

SECTION 7

STREET DESIGN



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SECTION 7

STREET DESIGN

7.1 GENERAL DESIGN CRITERIA

This section of the Design Manual generally follows the guidelines as established by the Institute of Transportation Engineers (ITE), the Illinois Department of Transportation (IDOT) and the American Association of State Highway and Transportation Officials (AASHTO). The references used to establish this Design Manual include the following:

- *Guidelines for Major Street Design* (ITE Publication No. RP-010A)
- *Guidelines for Residential Subdivision Street Design* (ITE Publication No. RP-011C)
- *A Policy of Geometric Design of Highways and Streets* (AASHTO, 1994)
- *An Information Guide for Roadway Lighting* (AASHTO, 1994)
- *Traffic Calming – State of the Practice* (ITE Publication No. 1R-098)
- *Illinois Department of Transportation Bureau of Local Roads & Streets Administrative Policies Manual*
- *Illinois Department of Transportation Bureau of Design & Environment Manual*

This chapter presents modifications to these guidelines in accordance with the policies and procedures established by the City of Batavia.

7.2 ROADWAY GEOMETRICS

7.2.1 Functional Classification

7.2.1.1 Arterial

Arterial streets are roadways that serve high volumes of traffic, and provide connectivity to surrounding communities. Generally these roads handle medium- to long- distance trips with some interruptions in traffic flow. The Comprehensive Plan identifies the following routes as Arterial Streets:

- Batavia Avenue / Illinois State Route 31
- Main Street
- Mooseheart Road
- South River Street / Illinois State Route 25
- North Washington Street / Illinois State Route 25
- Wilson Street (East of Randall Road) Western Avenue

7.2.1.2 Collector Streets

Collector streets are roads that serve a medium volume of traffic. These roads connect arterial roads to local streets and neighborhoods. Traffic flows

at a lower speed than on arterial routes.

7.2.1.3 Minor Collector

Minor Collectors typically allow further reduced speed but allow a greater amount of access to adjacent properties. Major collectors typically allow higher speeds and less access to surrounding properties.

7.2.1.4 Local Streets

Local streets provide individual properties direct access to the roadway system. These roads are intended to handle short trips, at a low speed. Local streets may be public or private. Public alleys serve as secondary or alternate connections for properties to these local streets.

7.2.2 Minor Street Design Guidelines

A minor street is defined as any street classified below the functional classification of an arterial. The design guidelines to be used in developing the minor street system layout shall be in accordance with Appendix E "Guidelines for Residential Subdivision Street Design" prepared by the Institute of Transportation Engineers, except as otherwise noted in the following provisions:

7.2.3 Pavement Width

The minimum pavement width for all local streets and cul-de-sacs is 28 feet, measured from back of curb to back of curb. Local Street shall be 37 feet adjacent to all school sites, park sites or other major facilities and on approaches to all collector and arterial roadways or as determined by the City Engineer. The minimum pavement width for collector streets is 37 feet, measured from back of curb to back of curb.

Type Of Street	Improved Street Width	Street Width
Arterial Street	100 feet divided by a median strip	Two 24-foot roadways
Major and Minor Collector	80 feet	37 feet
Local Streets	66 feet	28 feet
Cul-de-sac bulb	62 foot radius	45.5 foot radius

7.2.4 Maximum Cul-de-Sac Length

The length of a cul-de-sac should not exceed 1,000 feet, as measured from the centerline of the intersecting street, along the centerline to the center of the bulb of the cul-de-sac. For lengths in excess of 1,000 feet, a secondary point of

access must be provided. T-shaped turnaround with forty foot (40') extension to either side of the main stem shall be used where a temporary turnaround is recommended by the fire department. Permanent dead end or closed end streets shall have a circular paved turnaround at the end with a diameter of ninety feet (90') as measured from back of curb to back of curb. Islands in the center of the cul-de-sac shall not be allowed. Whenever an existing dead end street with a temporary turnaround is extended into a new subdivision, the new street construction work shall include a removal of the temporary turnaround. The base course in the utility corridor shall be replaced with topsoil and seeding. Any necessary repairs to the existing sidewalks, extension of sidewalks, curb and gutter, and street pavement should be made by the developer of the new subdivision as directed by the city engineer.

7.2.5 Curbs And Gutters

The standard curb and gutter section for all cul-de-sac, local roads, collector streets shall be a barrier type B 6.12 curb and gutter.

Curb Radii: Curb radii shall not be less than twenty five feet (25').

7.2.6 Curb and Gutter Protection

The contractor shall take necessary steps to preserve all curb and gutter. Prior to Hot-Mix Asphalt surfacing the flag line of the curb (typically the edge of the flag is susceptible to cracking and chipping due to heavy construction traffic and/or snow plowing) shall be repaired. Should repairs be required, the City Inspector will determine whether the developer must remove sections of the curb and gutter or if an epoxy patch system may be used. The determination will be the City Engineer's to make and will be based on the extent of damage and the developers efforts to protect the curb and gutter during construction.

The contractor may elect to choose from one of the following preventative maintenance techniques or propose an alternative to the City Engineer. All alternatives shall be approved by the City Engineer, prior to their use. The use of curb protection does not relieve the developer of their responsibility for replacing or repairing curb and gutter at a later date.

Alternative #1

The contractor may elect to place a layer of bituminous surface or binder along the flag line of the curb. The additional pavement shall extend no less than 6 feet from the flag line and be placed flush with the flag line of the curb. At the time of bituminous surfacing this additional layer must then be removed by grinding.

Alternative #2

A second alternative is to place clay or aggregate on the curb at the time that heavy traffic will be passing over the curb. This "padding" shall be removed

immediately after it has served it's purpose.

Alternative #3

The final alternative is for the contractor to leave gaps in the curb and gutter in key locations. The vacant areas could then be poured once heavy construction traffic has ceased.

7.2.7 Sidewalks

Unless the city council approves otherwise after discussion and recommendation by the plan commission, Portland cement concrete sidewalks in accordance with the standards set forth herein shall be required on both sides of all streets in all single-family and multi-family developments, and shall also be required on both sides of all streets in commercial, industrial, other developments and interconnects between park and school sites.

7.2.8 Street Lighting

Street lighting, including underground service cable, is required throughout all subdivisions for all public streets.

7.2.9 Street Name Signs and Traffic Control Devices

Street name signs are required at all street intersections.

Temporary Street Signs:

1. The developer of any subdivision shall provide temporary street signs on at least one corner of each intersection in said subdivision, said temporary street signs to be installed no later than two (2) working days after completion of curb and gutter construction at said intersection, and shall be maintained in a condition conforming with the standards hereinafter described until permanent signs have been erected.
2. Said temporary street signs shall be mounted on a four inch by four inch (4" x 4") post and set a minimum of thirty inches (30") into the ground.
3. Said street signs shall be stenciled and/or painted vertically on the four by four (4 x 4) post, and in a contrasting color to the background in order to be readable from a reasonable distance.
4. That the bottom of any such sign shall be a minimum of six feet six inches (6'6") above the top of the curb.
5. Said signs and post shall remain the property of the developer, and may be removed once permanent signs have been placed.

6. The developer shall provide type III barricades at dead end streets in accordance with IDOT standard 702001-05 or the latest revision thereto as directed by the city engineer or his/her authorized representative. At least one "Road Closed" sign, R11-2, shall be provided meeting the requirements of the most current edition of the "Manual on Uniform Traffic Control Devices". Additionally, the developer shall install "Future Road Extension" sign as approved by the City Engineer.

Permanent Street Signs:

Developers have the option of either; making and installing the signs to the City of Batavia specifications, or have the City install and fabricate each of the signs, at the expense to the developer (labor and materials). Before any signs are made and installed, contact should be made with the City of Batavia Street Department for the latest sign specifications and installation guidelines.

7.2.10 Traffic Control Devices and Pavement Markings

Traffic Control Devices:

Traffic control devices such as Stop signs, yield signs, speed limit signs shall be required as part of development. The city's police department and public works department shall provide guidelines on the locations of these signs during the engineering plan development process. Developers have the option of either; making and installing the signs to the City of Batavia specifications, or have the City install and fabricate each of the signs, at the expense to the developer (labor and materials). Before any signs are made and installed, contact should be made with the City of Batavia Street Department for the latest sign specifications and installation guidelines.

Crosswalks:

New marked crosswalks shall be ladder-style crosswalks with the accompanying signing per the MUTCD and IDOT. Additional marking and signing may be needed based upon the traffic conditions. Marked crosswalks should keep as much as possible to the natural path of travel. Ideally they will align with existing sidewalks.

7.2.11 Pavement Design

All streets within the subdivision shall be surfaced with either hot-mix-asphalt concrete or Portland cement concrete. The pavement structure shall be designed according to the Sections 402, 403, and 404 of the City of Batavia Standard Specifications. The pavement shall meet or exceed the requirements, materials, equipment, and methods documented in the latest editions of the Illinois department of transportation (IDOT) "Standard Specifications For Road And Bridge Construction", and the IDOT "Supplemental Specifications And Recurring Special Provisions".

Subgrade earth excavation in accordance with approved engineering plans to provide a stable subgrade having an IBR value of no less than 3.0. IBR tests will be required if, in the opinion of the city engineer, they are necessary to evaluate the subgrade material. A proof roll in the presence of a city inspector is required of all street and parking lot subgrades.

7.2.11.1 Type of Pavement

The following are all minimum pavement sections. All materials classifications are IDOT nomenclature. All flexible pavements will conform to the IDOT "Bureau of Design and Environment Special Provision the latest revision thereto, unless modified below. All dimensions are minimum compacted thickness. Friction aggregate for the bituminous surface course may be required as directed by the city engineer.

Public and private streets in commercial and industrial areas:

Following the approved subgrade proof roll, geotextile fabric, twelve (12) ounces per square yard, and otherwise meeting the requirements for ground stabilization found in section 210 of the IDOT standard specifications, shall be placed over the compacted subgrade prior to placement of the subbase or base course unless the subgrade has been lime stabilized.

6 inches crushed coarse aggregate base, gradation CA-1
6 inches crushed coarse aggregate subbase, gradation CA-6
Bituminous materials prime coat, 0.5 gallons per square yard
6 inches Hot-Mix Asphalt Base course
2 1/4 inches hot-mix asphalt binder course, IL19.0
1 1/2 inches hot-mix asphalt surface course, Mix D, IL-9.5

All other public and private streets:

Following the approved subgrade proof roll, geotextile fabric, twelve (12) ounces per square yard, and otherwise meeting the requirements for ground stabilization found in section 210 of the IDOT standard specifications, shall be placed over the compacted subgrade prior to placement of the subbase or base course unless the subgrade has been lime stabilized.

9 inches crushed coarse aggregate base, gradation CA-1
3 inches crushed coarse aggregate subbase, gradation CA-6
Bituminous materials prime coat, 0.5 gallons per square yard
4 inches bituminous base course
2 1/4 inches hot-mix asphalt binder course, IL19.0
1 1/2 inches hot-mix asphalt surface course, Mix D, IL-9.5

Off street private parking lots:

- 6 inches crushed coarse aggregate base, gradation CA-1
- 3 inches crushed coarse aggregate subbase, gradation CA-6
- Bituminous materials prime coat, 0.5 gallons per square yard
- 2 1/4 inches hot-mix asphalt binder course, IL19.0, SBR or SBS PG64-28 asphalt cement
- 1 1/2 inches hot-mix asphalt surface course, Mix D, IL-9.5, SBR or SBS PG64-28 asphalt cement

The city engineer may require Portland cement concrete or composite pavements if site conditions and/or usage warrant. These pavements shall be designed in accordance with the requirements provided in the IDOT "Bureau of Design and Environment Manual".

Before any paving work commences, the city engineer, or engineers retained by the city, shall approve all plans, profiles and specifications.

All underground work such as sewers, water and gas mains, house service connections, etc., for service to both sides of the street, shall be installed and approved by the city engineer prior to the construction of the street pavement.

Controlled backfilling will be required for all trenches excavated for conduits located under existing or proposed roadway and parking lot pavement areas. Said controlled backfilling shall consist of crushed coarse aggregate, IDOT gradation CA-6 or CA-7, or as directed by the city engineer or his/her authorized representative.

7.2.12 Right -of-Way Requirements

Type of Roadway	Minimum ROW (FT)
Arterial	100
Collector	80
Local Streets	Varies from 66 to 80
Cul-de-Sac Bulb	62
Alley	20

7.3 ROADWAY CONSTRUCTION

7.3.1 Roadway Construction

Prior to the placement of a pavements base course the contractor shall schedule a proof roll of the subbase. The City’s Inspector shall mark all areas that are not

acceptable and provide direction as to what areas shall be retested. Proof rolling shall conform with all specifications found in the State Standard Specifications for Road and Bridge Construction. A tandem axle truck loaded to a minimum gross weight of 40,000 lbs shall be used for the proof roll. The engineering division representative reserves the right to inspect the truck and load. If necessary the engineering representative can request the truck operator to empty the payload after proof rolling is completed.

7.3.2 Pavement Restoration

If the trench has been excavated in an existing pavement, the developer must replace the pavement with the use of a Class "C" or Class "D" Patch. This patch shall extend an additional one foot (1') in each direction, measured perpendicular from the trench wall.

In the event that the patch is to be constructed in existing concrete pavement it shall consist of eight inches (8") of Portland Cement Concrete Base Course with a surface course of two inches (2") of Hot-Mx-Asphalt. For an Arterial street, ten inches (10") of concrete base course will be used in place of the eight inches (8"). For trenches greater than six feet (6') in width #3 rebars shall be placed at twelve inch (12") centers. This rebar shall be placed 2" above the top of the trench. The rebar shall span the entire width of the patch. All edges of the patch shall be flush with the existing pavement, and will be completed to the approval of the City Engineer or representative.

Patches constructed in hot-mix-asphalt or gravel base pavements shall consist of a 10" hot-mix-asphalt binder course and a surface course of two inches (2"). Binder Course shall be placed and compacted in 3" lifts.

7.4 Right-of-Way Supervision

It is unlawful to construct any sidewalk or driveway approach in the ROW without having first secured a permit from the Community Development. This pertains to all construction within the right of way. All construction within the right of way shall be subject to inspection and approval by the City of Batavia Engineering Division. It shall be the contractor or owners responsibility to contact the Community Development at least forty-eight (48) hours in advance of desired inspection.

7.4.1 Right-of-Way Forms & Installation

All forms shall be set true to line and elevation, substantially built and rigidly braced to prevent bulging. They shall be constructed of clean lumber surfaced on four sides and be uniform in width and thickness or of steel of equal rigidity. An inspection is required during the forming and prior to the pouring of any concrete for all work within the public-right-of-way and other construction as directed by the Engineering Division.

Typical sidewalk shall have a 10:1 slope towards any intersection. The maximum allowable slope is 6:1. Sidewalk approaches shall not have side slopes. All walks shall remain a constant width to the curb. All sidewalk shall conform to the American Public Works Association Guidelines and the Americans with Disabilities Act.

Expansion joints shall be 3/4" thick and shall be placed at intervals of fifty feet in the sidewalks, between driveway pavement and sidewalk, driveway approaches and curbs, and sidewalk approaches and curb. These expansion joints shall consist of premolded bituminous joint filler or an IDOT approved alternative.

Expansion joints 1/2" thick shall be provided between the sidewalk and all structures such as street light standards, traffic signal posts and sign posts etc., located within the limits of public sidewalk. The expansion joints shall consist of premolded bituminous joint filler or an IDOT approved alternative.

7.4.2 Driveways & Approaches

No driveway approach shall be constructed by the owner or developer without first having obtained a permit from the community development department. The City Engineer shall be notified a minimum of forty-eight (48) hours prior to construction.

Curb cut for driveway approaches shall not exceed twenty two feet (22') in width including a minimum of two foot (2') transitions cut from barrier curb to depressed curb on either side of driveway entrance, unless approved by the city engineer.

Driveway approaches shall not exceed twenty two feet (22') in width at edge of pavement.

Driveway shall not exceed eighteen feet (18') in width at both front and back of sidewalk with garage setbacks less than forty five feet (45') from the garage door to the front property line.

Driveway shall not exceed fourteen feet (14') in width at both the front and back of sidewalk for all garages side load or setbacks greater than forty five feet (45') from the garage door to the front property line.

Distance From Hydrants: Driveway should not be more than two feet (2') closer from any fire hydrant.

7.4.2.1 Residential

Single family residential homes are limited to one driveway approach, unless approval has been granted by the City Engineer. Two family residential homes (duplex) may have two driveway entrances, both of which may be no more than sixteen feet (16') in width. Residential driveways shall have a maximum width of twenty-two feet (22') at the curb line, with the exception of a single family residential home with a three car garage which may have a thirty-two foot (32') opening.

7.4.2.2 Commercial

New commercial driveway approaches may have a maximum width of forty-five (45') feet measured at the curb line. At an intersection, a length of not less than ten feet shall be left undisturbed between the property line extended and the near edge of the driveway approach. A curb island with a minimum length of six (6') feet measured along both the curblines and the property line shall be placed between the driveway approach. A curb length of not less than three feet shall be left undisturbed adjacent to each property line to serve as an island area should the adjoining property owner request a permit for a driveway approach.

Any alterations to the geometrics or material for a proposed driveway approach must be submitted in writing and approved by the City Engineer.

7.4.3 Material and Specifications

All commercial driveway approaches shall be constructed of Portland Cement Concrete (meeting current IDOT standards) shall have a minimum thickness of 8" with a 4" aggregate base cross section. Residential driveway approaches shall be at least 2" Hot-Mix-Asphalt over 6" aggregate base.

All driveways shall be constructed to eliminate step downs in the sidewalk. The sidewalk should follow a straight line grade through or across driveways. It is unlawful to have the surface finish of any new driveway approach constructed so as to render it slippery and hazardous to pedestrians, or unsightly due to poor workmanship. The finish of the concrete shall be: brushed, consistent without waviness bumps or irregularities.

7.4.4 Underdrains

The developer shall submit with the engineering plans sufficient data concerning existing soil and ground water conditions to determine if a need exists for a pavement underdrain system. If an underdrain system is required it shall be installed by the developer as directed by the City Engineer: All underdrain must be in accordance with the requirements stated in the Storm Sewer Section 4.

7.5 INTERSECTION DESIGN

The design guidelines follow the "Guidelines for Residential Subdivision Street Design" as published by the Institute of Transportation Engineers. Table 3:

Intersection Design Guidelines denotes three classifications for the type of terrain. In the City of Batavia, the terrain is generally level (has a longitudinal slope of 0-8%). Therefore the guidelines under this classification should be followed.

Criteria	Requirement
Approach Speed (mph)	25
Clear Sight Distance (length along each approach leg)(feet)	90
Minimum Angle of Intersection	70° (90° Preferred)
Minimum Curb Radius (feet)	
a. Local-Local	25
c. Local-Collector	25
g. Collector-Collector	30
h. Collector-Arterial	30
Minimum Centerline Offset of Adjacent Intersection (feet)	
a. Local-Local	125
c. Local-Collector	150
f. Collector-Collector	200
Minimum Tangent Length (feet)	
Approaching Intersection (each length)	50

1. Streets shall be laid out so as to intersect as nearly as possible at right angles. A proposed intersection of two (2) new streets at an angle of less than eighty degrees (80°) shall not be acceptable unless adequate circular radii or angular cutouts are provided. Not more than two (2) streets shall intersect at any one point unless specifically approved by the plan commission.

2. Proposed new intersections along one side of any existing street shall, wherever practicable, coincide with any existing intersections on the opposite side of such street. Street jogs with centerline offsets of less than one hundred twenty five feet (125') shall not be permitted. Where streets intersect major streets, their alignment shall be continuous.

3. The corner lots at a major or secondary intersection shall be truncated by straight lines joining points twenty five feet (25') back from the property line intersection in each quadrant. Road or street dedications at intersections shall take this form, and in cases involving major highways, angular intersections, or in any case where more dedications are deemed necessary to provide safe sight distance or for traffic channelization, the plan commission may specify a greater cutoff than the normal cited above. Other intersections and abrupt changes in alignment within a block shall have the corners cut off in accordance with standard engineering practice, to permit safe vehicular movement.

4. Where any street intersection will involve earth banks or existing vegetation inside any lot corner that would create a traffic hazard by limiting visibility, the developer shall cut such ground and/or vegetation (including trees) in connection with the grading of the public right of way to the extent deemed necessary to provide adequate sight distance.

7.6 SIDEWALKS

7.6.1 Minimum Width

The minimum width for sidewalks is 5 feet, except where the volume of pedestrian or bicycle traffic justifies a greater width, or where parked vehicles may overhang onto the sidewalk. The minimum sidewalk width in the Central Business District is 10 feet.

Area	Minimum Width of Sidewalk
Central Business District	Minimum 10 Feet with grass parkway
Commercial areas	6 feet minimum
Arterial and collector streets	6 feet minimum
Industrial areas	5 feet minimum
Multi-family/single-family	5 feet minimum
Carriage walks (when permitted)	6 feet minimum

7.6.2 Thickness

All new and replacement sidewalks shall have a minimum thickness of five inches (5"). Sidewalks shall have a minimum thickness of six inches (6") for wheelchair ramps, carriage walks and residential driveways. Sidewalks shall have a minimum thickness of eight inches (8") for commercial driveways.

7.6.3 Material

Appropriate Class concrete shall be used for all sidewalk work and shall be in accordance with the appropriate section of the Illinois department of transportation "Standard Specifications for Road and Bridge Construction" as adopted January 1, 1997, or latest edition thereof.

7.6.4 Location

All sidewalks are to be located such that the outside edge of the walk is 1-foot from the dedicated right-of-way line, and entirely within the dedicated right-of-way. Exceptions may be made, with approval of the city engineer or his designee, to avert trees and other natural features.

7.6.5 Lateral Separation

The minimum lateral separation between the edge of a sidewalk and any above ground obstruction (i.e. posts, poles, tree trunks, utility boxes, etc.) shall be 1-foot. When such conflicts require a lateral change in sidewalk alignment, a 10:1 transition shall be made.

7.6.6 Slope And Grade

Transverse Slope, not to exceed 2% ($\frac{1}{4}$ " per foot)

Longitudinal Slope, maximum 5% (20:1)

Longitudinal Slope, in excess of 5% shall meet the requirements of the Illinois Accessibility Code.

7.6.7 Intersections

When a sidewalk approaches an intersection with a street to provide a pedestrian crossing; the curb and adjacent sidewalk shall be depressed, meeting the requirements of the Illinois Accessibility Code.

7.6.8 Sidewalk Construction

Sidewalks shall not be placed until building construction has been completed to the point that construction traffic need no longer cross the sidewalk area. In areas where there are to be no buildings (parks, etc.) sidewalks shall be completed following trench settlement and grading of site.

Sidewalk construction shall be completed prior to the issuance of an occupancy permit, except during periods when weather prohibits the installation of the new walk. In such cases, the owner/builder may execute a bond in an amount equal to that of current city policy, to ensure the work is completed.

Sidewalks are to be continuous through paved areas such as driveways and parking lots.