDARDS

0000673003 - 100W, HPS
0000673004 - 150W, HPS
0000673006 - 250W, HPS
0000673010 - 400W, HPS
0000673279 - 175W, MH
0000673779 - 250W, MH
0000673280 - 400W, MH
0000673281 - 1000W, MH

LAMPS - NON-STANDARD- FOR MAINTENANCE ONLY

0000673005 – 200W HPS
0000673192 - 175W MV
0000673207 - 400W MV

LIGHTING ON/OFF PHOTOELECTRIC CELL

0050101140 HITEMP 105-120V 220J 120V BLACK
0050101141 HITEMP 105-305V 220J MT V BLUE
0050101142 HILIGHT105-130V 220J 120V BRN

POLE NUMBER TAGS AND IDENTIFIERS FOR LIGHTS INSTALLED ON THE OLE/UOLS RATES

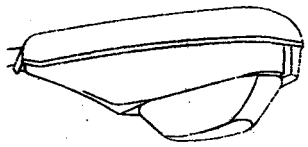
SEE PAGE 17

OUTDOOR LIGHTING POLICIES AND GUIDELINES

EQUIPMENT AVAILABLE FOR STANDARD LIGHTING PROJECTS

STANDARD DRG. 15300, 15310, 15320

CH – COBRAHEAD

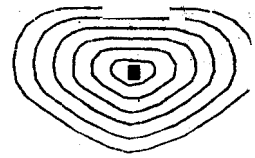


SEMI-CUTOFF DROP LENS

CUTOFF FLAT LENS
RATED AS FULL CUTOFF OR VERY LOW UPLIGHT

LIGHT DESCRIPTION		LUMENS	C.I.D.
100W HPS,	*Drop Lens,*	*9500,*	*(0000800006)*
150W HPS,	*Drop Lens,*	*16000,*	*(0000800006)*
250W HPS,	*Drop Lens,*	*30000,*	*(0000806726)*
400W HPS,	*Drop Lens,*	*50000,*	*(0000806726)*
175W MH,	*Drop Lens,*	*14500,*	*(0050096799)*
250W MH,	*Drop Lens,*	*20500,*	*(0050096800)*
400W MH,	*Drop Lens,*	*36000,*	*(0050096800)*
100W HPS,	*Flat Lens,*	*9500,*	*(0050108504)*
150W HPS,	*Flat Lens,*	*16000,*	*(0050108504)*
250W HPS,	*Flat Lens,*	*30000,*	*(0050110446)*
400W HPS,	*Flat Lens,*	*50000,*	*(0050110446)*
175W MH,	*Flat Lens,*	*14500,*	*(0050110445)*
250W MH,	*Flat Lens,*	*20500,*	*(0050110447)*
400W MH,	*Flat Lens,*	*36000,*	*(0050110447)*

THE DIFFERENCE IN LUMINAIRE STYLES IS IN THE UPLIGHT (LIGHT LOST IN THE SKY) THAT IS PRODUCED. THE FLAT LENS COBRAHEAD WILL PRODUCE LESS UPLIGHT THAN THE DROP LENS.



TYPE III LIGHTING PATTERN

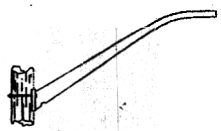
BOTH COBRAHEAD LUMINAIRES HAVE THE **TYPE III** LIGHTING PATTERN WHERE THE LIGHT ILLUMINATES THE GROUND.

LIGHTING-COBRAHEAD DRG.15400

18 INCH LONG ARM

0050110448 1 1/4" X18" COBRAHEAD WATTAGES

MAST ARMS FOR WOOD POLES- DRG. 15300



TAPERED ELLIPTICAL
4 FT. 0000800412
6 FT. 0000800433
8 FT. 0000800439

TRUSS STYLE
10 FT. 0000800463,
12 FT. 0000800476
15 FT. 0000800536

MAST ARMS FOR ALUMINUM POLES DRG. 15310 –15320

THESE MAST ARMS ARE USED WITH HAPCO ALUMINUM POLES AND ARE ORDERED SEPARATELY FROM POLE TO MIX & MATCH SIZES

TRUSS STYLE MAST ARM FOR ALUMINUM POLE

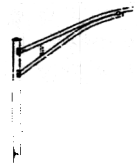
4 FT.	0050110466	10 FT.	0050110469
6 FT.	0050110467	12 FT.	0050110470
8 FT.	0050110468	15 FT.	0050110471

POLES – STD. DRG 15300-15400

STANDARDS DRGS. 15300 & 15400 ARE FOR WOOD POLES

Ground Rod - GRD UG STREET LIGHT
Fuselink – STD 19155 ST LT FUSE

ALUMINUM POLES FOR STD. DRG. 15310



TWIN OR SINGLE ARM PROVISION - USE SAME MAST ARMS AS DRG. 15320

DIRECT IMBEDDED

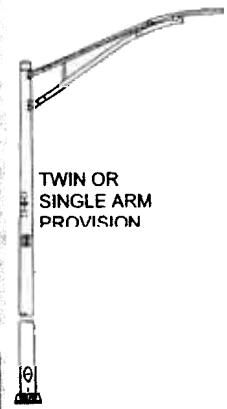
HAPCO ALUM. POLES POLISHED SATIN FINIS H MOUNTING HEIGHTS SHOWN BELOW

WITH OUTLETS (FESTOONS)(PSI)
0050110464 35'

WITHOUT OUTLETS
0050110463 35'

'WITH OUTLETS' MEAN 120V OUTLET FOR SEASONAL LIGHTING- 20' UP ON POLE

ALUMINUM POLES FOR STD. DRG. 15320



TWIN OR SINGLE ARM PROVISION

ANCHOR BASE

HAPCO ALUM. POLES POLISHED SATIN FINISH MOUNTING HEIGHTS SHOWN BELOW

WITHOUT OUTLETS
0050110460 30'
0050110461 35'
0050110462 40'

NON-STANDARD W ITH OUTLETS (FESTOONS)
0050110457 30'
0050110458 35'
0050110459 40'

'WITH OUTLETS' MEAN POLE DRILLED FOR 120V OUTLET FOR SEASONAL LIGHTING 20' UP ON POLE

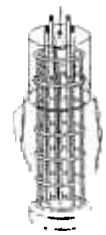
Festoon and Hardware Kit for poles drilled for outlet. Includes 1 festoon double outlet with associated mounting hardware and cover.

Pole cap, alum. 6 inch dia. with set screws. For Hapco Aluminum anchor base and direct imbedded poles.

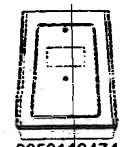
Bolt cover set for Hapco anchor base poles. Includes 4, 356 cast alum. alloy covers with 4 stainless steel screw fasteners.

Handhole cover plate with set screws.

Rubber stoppers or plugs used when using a single mast arm on these poles drilled for two mast arms.



CONCRETE



0050110474
10½"-13 ½" TOP
DRG.75751
T- BASE
50110474 - BASE
50110574 - HRDW
50114945- RPL COVER