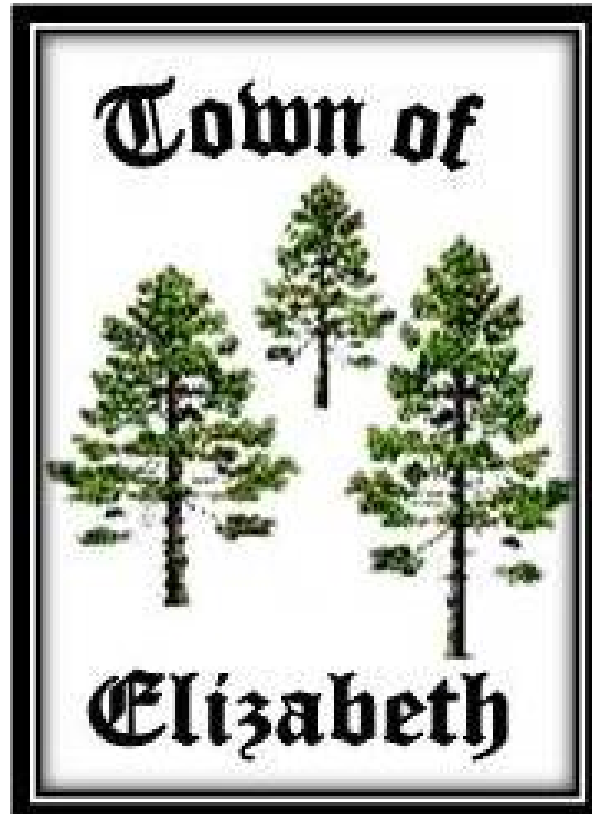


TOWN OF ELIZABETH



STREET STANDARDS AND SPECIFICATIONS

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STREET STANDARDS AND SPECIFICATIONS

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STREET STANDARDS AND SPECIFICATIONS

Section 1—GENERAL

This manual sets forth the minimum design and technical criteria and specifications to be used in the preparation of all roadway plans.

- 1.1 Within this chapter on Roadway Design and Technical Criteria, AASHTO "Green Book" refers to **"A Policy on Geometric Design of Highways and Streets - 2004"** as published by the American Association of State Highway and Transportation Officials.

Section 2—ROADWAY DESIGN AND TECHNICAL CRITERIA

The Town of Elizabeth has adopted the Town of Elizabeth Street Plan based on traffic volumes, land use and expected growth. This Street Plan designates streets as arterial, major collector, minor collector, and urban local type I, II, III, and IV.

Basic considerations in the design of circulation systems must recognize the following factors:

- Safety - for both vehicular and pedestrian traffic
- Efficiency of Service - for all users
- Livability - especially as affected by traffic elements in the circulation system
- Economy - of both construction and use of land

Each of the following principles is an elaboration on one of more of these four factors. The principles are not intended as absolute criteria, since instances may appear where certain principles conflict. The principles should, therefore, be used as guides to proper systems layout.

- Ensure Vehicular and Pedestrian Access
- Minimize Through Trips
- Control Access to Arterials
- Discourage Speeding
- Minimize Pedestrian - Vehicular Conflicts
- Minimize Space Devoted to Street Use
- Relate Street to Topography
- Parking on both sides of the Street

The Town of Elizabeth may require developments that adjoin existing streets, to dedicate additional rights of way and or improve that section of adjoining street per these standards.

Construction of half streets is not allowed.

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Section 2—ENGINEERING DESIGN & TECHNICAL CRITERIA

2.1. URBAN LOCAL-Type I (UL1)

a. Posted Speed Limit

Twenty-five (25) mph

b. Design Speed

Thirty (30) mph

c. Traffic Volumes

1,500 vehicles per day (VPD), maximum

d. Safety

Designed for the safety of pedestrians and bicyclists, and the ease of access to adjacent property.

e. Traffic Control

Stop signs, speed limit, street name, etc.

f. Function

Urban Local-Type 1 street shall provide direct access to adjacent property. Traffic carried by local streets should have an origin or a destination within the neighborhood.

g. Right-Of-Way (R.O.W)

- Sixty (60) feet minimum width.

Any change in R.O.W. width shall be made at intersections only. An appropriate intersection design shall ensure the sight line falls within the public R.O.W. (SEE, SIGHT LINE, in this chapter). The right-of-way line behind curb returns shall be a diagonal line. Certain circumstances related to, but not limited to; sight lines, traffic control devices, and pedestrian improvements may require additional right-of-way resulting in a site-specific adjustment of the right-of-way line behind a curb return.

h. Number of Driving Lanes

Two (2)

i. Access Conditions

Intersections with Cul-de-sacs, Urban Local, and Minor Collector roads only. Direct access to abutting property permitted.

j. Design Characteristic

Urban Local-Type 1 (UL1) streets shall be designed to discourage through traffic from moving through the neighborhood. UL1 streets should not intersect major

collectors or arterial streets. The street section shall include two driving lanes plus parallel parking on one side of the street. Utility line easements are required along both sides of the street. See also the Utility section of these Design and Construction Standards.

k. Type of Curb, Gutter and Walk

- Six (6) inch vertical curb with five (5) foot detached sidewalk on both sides, separated five and one-half (5.5) feet from back of curb to front edge of sidewalk or
- Six (6) inch vertical curb with five (5) foot attached sidewalk on both sides.

See detail RD-1 (CURB, GUTTER, AND SIDEWALK DETAILS)

l. Turnaround

Turnarounds shall NOT be allowed on this category of street.

m. Street Section

Twenty-four (24) feet paved width plus Two (2), Two (2) foot gutter pans. (Twenty-eight (28) feet, flowline to flowline with parking restricted on one side).

n. Minimum Horizontal Curve Radius on Centerline

See Table 5.1 (HORIZONTAL CURVES).

o. Minimum Length of Vertical Curves

See Table 6.1 (Vertical Alignment Controls)

p. Street Grades

A minimum longitudinal **flowline** grade of 1.0% shall be required on all local streets, except at curb returns, where the minimum **flowline** grade shall be 2.0%. Maximum **centerline** grade is 6.0%. See Table 2.1(ROADWAY CONSTRUCTION STANDARDS) and Table 6.1 (VERTICAL ALIGNMENT CONTROLS)

q. Curb Return Radii

See Table 5.2. (CURB RETURN RADII)

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2.2 URBAN LOCAL-Type II (UL2)

a. Posted Speed Limit

Twenty-five (25) mph

b. Design Speed

Thirty (30) mph

c. Traffic Volumes

1,500 vehicles per day, maximum

d. Safety

Designed for the safety of pedestrians and bicyclists, and the ease of access to adjacent property.

e. Traffic Control

Stop signs, speed limit, street name, no parking signs, etc.

f. Function

Local streets provide direct access to adjacent property. Traffic carried by local streets should have an origin or a destination within the neighborhood.

g. Right-Of-Way (R.O.W)

Forty (40) feet minimum width.

Any change in R.O.W. width shall be made at intersections only. An appropriate intersection design shall ensure the sight line falls within the public R.O.W. (SEE, SIGHT LINE, in this chapter). The right-of-way line behind curb returns shall be a diagonal line. Certain circumstances related to, but not limited to; sight lines, traffic control devices, and pedestrian improvements may require additional right-of-way resulting in a site-specific adjustment of the right-of-way line behind a curb return.

h. Number of Driving Lanes

Two (2)

i. Access Conditions

Intersections with Cul-de-sacs, Local, and Minor Collector roads only. Direct access to abutting property permitted.

j. Design Characteristic

Urban Local-Type II (UL2) streets should be designed to discourage through traffic from moving through the neighborhood. Urban local streets should not intersect major collectors or arterial streets. Utility line easements are required along both sides of the street. See also the Utility section of these Design and Construction Standards.

k. **Type of Curb, Gutter and Walk**

Six (6) inch vertical curb with five (5) foot detached sidewalk located adjacent to the side of on-street parking, separated five and one-half (5.5) feet from back of curb to front edge of sidewalk. See detail RD-1 (CURB, GUTTER, AND SIDEWALK DETAILS)

l. **Turnaround**

Turnarounds shall NOT be allowed on this category of street.

m. **Street Section**

Twenty-four (24) feet paved width plus Two (2), Two (2) foot gutter pans. (Twenty-eight (28) feet, flowline to flowline with parking restricted on one side).

n. **Minimum Horizontal Curve Radius on Centerline**

See Table 5.1 (HORIZONTAL CURVES).

o. **Minimum Length of Vertical Curves**

See Table 6.1 (Vertical Alignment Controls)

p. **Street Grades**

A minimum longitudinal **flowline** grade of 1.0% shall be required on all local streets, except at curb returns, where the minimum **flowline** grade shall be 2.0%. Maximum **centerline** grade is 6.0%. See Table 2.1(ROADWAY CONSTRUCTION STANDARDS) and Table 6.1 (VERTICAL ALIGNMENT CONTROLS)

q. **Curb Return Radii**

See Table 5.2(CURB RETURN RADII)

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2.3 URBAN LOCAL-Type III (UL3)

a. Posted Speed Limit

Twenty-five (25) mph

b. Design Speed

Thirty (30) mph

c. Traffic Volumes

1,500 vehicles per day, maximum

d. Safety

Designed for the safety of pedestrians and bicyclists, and the ease of access to adjacent property.

e. Traffic Control

Stop signs, speed limit, street name, no parking signs, etc.

f. Function

Local streets provide direct access to adjacent property. Traffic carried by local streets should have an origin or a destination within the neighborhood.

g. Right-Of-Way (R.O.W)

Sixty (60) feet minimum width. A design option for 50' Right of way is allowed in accordance with detail RD-12.

Any change in R.O.W. width shall be made at intersections only. An appropriate intersection design shall ensure the sight line falls within the public R.O.W. (SEE, SIGHT LINE, in this chapter). The right-of-way line behind curb returns shall be a diagonal line. Certain circumstances related to, but not limited to; sight lines, traffic control devices, and pedestrian improvements may require additional right-of-way resulting in a site-specific adjustment of the right-of-way line behind a curb return.

h. Number of Driving Lanes

Two (2)

i. Access Conditions

Intersections with Cul-de-sacs, Local, and Minor Collector roads only. Direct access to abutting property permitted.

j. Design Characteristic

Urban Local-Type III (UL3) streets should be designed to discourage through traffic from moving through the neighborhood. Urban local streets should not intersect major collectors or arterial streets. Utility line easements are required along both sides of the street. See also the Utility section of these Design and Construction

Standards.

k. **Type of Curb, Gutter and Walk**

Six (6) inch vertical curb with five (5) foot detached sidewalk on both sides, separated five and one-half (5.5) feet from back of curb to front edge of sidewalk. See detail RD-1 (CURB, GUTTER, AND SIDEWALK DETAILS). Also see design options per detail RD-12.

l. **Turnaround**

Turnarounds shall NOT be allowed on this category of street.

m. **Street Section**

Thirty two (32) feet paved width plus Two (2), Two (2) foot gutter pans. (Thirty-six (36) feet, flowline to flowline with parking on both sides).

n. **Minimum Horizontal Curve Radius on Centerline**

See Table 5.1 (HORIZONTAL CURVES).

o. **Minimum Length of Vertical Curves**

See Table 6.1 (Vertical Alignment Controls)

p. **Street Grades**

A minimum longitudinal **flowline** grade of 1.0% shall be required on all local streets, except at curb returns, where the minimum **flowline** grade shall be 2.0%. Maximum **centerline** grade is 6.0%. See Table 2.1 (ROADWAY CONSTRUCTION STANDARDS) and Table 6.1 (VERTICAL ALIGNMENT CONTROLS)

q. **Curb Return Radii**

See Table 5.2 (CURB RETURN RADII)

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2.4 URBAN LOCAL-Type IV (UL4)

a. Posted Speed Limit

Twenty-five (25) mph

b. Design Speed

Thirty (30) mph

c. Traffic Volumes

1,500 vehicles per day, maximum

d. Safety

Designed for the safety of pedestrians and bicyclists, and the ease of access to adjacent property.

e. Traffic Control

Stop signs, speed limit, street name, no parking signs, etc.

f. Function

Local streets provide direct access to adjacent property. Traffic carried by local streets should have an origin or a destination within the neighborhood.

g. Right-Of-Way (R.O.W)

Sixty (60) feet minimum width.

Any change in R.O.W. width shall be made at intersections only. An appropriate intersection design shall ensure the sight line falls within the public R.O.W. (SEE, SIGHT LINE, in this chapter). The right-of-way line behind curb returns shall be a diagonal line. Certain circumstances related to, but not limited to; sight lines, traffic control devices, and pedestrian improvements may require additional right-of-way resulting in a site-specific adjustment of the right-of-way line behind a curb return.

h. Number of Driving Lanes

Two (2)

i. Access Conditions

Intersections with Cul-de-sacs, Local, and Minor Collector roads only. Direct access to abutting property permitted.

j. Design Characteristic

Urban Local-Type IV (UL4) streets should be designed to discourage through traffic from moving through the neighborhood. Urban local streets should not intersect major collectors or arterial streets. Utility line easements are required along both

sides of the street. See also the Utility section of these Design and Construction Standards.

k. **Type of Curb, Gutter and Walk**

Six (6) inch vertical curb with five (5) foot detached sidewalk on both sides, separated five and one-half (5.5) feet from back of curb to front edge of sidewalk. See detail RD-1 (CURB, GUTTER, AND SIDEWALK DETAILS)

l. **Turnaround**

Turnarounds shall NOT be allowed on this category of street.

m. **Street Section**

Twenty (20) feet paved width plus Two (2), Two (2) foot gutter pans. (Twenty-four (24) feet, flowline to flowline with no parking on either side).

n. **Minimum Horizontal Curve Radius on Centerline**

See Table 5.1 (HORIZONTAL CURVES).

o. **Minimum Length of Vertical Curves**

See Table 6.1 (Vertical Alignment Controls)

p. **Street Grades**

A minimum longitudinal **flowline** grade of 1.0% shall be required on all local streets, except at curb returns, where the minimum **flowline** grade shall be 2.0%. Maximum **centerline** grade is 6.0%. See Table 2.1(ROADWAY CONSTRUCTION STANDARDS) and Table 6.1 (VERTICAL ALIGNMENT CONTROLS)

q. **Curb Return Radii**

See Table 5.2 (CURB RETURN RADII)

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2.5 Minor Collector

Collector streets collect and distribute traffic between arterial and local streets and serve as main connectors within communities, linking one neighborhood with another. Direct access is not permitted on a collector street.

a. POSTED SPEED LIMIT

Thirty (30) mph

b. DESIGN SPEED

Thirty-Five (35) mph

c. TRAFFIC VOLUMES

7,000 vehicles per day, maximum

d. SAFETY

Designed to handle traffic volumes loading from and onto local, other collector, and arterial roadways.

e. TRAFFIC CONTROL

Stop signs, channelization, and street name signs. Traffic signals are normally used only at intersections with major collectors and arterial streets. Parking is allowed on both sides.

f. FUNCTION

Collector streets collect and distribute traffic between arterial and local streets and serve as main connectors within communities, linking one neighborhood with another. Traffic carried by collector streets should have an origin or a destination within the community. Utility line easements should be available.

g. Right-Of-Way (R.O.W.)

Sixty (60) feet

Any change in R.O.W. width shall be made at intersections only. An appropriate intersection design shall ensure the sight line falls within the public R.O.W. (SEE, SIGHT LINE, in this chapter). The right-of-way line behind curb returns shall be a diagonal line. Certain circumstances related to, but not limited to; sight lines, traffic control devices, and pedestrian improvements may require additional right-of-way resulting in a site-specific adjustment of the right-of-way line behind a curb return.

Additional right-of-way may be required at intersections.

h. NUMBER OF Driving LANES

Two (2)

i. **ACCESS CONDITIONS**

Intersections with local, collector and arterial streets. Residential access is not permitted. Direct access to other abutting property is not permitted unless no other access is reasonably available. Intersections should be spaced a minimum of 330 feet apart.

j. **DESIGN CHARACTERISTIC**

Collector streets should have continuity throughout a neighborhood but need not extend beyond the neighborhood.

k. **TYPE OF CURB AND GUTTER AND WALK**

Six (6) inch vertical curb with five (5) foot detached sidewalk on both sides, separated six (6) feet from back of curb to front edge of sidewalk.

l. **STREET SECTION**

Thirty two (32) feet paved width plus Two (2) – Two (2) foot gutter pans. (Thirty six (36) feet, flowline to flowline). Additional lanes may be required at intersections.

m. **Minimum Horizontal Curve Radius on Centerline**

See Table 5.1 (HORIZONTAL CURVES)

n. **MINIMUM LENGTH OF VERTICAL CURVES**

See Table 6.1 (VERTICAL ALIGNMENT CONTROLS)

o. **MINIMUM LENGTH OF TANGENTS BETWEEN ALL CURVES**

One hundred (100) feet.

p. **STREET GRADES**

A minimum longitudinal grade of 2.0% shall be required along the **centerline** of all Collector and Arterial streets. Maximum grade is 5.0%. See Table 2.1 (ROADWAY CONSTRUCTION STANDARDS) and Table 6.1 (VERTICAL ALIGNMENT CONTROLS).

q. **CURB RETURN RADII**

See Table 5.2 (CURB RETURN RADII)

The remainder of this page is intentionally left blank.

2.6 Minor Collector with Bike Lanes

Collector streets collect and distribute traffic between arterial and local streets and serve as main connectors within communities, linking one neighborhood with another. Direct access is not permitted on a collector street.

b. POSTED SPEED LIMIT

Thirty (30) mph

b. DESIGN SPEED

Thirty-Five (35) mph

c. TRAFFIC VOLUMES

7,000 vehicles per day, maximum

d. SAFETY

Designed to handle traffic volumes loading from and onto local, other collector, and arterial roadways.

e. TRAFFIC CONTROL

Stop signs, channelization, and street name signs. Traffic signals are normally used only at intersections with major collectors and arterial streets. Parking is allowed on one side of the street with a five (5) foot bike lane adjacent to the parking and a three (3) foot bike lane on the opposing side of the street section.

f. FUNCTION

Collector streets collect and distribute traffic between arterial and local streets and serve as main connectors within communities, linking one neighborhood with another. Traffic carried by collector streets should have an origin or a destination within the community. Utility line easements should be available.

g. Right-Of-Way (R.O.W.)

Sixty (60) feet

Any change in R.O.W. width shall be made at intersections only. An appropriate intersection design shall ensure the sight line falls within the public R.O.W. (SEE, SIGHT LINE, in this chapter). The right-of-way line behind curb returns shall be a diagonal line. Certain circumstances related to, but not limited to; sight lines, traffic control devices, and pedestrian improvements may require additional right-of-way resulting in a site-specific adjustment of the right-of-way line behind a curb return.

Additional right-of-way may be required at intersections.

h. NUMBER OF Driving LANES

Two (2) Vehicle lanes and two (2) bike lanes.

i. ACCESS CONDITIONS

Intersections with local, collector and arterial streets. Residential access is not permitted. Direct access to other abutting property is not permitted unless no other access is reasonably available. Intersections should be spaced a minimum of 330 feet apart.

j. DESIGN CHARACTERISTIC

Collector streets should have continuity throughout a neighborhood but need not extend beyond the neighborhood.

k. TYPE OF CURB AND GUTTER AND WALK

Six (6) inch vertical curb with five (5) foot detached sidewalk on both sides, separated six (6) feet from back of curb to front edge of sidewalk.

l. STREET SECTION

Thirty four (34) feet paved width plus Two (2) – Two (2) foot gutter pans. (Thirty eight (38) feet, flowline to flowline). Additional lanes may be required at intersections.

m. Minimum Horizontal Curve Radius on Centerline

See Table 5.1 (HORIZONTAL CURVES)

n. MINIMUM LENGTH OF VERTICAL CURVES

See Table 6.1 (VERTICAL ALIGNMENT CONTROLS)

o. MINIMUM LENGTH OF TANGENTS BETWEEN ALL CURVES

One hundred (100) feet.

p. STREET GRADES

A minimum longitudinal grade of 2.0% shall be required along the **centerline** of all Collector and Arterial streets. Maximum grade is 5.0%. See Table 2.1(ROADWAY CONSTRUCTION STANDARDS) and Table 6.1 (VERTICAL ALIGNMENT CONTROLS).

q. CURB RETURN RADII

See Table 5.2 (CURB RETURN RADII)

The remainder of this page is intentionally left blank.

2.7 Major Collector

Major collector streets permit relatively unimpeded traffic movement and are intended for use on those routes. Direct access is not permitted on a Major Collector street.

a. POSTED SPEED LIMIT

Thirty Five (35) mph

b. DESIGN SPEED

Forty (40) mph

c. TRAFFIC VOLUMES

Generally greater than 7,000 vehicles per day when the properties, which the collector serves, are fully developed.

d. SAFETY

Designed to handle traffic volumes loading from and onto local, other collector, and arterial roadways.

e. TRAFFIC CONTROL

Stop signs, channelization, and street name signs. Traffic signals are normally used only at intersections with collectors and arterial streets. Parking is prohibited.

f. FUNCTION

Collector streets collect and distribute traffic between arterial and local streets and serve as main connectors within communities, linking one neighborhood with another. Traffic carried by collector streets should have an origin or a destination within the community. Utility line easements should be available.

g. Right-Of-Way (R.O.W.)

Ninety (90) feet Minimum

Any change in R.O.W. width shall be made at intersections only. An appropriate intersection design shall ensure the sight line falls within the public R.O.W. (SEE, SIGHT LINE, in this chapter). The right-of-way line behind curb returns shall be a diagonal line. Certain circumstances related to, but not limited to; sight lines, traffic control devices, and pedestrian improvements may require additional right-of-way resulting in a site-specific adjustment of the right-of-way line behind a curb return.

h. NUMBER OF Driving LANES

Two (2)

i. **ACCESS CONDITIONS**

Access from street of lower classification will be permitted but in all cases will be controlled by traffic control devices. Residential access is not permitted. Direct access to other abutting property is not permitted unless no other access is reasonably available. Intersections should be spaced a minimum of 660 feet apart. See Section 13.2 for intersection spacing criteria.

j. **DESIGN CHARACTERISTIC**

Major collector streets should be employed where traffic demands dictate. Enhanced landscaping elements are encouraged.

k. **TYPE OF CURB AND GUTTER AND WALK**

Six (6) inch vertical curb & gutter with Eight (8) foot detached sidewalk, separated eight (8) feet from back of curb to front edge of sidewalk.

l. **STREET WIDTHS**

2-12' travel lanes; 1-16' center turn lane/raised median; 2-2' gutter pans. (44' flowline - flowline)

m. **MINIMIZE HORIZONTAL CURVE RADIUS ON CENTERLINE**

See Table 5.1 (HORIZONTAL CURVES)

n. **MINIMUM LENGTH OF VERTICAL CURVES**

See Table 6.1 (VERTICAL ALIGNMENT CONTROLS)

o. **MINIMUM LENGTH OF TANGENTS BETWEEN ALL CURVES**

One hundred (100) feet.

p. **STREET GRADES**

A minimum longitudinal grade of 2.0% shall be required along the **centerline** of all Collector and Arterial streets. Maximum grade is 5.0%. See Table 2.1 (ROADWAY CONSTRUCTION STANDARDS) and Table 6.1 (VERTICAL ALIGNMENT CONTROLS).

q. **CURB RETURN RADII**

See Table 5.2 (CURB RETURN RADII)

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2.8 Major Collector with Bike Lanes

Major collector streets permit relatively unimpeded traffic movement and are intended for use on those routes. Direct access is not permitted on a Major Collector street.

b. POSTED SPEED LIMIT

Thirty Five (35) mph

b. DESIGN SPEED

Forty (40) mph

c. TRAFFIC VOLUMES

Generally greater than 7,000 vehicles per day when the property, which the collector serves, is fully developed.

d. SAFETY

Designed to handle traffic volumes loading from and onto local, other collector, and arterial roadways.

e. TRAFFIC CONTROL

Stop signs, channelization, and street name signs. Traffic signals are normally used only at intersections with collectors and arterial streets. Parking is prohibited. Four (4) foot bike lanes shall be located on both sides of the street section.

f. FUNCTION

Collector streets collect and distribute traffic between arterial and local streets and serve as main connectors within communities, linking one neighborhood with another. Traffic carried by collector streets should have an origin or a destination within the community. Utility line easements should be available.

g. Right-Of-Way (R.O.W.)

Ninety (90) feet Minimum

Any change in R.O.W. width shall be made at intersections only. An appropriate intersection design shall ensure the sight line falls within the public R.O.W. (SEE, SIGHT LINE, in this chapter). The right-of-way line behind curb returns shall be a diagonal line. Certain circumstances related to, but not limited to; sight lines, traffic control devices, and pedestrian improvements may require additional right-of-way

resulting in a site-specific adjustment of the right-of-way line behind a curb return.

h. NUMBER OF Driving LANES

Two (2) Vehicle lanes and two (2) bike lanes.

i. ACCESS CONDITIONS

Access from street of lower classification will be permitted but in all cases will be controlled by traffic control devices. Residential access is not permitted. Direct access to other abutting property is not permitted unless no other access is reasonably available. Intersections should be spaced a minimum of 660 feet apart. See Section 13.2 for intersection spacing criteria.

j. DESIGN CHARACTERISTIC

Major collector streets should be employed where traffic demands dictate. Enhanced landscaping elements are encouraged.

k. TYPE OF CURB AND GUTTER AND WALK

Six (6) inch vertical curb & gutter with six (6) foot detached sidewalk, separated eight (8) feet from back of curb to front edge of sidewalk.

l. STREET WIDTHS

2-12' travel lanes; 1-16' center turn lane/raised median; 2-2' gutter pans, 2-4' bike lanes. (52' flowline - flowline)

m. MINIMIZE HORIZONTAL CURVE RADIUS ON CENTERLINE

See Table 2.1 (HORIZONTAL CURVES)

n. MINIMUM LENGTH OF VERTICAL CURVES

See Table 6.1 (VERTICAL ALIGNMENT CONTROLS)

o. MINIMUM LENGTH OF TANGENTS BETWEEN ALL CURVES

One hundred (100) feet.

p. STREET GRADES

A minimum longitudinal grade of 2.0% shall be required along the **centerline** of all Collector and Arterial streets. Maximum grade is 5.0%. See Table 2.1 (ROADWAY CONSTRUCTION STANDARDS) and Table 6.1 (VERTICAL ALIGNMENT CONTROLS).

q. CURB RETURN RADII

See Table 5.2 (CURB RETURN RADII)

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2.9 Arterial

Arterial routes permit relatively unimpeded traffic movement and are intended for use on these routes where four moving lanes and one left-turn lane are required.

a. POSTED SPEED LIMIT

Greater than or equal to Thirty-Five (35) MPH. Actual posted speed to be determined by the Town of Elizabeth Engineering Division prior to submittal of construction plans.

b. DESIGN SPEED

Forty-Five (45) to Fifty-Five (55) MPH

c. TRAFFIC VOLUMES

Generally greater than 12,000 vehicles per day, when the property which the arterial serves is fully developed.

d. SAFETY

Designed to handle traffic volumes from and onto collector streets and other arterial roadways.

e. TRAFFIC CONTROL

Regulation of traffic is accomplished through the use of traffic signs, medians, signals, and channelization. Parking is prohibited. Traffic signals will normally be required.

f. FUNCTION

Arterial routes permit relatively unimpeded traffic movement and are intended for use on these routes where four moving lanes and one left turn lane are required.

g. Right-Of-Way (R.O.W.)

One Hundred Twenty Eight (128) feet minimum unless otherwise approved by the Board of Trustees.

Additional R.O.W. may be required based on future transit needs as identified by the Division of Public Works.

Any change in R.O.W. width shall be made at intersections only. An appropriate intersection design shall ensure the sight line falls within the public R.O.W. (SEE, SIGHT LINE, in this chapter). The right-of-way line behind curb returns shall be a diagonal line. Certain circumstances related to, but not limited to; sight lines, traffic

control devices, and pedestrian improvements may require additional right-of-way resulting in a site-specific adjustment of the right-of-way line behind a curb return.

h. **NUMBER OF DRIVING LANES**

Four (4) minimum

i. **ACCESS CONDITIONS**

Access from Collector and Arterial Streets will be controlled by traffic control devices.

Residential access is not permitted. Direct access to other abutting property is not permitted unless no other access is reasonably available.

Intersections should be spaced a minimum of ¼ mile (1,320 feet) apart. See Section 13.2 for intersection spacing criteria.

j. **DESIGN CHARACTERISTIC**

Arterials should be spaced from one half (1/2) to one (1) mile apart and should, where possible, be continuous. Arterials should act as boundaries between neighborhood areas.

k. **TYPE OF CURB AND GUTTER AND WALK**

Six (6) inch vertical curb & gutter with Six (6) foot attached sidewalk, or detached with a landscaped separation of eight (8) feet from back of curb to front edge of sidewalk.

l. **STREET SECTIONS**

With 16' raised median

- 4-12' travel lanes and 2-2' gutter pans; (52 feet).
- Median with 2-1' curb and gutter, and 16' between curbs faces; (18 feet).
- 2-6' attached sidewalks; (12 feet)

Total minimum dimension is 83 feet **(84 feet R.O.W.)**

With raised median at an intersection

- 4-12' travel lanes and 2-2' gutter pans; (52 feet).
- 2-12' acceleration/deceleration lanes; (24 feet).
- Median with 2-1' curb and gutter, and 4' between curbs faces; (6 Feet).
- One 12' left turn lane; (12 feet)
- 2-6' attached sidewalks; (12 feet)
- 2-8' landscaped areas (16 feet)

Total minimum dimension is 122 feet **(127 feet R.O.W.)**

m. **Minimum Horizontal Curve Radius on Centerline**

See Table 5.1 (HORIZONTAL CURVES)

n. **MINIMUM LENGTH OF VERTICAL CURVES**

See Table 6.1 (VERTICAL ALIGNMENT CONTROLS)

o. **MINIMUM LENGTH OF TANGENTS BETWEEN ALL CURVES**

One hundred feet.

p. **STREET GRADES**

A minimum longitudinal grade of 2.0% shall be required along the **centerline** of all Collector and Arterial streets. Maximum grade is 4.0%. See Table 2.1(ROADWAY CONSTRUCTION STANDARDS) and Table 6.1 (VERTICAL ALIGNMENT CONTROLS).

q. **CURB RETURN RADII**

See Table 5.2 (CURB RETURN RADII)

2 .10 **Roadway Specifications**

Table 2.1 shows a summary of the minimum roadway construction requirements and other related information.

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TOWN OF ELIZABETH

TABLE 2.1
ROADWAY CONSTRUCTION STANDARDS

	LOCAL				COLLECTOR	
	TYPE I	TYPE II	TYPE III	TYPE IV	MINOR	MINOR W/ BIKE LANES
	30	30	30	30	35	35
DESIGN SPEED ¹ (MPH)						
DRIVING LANES	2	2	2	2	2	2
MIN. R.O.W. (ft.)	60	40	60/50	60	60	60
ROADWAY WIDTH AND COMPOSITION OF CROSS-SECTION AT INTERSECTION	28' 24' paved width 2-2' gutter pans	28' 24' paved width 2-2' gutter pans	36' 32' paved width 2-2' gutter pans	24' 20' paved width 2-2' gutter pans	36' 32' paved width 2-2' gutter pans	38' 34' paved width 2-2' gutter pans
ROADWAY WIDTH AND COMPOSITION OF CROSS-SECTION NOT AT INTERSECTION	28' 24' paved width 2-2' gutter pans	28' 24' paved width 2-2' gutter pans	36' 32' paved width 2-2' gutter pans	24' 20' paved width 2-2' gutter pans	36' 32' paved width 2-2' gutter pans	38' 34' paved width 2-2' gutter pans
SIDEWALK, CURB, GUTTER	vertical with 5' detached sidewalk on both sides	vertical with 5' detached sidewalk on parking side	vertical with 5' detached sidewalk on both sides See Detail RD-12	vertical 6" and gutter with 5' detached walk	vertical with 5' detached sidewalk on both sides	vertical with 5' detached sidewalk on both sides
CURB RETURN MIN. RADII						
-Intersect. art.	N/A	N/A	N/A	N/A	50	50
-Intersect. coll.	35	35	35	35	35	35
-Intersect. local	25	25	20-25	20-25	35	35

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MINIMUM RADIUS AT CURVE (ft.)	175	225	225	225	See Table 5.1	
MIN. TANGENT LENGTH BETWEEN REVERSE CURVE (ft.)	25	25	25	25	100	100
MAXIMUM GRADE OF INTERSECTION -Intersect. art. -Intersect. coll. -Intersect. local	See Figure 4.4					
MIN.-MAX. STREET GRADIENT	1.0 - 6.0%				1.0 - 5.0%	
VERTICAL ALIGNMENT CONTROL	See Table 6.1					
MINIMUM PAVEMENT SECTION	See Pavement Design and Technical Criteria for Recommended Minimum Pavement Sections					
¹ Posted or prima facie speeds for the various street classifications are normally 5-10 miles per hour less than the design speed of that street.						

TABLE 2.1 (CONT.) ROADWAY CONSTRUCTION STANDARDS			
	COLLECTOR		ARTERIAL
	MAJOR	MAJOR W/ BIKE LANES	ARTERIAL
DESIGN SPEED ¹ (MPH)	40	40	45 (MIN.)
DRIVING LANES	2	2	4
MIN. R.O.W. (ft.)	90	90	84 (min.)
ROADWAY WIDTH AND COMPOSITION OF CROSS-SECTION AT INTERSECTION (Full Section)	44' 40' paved width 2-2' gutter pans Additional lanes may be required based on review of traffic impact study	52' 48' paved width 2-2' gutter pans Additional lanes may be required based on review of traffic impact study	94' 72' paved width 2-2' gutter pans & 2-1' spill pans 4-12' travel lanes 2-12' accel/decel lanes 1-12' left turn lane 1-4' median (fl-fl) Additional lanes may be required based on review of traffic impact study
ROADWAY WIDTH AND COMPOSITION OF CROSS-SECTION NOT AT INTERSECTION (Minimum Section)	52' 48' paved width 2-2' gutter pans Additional lanes may be required based on review of traffic impact study	52' 48' paved width 2-2' gutter pans Additional lanes may be required based on review of traffic impact study	70' 48' paved width 2-2' gutter pans & 2-1' spill pans 4-12' travel lanes 1-16' median (fl-fl) Additional lanes may be required based on review of traffic impact study

TOWN OF ELIZABETH

SIDEWALK, CURB, GUTTER	vertical with 8' detached sidewalk on both sides	vertical with 8' detached sidewalk on both sides	vertical with 6' attached/detached sidewalk on both sides
CURB RETURN MIN. RADII			
-Intersect. art.	50		50
-Intersect. coll.	35		50
-Intersect. local	35		N/A
MINIMUM RADIUS AT CURVE (ft.)*	See Table 5.1		650
MIN. TANGENT LENGTH BETWEEN REVERSE CURVE (ft.)	100		100
MAXIMUM GRADE OF INTERSECTION	See Figure 4.4		See Figure 4.4
-Intersect. art.			
-Intersect. coll.			
-Intersect. local			
MIN.-MAX. STREET GRADIENT	2.0 - 5.0%		2.0 - 4.0%
VERTICAL ALIGNMENT CONTROL	See Table 6.1		See Table 6.1
MINIMUM PAVEMENT SECTION	See Pavement Design and Technical Criteria for Recommended Minimum Pavement Sections		
¹ Posted or prima facie speeds for the various street classifications are normally 5-10 miles per hour less than the design speed of that street.			

Section 3—SIDEWALKS, CURBS AND GUTTER, AND DRIVEWAYS

- 3.1 Roadway typical sections shall be as specified by these Roadway Standards. They are summarized in Appendix A of these Standards.
- 3.2 Sidewalks or bicycle paths shall be constructed on both sides of all roadways unless specifically deleted by action of the Town of Elizabeth Board of Trustees.
- 3.3 All sidewalks used in conjunction with vertical curb and gutter shall have a minimum width of five (5) feet, from top back of curb to back of walk on attached sidewalk and from inside edge of sidewalk to back of walk for detached sidewalk.
- 3.4 Combination curb, gutter and walk is approved for use on local roadways only. Vertical curb, gutter and detached walk shall be used on all other roadways, except minor collectors on which either attached or detached sidewalks are permitted.
- 3.5 State law requires that handicap ramps be installed at all intersections and at certain mid-block locations for all new construction or reconstruction of curb and sidewalk (CRS 43-2-107 [2]). Handicap ramps shall be constructed in accordance with the Town of Elizabeth Standard Details found in Appendix A of these Standards. Handicap ramps may be shown at all curb returns or called out by a general note on the development plans, but must be shown (located) at all "T" intersections directly opposite either curb return. Whenever referencing a handicap ramp call out the specific Town of Elizabeth Standard Detail to be used to construct that ramp.
- 3.6 In general, when the number of parking spaces serviced by the driveway exceeds ten (10), radius returns are required (See Table 7.1 for curb return radii).
- 3.7 Where curb cuts are allowed based on traffic considerations, concentrated storm water runoff must not be discharged into Public right-of-way. If this is not possible due to grading restraints, radius returns and a crossspan must be used.
- 3.8 Curb cuts and driveways shall be constructed in accordance with the Town of Elizabeth Standard Drawing RD-2 found in Appendix A of these Roadway Standards.
- 3.9 On all major collectors and arterials, wherever desirable, under-pass or over-pass (grade separated) pedestrian crossings shall be provided for regional/ neighborhood trails.

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Section 4—DRAINAGE

The minor and major storm drainage systems are designed in accordance with the Town of Elizabeth Storm Drainage Design and Technical Criteria Manual. Because safe and efficient conveyance of traffic is the primary function of roadways, the storm drainage function of the roadway (such as allowable gutter capacity and street overtopping) will be designed to the limits set forth in the Drainage Criteria. In the case of a conflict caused by requirements of the Storm Drainage Criteria Manual, drainage requirements of the Town of Elizabeth Street Standards shall govern.

4.1 Crossspans

Crossspans shall be constructed in accordance with the Town of Elizabeth Standard Drawing, SP.6, in Appendix A. Crossspans are not permitted across entry streets, collector roadways, or arterial roadways.

Double crossspans may be used parallel to collector roadways (so long as they do not cross adjacent "entry streets" or other collector roadways) to convey storm runoff across residential roadways (local streets only). The use of double crossspans elsewhere, or the use of any crossspan on roadways where the vertical grade exceeds four and one-half (4.5) percent at the crossspan will be considered only after all other alternatives have been exhausted.

No mid-block crossspans will be allowed.

4.2 Inlets

Inlets shall be located to intercept the curb flow at the point curb flow capacity is exceeded by the storm runoff. Refer to Chapter 9 in the Town of Elizabeth Storm Drainage Design and Technical Criteria Manual for curb capacity. Inlets shall also be installed to intercept cross-pavement flows at points of transition in superelevation. Inlets are not allowed in the curb return, but will be located at or behind the tangent points of the curb returns. Minimum inlet length for type R inlets shall be 5 feet. For Local Streets only, on the approach to an inlet in a vertical curve, the instantaneous slope of the flowline shall not be less than 1.0%.

4.3 Cross Slope

Except at intersections, or where superelevation is required, roadways shall be level from top of curb to top of curb (or flowline to flowline) and shall have a two (2) percent crown. At or within the "L" distance shown in Figure 4.4, the maximum elevation difference between flowlines is that dictated by the allowable intersection grade (See Figure 4.4) and the actual distance between flowlines.

4.3.1 Parabolic or curved crowns are not allowed. In no case shall the pavement cross slope at warped intersections exceed the grade of the through street.

4.3.2 The rate of change in pavement cross slope, when warping side streets at intersections, shall not exceed one (1) percent every twenty-five (25) feet horizontally on a local roadway, one (1) percent every thirty-seven and one-half

(37.5) feet horizontally on a collector roadway, or one (1) percent every fifty-six and one-half (56.5) feet horizontally on arterial roadways.

4.4 Temporary Erosion Control

Temporary erosion control is required along and at the ends of all roadways that are not completed due to project phasing, subdivision boundaries, etc., in accordance with the Town of Elizabeth Storm Drainage Design and Technical Criteria Manual and other approved Engineering Division Administrative Procedures. Developer/Contractor shall be responsible for obtaining all necessary permits for all applicable agencies including all required State and Federal Storm Water permits. The Developer/Contractor shall comply with all terms and conditions of the Colorado Permit for Storm water Discharge, the Storm Water Management Plan, and the Erosion Control Plan.

4.5 Sidewalk Chases

Storm water from concentrated points of discharge shall not be allowed to flow over sidewalks, but shall drain to the roadway by use of chase sections. Sidewalk chase sections shall not be located within the curb cut or driveway. Hydraulic design shall be in accordance with the Town of Elizabeth Storm Drainage Design and Technical Criteria Manual. Sidewalk chases will only be allowed in special situations, on a case-by-case basis, as determined by the Town Engineer. Sidewalk chases, when permitted, are to be used to allow surface drainage to enter into the street gutter, rather than being used to avoid the use of a standard inlet.

Sidewalk chase sections are to be constructed in accordance with the Town of Elizabeth Standard Details found in Appendix A of these Roadway Standards.

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Section 5—HORIZONTAL ALIGNMENT**5.1 Horizontal Curves—See Table 5.1.**

TABLE 5.1
HORIZONTAL CURVES

DESIGN SPEED (MPH)	MAXIMUM CURVE (DEGREES)	MINIMUM CURVE RADIUS* (FEET)
25	32.7	205
30	22.9	300
35	14.3	420
40	10.4	565
45	8.0	730
50**	6.7	930
55**	5.7	1,190

* Adapted from AASHTO

** Superelevation may be allowed. See Section 5.6.5 of these standards.

5.2 Curb Return Radii

Minimum and maximum curb return radii shall be shown in Table 5.2 below.

TABLE 5.2
CURB RETURN RADII
MINIMUM AND MAXIMUM
(Measured Along Flowline)

THROUGH STREET	ARTERIAL	COLLECTOR	LOCAL SERVICE
ARTERIAL	50	50	N/A
COLLECTOR	50	35'	35
URBAN LOCAL	N/A	35'	20' min. 25' max.
CUL-DE-SAC	N/A	35	20' min. 25' max.

5.3. Design Speed

Horizontal alignment design speed shall be consistent with the requirement for vertical alignment design speed.

If no superelevation is required and a normal crown section exists, the horizontal curve data as shown in Table 5.1 shall be used.

5.4. Barricades

Whenever roadways terminate due to project phasing, subdivision boundaries, etc., barricades are required. Design and construction shall comply with the requirements of the Manual of Uniform Traffic Control Devices most recent edition. Details shall be shown on the construction drawings, and installation and maintenance shall be provided by the developer.

5.5. Superelevation

Superelevation may be required for curves on arterial roadways and selected collector roadways. Horizontal curve radii and superelevation shall be in accordance with the recommendations of the AASHTO "Green Book," (Horizontal Alignment).

Superelevation shall not be used on local or other roadway classifications with a design speed of 50 mph or less. Superelevation shall not be used without prior approval by the Town Engineer.

5.6. Cul-de-sacs

Criteria for cul-de-sacs shall follow the requirements of Section 13.

5.7. Sight Distances

The major considerations in alignment design are safety, grade, profile, road area, design speed, sight distance, topography, drainage and performance of heavy duty vehicles. Alignment should provide for safe and continuous operation at a uniform design speed. Road layout shall bear a logical relationship to existing or platted roads in adjacent properties.

5.7.1 **Sight Distance.** Horizontal alignment must provide at least the minimum stopping distance for the design speed at all points. This includes visibility at intersections as well as around curves and roadside encroachments.

5.7.2 **Stopping Sight Distance.** The minimum stopping sight distance is the distance required by the driver of a vehicle traveling at the design speed to bring the vehicle to a stop after an object on the road becomes visible. Stopping sight distance is calculated in accordance with the American Association of State Highway and Transportation Officials (AASHTO) "A Policy on Geometric Design of Highways and Streets aka "Green Book". Object height is 2.0' (Two feet) above road surface and viewer's height is 3.50 ft. above road surface.

In no case shall the stopping sight distance be less than as specified in Table 5.3. A likely obstruction may be a bridge abutment or line of columns, wall, cut sideslope, or a side or corner of a building. The sight distance design procedure shall assume a 6'-0" fence (as measured from actual finished grade) exists at all property lines except in the sight-distance triangles required at all intersections.

The lateral clearance, inner edge of pavement to sight obstruction, for various radii of inner edge of pavement and design speeds, is shown graphically in Figure 4.1. The position of the driver's eye and the object sighted are assumed to be 6 ft. from the inner edge of pavement, with the sight distance being measured along this arc.

TABLE 5.3
STOPPING SIGHT DISTANCE

DESIGN SPEED (MPH)	STOPPING SIGHT DISTANCE
15	80
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495

From AASHTO "Green Book"

(For Intersection & Driveway Sight-Distance, see Figure 4.2)

- 5.7.3 **Coefficient of Friction.** The coefficient of friction (f) shall conform to the values shown in Table 5.4 for snow packed conditions rather than as stated in Figure III-1 of the AASHTO "Green Book".

TABLE 5.4 COEFFICIENT OF FRICTION

(Design Criteria Snowpacked)

DESIGN SPEED	f
30-40	.24
40-50	.22
50-60	.21
60-70	.20

- 5.7.4 **Intersection and Driveway Sight Distance (Sight Triangle).** There shall be an unobstructed sight distance along both approaches of both sides at an intersection within the R.O.W. for distances sufficient to allow the operators of vehicles, approaching simultaneously, to see each other in time to prevent collisions at the intersection. The sight triangle relationship developed for use in the Town of Elizabeth is based upon the dimensions shown in Figure 4.2.

Any object within the sight triangle more than thirty-six (36) inches above the flowline elevation of the adjacent street shall constitute a sight obstruction, and shall be removed or lowered. Such objects include: buildings, cut slopes, hedges, trees, bushes, utility cabinets or tall crops. This design criteria also requires the elimination of parking (except on local streets) within the sight triangle and applies whether the intersecting roads are level or on grades. The sight distance shall be measured to the centerline of the closest through lane in both directions.

All sight-distance triangles must be shown on the street plan/profile plans. All sight distances must be within the public right-of-way. In order to obtain the required sight distance within the right-of-way (ROW), the ROW cannot be widened more than 5.0 feet. On local residential streets only, if the L.O.S. (Line Of Sight) crosses the front yards of the lots, a "SIGHT DISTANCE EASEMENT" of no more than 5.0 feet may be dedicated on the plat to meet the required sight distance.

In no case shall any permanent object encroach into the line-of-sight of any part of the sight-distance triangle.

5.7.5 **Vertical Alignment**

Both the horizontal and vertical sight distance should be checked to

insure that the sight distance along the major highway is sufficient to allow a vehicle to cross or turn left, whichever is required.

- a. By determining graphically the sight distances on the plans and recording them at frequent intervals, the designer can appraise the overall layout and affect a more balanced design by minor adjustments in the plan or profile. Methods for scaling sight distances are demonstrated in Figure 4.3. The figure also shows a typical sight distance record that would be shown on the final plans.

Because the view of the highway ahead may change rapidly in a short distance, it is desirable to measure and record sight distance for both directions of travel at each station. Both horizontal and vertical sight distances should be measured and the shorter lengths recorded. In the case of two-lane streets, passing sight distance in addition to stopping sight distance should be measured and recorded.

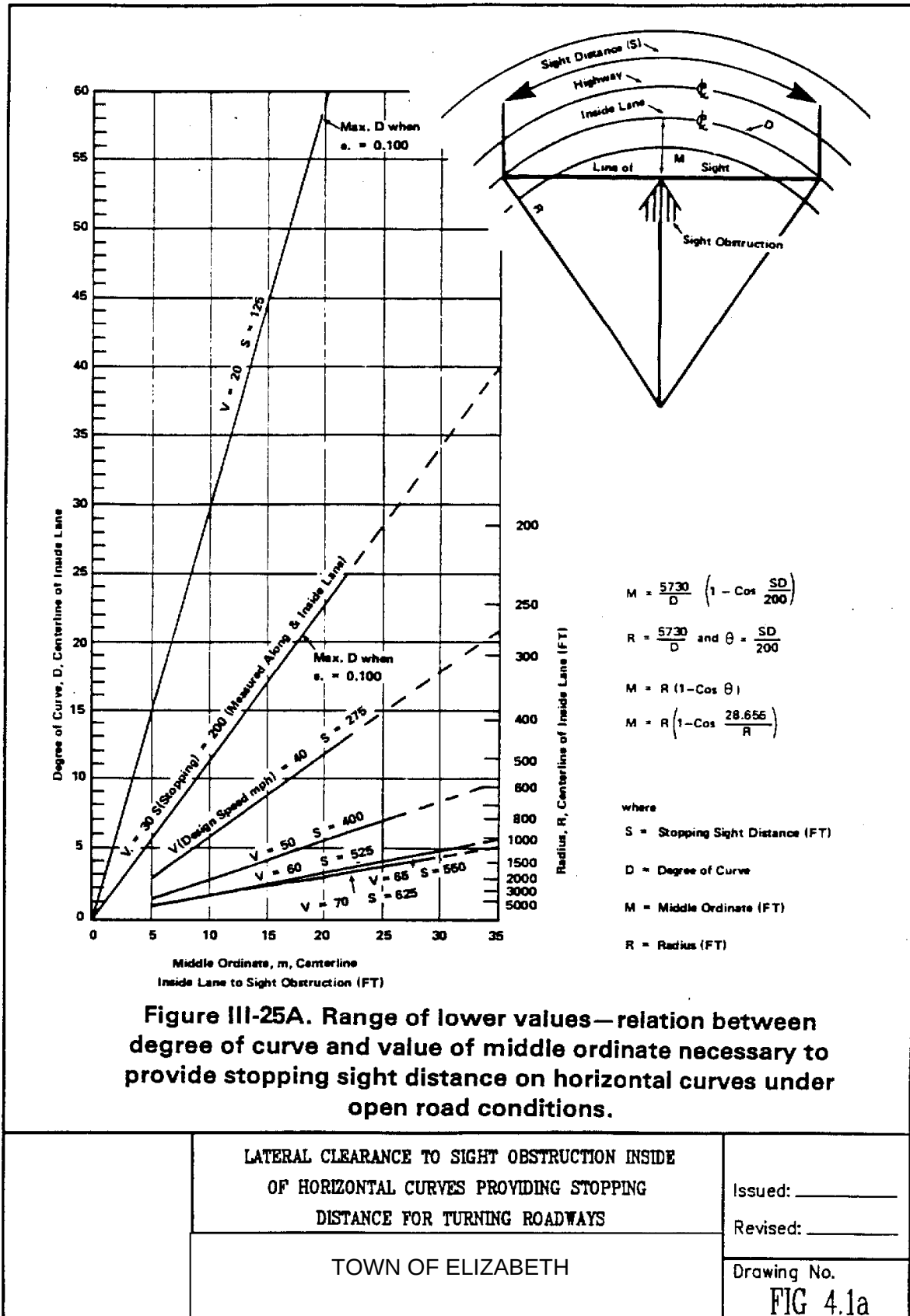
Once the horizontal and vertical alignments are tentatively established, the practical means of examining sight distances along the proposed street is by direct scaling on the plans. (See Figure 4.3)

- b. Horizontal sight distance on the inside of a curve is limited by obstructions such as buildings, hedges, wooded areas, high ground, or other topographical features. These generally are plotted on the plans. Horizontal sight is measured with a straightedge, as indicated at the upper left in Figure 4.3. The cut slope obstruction is shown on the worksheets by a line representing the proposed excavation slope at a point 2.0 ft. (average of 3.50 and 0.5 ft) above the road surface for stopping sight distance and at a point about 3.75 ft. above the road surface for passing sight distance. The position of this line with respect to the centerline may be scaled from the plotted roadway cross sections. The stopping sight distance should be measured between points on the one traffic lane, and passing sight distance from the middle of one lane to the middle of the other lane as outlined in Figures 4.1a and 4.1b.
- c. Vertical sight distance may be scaled from a plotted profile by the method illustrated at the right center of Figure 4.3. A transparent strip with parallel edges 4.25 ft. apart and with scratched lines 6 in. and 3.50 ft. from the upper edge, in accordance with the vertical scale, is a useful tool. The 3.50 ft. line is placed on the station from which the vertical sight distance is desired, and the strip is pivoted about this point until the upper edge is tangent to the profile. The distance between the initial station and the station on the profile intersected by the 6 in. line is the stopping sight distance. The distance between the initial station and the station on the profile intersected by the lower

edge of the strip is the passing sight distance.

- d. A simple sight distance record is shown in the lower part of Figure 4.3. Sight distances in both directions are indicated by arrows and figures at each station on the plan and profile sheet of the proposed highway. To avoid the extra work of measuring unusually long sight distances that may occasionally be found, a selected maximum value may be recorded. In the example shown, all sight distances of more than 3,000 ft. are recorded as 3,000+, and where this occurs for several consecutive stations, the intermediate values are omitted. Sight distances less than 1,000 ft. may be scaled to the nearest 50 ft. and those greater than 1,000 ft. to the nearest 100 ft.
- e. The methodology of graphically determining sight distances may well require longer stopping sight distances than noted in Table 5.3 or Figure 4.1. However, in urban design, the combination of horizontal curves, vertical curves and intersections occurring at the same time is very real. The graphic solution then is a simple means to determine the controlling sight distances.

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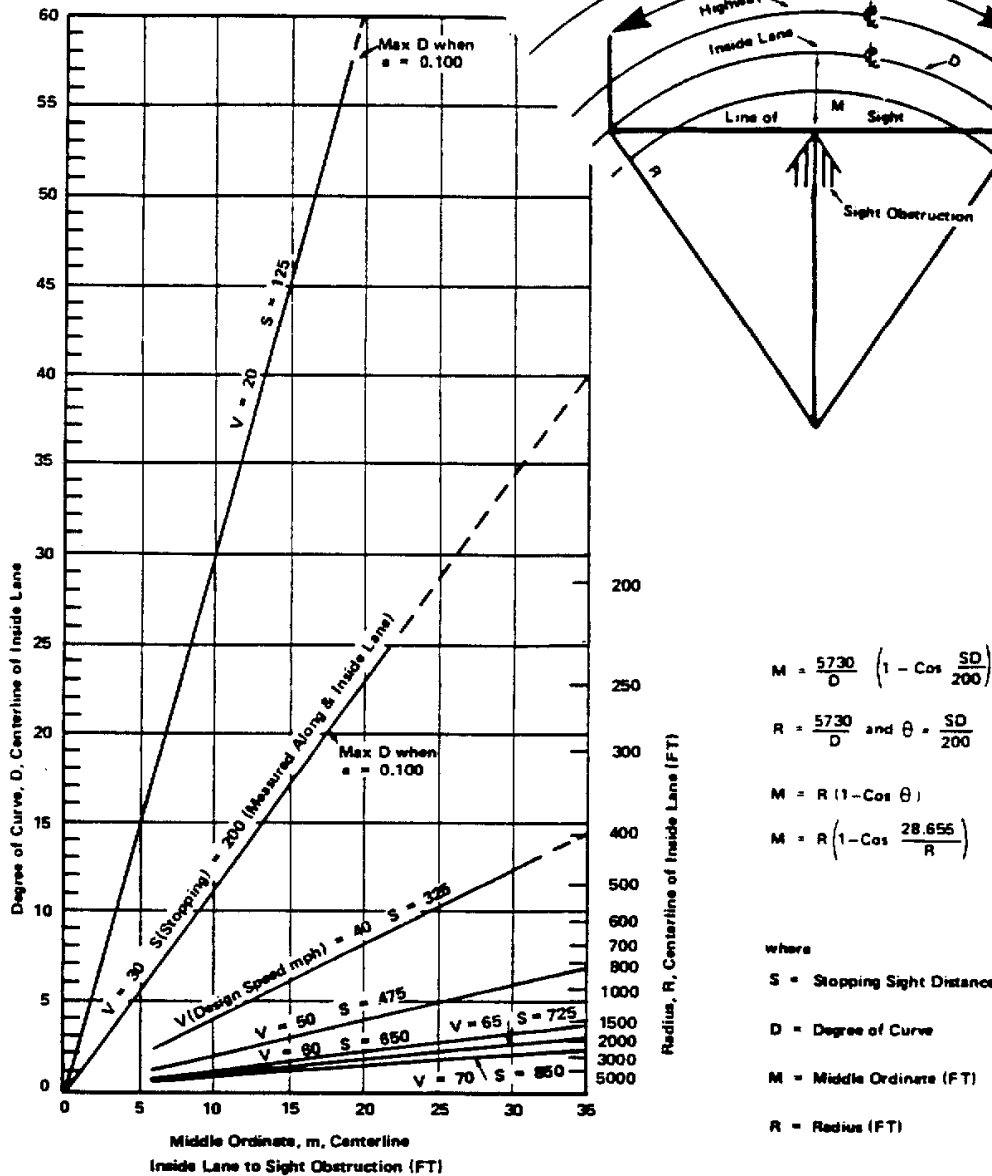
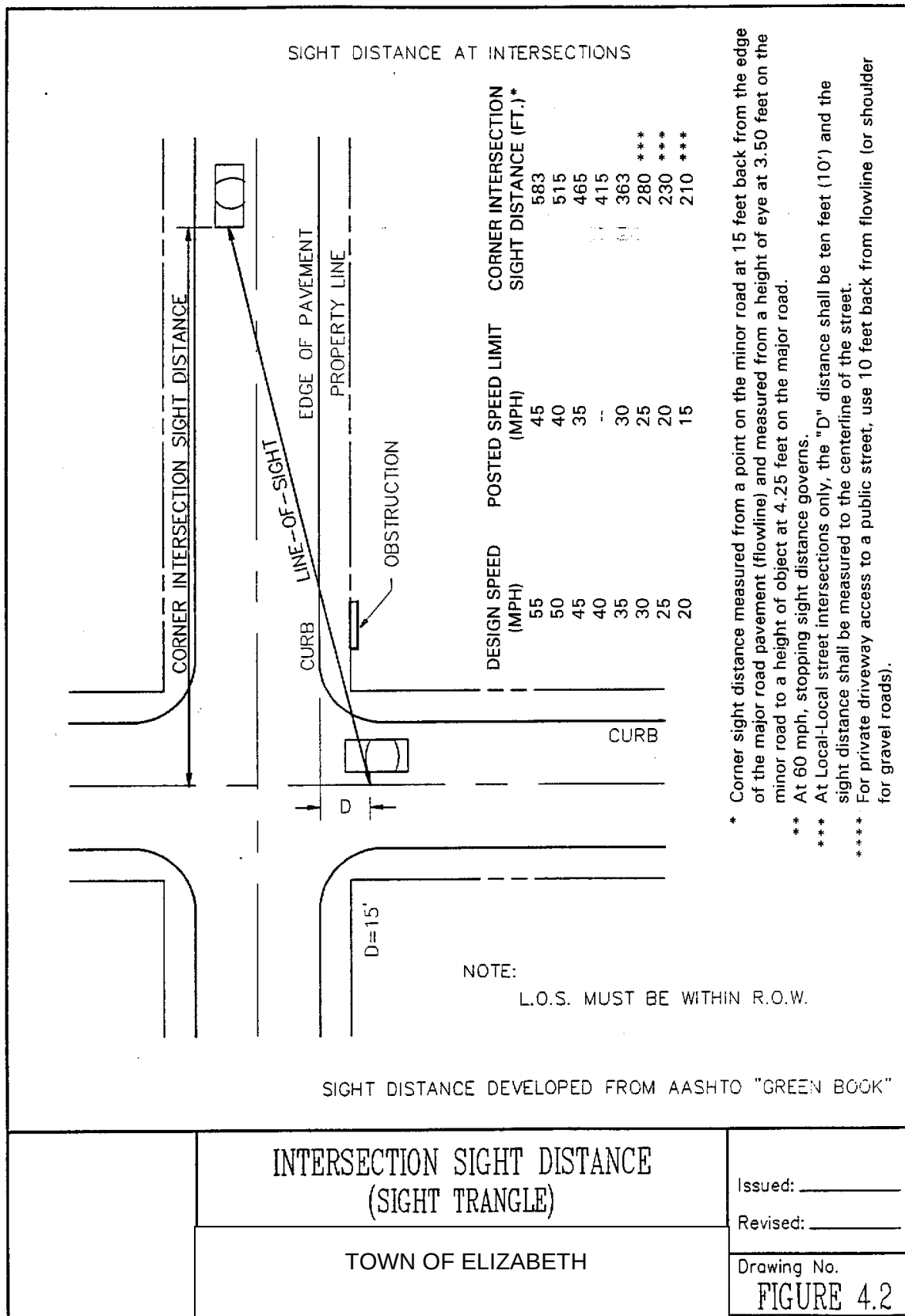


Figure III-25B. Range of upper values—relation between degree of curve and value of middle ordinate necessary to provide stopping sight distance on horizontal curves under open conditions.

	LATERAL CLEARANCE TO SIGHT OBSTRUCTION INSIDE OF HORIZONTAL CURVES PROVIDING STOPPING DISTANCE FOR TURNING ROADWAYS	Issued: _____ Revised: _____
	TOWN OF ELIZABETH	Drawing No. FIG 4.1b



* Corner sight distance measured from a point on the minor road at 15 feet back from the edge of the major road pavement (flowline) and measured from a height of eye at 3.50 feet on the minor road to a height of object at 4.25 feet on the major road.

** At 60 mph, stopping sight distance governs.

*** At Local-Local street intersections only, the "D" distance shall be ten feet (10') and the sight distance shall be measured to the centerline of the street.

**** For private driveway access to a public street, use 10 feet back from flowline (or shoulder for gravel roads).

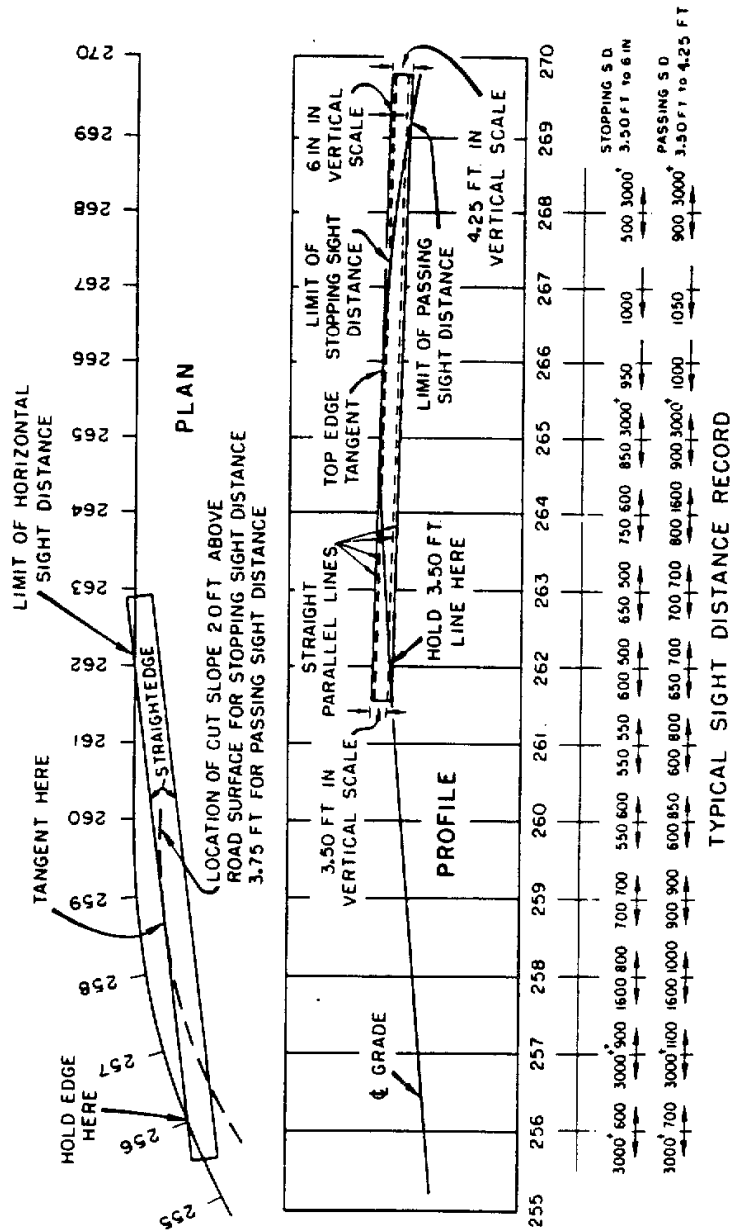


Figure III-3. Scaling and recording sight distances on plans.

SCALING AND RECORDING SIGHT DISTANCES ON PLANS

TOWN OF ELIZABETH

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Revised: _____

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FIGURE 4.3

Section 6—VERTICAL ALIGNMENT

Design controls for vertical alignment are shown on Table 6.1 below.

TABLE 6.1
VERTICAL ALIGNMENT CONTROLS

DESCRIPTION	DESIGN SPEED*	MAX GRADE	K-VALUE RANGES		MIN V.C.L.	
			CREST	SAG	CREST	SAG
CUL-DE-SAC	25	6%	25-30	25-30	50	50
URBAN LOCAL (TYPE I)	30	6%	25-30	25-30	50	50
URBAN LOCAL (TYPE II)	30	6%	25-30	25-30	50	50
URBAN LOCAL (TYPE III)	30	6%	25-30	25-30	50	50
URBAN LOCAL (TYPE IV)	30	6%	25-30	25-30	50	50
MINOR COLLECTOR	35	5%	35-50	40-50	50	50
MAJOR COLLECTOR	40	5%	55-65	55-65	50	50
ARTERIAL	45	4%	115-220	90-125	110	90

*The design speed is a minimum of five (5) mph over the posted speed for each classification where the posted speed is thirty (30) mph or less. The design speed is a minimum of ten (10) mph over the posted speed for roads with a posted speed of thirty five (35) mph or greater.

NOTE: All vertical curves in the flowline profiles of knuckles and bubbles shall have a length of 50 feet.

6.1.1 Permissible Roadway Grades

A minimum longitudinal flowline grade of 1.0% shall be required on all Local streets, except at curb returns, knuckles, and bubbles where the minimum flowline grade shall be 2.0%.

A minimum longitudinal grade of 2.0% shall be required along the centerline of all Collector and Arterial streets.

The maximum allowable grade for any roadway is shown on Tables 2.1 and 6.1 of these Standards.

6.1.2 Permissible Intersection Grades (Public Rights-of Way)

The maximum permissible grade at intersections will be as shown in Figure 4.4. These grades are maximum instantaneous flowline grades for the stated distances (each side of the street) for the minor (intersecting) street. Desirable intersection grades should be in the range of two (2.0) to four (4.0) percent for all intersecting streets with the limit of three (3.0) percent for arterials.

Then, intersection grade of the major (through) street at the intersection may be dictated by design considerations for that street.

However, if the major street intersection grade exceeds 3%, the type of access and access control will be dictated by the Town of Elizabeth.

All private driveways with curb return radii shall follow the standard set forth for a local street. The length of the maximum grade for the driveway shall be a minimum of 50 feet measured from the flowline intersection of the public roadway.

6.1.3 Changing Grades

The use of grade breaks in lieu of vertical curves is discouraged. However, if a grade break is necessary and the algebraic difference in grade (A) does not exceed five tenths (0.005 ft./ft.) of a percent along the roadway, the grade break will be permitted.

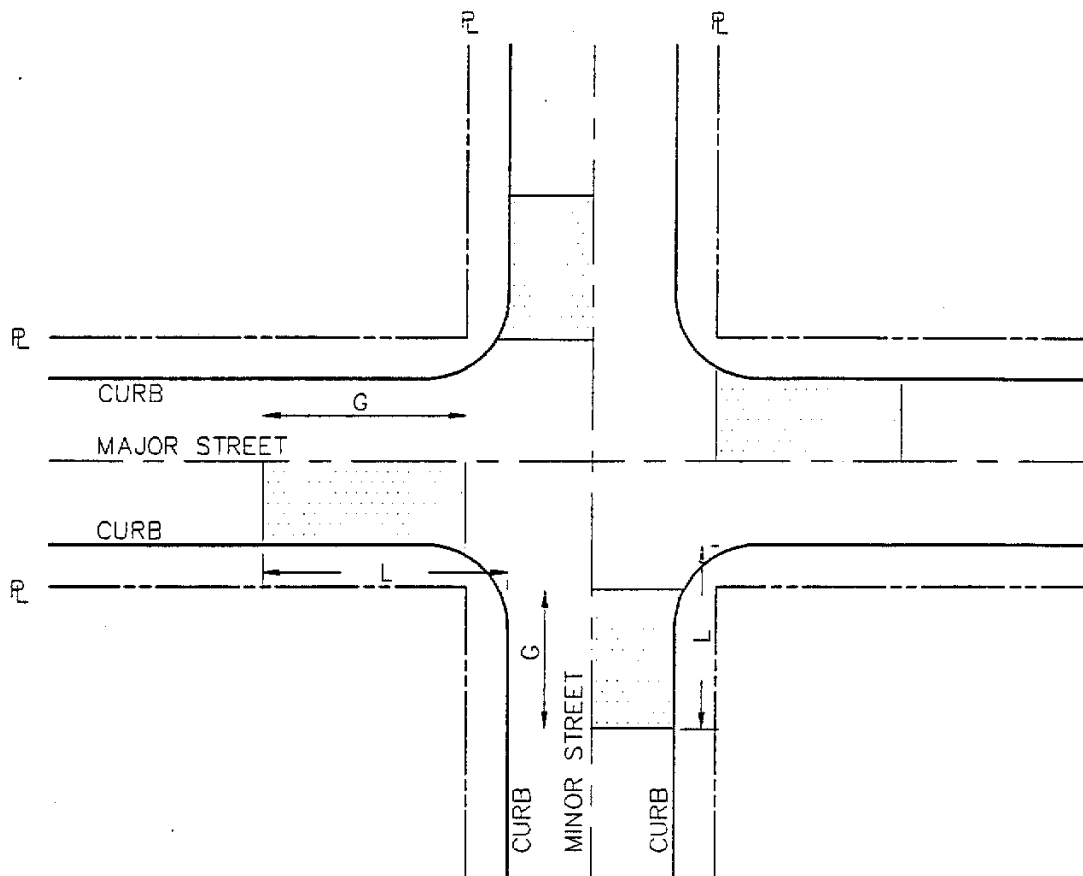
The maximum grade break allowed at the point of tangency at a curb return for local and collector roads shall be two (2.0) percent and for arterial roadways a maximum of one (1.0) percent.

6.1.4 Cross Fall

Except at intersections, or where superelevation is required, roadways shall be level from top of curb to top of curb (or flowline to flowline). The distance from intersections with which 'cross-fall' will be permitted shall be determined by criteria in Section 4.4.3, Cross-Slope.

6.1.5 Vertical Curves

When the algebraic difference in grade (A) is at or exceeds five-tenths (0.005 ft./ft.) of a percent, a vertical curve is to be used. Design criteria for vertical curves are found in Table 6.1 of these Standards. The minimum gradients into and out of a sag (sump) vertical curve is five-tenths (0.005 ft./ft.) of a percent. Minimum length of a vertical curve is shown in Table 6.1. All vertical curves shall be labeled, in the profile, with length of curve (L) and $K = (L/A)$ values.



* The longitudinal slope of the major street shall continue through the intersection and may be greater than the max "G" shown in the table except at major collectors and arterials.

MINOR STREET \ MAJOR STREET	LOCAL	MINOR COLLECTOR	MAJOR COLLECTOR	MINOR ARTERIAL	MAJOR ARTERIAL
LOCAL	L- 95' G- 4%	100' 4%	100' 4%	125' 4%	125' 4%
MINOR COLLECTOR	L- G-	100' 4%	120' 3%	150' 3%	150' 3%
MAJOR COLLECTOR	L- G-	- -	120' 3%	150' * 3%	200' * 3%
MINOR ARTERIAL	L- G-	- -	- -	200' * 2%	200' * 2%
MAJOR ARTERIAL	L- G-	- -	- -	- -	200' * 2%

PERMISSIBLE INTERSECTION
GRADES

TOWN OF ELIZABETH

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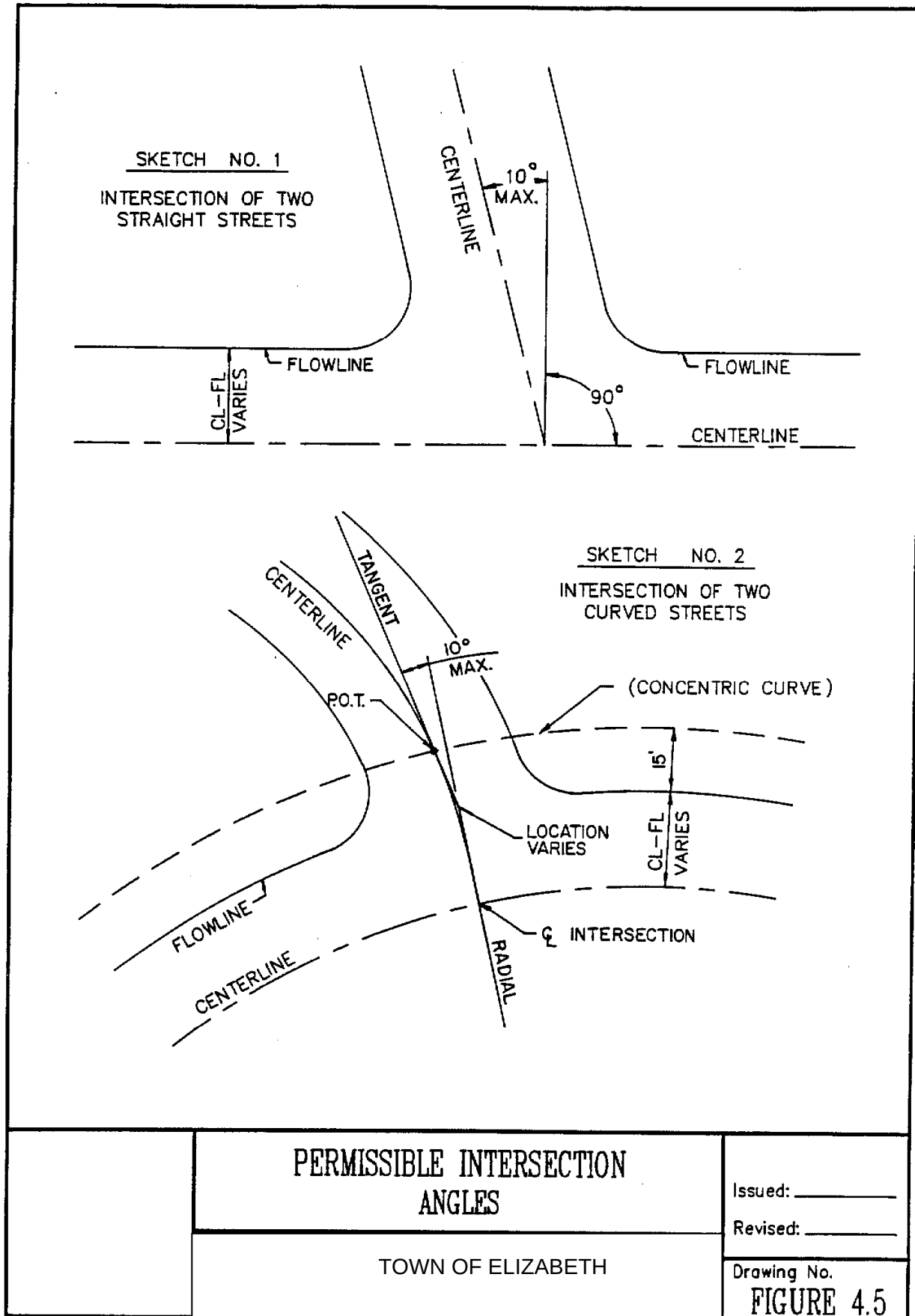
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FIGURE 4.4

Section 7—INTERSECTIONS

- 7.1 The following criteria shall apply at intersections:
- 7.1.1 The grade of the "through" street shall take precedence at intersections. At intersections of roadways with the same classification, the more important roadway, as determined by the Town of Elizabeth Engineering Division, shall have this precedence. The design should warp side streets to match through streets with as short a transition as possible.
 - 7.1.2 The key criteria for determining the elevation of the curb return on the side street and the amount of warp needed on a side street transitioning to a through street are:
 - a. Permissible grade in the stop/start lane. (See Section 4.6.2).
 - b. Pavement cross slope at the P.C.R.'s on the side street and permissible warp in pavement cross slope. (See Section 4.4.3).
 - c. Normal vertical curve criteria. (See Section 4.6.5).
 - d. Vertical controls within the curb return itself. (See Section 4.7.3).
 - e. Permissible grade(s) to conform with A.D.A. requirements.
 - 7.1.3 The elevation at the P.C.R. of the curb return on the through street is always set by the grade of the through street in conjunction with normal pavement cross slope (2.0%).
 - 7.1.4 Carrying the crown at a side street into the through street is permitted only when drainage considerations warrant such a design. Refer to Section 4.4.3.2 for street cross slope allowances.
 - 7.1.5 Dipping the flowline to the extent that the lip of gutter is dipped is not permitted. Dipping the flowline is only permitted as specified by Town of Elizabeth Standard Details concerning curb opening inlets. Tipping an inlet for the benefit of drainage is also not permitted.
 - 7.1.6 A more detailed review shall be performed for arterial-arterial intersections to maximize drive ability. Few arterial intersections will have a uniform 2% cross slope, the majority of them having one or more sides warped. (See Sections 4.4.3 and 4.7.1.2 of these Standards for rates of pavement warp allowed).
 - 7.1.7 Whenever possible, intersections shall be made at right angles or radial to a curve. No intersecting angle of less than eighty (80) degrees will be allowed. (See Figure 4.5).
 - 7.1.8 Intersection sight distances shall conform to the requirements of Section 4.5.9.2.e and Figure 4.2 of these STANDARDS which have been taken from the AASHTO "Green Book".



7.2 Curb Returns

Minimum fall around curb returns along the flowline shall be as follows:

TABLE 7.1
CURB RETURNS

RADIUS	MINIMUM FALL
All	2.0% around the curb return

7.3 Curb Return Profiles

Curb return profiles are required for radii equal to or greater than thirty (30) feet within the public right-of-way. A midpoint elevation along the arc length of the curb return shall be shown in plan view for radii equal to or greater than twenty five (25) feet. Curb return design shall be set in accordance with the following design procedure. General standards for flowline control and profiles within the curb returns shall be as follows:

- 7.3.1 The point of tangency at each curb return shall be determined by the projected tangent grade beginning at the point of intersection (P.I.) of the flowlines.
- 7.3.2 The arc length and external distance of the curb return shall be computed and indicated on the drawing.
- 7.3.3 Show the corresponding flowline (or top of curb) grade for each roadway beyond the P.C.R.
- 7.3.4 Design the flowline of the curb return such that the maximum slope along the flowline does not exceed +8 percent. Grade breaks at the PCR's will not exceed two (2) percent for local and collector streets and one (1) percent for arterials. Maximum vertical curves will equal the arc length of the curb return. The elevation and location of the high or low point within the return, if applicable, is to be called out in the profile. Warp of the side streets shall match across the street within the "L" distance shown on Figure 4.4. No more than 1' vertical difference in elevation across the street at the PCR is allowed.
- 7.3.5 Scale for the curb return profile is 1" = 10' horizontally and 1" = 1' vertically.
- 7.3.6 Curb return radii, existing and proposed, shall be shown.

7.4 Connection With Existing Roadways

- 7.4.1 Connection with existing roadways shall be smooth transitions conforming to normal vertical curve criteria (See Section 4.6) if the algebraic difference in grade (A) between the existing and proposed grade exceeds five-tenths (0.005 ft./ft.) percent. When a vertical curve is used to make this transition, it shall be fully accomplished prior to the connection with the existing

STREET STANDARDS AND SPECIFICATIONS

improvement, and also comply with the grade requirements at intersection approaches.

- 7.4.2 Existing grade shall be shown for at least three-hundred (300) feet with field verified as-builts showing stations and elevations at twenty-five (25) foot intervals. In the case of connection with an existing intersection, these as-builts are to be shown within a three-hundred (300) foot radius of the intersection. This information will be included in the plan and profile that shows that proposed roadway.

Limits and characteristics of the existing improvement are the primary concern in the plan view. Such characteristics include horizontal alignment, off-site intersections, limits of the improvement, etc.

- 7.4.3 Previously approved designs for the existing improvement are not an acceptable means of establishing existing grades, however, they are to be referenced on the construction plan, where they occur.

- 7.4.4 The basis of the as-built elevations shall be the same as the design elevations (both flowlines or both top or curbs, etc,) when possible.

Section 8—OFF-SITE DESIGN

The design grade, and existing ground at that design grade, of all roadways that dead end due to project phasing, subdivision boundaries, etc., shall be continued, in the same plan and profile as the proposed design, for at least five hundred (500) feet or to its intersection with an arterial roadway. This limit shall be extended to one thousand (1,000) feet when arterial roadways are being designed.

- 8.1 If the off-site roadway, adjacent to the proposed development is not fully improved, the developer is responsible for the design and construction of a transition for the safe conveyance of traffic from his improved section to the existing roadway. The following formula shall be applied to the taper of lane change necessary for this transition:

When speed limit is 40 mph or less → $L = WS^2/60$

When speed limit is 45 mph or greater → $L=SW$

Where L = Length of Transition (ft.)

W = Width of offset (ft.)

S = Speed Limit or 85th percentile speed

- 8.2 The Town of Elizabeth Engineering Division should be contacted to approve unusual transition criteria. This contact is the responsibility of the applicant.

Section 9—ACCELERATION/DECELERATION LANES

The design of the arterial street system depends upon the proper control of access to developments. The location and design of access points must minimize traffic hazards and interference to through traffic movements. Acceleration/Deceleration lanes shall be designed using Section 400 and 500 of the CDOT Road Design Manual. The need for acceleration or deceleration lanes shall be established by the approved traffic impact study for the final plat or final development plan.

Section 10—CONSTRUCTION TRAFFIC CONTROL**10.1 Pedestrian Traffic**

- 10.1.1 Every precaution shall be taken to ensure that construction work does not interfere with the movement of pedestrian traffic, which shall be maintained on the sidewalk at all times. Flagmen shall be provided for guidance as necessary.
- 10.1.2 Where an excavation interrupts the continuity of the sidewalk, the contractor shall provide suitable bridge or deck facilities, to be supplemented by the use of such proper devices and measures as prescribed in the Manual of Uniform Traffic Control Devices most recent edition, for the safe and uninterrupted movement of pedestrian traffic. The edges or ends of the pedestrian bridge or decking shall be beveled or chamfered to a thin edge to prevent tripping.
- 10.1.3 Temporary diversion walkways shall be hard surfaced and electric lighting shall be provided and kept continuously burning during hours of darkness, when required by the Public Works Department.
- 10.1.4 Unless otherwise authorized by the Public Works Department, pedestrians shall not be channeled to walk on the travelled portion of a roadway.
- 10.1.5 Under certain conditions, it may be necessary to divert pedestrians to the sidewalk on the opposite side of the street. Such crossings shall only be made at intersections or marked pedestrian crossovers.
- 10.1.6 Facilities satisfactory to the Town of Elizabeth Public Works Department shall be provided for pedestrians crossing at corners, pedestrian crossovers and public transportation stops.

10.2 Vehicular Traffic

- 10.2.1 Construction work zone traffic shall be controlled by signs, barricades, detours, etc., which are designed and installed in accordance with the Manual of Uniform Traffic Control Devices most recent edition, and applicable Town of Elizabeth Traffic Standards. A Traffic control plan

shall be submitted and accepted by the Town Engineer or his designate prior to start of any construction.

- 10.2.2 During construction of new facilities, traffic control should strive to keep the motorist from entering the facility. The primary means to accomplish this are by use of temporary barricades, located in advance of the point where new construction joins existing and by appropriate signing. New construction shall not be opened to traffic, and thus the construction traffic control removed, without the approval of the Town of Elizabeth Public Works.
- 10.2.3 In general terms, a construction traffic control plan must be drawn on a map. For minor projects or local roadways, a neat sketch of the roadways and the proposed control devices will suffice. For major projects or major roadways, the traffic control plan should be superimposed on as-builts, construction plan drawings, or other detailed maps.
- 10.2.4 The Manual on Uniform Traffic Control Devices shall be the basis upon which the construction traffic control plan is designed, in concert with proper, prudent, and safe engineering practice. All necessary signing, striping, channelization devices, barricading, flagging, etc., shall be shown on the plan.
- 10.2.5 In concept, Town streets shall not be closed overnight, and work shall not force road or lane closures before 8:30 a.m. or after 3:30 p.m. If exceptions to this are required, this shall be so noted on the construction traffic control plan and must be specifically approved by the Public Works Department.
- 10.2.6 Directional access on roadways may be restricted (minimum travel lane width in construction area is 10 feet), but proper controls including flagging must be indicated. Removal of on-street parking should be considered, and noted where applicable.

Section 11—MEDIAN ISLANDS

- 11.1 Median islands shall be designed per the AASHTO "Green Book".
- 11.2 The nose of the median island shall not extend past the curb return at the intersection.
- 11.3 Landscaping on median islands shall have a mature height of 24 inches or less above the travelled way in areas around intersections to facilitate adequate sight distance and will preferably be dry land or native vegetation. If irrigation is planned for a median island, mitigation will be provided to protect the subgrade under the pavement from being saturated.
 - 11.3.1 A minimum flowline-flowline dimension of 20 feet must be maintained on both sides of all median islands, unless otherwise approved by the Elizabeth Fire District.

Section 12—SIGNAGE AND STRIPING CRITERIA

Because the Town will maintain the traffic control devices on public rights-of-way, all traffic control devices shall be fabricated and installed in accordance with the Town of Elizabeth Standards. The Town of Elizabeth signage and striping details and notes shall be included in all sets of construction plans.

Permanent signage and striping shall be completely in place before any new roadway is opened to the public. These standards are to be used in conjunction with other applicable Town of Elizabeth Standards.

Traffic signal installation and equipment shall conform to the Colorado Department of Transportation standards and specifications. The Manual on Uniform Traffic Control Devices Signal Warrants shall be met for signal installation, prior to design of the signal.

12.1 Reflectivity

All traffic control devices and all regulatory signs must have reflective materials. All reflective materials must qualify at 70 candlepower (E.G.) or above (High Intensity). All signs, or traffic control devices, must have a seven-year materials warranty. Red regulatory signs must be High Intensity grade reflectivity or greater; in particular, all STOP, YIELD, or DO NOT ENTER signs.

12.2 Design and Size

Sign specifications and diagrams are detailed in the Federal "Standard Highways Sign." (Publication available from the U.S. Department of Transportation, Federal Highway Administration 1979.) Acceptable sign sizes are listed in the standard column of the table printed with each diagram. Arterial and construction signs will be a minimum 36 inches. STOP signs used at major roadway intersections shall be a minimum of 36 inches.

12.2 Backing Plates

Aluminum blanks of .080 gauge is standard, except for signs larger than 36 x 36 inches, which shall be .100 or .125 gauge aluminum.

12.3 Posts and Boots

- 12.3.1 All regulatory and warning signs shall be mounted on standard two inch by two inch (2"x2") galvanized steel tubing, all four sides punched with 3/8" holes at one inch (1") centers. Posts must be of appropriate length to pass the MUTCD specifications for the location, must conform to CDOT specification Section 614, and must meet the Federal break-away standards. Installation boots are to be two and one-fourth inch by three feet (2-1/4"x3') four (4) punch tubing, driven down flush to ground level.
- 12.3.2 Sign boots are to be driven a minimum of three feet (3') into the ground, and longer boots may be required because of soil composition and compaction.
- 12.3.3 Street signs shall be installed on standard one and three-quarter inch (1-3/4") four (4) punch square steel tubing, (3/8" diameter holes on 1" centers galvanized), or mounted on available utility poles with suitable hardware, when required lateral clearance can be achieved.
- 12.3.4 When street name sign assemblies are posted with the traffic control, posts must be standard two inch (2") tubing, using two and one-quarter inch by three foot (2 1/4"x3') boots driven into ground until flush with the ground. For exclusive street name installations, standard one and three-quarter inch (1-3/4") tubing with two inch by three foot (2"x3') boots may be used.
- 12.3.5 The height to the bottom of the sign assembly shall be at least eight feet (8') above the adjacent roadway crown, when installed exclusively for street name posting. When combined with traffic control (STOP or YIELD) signs, the street name sign assembly shall be at least nine feet (9') above the adjacent roadway crown.
- 12.3.6 Post caps and crosses shall have five inch by one-fourth inch (5"x1/4") slots for plates.
- 12.3.7 Street name assembly should be located at point of curvature of corner radius and should be placed according to the requirements as stated in 12.4.3 (Street Name Signs) of this Manual. When street name assembly is combined with regulatory signs, sign placement for the regulatory sign shall govern.

12.4 Street Name Signs

- 12.4.1 Street names and 100-block (where applicable) designations should be obtained from the Town of Elizabeth Building Department.
- 12.4.2 Six inch plates, up to 30 inches long, may be used at all minor intersections, minimum two plates per street sign assembly. Nine inch plates shall be used at all major intersections. All 9-inch plates and 6-inch by 30-inch plates will be installed, two for each road, minimum four plates per street sign assembly and shall be installed with end bolts on all plates. In the instance where a street changes names, such name changes should be designated on the street name assembly by using directional arrows and will require two additional plates.
- 12.4.3 Street name assembly should be located at the point of curvature of the corner

radius and should be placed according to the following, as measured from the edge of the sign. When the street name assembly is combined with regulatory signs, sign placement for the regulatory sign shall govern.

Curb, Gutter and Sidewalk Combination:

Two feet behind sidewalk

Curb with no Sidewalk or Detached Sidewalk:

Two to five feet behind curb on local streets. On collector streets, 4 to 6 feet behind curb, and on arterials, 6 to 8 feet behind curb.

No Curb or Gutter:

Six to twelve feet from edge of pavement.

Gravel Road:

Six to eighteen feet from edge of travel lane and outside of roadside ditch.

- 12.4.4 The height to the bottom of the sign assembly shall be at least eight feet above the adjacent roadway crown, when installed exclusively for street name posting. When combined with traffic control (STOP or YIELD) signs, the street name sign assembly shall be at least nine feet above the adjacent roadway crown.
- 12.4.5 Sign assemblies shall be installed on standard 1-3/4", four (4) punch square tubing, (3/8" diameter holes on one inch centers, galvanized), or mounted on available utility poles with suitable hardware, when required lateral clearance can be achieved.
- 12.4.6 When street name sign assemblies are posted with the traffic control, posts must be standard 2-inch tubing, using 2-1/4"x3' boots driven until flush with the grade. For exclusive street name installations, standard 1-3/4" tubing with 2"x3' boots may be used.
- 12.4.7 Sign boots are to be driven a minimum of three feet into the ground. Longer boots may be required because of soil composition and compaction.
- 12.4.8 Post caps and crosses shall be 5"x1/4" slots for plates.
- 12.4.9 All street signs will be high intensity white on reflectorized green. Lettering shall be Series C 2000.

12.5 Criteria on Special Allowances for Street Name Sign Variations

- 12.5.1 Plans for any variances must be submitted to and reviewed by the Town of Elizabeth Public Works Department. Applicant must list all specific variances from Town standards in the special footnote box on the first sheet of the construction plans.
- 12.5.2 Only Metropolitan Districts may apply for variances. The Metropolitan District must submit a draft of a "save harmless" letter to be reviewed and approved by the Town of Elizabeth Public Works Department and the Town Attorney prior to any review of requested variances.

12.5.3 This letter is to be addressed to the Department of Public Works and the Town of Elizabeth Board of Trustees. It must identify that the Metropolitan District's responsibility for maintenance and supply in perpetuity of their specific signs and materials. It must stipulate the District will respond within 24 hours after notification by the Public Works Department to maintain or repair. This letter must also state that if the Metropolitan District fails to maintain or repair the specific signs or material within 24 hours after notification from the Town, that the Town will shall make required repairs or maintenance at a cost of time and materials plus fifteen (15) percent.

12.5.4 This agreement will be recorded; and notification of the book and page number will be returned to the Metropolitan District.

12.5.5 All street name signage size and reflectivity (red may not be used as background color) shall meet or exceed Town of Elizabeth standards.

12.6 Designer's Responsibility

These plans are intended for typical applications of signage and striping for standard conditions. These standards do not alleviate the responsibility of the designer from sound engineering judgment or to exceed minimum standards in specific cases where conditions warrant.

Section 13—CUL-DE-SAC

A cul-de-sac is a local road that has no outlet, and includes an area for turnaround at the end of the street. A cul-de-sac shall include two driving lanes plus parallel parking on both sides of the street. Cul-de-sacs are generally not encouraged and do not provide the continuity of traffic patterns that the Town of Elizabeth desires. When cul-de-sacs are proposed, they shall meet the following standards.

a. Posted Speed Limit

Twenty (20) mph

b. Design Speed

Twenty-five (25) mph

c. Traffic Volumes

400 vehicles per day (VPD) maximum

d. Continuity

Limited

e. Safety

Designed for the safety of pedestrians and bicyclists, and the ease of access to adjacent property.

f. Traffic Control

Stop signs, speed limit, street name, dead end, etc.

STREET STANDARDS AND SPECIFICATIONS

g. Function

Cul-de-sacs provide direct access to adjacent property. Traffic carried by a cul-de-sac has an origin or a destination within the neighborhood.

h. Right-Of-Way (R.O.W.)

Sixty (60) feet minimum width, or in accordance with detail RD-13B.

Any change in R.O.W. width shall be made at intersections only. An appropriate intersection design shall ensure the sight line falls within the public R.O.W. (SEE, SIGHT LINE, in this chapter). The right-of-way line behind curb returns shall be a diagonal line. Certain circumstances related to, but not limited to; sight lines, traffic control devices, and pedestrian improvements may require additional right-of-way resulting in a site-specific adjustment of the right-of-way line behind a curb return.

i. Number of Driving Lanes

Two (2)

j. Access Conditions

A cul-de-sac may intersect other cul-de-sacs, local roads and minor collector roads only. Direct access to abutting property permitted.

k. Design Characteristic

A cul-de-sac has no outlet, and includes an area for turnaround (SEE "TURNAROUNDS") at the end of the street. A Cul-de-sac may have a maximum length of 500 feet or a maximum of ~~40~~ 30 dwelling units whichever is most restrictive. When a cul-de-sac serves more than 25 dwelling units, sprinklering of the units per NFPA-13D (NFPA, "National Fire Protection Association") may be required. The street section shall include two driving lanes plus parallel parking on one or both sides of the street. Cul-de-sacs shall not intersect major collectors or arterial streets. Utility line easements are required along both sides of the right-of-way. See also the Utility section of these Design and Construction Standards.

l. Type of Curb, Gutter and Walk

- Within the cu-de sac bulb, only 4" mountable combination curb & gutter (per detail RD-1B) is allowed.

See detail RD-1 (CURB, GUTTER, AND SIDEWALK DETAILS)

m. Turnaround

A Turnaround shall all have a minimum flowline radius of forty-five (45) feet. Turnarounds located in rural areas with no curb and gutter, may be required to use NFPA-299 standards as amended by the Town of Elizabeth, which require a 50-foot radius on the driving surface of the turnaround.

n. Street Sections

All local street sections may be used to connect to a cul-de-sac bulb.

o. Minimum Horizontal Curve Radius on Centerline

See Table 5.1 (HORIZONTAL CURVES).

p. Minimum Length of Vertical Curves

See Table 6.1 (VERTICAL ALIGNMENT CONTROLS)

q. Street Grades

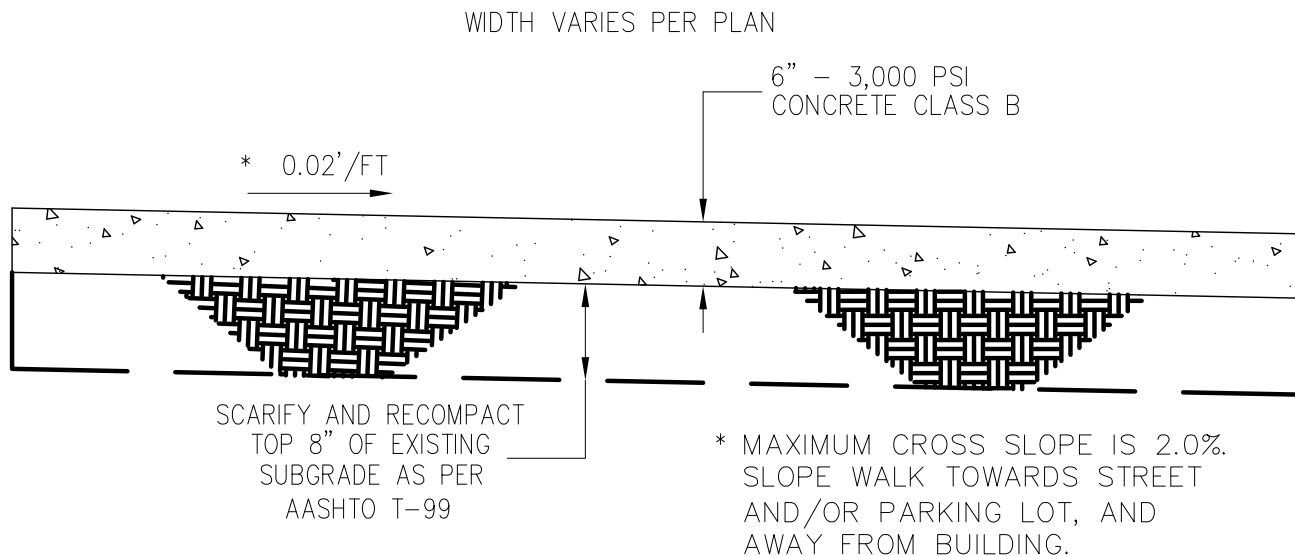
A minimum longitudinal **flowline** grade of 1.0% shall be required on all cul-de-sacs, except at curb returns, knuckles, eyebrows and turnarounds where the minimum **flowline** grade shall be 2.0%. Maximum **centerline** grade is 6.0%. See Table 2.1 (ROADWAY CONSTRUCTION STANDARDS) and Table 6.1 (VERTICAL ALIGNMENT CONTROLS)

r. Curb Return Radii

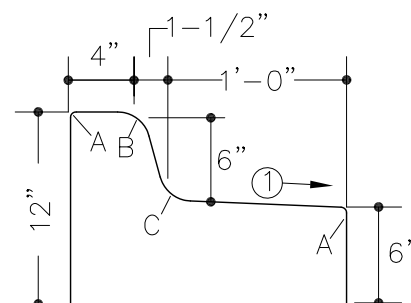
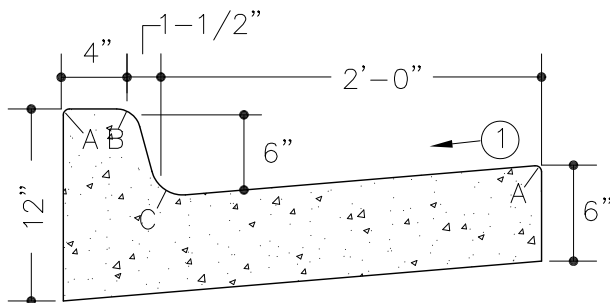
See Table 5.2 (CURB RETURN RADII)

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APPENDIX A



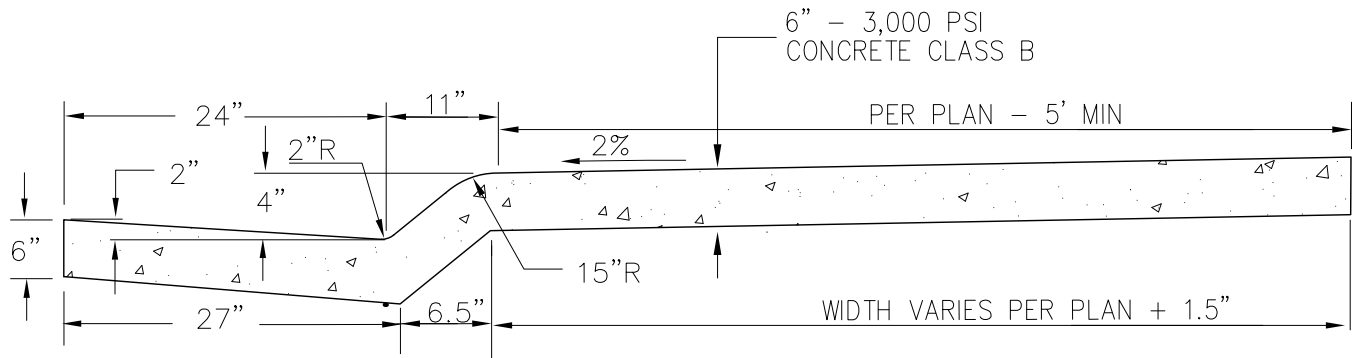
SIDEWALK DETAIL



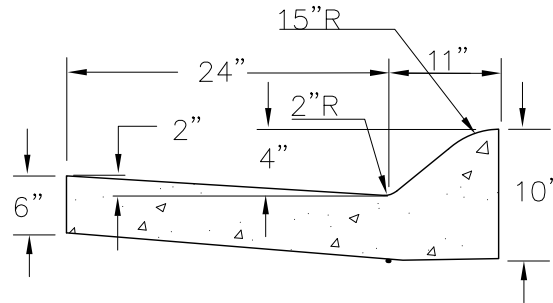
CURB DETAIL LEGEND	
A	RADIUS = 1/8"
B	RADIUS = 1-1/2"
C	RADIUS = 1-1/2" - 2"
1	CROSS SLOPE SHALL BE 1/2" PER FOOT WHEN DRAINING AWAY FROM CURB, AND 1" PER FOOT WHEN DRAINING TOWARD THE CURB

CURB DETAIL

TOWN OF ELIZABETH STANDARD ROADWAY DETAILS	
CURB, GUTTER, & SIDEWALK DETAILS	
SCALE: NOT TO SCALE	DATE: 02/10/09
APPROVED: TST INC. OF DENVER TOWN ENGINEER	RD-1A



COMBINATION CURB, GUTTER & SIDEWALK



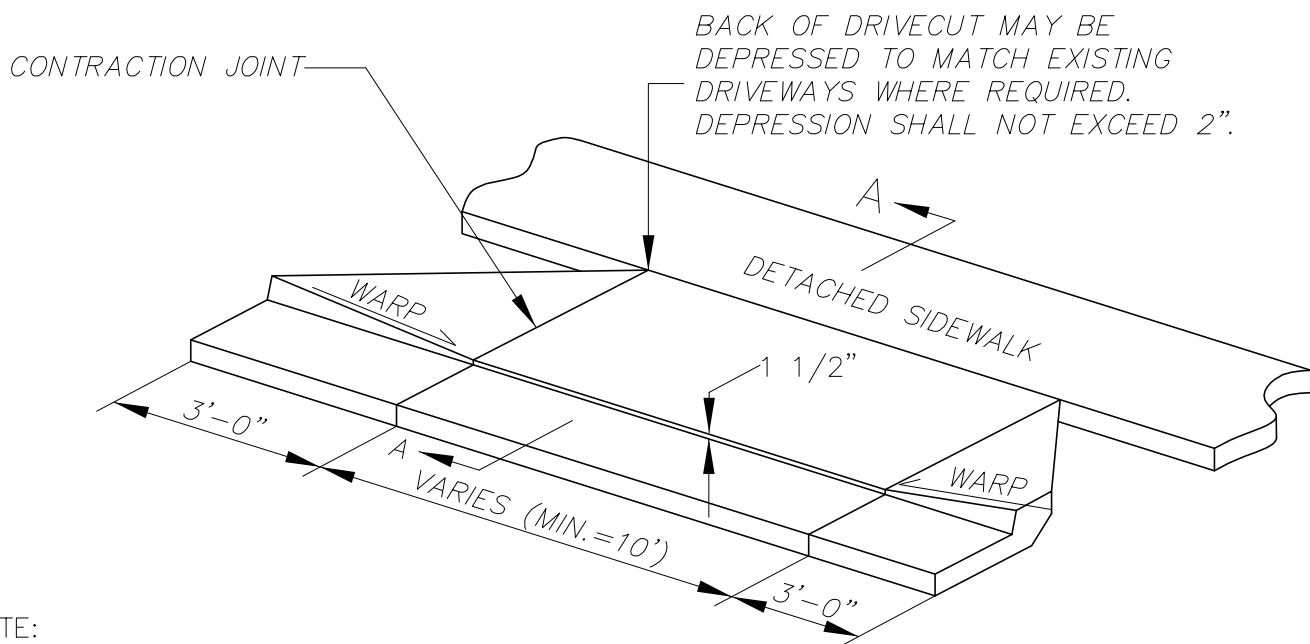
LOCAL MOUNTABLE CURB & GUTTER

NOTES:

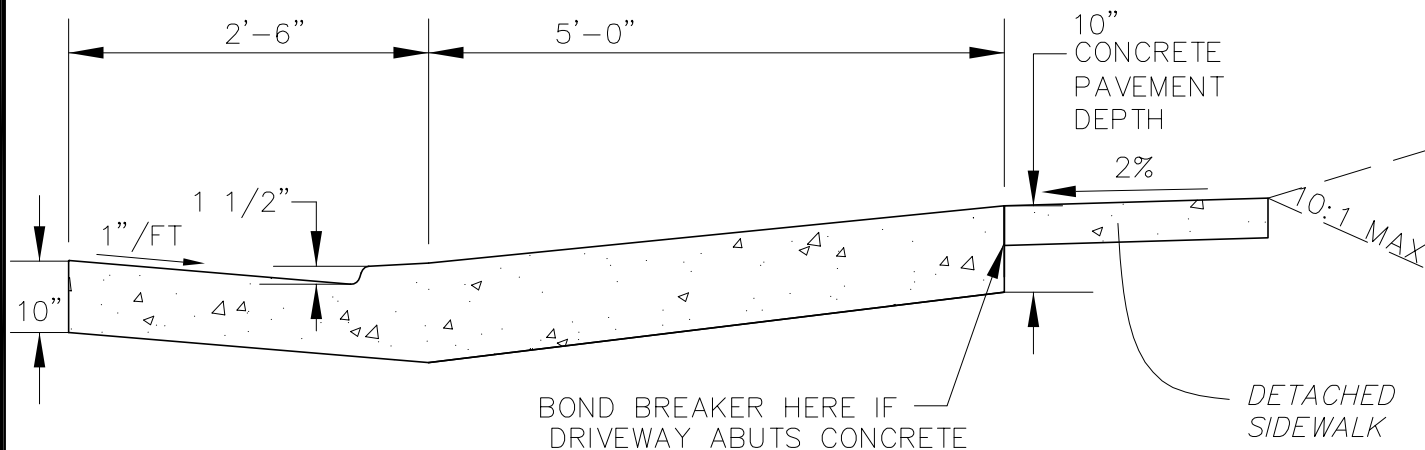
- 1) IF A SIDEWALK IS PLACED BEHIND THE CURB BUT IS NOT PLACED MONOLITHICALLY, EXPANSION JOINT MATERIAL AND A SILICONE BASE SEALER MUST BE APPLIED BETWEEN THE SIDEWALK AND CURB.

TOWN OF ELIZABETH STANDARD ROADWAY DETAILS	
CURB, GUTTER, & SIDEWALK DETAILS	
SCALE: NOT TO SCALE	DATE: 09/06/17
APPROVED: CORE CONSULTANTS INC. TOWN ENGINEER	RD-1B

NOTE: CURBCUTS ARE TO BE PLACED
MONOLITHIC WITH CURB & GUTTER.



NOTE:
CONTRACTION JOINTS REQUIRED
IN DRIVECUT AT MAXIMUM 10' SPACING



SECTION A-A

TOWN OF ELIZABETH
STANDARD ROADWAY DETAILS

DRIVEWAY CUT DETAIL

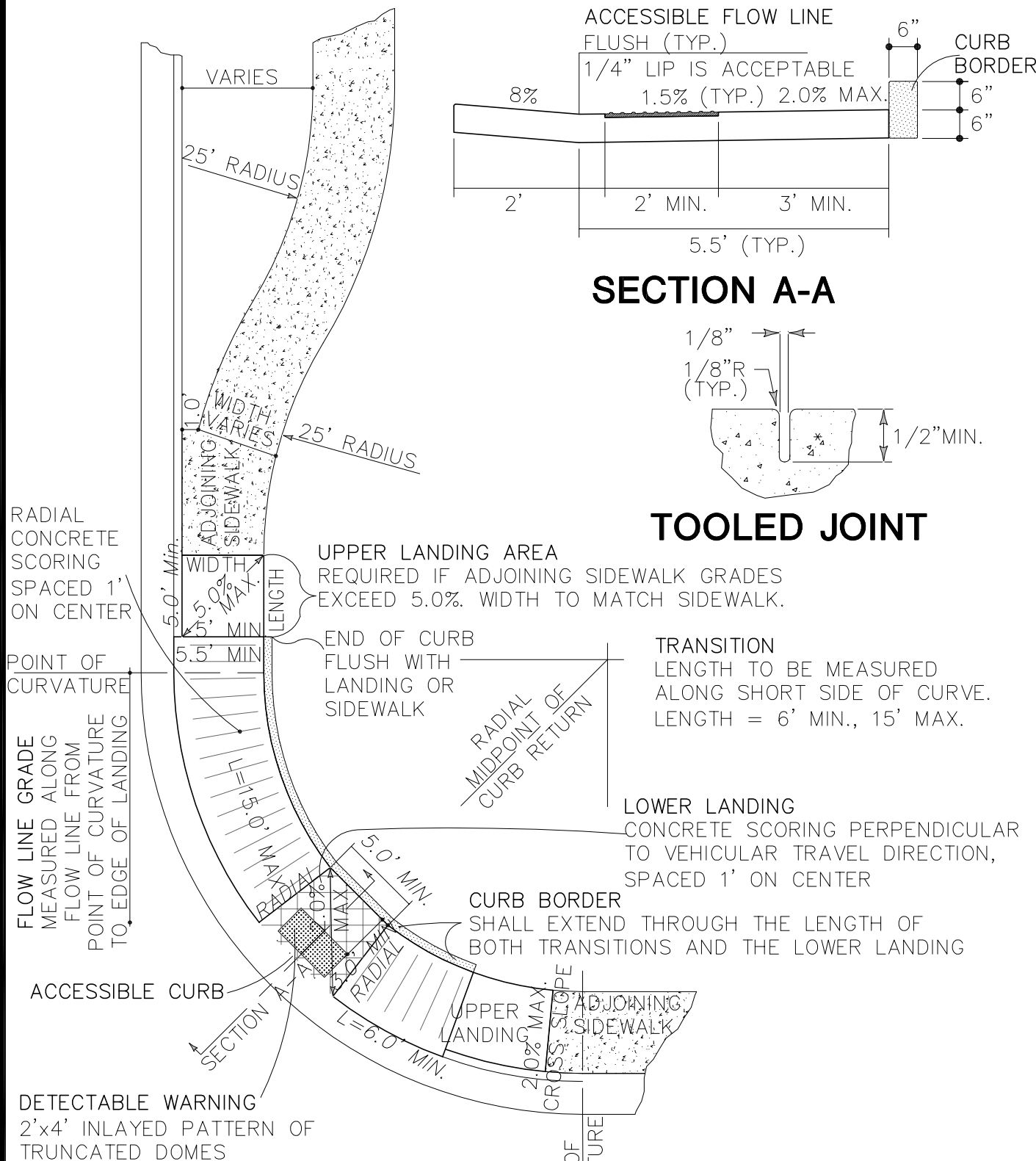
SCALE: NOT TO SCALE

DATE: 02/10/09

APPROVED:

TST INC. OF DENVER
TOWN ENGINEER

RD-2



TOWN OF ELIZABETH STANDARD ROADWAY DETAILS	
HANDICAP RAMP DETAIL	
SCALE: NOT TO SCALE	DATE: 02/10/09
APPROVED: TST INC. OF DENVER TOWN ENGINEER	RD-3A

NOTES

SLOPED TRANSITIONS SHALL COMPLY WITH ALL APPLICABLE RULES AND GUIDELINES OF THE AMERICANS WITH DISABILITIES ACT.

SLOPED TRANSITIONS SHALL BE CONSISTENT WITH THE CURRENT PUBLICATION OF FEDERAL GUIDELINES FOR ACCESSIBLE RIGHTS OF WAY.

LONGTITUDINAL SLOPES WITHIN THE TRANSITION SHALL NOT EXCEED 1:12 (8.33%).

CROSS SLOPES, OR SLOPES PEPENDICULAR TO THE DIRECTION OF TRAVEL SHALL NOT EXCEED 1:50 (2.0%)

THE LOWER LANDING AREA IS A REQUIRED ELEMENT.

SLOPED TRANSITIONS ARE A REQUIRED ELEMENT AND SHALL:

- A. NOT EXCEED 1:12 (8.3%) LONGTITUDINAL SLOPE ALONG THE SHORTEST SIDE UNLESS TRANSITION LENGTH EXCEEDS 15.0'
- B. NOT EXCEED 1:50 (2.0%) SLOPE PERPENDICULAR TO THE TRAVELED DIRECTION.
- C. NOT EXCEED 15.0' IN LENGTH AS MEASURED ALONG THE SHORTEST SIDE. MAXIMUM LONGTITUDINAL SLOPE SHALL BE ADJUSTED TO ACCOMODATE THE LENGTH.
- D. NOT BE LESS THAN 6.0' IN LENGTH.

THE UPPER LANDING AREA IS REQUIRED IF:

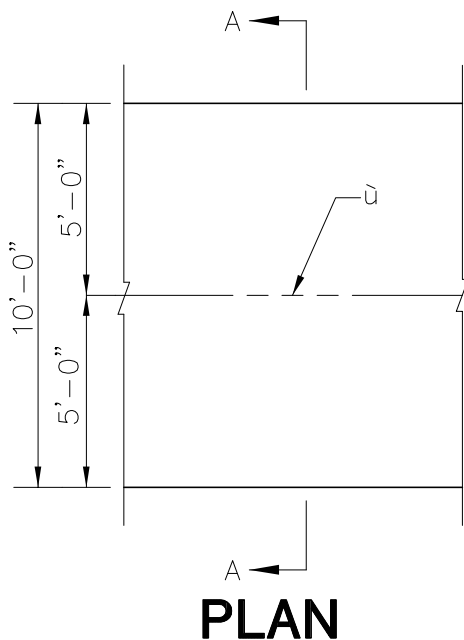
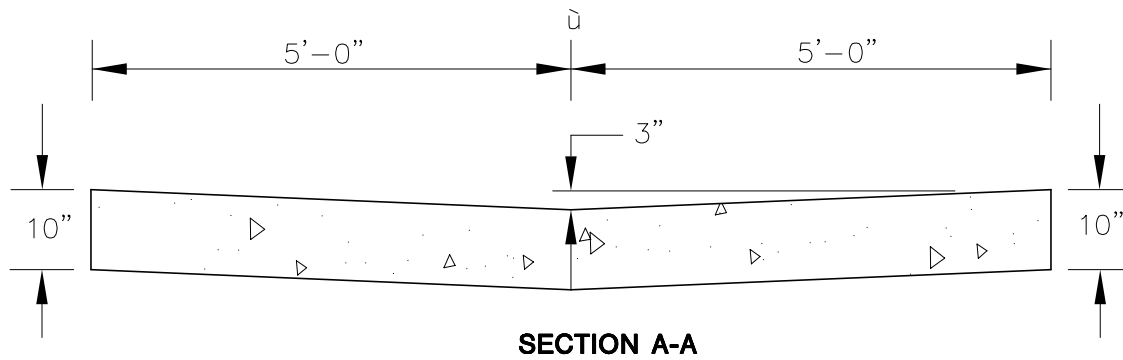
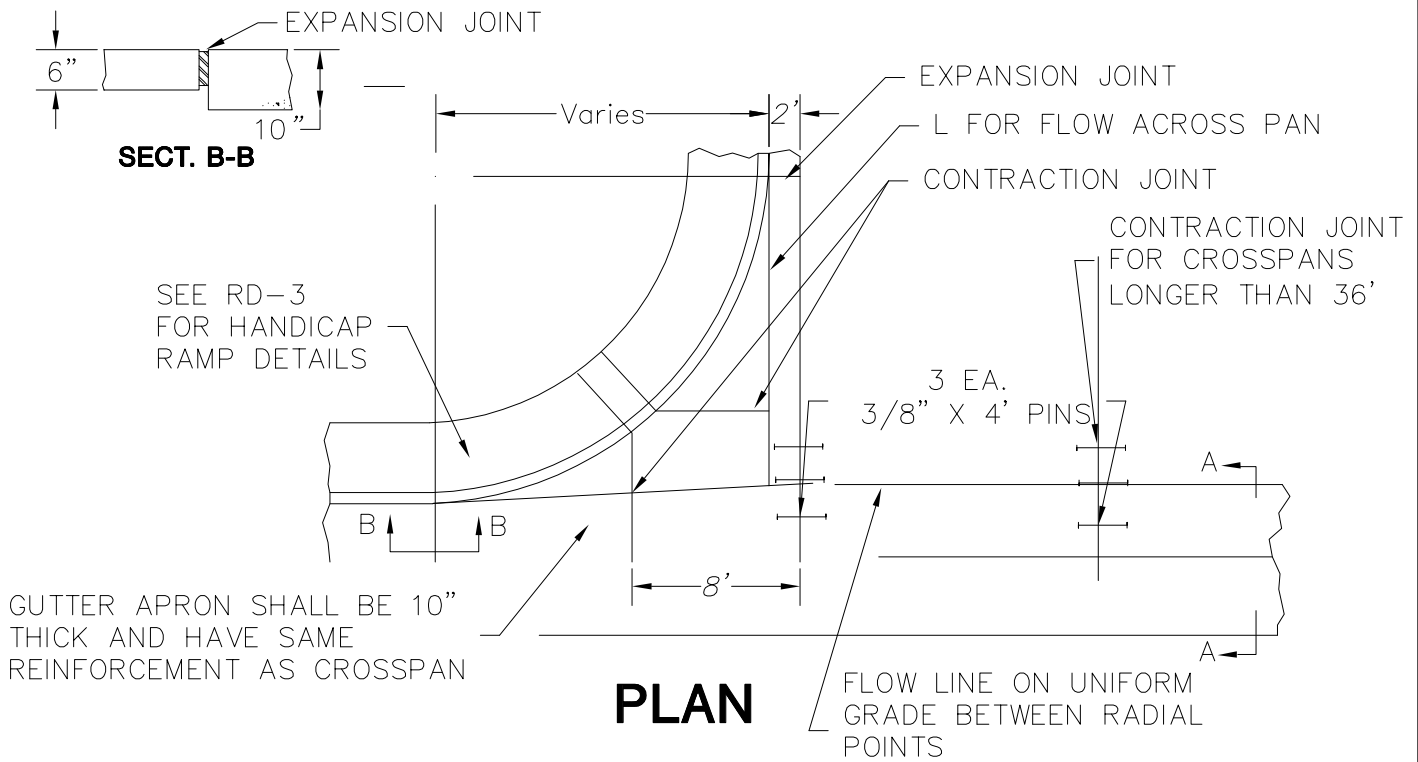
- A. THE ADJOINING SIDEWALK HAS A LONGTITUDINAL GRADE (DIRECTION OF TRAVEL) IN EXCESS OF 1:20 (5.0%). SAID LANDING SHALL NOT EXCEED A 1:20 (5.0%) SLOPE IN ANY DIRECTION.
- B. A CHANGE IN DIRECTION IS REQUIRED TO ENTER OF EXIT THE SLOPED TRANSITION. SAID LANDING SHALL SHALL NOT EXCEED 1:50 (2.0%) SLOPE IN ANY DIRECTION.

LANDINGS AND SLOPED TRANSITIONS SHALL MATCH THE WIDTH OF THE ADJOINING SIDEWALK, 3.0' MINIMUM.

ALL TOOLED JOINTS WITHIN THE SLOPED TRANSITIONS SHALL RUN PERPENDICULAR TO THE DIRECTION OF TRAVEL.

ALL TOOLED JOINTS WITHIN THE LOWER LANDING AREA SHALL RUN PARALLEL TO AND/OR PERPENDICULAR TO THE DIRECTION OF VEHICULAR TRAVEL WITHIN THE TRAVELED WAY.

TOWN OF ELIZABETH STANDARD ROADWAY DETAILS	
HANDICAP RAMP DETAIL NOTES	
SCALE: <u>NOT TO SCALE</u>	DATE: <u>02/10/09</u>
APPROVED: <u>TST INC. OF DENVER</u> TOWN ENGINEER	RD-3B



PAN LENGTH	REBAR HAVING END AREA OF
36'	.10 Sq. In. Per Ft. (#4 @ 18" E.W.)
46'	.13 Sq. In. Per Ft. (#4 @ 18" E.W.)
64'	.20 Sq. In. Per Ft. (#4 @ 18" E.W.)
84'	.26 Sq. In. Per Ft. (#4 @ 18" E.W.)

TOWN OF ELIZABETH
STANDARD ROADWAY DETAILS

CROSSPAN

SCALE: NOT TO SCALE

DATE: 02/10/09

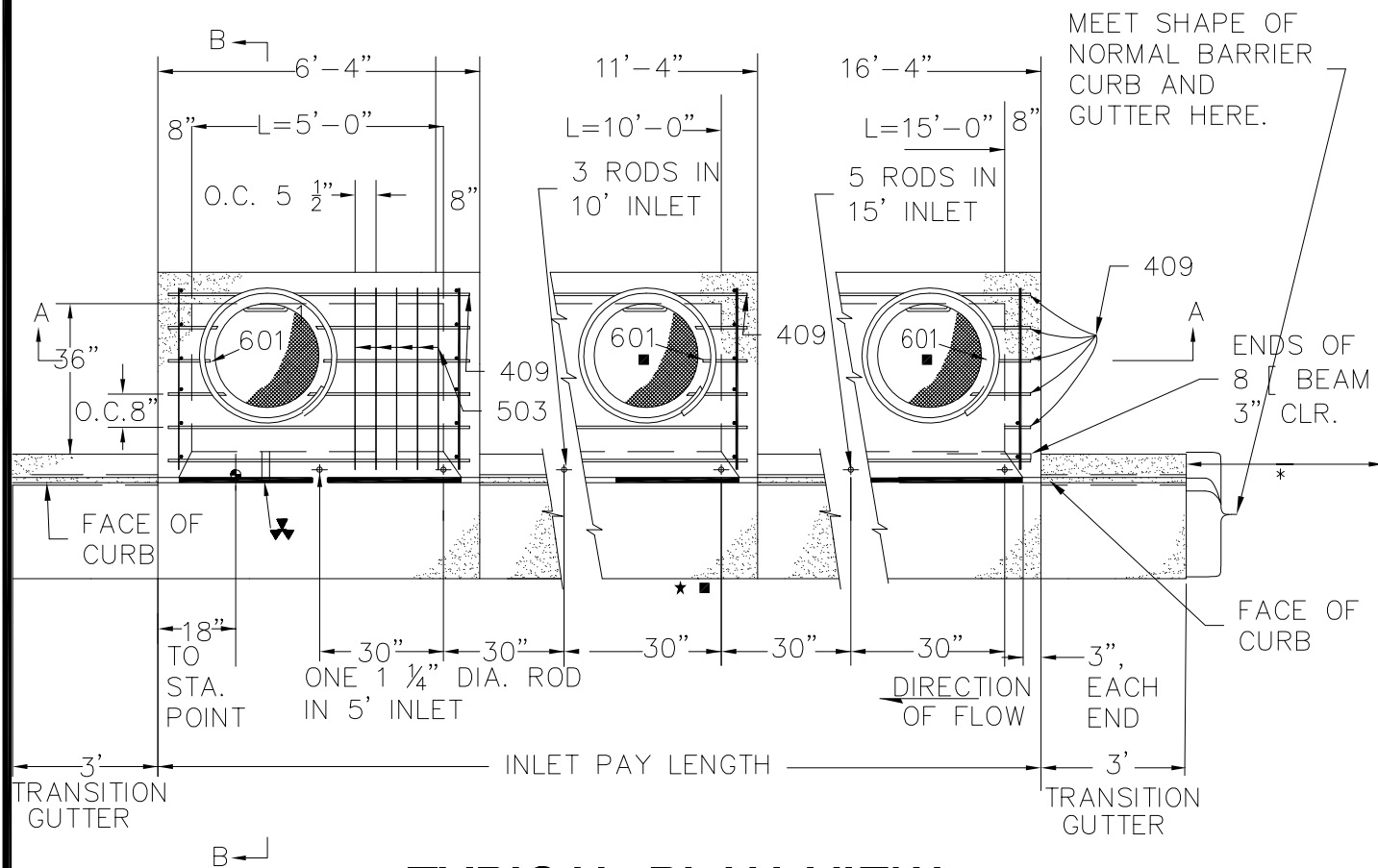
APPROVED:

TST INC. OF DENVER
TOWN ENGINEER

RD-4

- ★ FOR LENGTH GREATER THEN 5 FT.
PROVIDE ACCESS AT BOTH ENDS.

- ✶ A 2" DIAMETER TEMPORARY HOLE FOR DRAINAGE SHALL BE PLACED AT SUBGRADE ELEVATION OR A MINIMUM THREE INCHES BELOW ROAD BASE. THE HOLE SHALL BE PLUGGED WITH CONCRETE BEFORE ACCEPTANCE OF THE INLET.

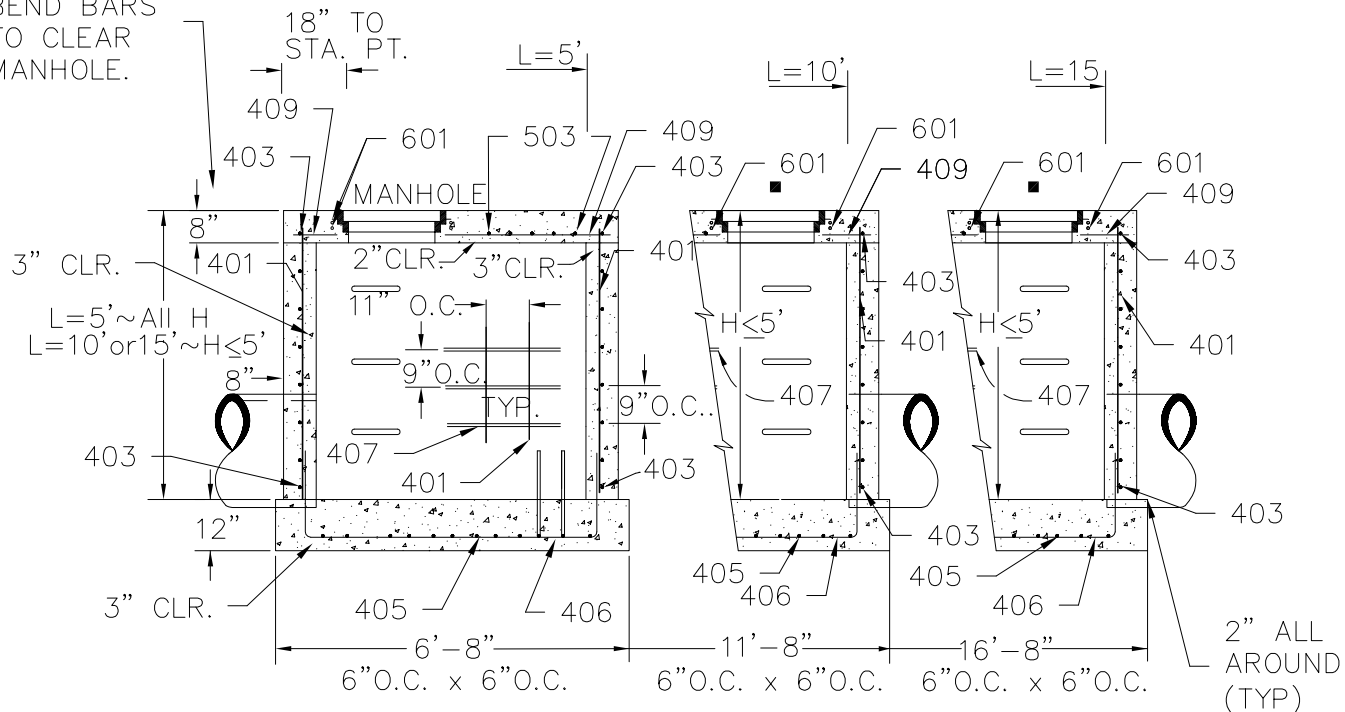


TYPICAL PLAN VIEW

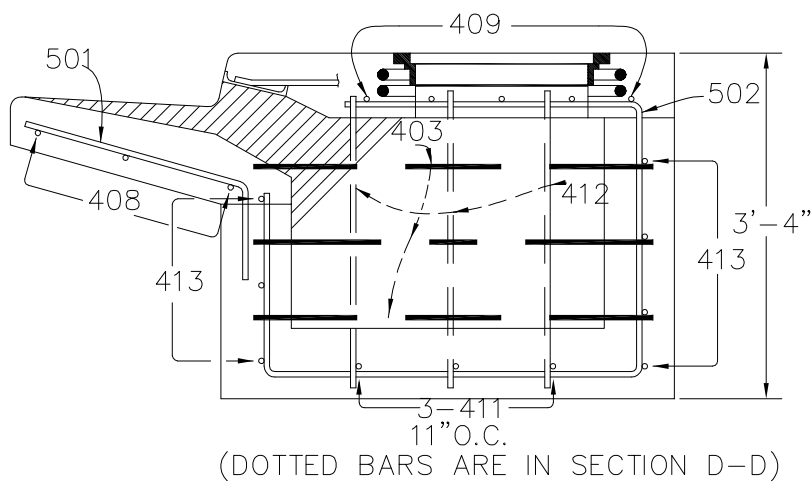
MANHOLE RING & COVER,
STATION POINT AND OUTFLOW
PIPE SHALL BE LOCATED AT
THE SAME END OF THE INLET.

TOWN OF ELIZABETH STANDARD ROADWAY DETAILS	
CURB INLET – TYPE R	
SCALE: _____ NOT TO SCALE _____	DATE: _____ 02/10/09 _____
APPROVED: _____ TST INC. OF DENVER TOWN ENGINEER	RD-5A

CUT OFF OR
BEND BARS
TO CLEAR
MANHOLE.



SECTION A-A REGULAR INLET



(DOTTED BARS ARE IN SECTION D-D)

- ADDITIONAL MANHOLE, RING AND COVER REQUIRED WHEN $L=10'$ OR MORE. CUT REINFORCEMENT BAR ACCORDINGLY.

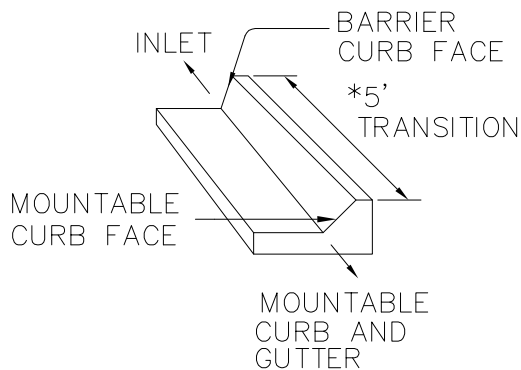
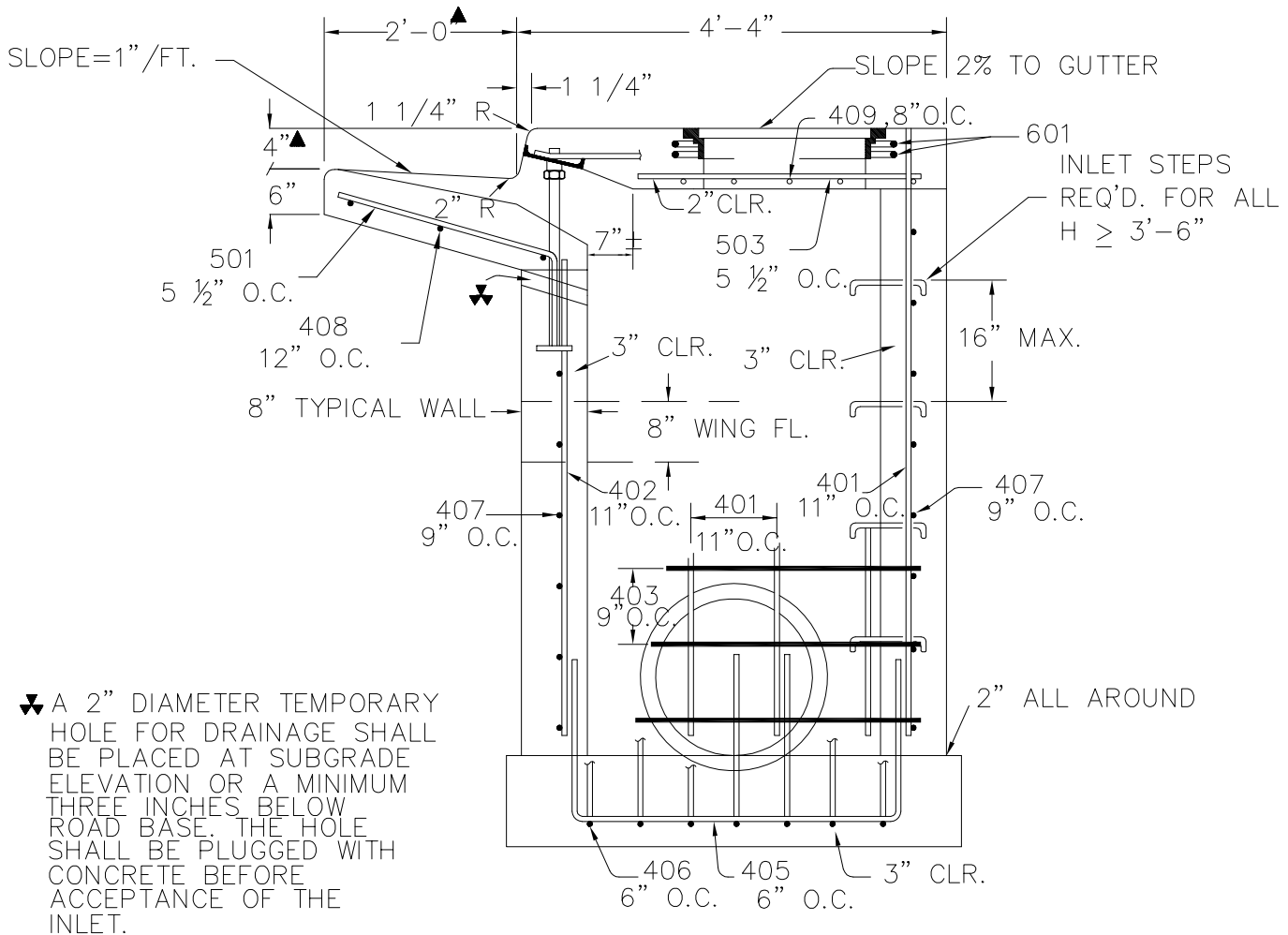
NOTE:

MANHOLE RING & COVER, STATION POINT AND OUTFLOW PIPE SHALL BE LOCATED AT THE SAME END OF THE INLET.

SECTIONS C-C & D-D

TOWN OF ELIZABETH STANDARD ROADWAY DETAILS	
CURB INLET — TYPE R	
SCALE: NOT TO SCALE	DATE: 02/10/09
APPROVED: TST INC. OF DENVER TOWN ENGINEER	RD-5B

▲— FOR A 1'-0" PAN SLOPE 2" PER FT.

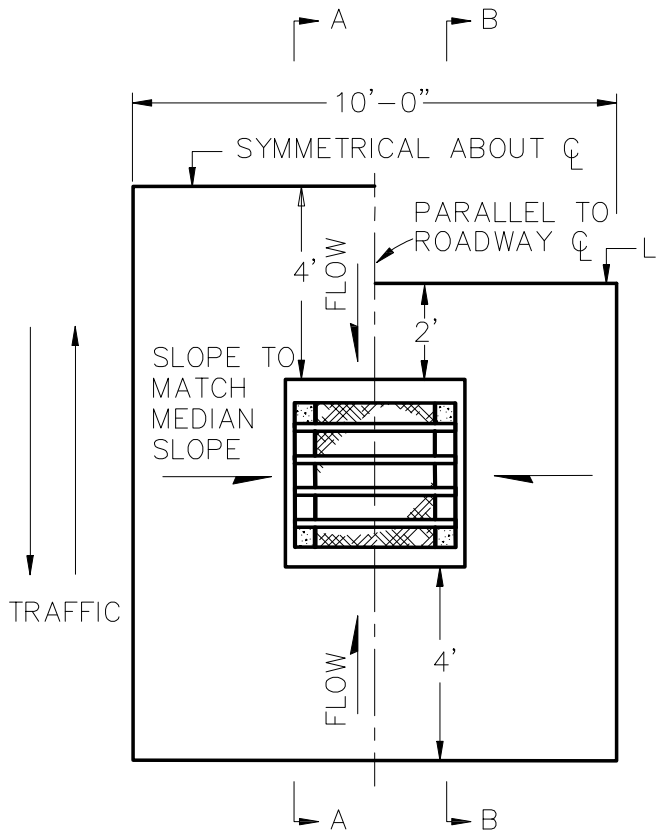


TOWN OF ELIZABETH STANDARD ROADWAY DETAILS	
CURB INLET — TYPE R	
SCALE: NOT TO SCALE	DATE: 02/10/09
APPROVED: TST INC. OF DENVER TOWN ENGINEER	RD-5C

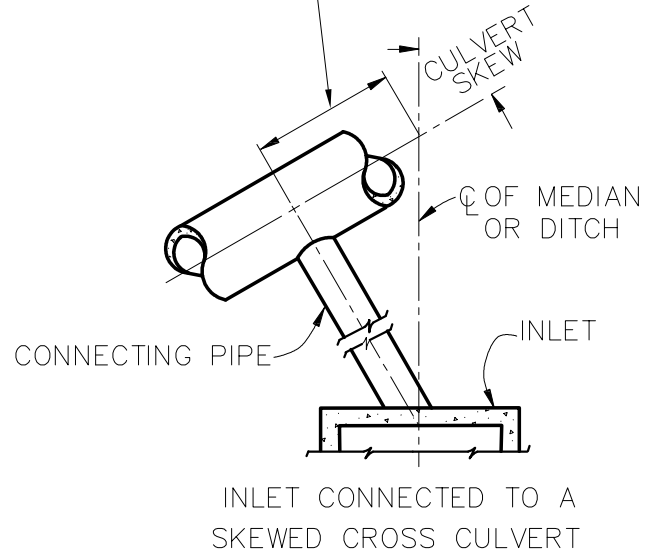


PLACING ENTIRE
ASSEMBLY BEFORE
POURING CONCRETE.

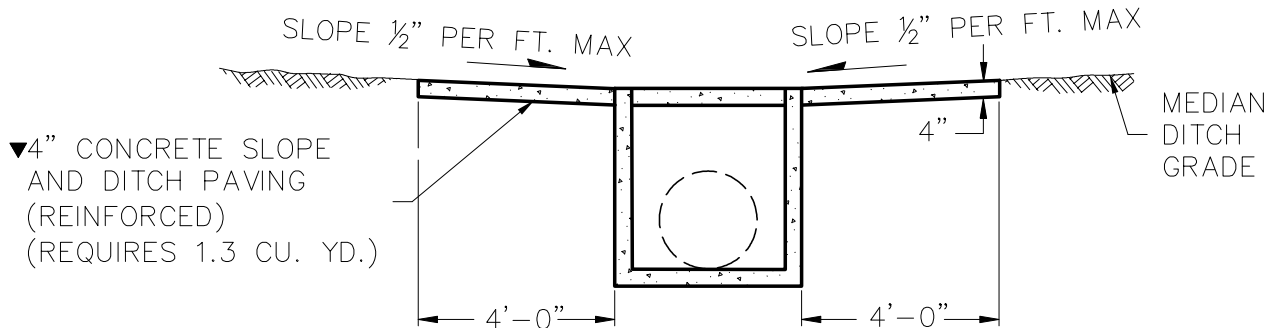
RD-5D



IN CASES OF SKEWED PIPE THIS DIMENSION TO BE SHOWN ON PLANS

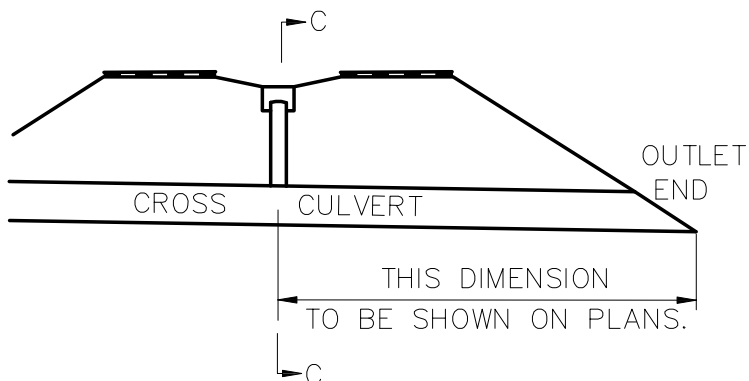


INLET WITH DITCH PAVING



SECTION A-A
INLET AT BOTTOM
OF VERTICAL CURVE

▼-CONCRETE SLOPE AND DITCH PAVING WILL BE REQUIRED WHEN SHOWN ON PLANS



TOWN OF ELIZABETH
STANDARD ROADWAY DETAILS

INLET - TYPE C

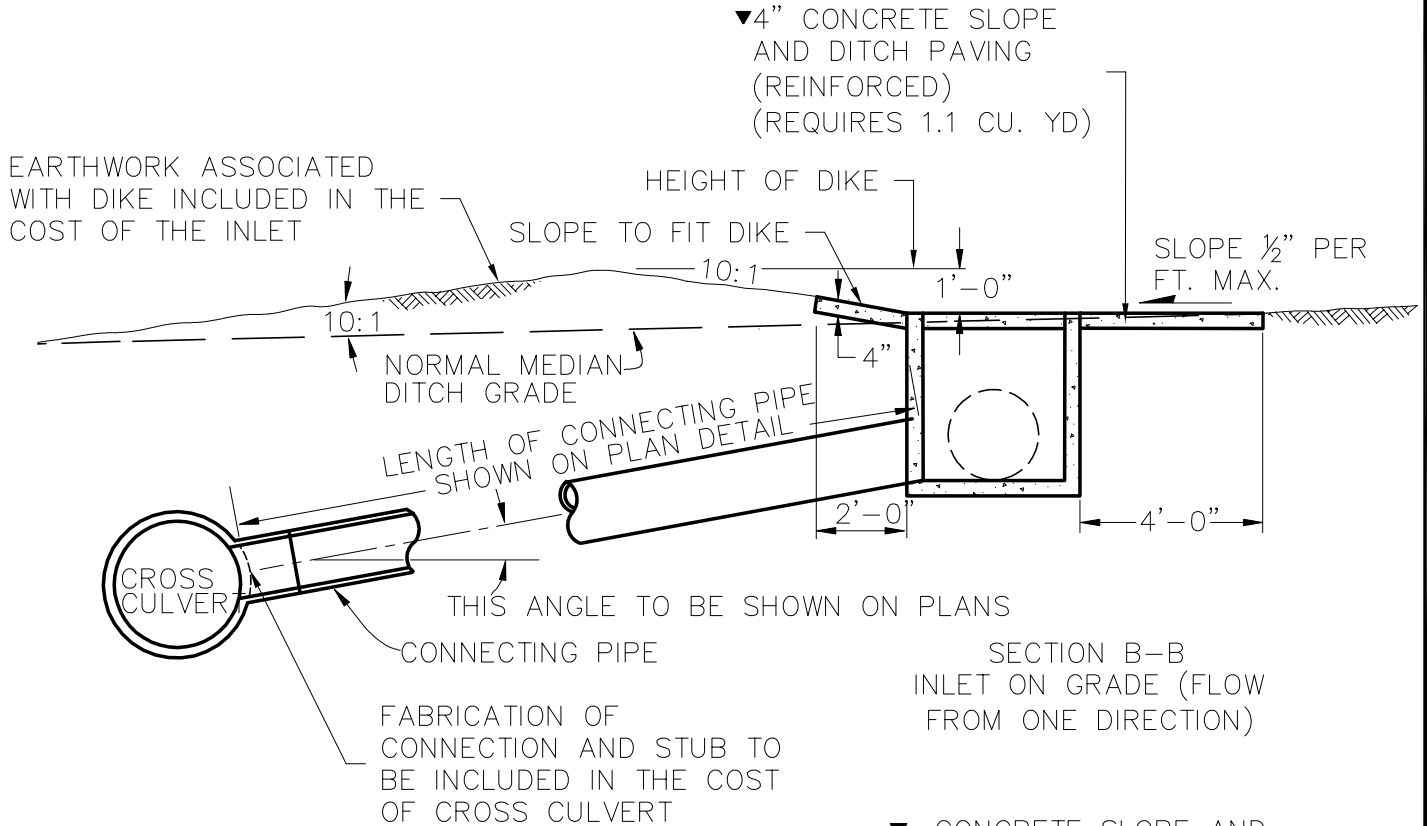
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DATE: 02/10/09

APPROVED:

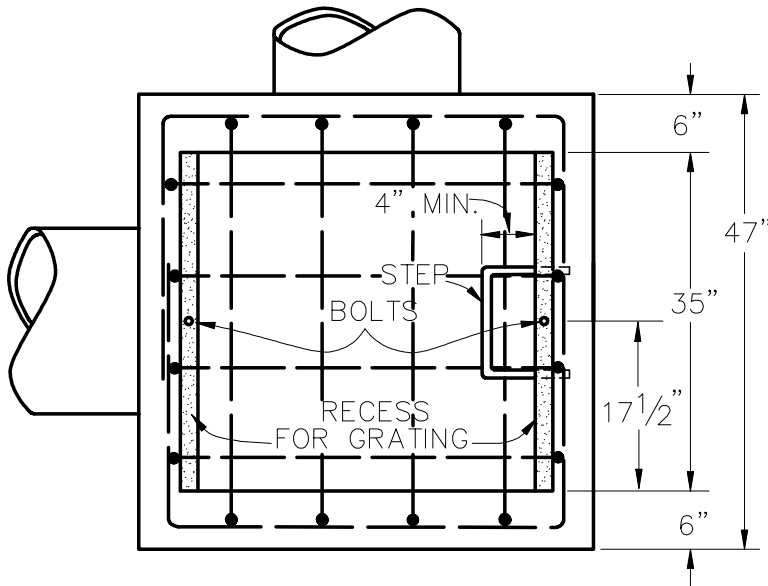
TST INC. OF DENVER
TOWN ENGINEER

RD-6A



SECTION C-C
INLET CONNECTED TO
A CROSS CULVERT

▼-CONCRETE SLOPE AND DITCH PAVING WILL BE REQUIRED WHEN SHOWN ON PLANS



PLAN

TOWN OF ELIZABETH
STANDARD ROADWAY DETAILS

INLET - TYPE C

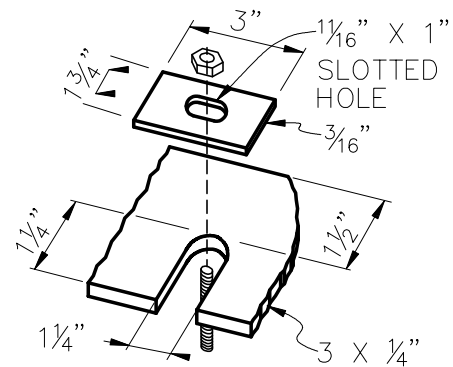
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DATE: 02/10/09

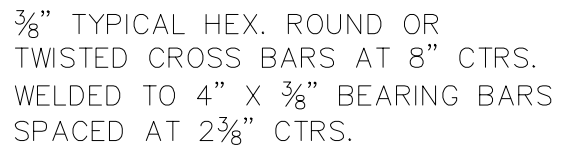
APPROVED:

TST INC. OF DENVER
TOWN ENGINEER

RD-6B



ALTERNATIVE SLOT AND HOLD DOWN PLATE DETAIL



SLOT DETAIL IN 3½"
X ¼" FLATS AS IN
STANDARD INLET
GRATE

CLOSE MESH GRATE

HYDRAULICALLY INEFFICIENT, POOR
TOLERANCE FOR DEBRIS AND ICE.
USE FOR PEDESTRIAN AND BICYCLE
AREA.

TOWN OF ELIZABETH STANDARD ROADWAY DETAILS	
INLET – TYPE C	
SCALE: _____ NOT TO SCALE _____	DATE: 02/10/09 _____
APPROVED: _____ TST INC. OF DENVER TOWN ENGINEER	RD-6D

GENERAL NOTES

- 1 CONCRETE SHALL BE CLASS B. INLET MAY BE CAST-IN-PLACE OR PRECAST.
- 2 REINFORCING BARS SHALL BE EPOXY COATED AND DEFORMED AND SHALL HAVE A MINIMUM 2" CLEARANCE.
- 3 CONCRETE SLOPE AND DITCH PAVING SHALL CONFIRM TO SECTION 507. REINFORCEMENT FOR CONCRETE SLOPE SHALL BE 6 X 6 - W1.4 X W1.4 OR 6 X 6 - W2.1 X W2.1.
- 4 STRUCTURAL STEEL FOR GRATES AND GRATE INSTALLATION HARDWARE SHALL BE GALVANIZED AND SHALL BE IN ACCORDANCE WITH 712.06.
- 5 THE STANDARD INLET GRATES SHALL BE USED ON ALL TYPE C INLETS UNLESS CLOSE MESH GRATES ARE SPECIFIED ON THE PLANS.
- 6 STEPS SHALL BE PROVIDED WHEN INLET DIMENSION "H" EXCEEDS 3'-6" AND SHALL BE IN ACCORDANCE WITH ASHTO M 199.
- 7 SEE CDOT SHEET M-504-11, INLET, TYPE D FOR REINFORCEMENT AROUND THE PIPE OPENING.

BAR LIST FOR H = 2'-6"
AND BENDING DIAGRAM

MARK	NO. REQ'D.	HGT.	LENGTH
401	2	2'-3"	7'-11"
401	6	2'-7"	8'-7"
402	3	"U"	15'-0"

NO. 401

3'-5"

"U"

INCREASE DIMENSION "U" 6"
FOR EACH 6" INCREASE OF
"H" ABOVE 2'-6"

NO. 402

3'-6"

6"

12"

ADD ONE BAR FOR EACH FOOT
INCREASE OF "H" ABOVE 2'-6".

ALL BARS TO BE 1/2" DIA. CUT OR BEND AROUND PIPES AS REQUIRED.

402 BARS WILL BE EQUALLY SPACED FROM EACH OTHER.

QUANTITIES FOR ONE INLET

H	CONCRETE *(CU. YDS.)	REINF. STEEL (LBS.)	NO. STEPS REQ'D.
2'-6"	0.9	75	0
3'-0"	1.0	80	0
3'-6"	1.2	96	0
4'-0"	1.3	101	1
4'-6"	1.4	116	2
5'-0"	1.5	122	2
5'-6"	1.7	137	2
6'-0"	1.8	142	3
6'-6"	1.9	158	3
7'-0"	2.0	163	3
7'-6"	2.2	179	4
8'-0"	2.3	184	4
8'-6"	2.4	199	4
9'-0"	2.5	205	5
9'-6"	2.7	220	5
10'-0"	3.0	235	6
11'-6"	3.4	251	6

* INCLUDES VOLUME OCCUPIED BY PIPES.

TOWN OF ELIZABETH
STANDARD ROADWAY DETAILS

INLET - TYPE C

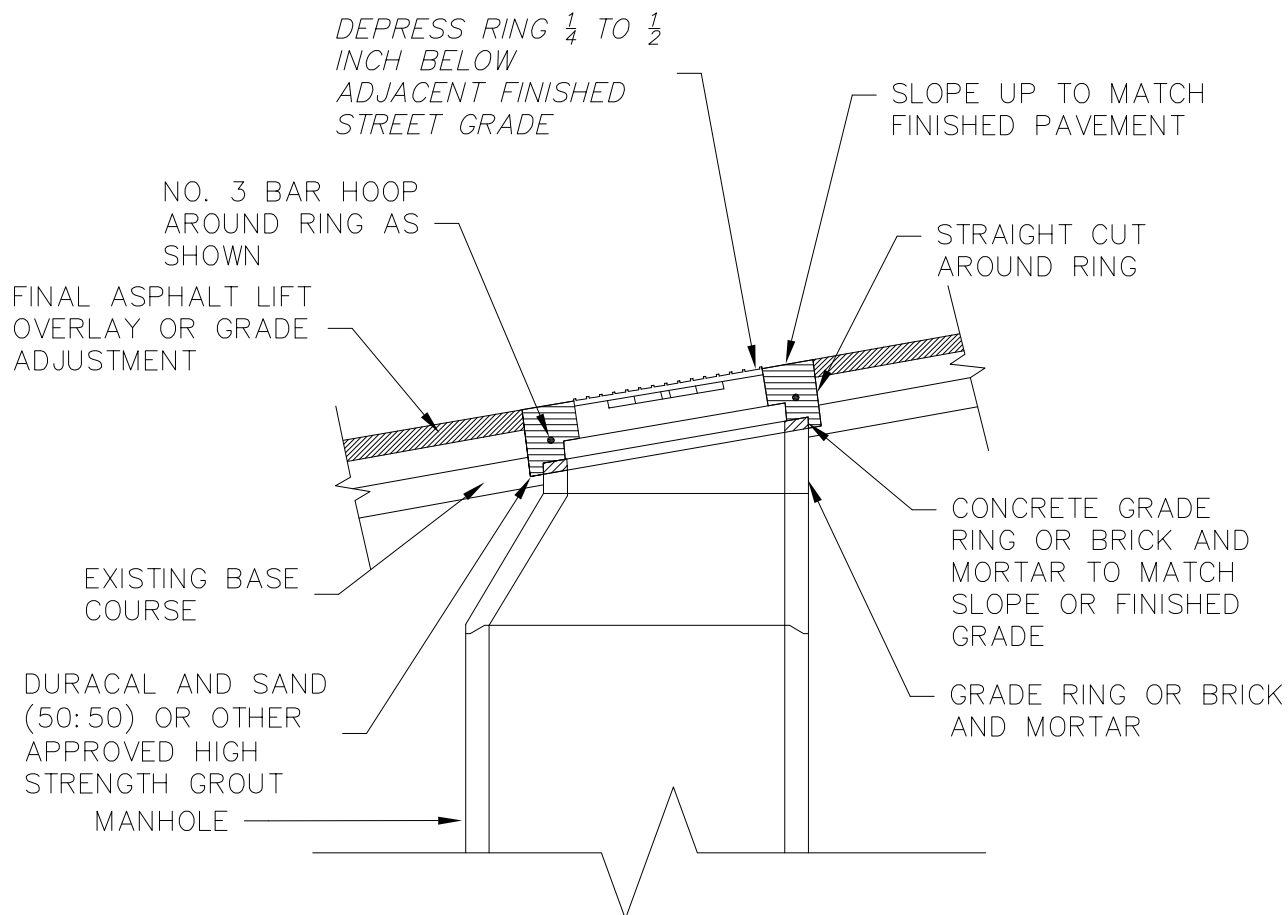
SCALE: NOT TO SCALE

DATE: 02/10/09

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TST INC. OF DENVER
TOWN ENGINEER

RD-6E



NOTES:

1. ADEQUATE BARRICADES SHALL BE PLACED AND MAINTAINED UNTIL THE COLLAR ATTAINS A COMPRESSIVE STRENGTH OF 3000 PSI.
2. DURACAL GROUT SHALL BE A MIXTURE OF 100 LBS. DURACAL, 26 LBS. WATER (3.12 GAL.) AND 100 LBS. OF SAND CONFORMING TO ASTM C-35.
3. MANHOLES SHALL NOT BE LOCATED IN CROSSPANS OR GUTTERS

TOWN OF ELIZABETH
STANDARD ROADWAY DETAILS

MANHOLE RING AND COVER

SCALE: NOT TO SCALE

DATE: 02/10/09

APPROVED:

TST INC. OF DENVER
TOWN ENGINEER

RD-7

THE FOLLOWING NOTES ARE APPLICABLE TO ALL ROADWAY SECTIONS IDENTIFIED ON THE FOLLOWING PAGES (LOCAL, MINOR COLLECTOR, MAJOR COLLECTOR, MINOR ARTERIAL AND MAJOR ARTERIAL), UNLESS MODIFICATIONS ARE APPROVED IN WRITING BY THE DIRECTOR OF PUBLIC WORKS.

NOTES:

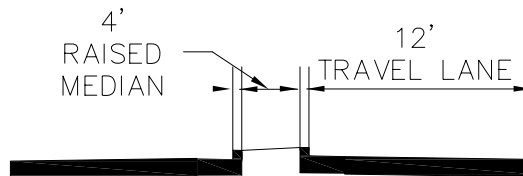
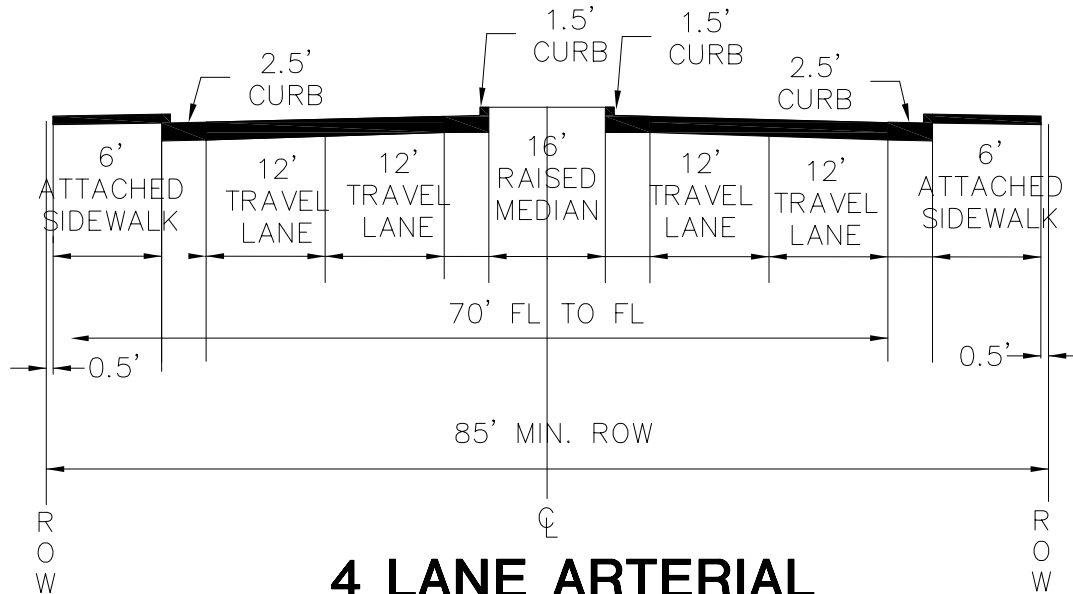
1. GUTTERS SHALL BE AT LEAST 6" THICK.
2. ALL COMBINATION CURB, GUTTER, AND SIDEWALKS TO BE 6" THICK (MIN.). SIDEWALKS WITH VERTICAL CURB AND GUTTER MAY BE 4" THICK.
3. TOTAL PAVEMENT THICKNESS TO BE DETERMINED BY PAVEMENT DESIGN PROCEDURES IN SECTION 5.4.
4. PLACEMENT, MOISTURE AND DENSITY CONTROL FOR SUBGRADE, SUBBASE AND SURFACING MATERIALS SHALL BE IN CONFORMANCE WITH THE REQUIREMENTS OF CHAPTER 8 OF THE ROADWAY DESIGN AND CONSTRUCTION STANDARDS.
5. NON-LANDSCAPED MEDIAN ISLANDS SHALL BE COVERED WITH AN ACCEPTABLE IMPERMEABLE SURFACE.
6. LEGEND

P = PARKING ALLOWED

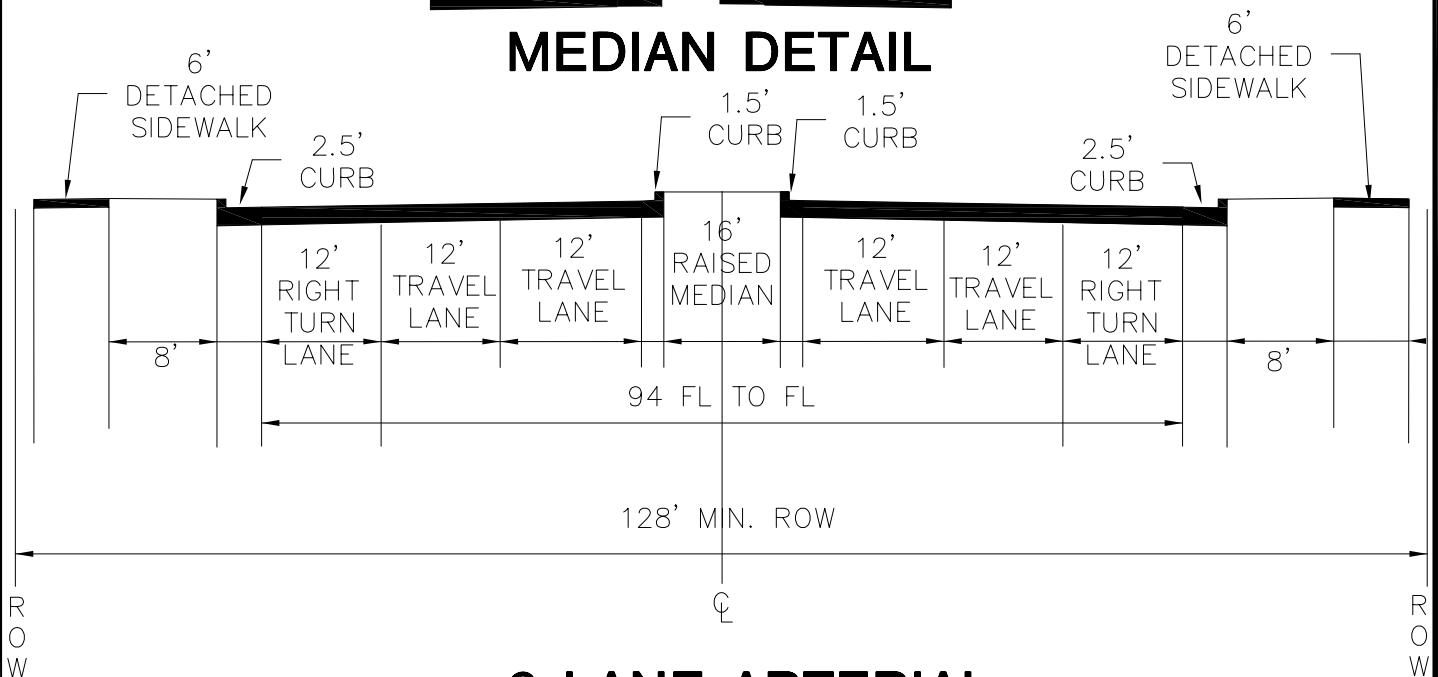
NP = NO PARKING ALLOWED

 = LANEAGE

TOWN OF ELIZABETH STANDARD ROADWAY DETAILS	
STREET CROSS SECTIONS NOTES	
SCALE: <u>NOT TO SCALE</u>	DATE: <u>02/10/09</u>
APPROVED: <u>TST INC. OF DENVER</u> TOWN ENGINEER	RD-8



MEDIAN DETAIL



TOWN OF ELIZABETH
STANDARD ROADWAY DETAILS

ARTERIAL STREET CROSS SECTIONS

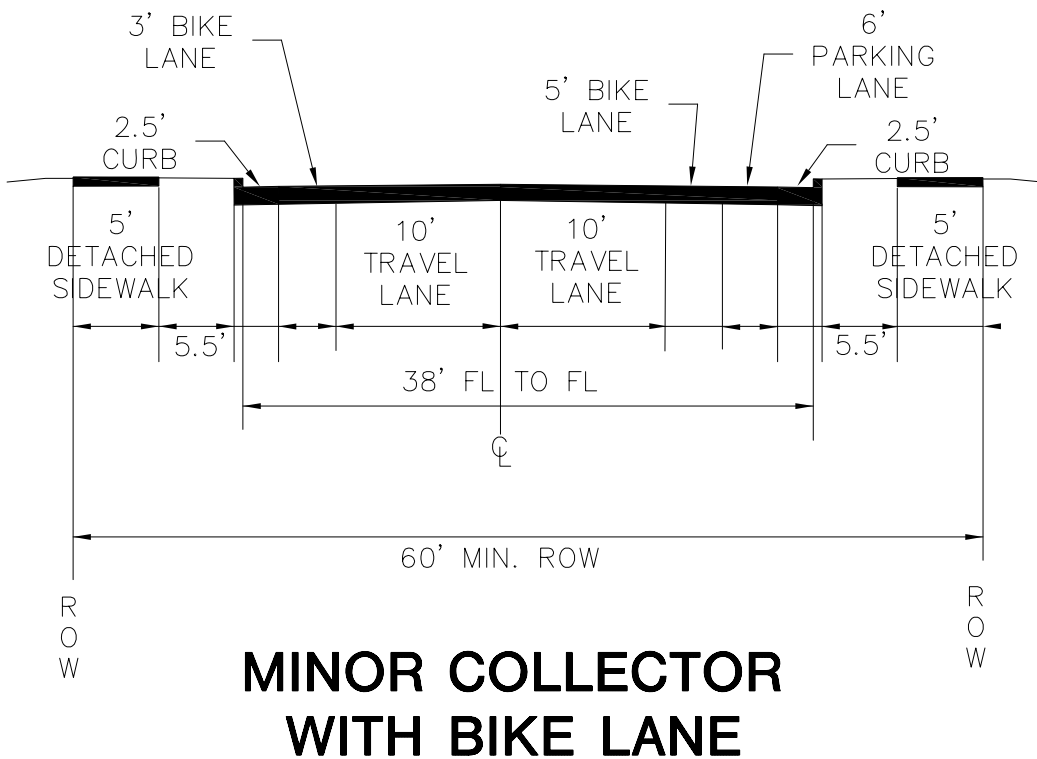
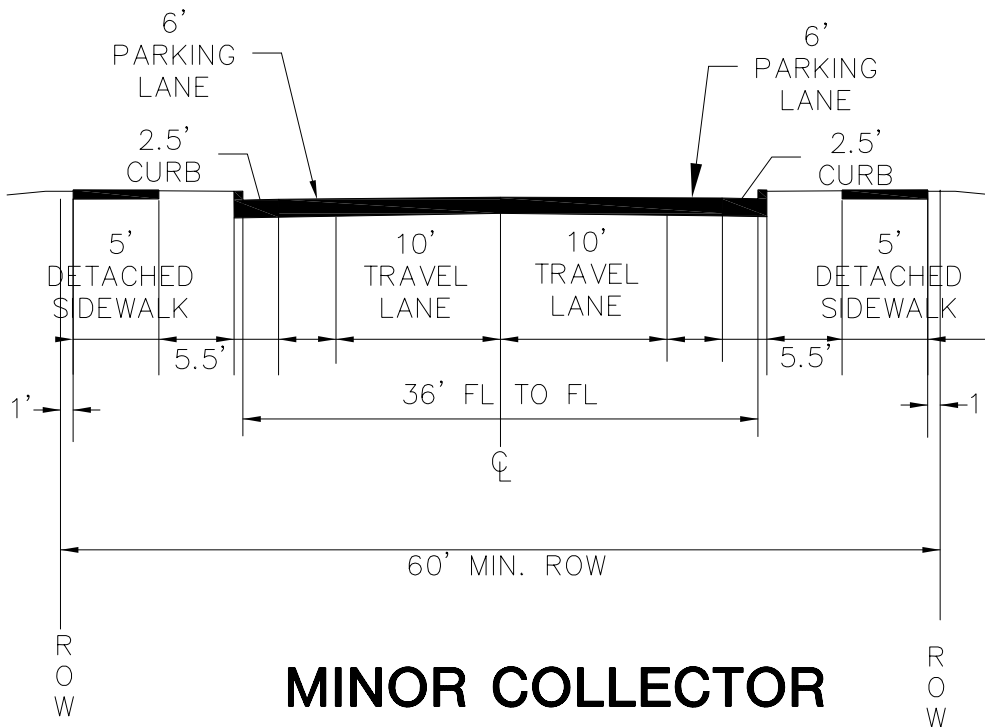
SCALE: NOT TO SCALE

DATE: 02/10/09

APPROVED:

TST INC. OF DENVER
TOWN ENGINEER

RD-9



TOWN OF ELIZABETH
STANDARD ROADWAY DETAILS

MINOR COLLECTOR
STREET CROSS SECTIONS

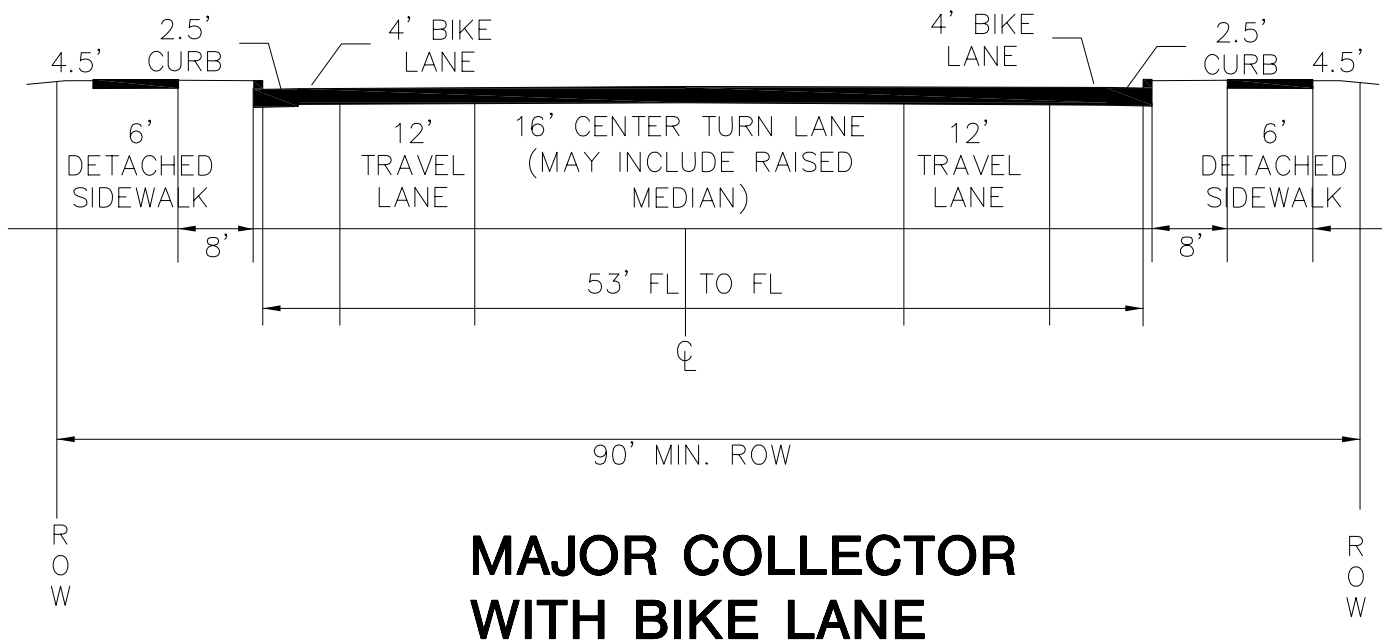
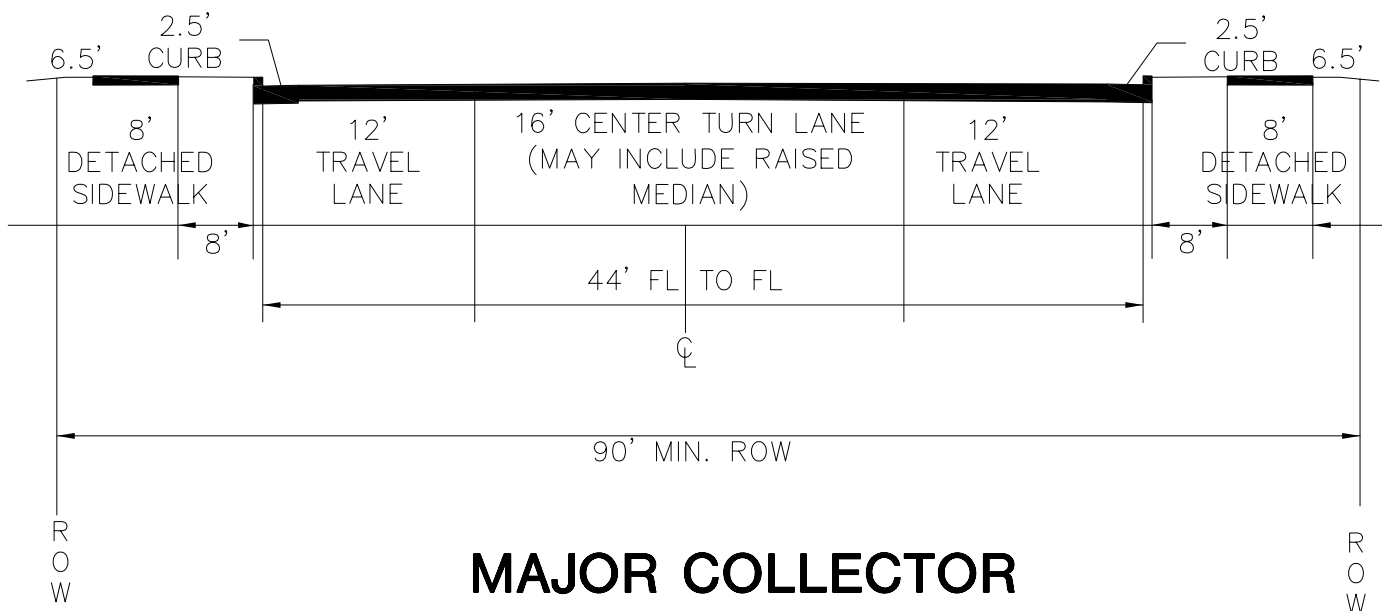
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DATE: 02/10/09

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TST INC. OF DENVER
TOWN ENGINEER

RD-10



TOWN OF ELIZABETH
STANDARD ROADWAY DETAILS

MAJOR COLLECTOR
STREET CROSS SECTIONS

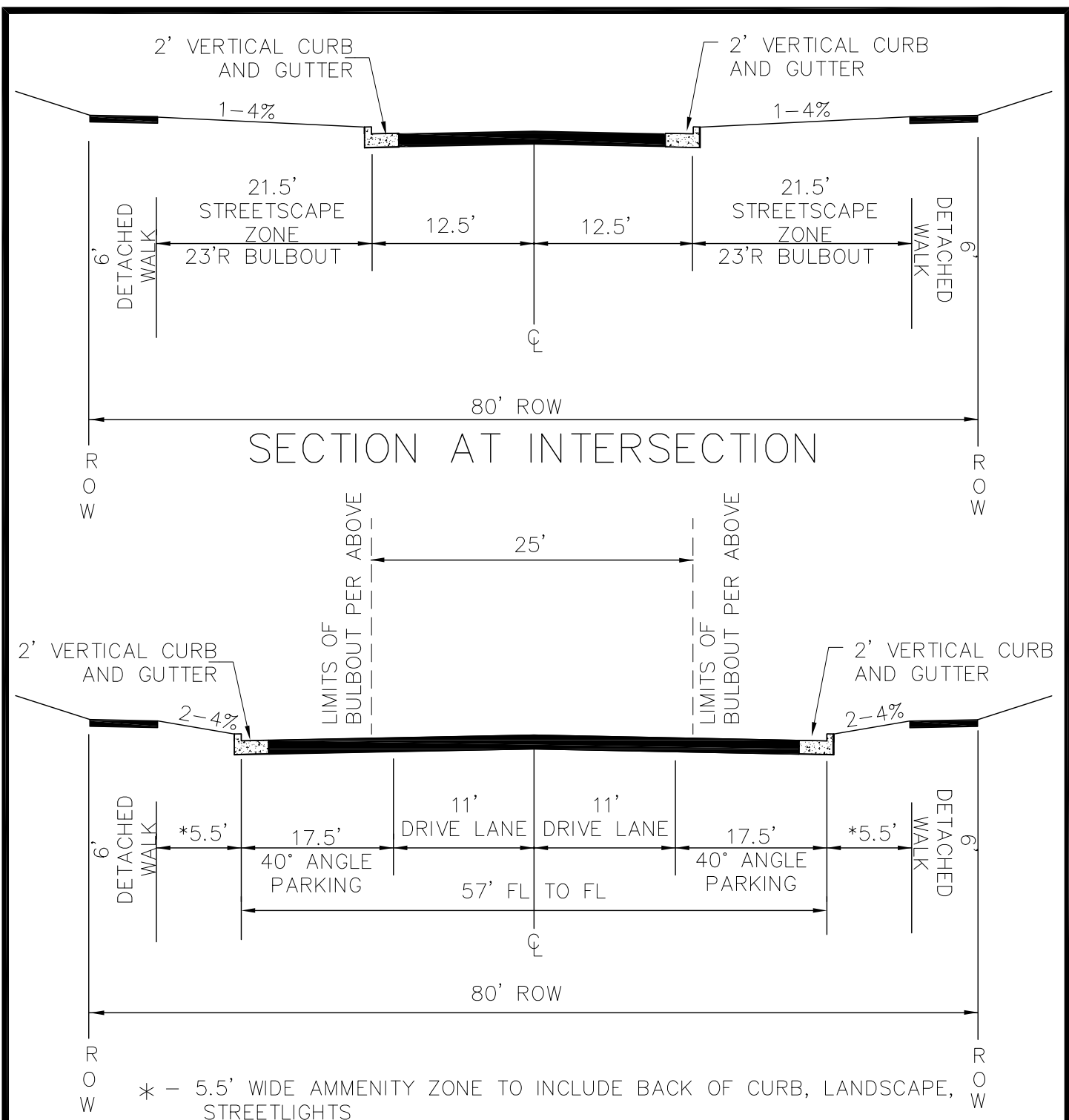
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DATE: 02/10/09

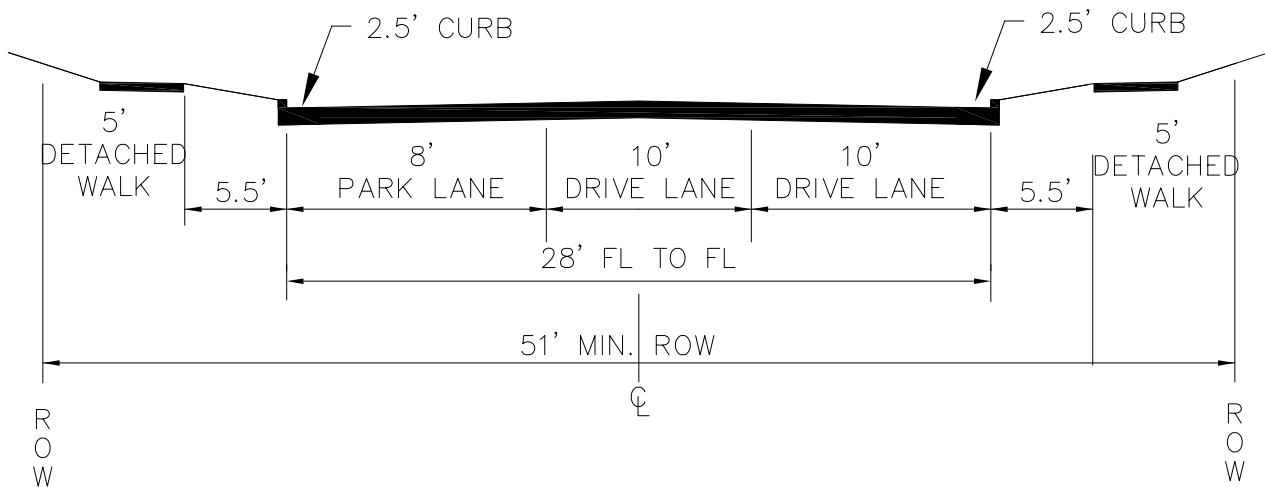
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TST INC. OF DENVER
TOWN ENGINEER

RD-10A



TOWN OF ELIZABETH STANDARD ROADWAY DETAILS	
MAIN STREET	
SCALE: <u>NOT TO SCALE</u>	DATE: <u>1/11/18</u>
APPROVED: CORE CONSULTANTS INC. TOWN ENGINEER	RD-10B



LOCAL TYPE I-UL1

TOWN OF ELIZABETH
STANDARD ROADWAY DETAILS

LOCAL TYPE 1
STREET CROSS SECTIONS

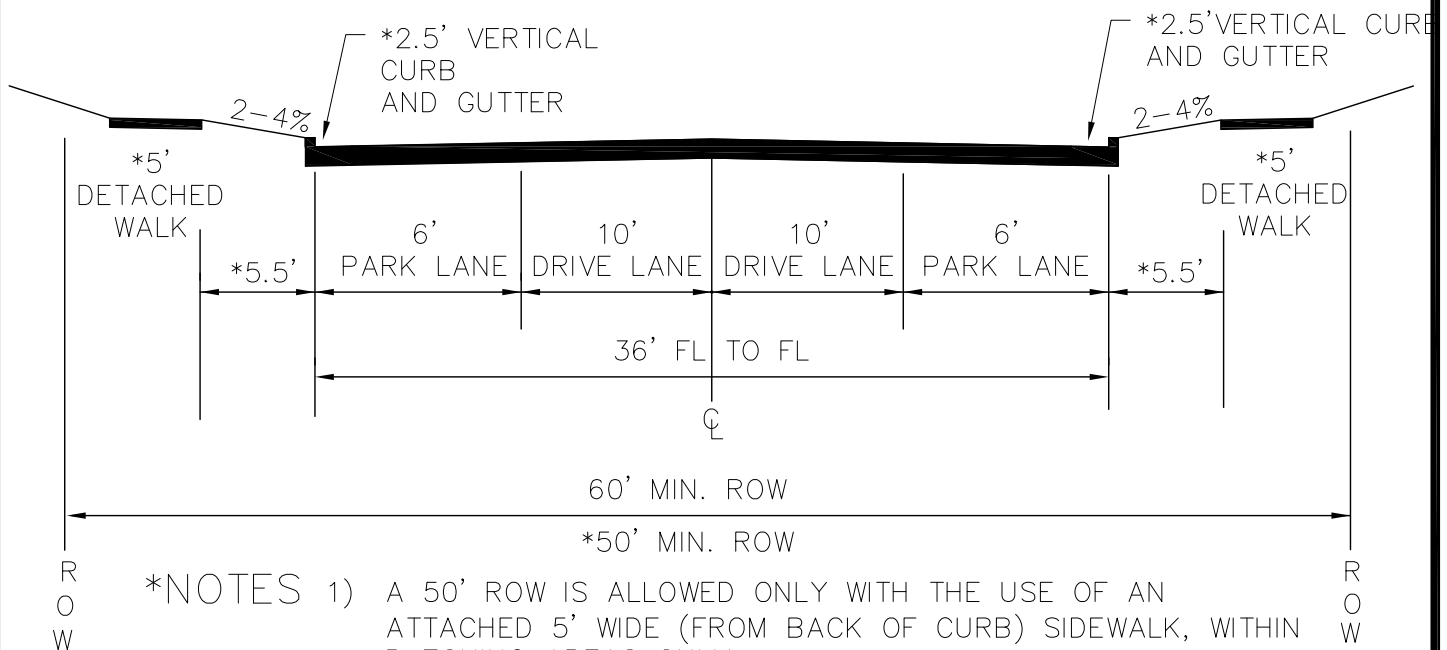
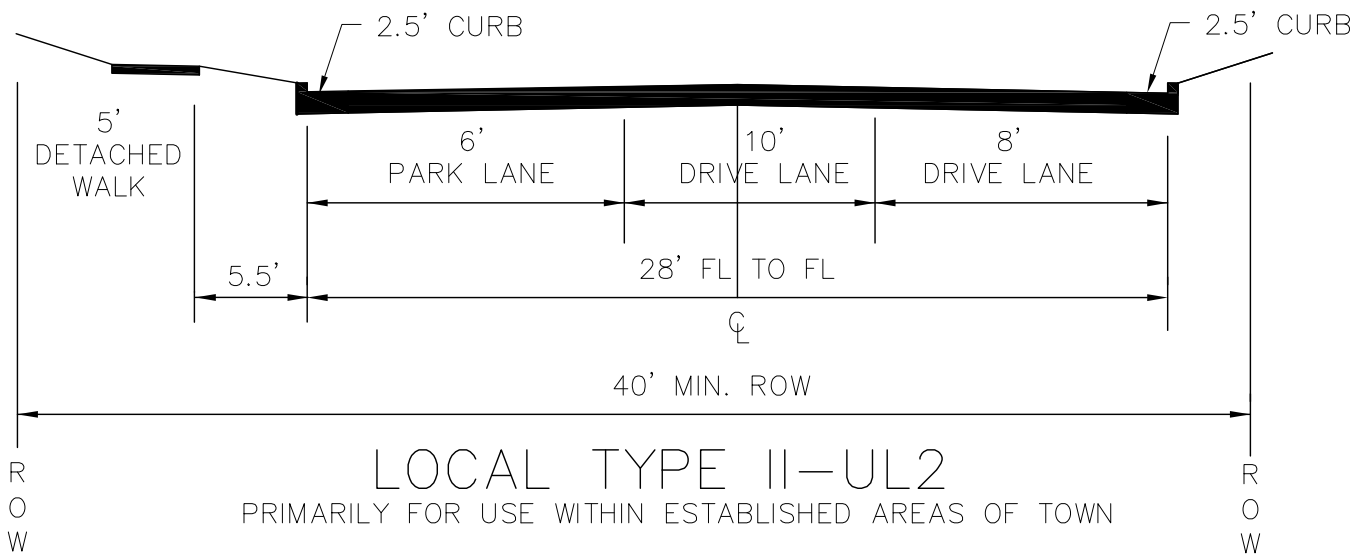
SCALE: NOT TO SCALE

DATE: 02/10/09

APPROVED:

TST INC. OF DENVER
TOWN ENGINEER

RD-11



LOCAL TYPE III-UL3

TOWN OF ELIZABETH
STANDARD ROADWAY DETAILS

LOCAL TYPE II & III
STREET CROSS SECTIONS

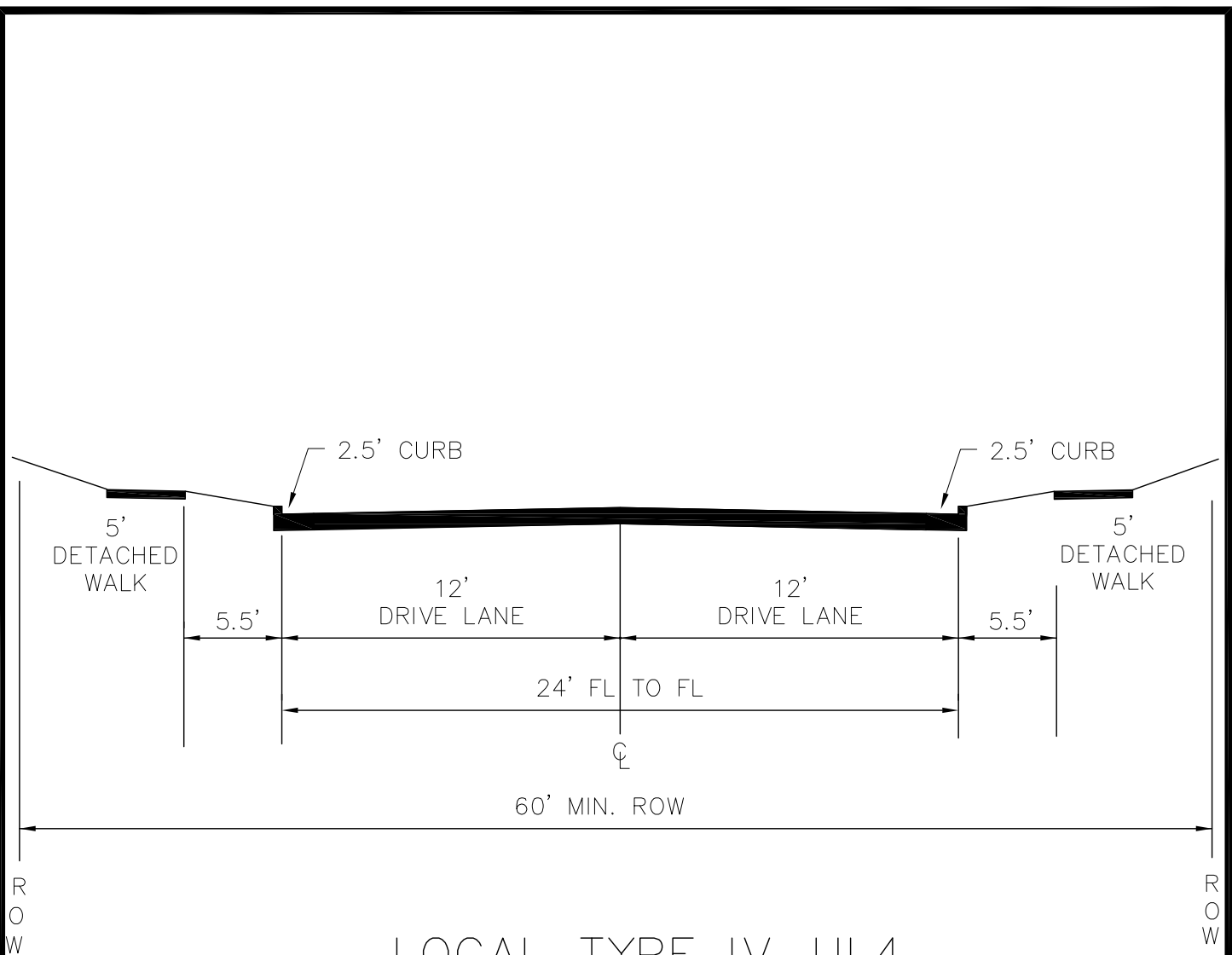
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DATE: 02/10/09 REV 9/6/17

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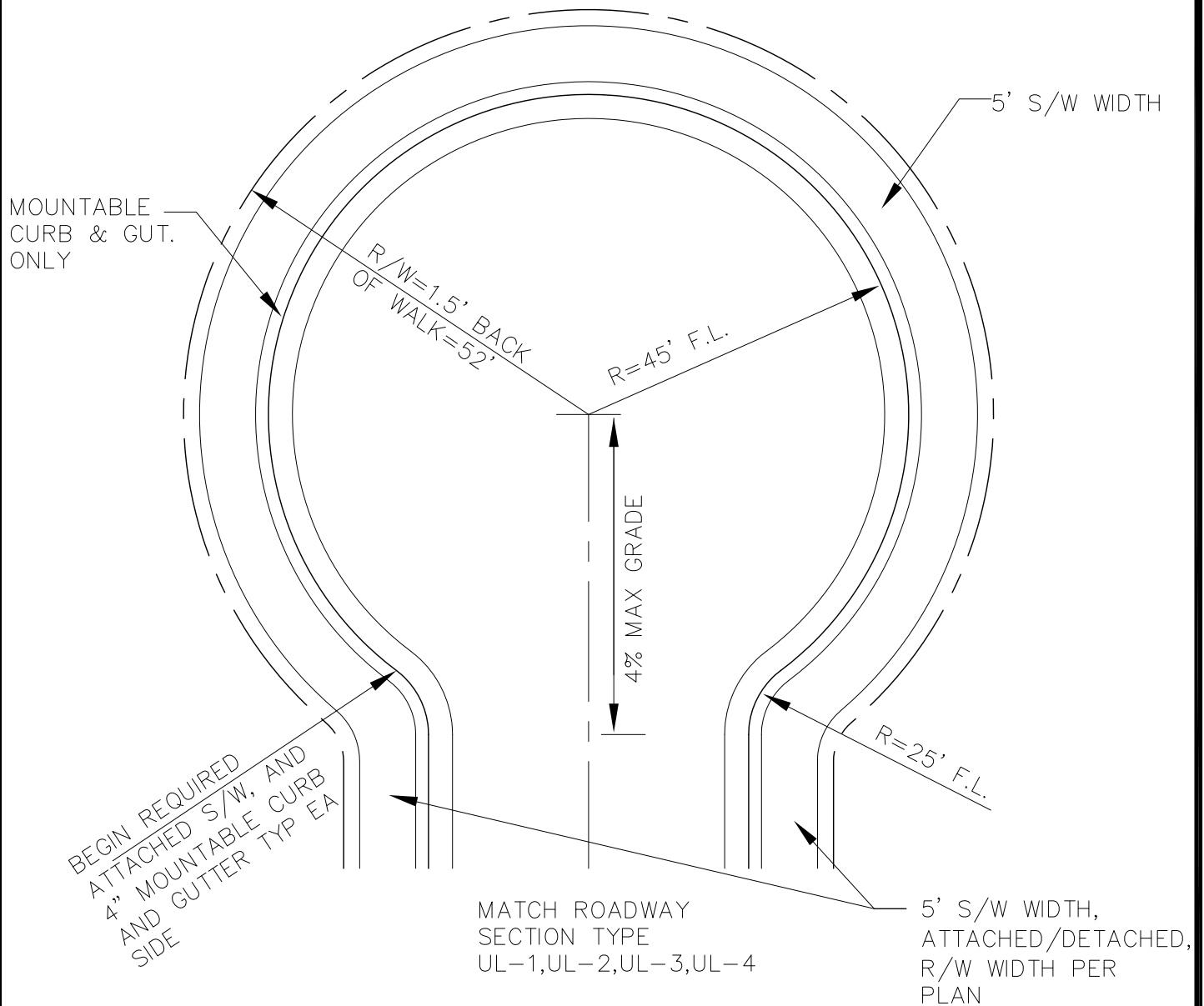
CORE CONSULTANTS INC.
TOWN ENGINEER

RD-12



LOCAL TYPE IV-UL4 PRIMARILY FOR USE WITHIN ESTABLISHED AREAS OF TOWN

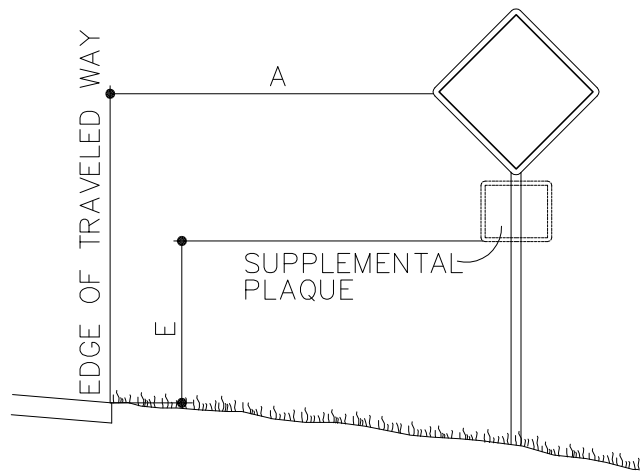
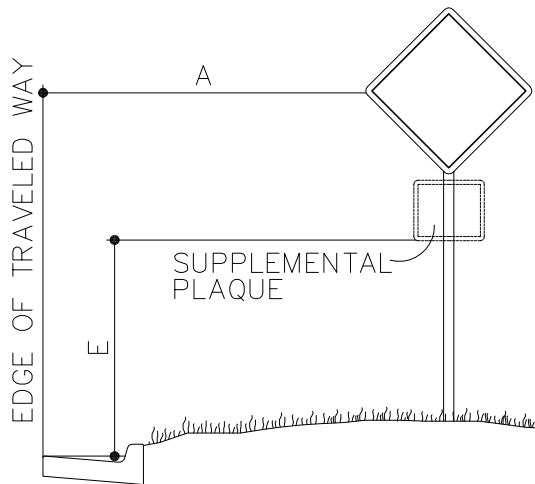
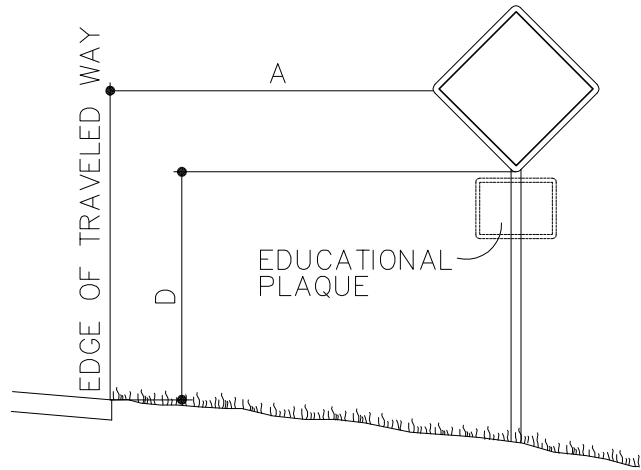
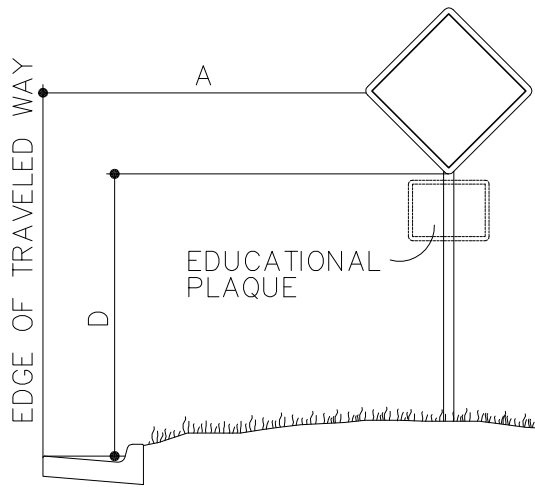
TOWN OF ELIZABETH STANDARD ROADWAY DETAILS	
LOCAL TYPE IV STREET CROSS SECTIONS	
SCALE: <u>NOT TO SCALE</u>	DATE: <u>02/10/09 REV 09/06/17</u>
APPROVED: <u>CORE CONSULTANTS INC.</u> TOWN ENGINEER	RD-13



NOTES

- 1) CUL-DE SACS SHALL SERVE NO MORE THAN 30 SF DETACHED DWELLING UNITS AND ARE LIMITED TO 500' IN LENGTH.
- 2) THIS DETAIL APPLIES ONLY TO RESIDENTIAL ZONE CATEGORIES
- 3) CUL-DE SACS MAY BE PARTIALLY OR FULLY OFFSET.

TOWN OF ELIZABETH STANDARD ROADWAY DETAILS	
LOCAL CUL-DE-SAC BULB DETAIL	
SCALE: <u>NOT TO SCALE</u>	DATE: <u>09/06/17</u>
APPROVED: CORE CONSULTANTS INC. TOWN ENGINEER	RD-13B

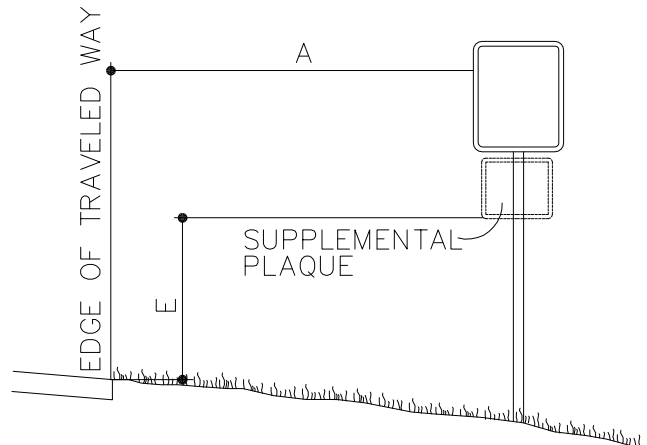
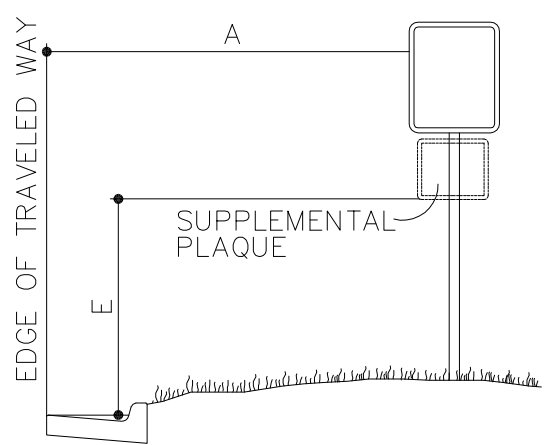
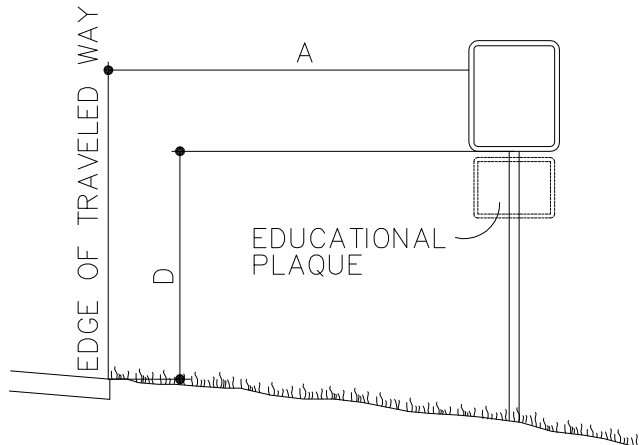
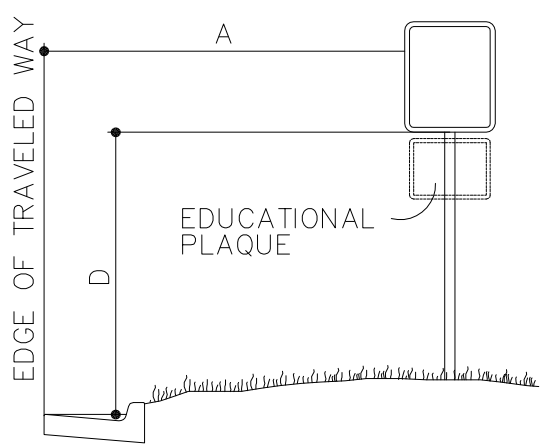


LATERAL PLACEMENT				
KEY	LOCAL STREETS		COLLECTORS & ARTERIALS	
	MINIMUM	NORMAL	MINIMUM	NORMAL
A	8'-0"	12'-0"	10'-0"	14'-0"

VERTICAL PLACEMENT			
KEY	URBAN		RURAL
	W/ SIDEWALKS	W/OUT SIDEWALKS	W/OUT SIDEWALKS
D	7'-0"	7'-0"	5'-0"
E	7'-0"	6'-0"	4'-0"

WARNING SIGN PLACEMENT

TOWN OF ELIZABETH STANDARD ROADWAY DETAILS	
WARNING SIGN PLACEMENT	
SCALE: NOT TO SCALE	DATE: 02/10/09
APPROVED: TST INC. OF DENVER TOWN ENGINEER	RD-14



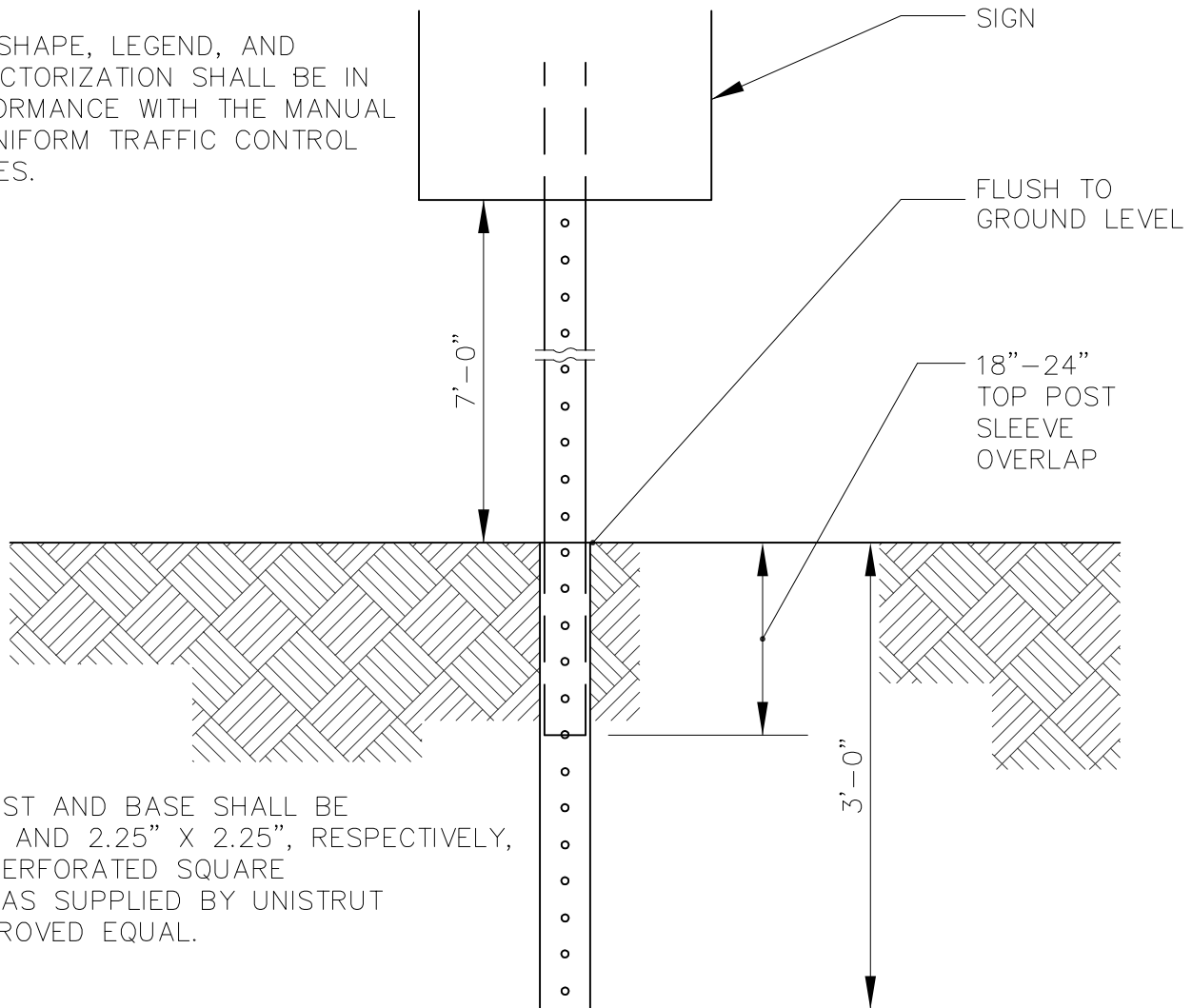
LATERAL PLACEMENT				
KEY	LOCAL STREETS		COLLECTORS & ARTERIALS	
	MINIMUM	NORMAL	MINIMUM	NORMAL
A	8'-0"	12'-0"	10'-0"	14'-0"

VERTICAL PLACEMENT			
KEY	URBAN		RURAL
	W/ SIDEWALKS	W/OUT SIDEWALKS	W/OUT SIDEWALKS
D	7'-0"	7'-0"	5'-0"
E	7'-0"	6'-0"	4'-0"

REGULATION SIGN PLACEMENT

TOWN OF ELIZABETH STANDARD ROADWAY DETAILS	
REGULATION SIGN PLACEMENT	
SCALE: <u>NOT TO SCALE</u>	DATE: <u>02/10/09</u>
APPROVED: TST INC. OF DENVER TOWN ENGINEER	RD-15

SIGN SHAPE, LEGEND, AND REFLECTORIZATION SHALL BE IN CONFORMANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.



SIGN POST AND BASE SHALL BE 2" X 2" AND 2.25" X 2.25", RESPECTIVELY, STEEL PERFORATED SQUARE TUBING AS SUPPLIED BY UNISTRUT OR APPROVED EQUAL.

SIGN BASE DETAIL

TOWN OF ELIZABETH
STANDARD ROADWAY DETAILS

SIGN BASE DETAIL

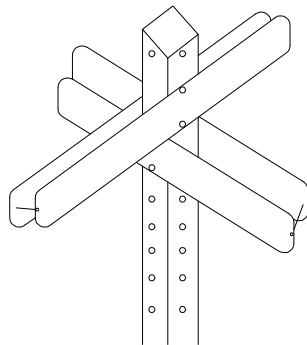
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DATE: 02/10/09

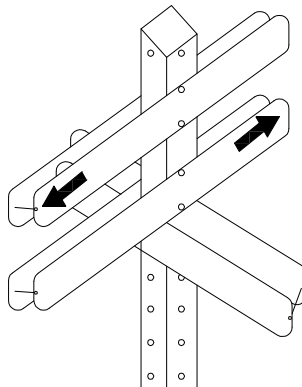
APPROVED:

TST INC. OF DENVER
TOWN ENGINEER

RD-16



STANDARD STREET SIGN ASSEMBLY



STREET SIGN ASSEMBLY WHEN STREET NAMES CHANGE

TOWN OF ELIZABETH
STANDARD ROADWAY DETAILS

STREET SIGN ASSEMBLY

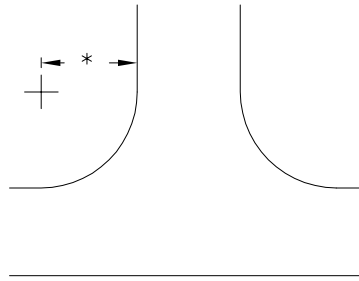
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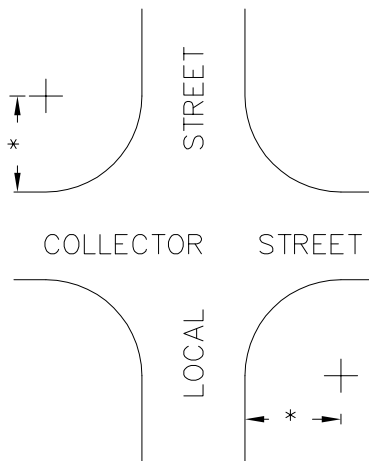
TST INC. OF DENVER
TOWN ENGINEER

RD-17



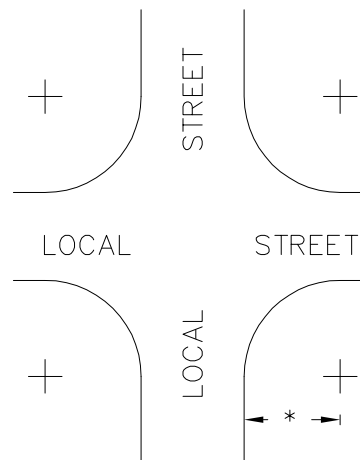
ASSEMBLY MUST BE
PLACED AT THIS LOCATION

T-INTERSECTION



ASSEMBLY CAN BE LOCATED
AT EITHER LOCATION

LOCAL-COLLECTOR STREET INTERSECTION



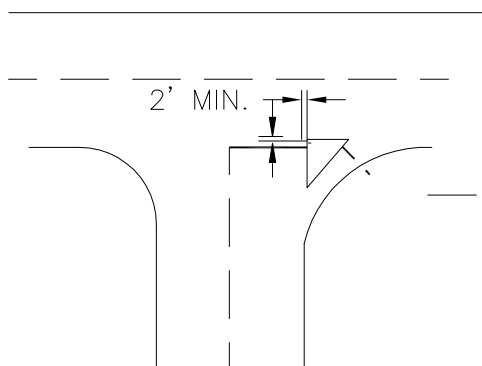
ASSEMBLY CAN BE LOCATED
AT ANY OF THESE LOCATIONS

LOCAL-LOCAL STREET INTERSECTION

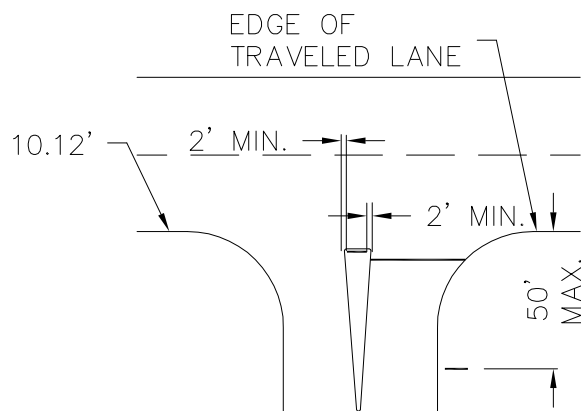
NOTE:

* 5' MIN FROM FLOWLINE

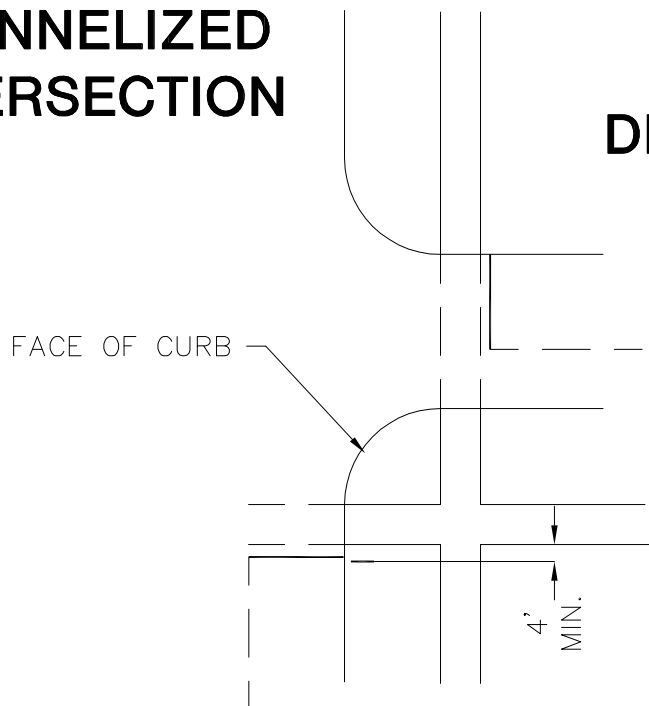
TOWN OF ELIZABETH STANDARD ROADWAY DETAILS	
STREET NAME ASSEMBLY LOCATION	
SCALE: <u>NOT TO SCALE</u>	DATE: <u>02/10/09</u>
APPROVED: TST INC. OF DENVER TOWN ENGINEER	RD-18



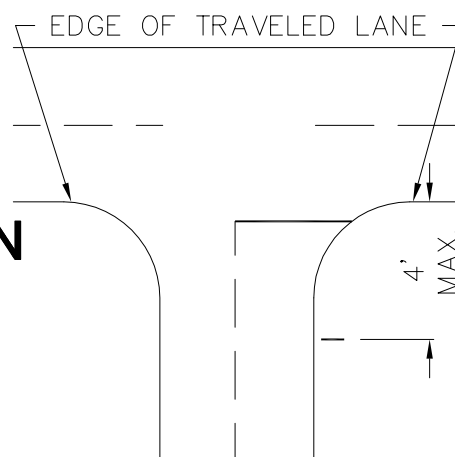
CHANNELIZED INTERSECTION



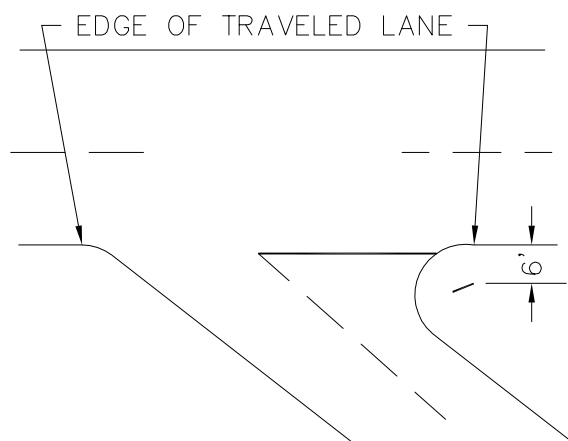
DIVISIONAL ISLAND



URBAN INTERSECTION

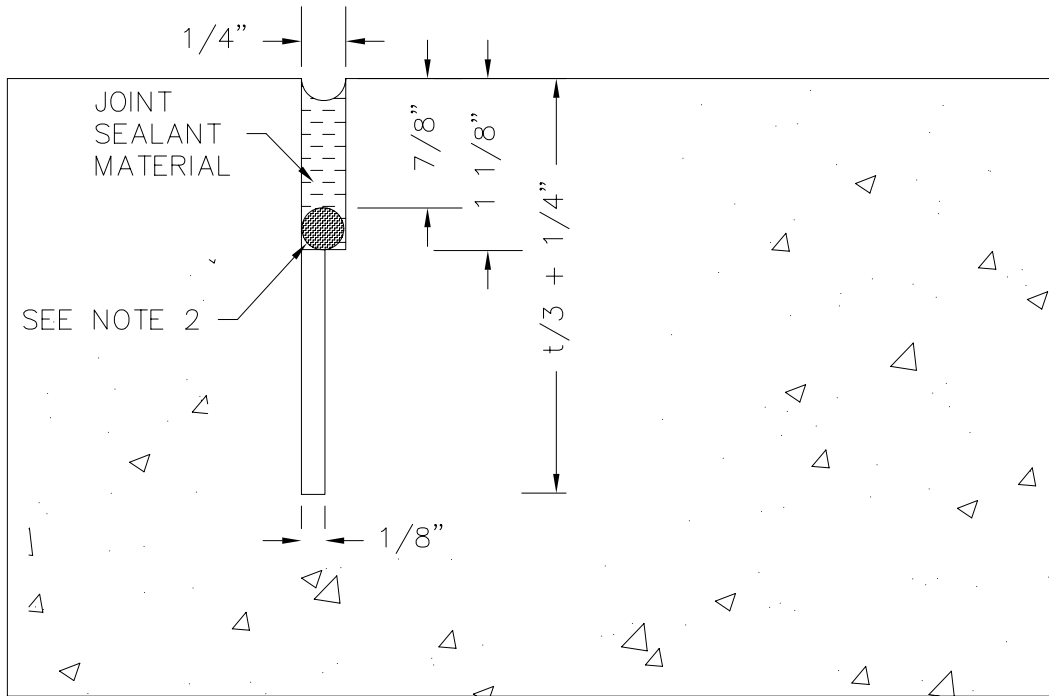


WIDE THROAT INTERSECTION



ACUTE ANGLE INTERSECTION

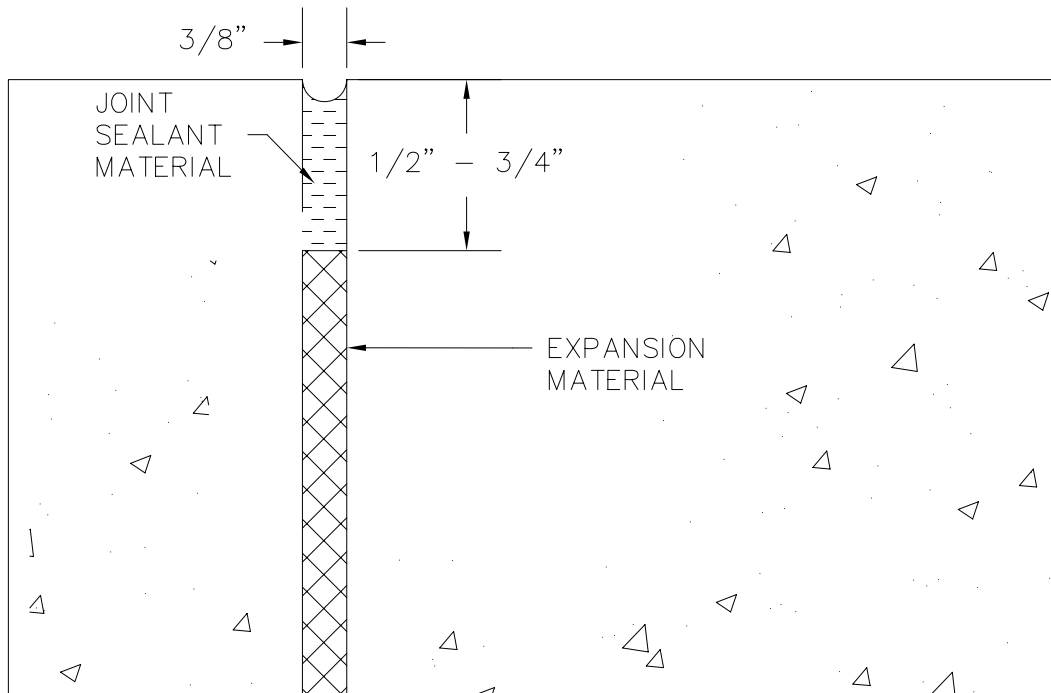
TOWN OF ELIZABETH STANDARD ROADWAY DETAILS	
TYPICAL LOCATIONS STOP SIGN AND YIELD SIGNS	
SCALE: NOT TO SCALE	DATE: 02/10/09
APPROVED: TST INC. OF DENVER TOWN ENGINEER	RD-19



NOTE:

WASH & BLOW OUT
WITH FORCED AIR UNTIL
DRY BEFORE APPLYING
SEALANT MATERIAL.

SAWED JOINT



EXPANSION JOINT

NOTE:

JOINT SEALANT MATERIAL MUST
MEET ASTM 3406.
NYLON ROPE OR OPEN CELL
POLYURETHANE STRAND.

TOWN OF ELIZABETH
STANDARD ROADWAY DETAILS

SAWED JOINT AND
EXPANSION JOINT

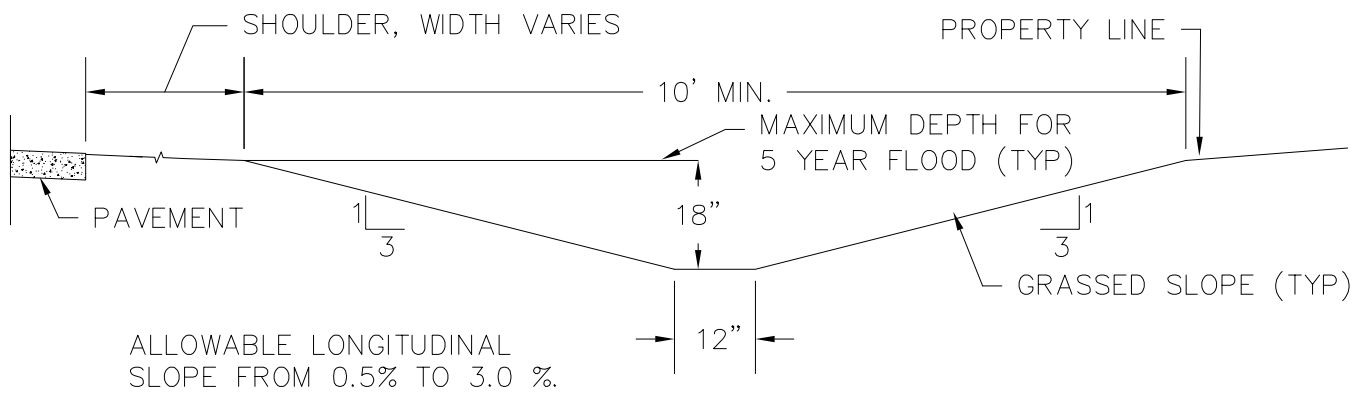
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DATE: 02/10/09

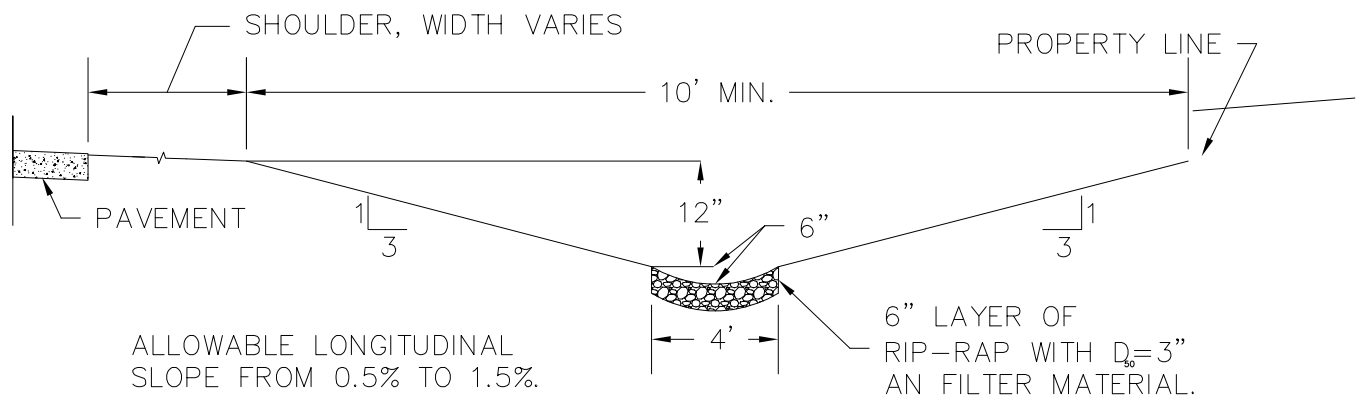
APPROVED:

TST INC. OF DENVER
TOWN ENGINEER

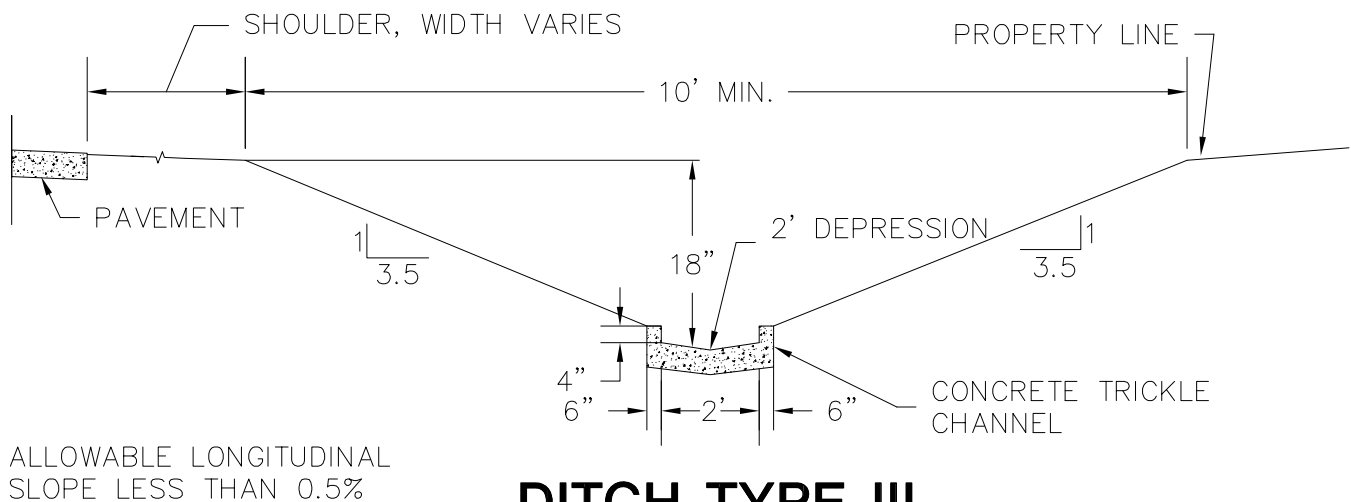
RD-20



DITCH TYPE I



DITCH TYPE II



DITCH TYPE III

TOWN OF ELIZABETH
STANDARD ROADWAY DETAILS
ROADSIDE DITCH SECTIONS
AND SHOULDERS

SCALE: NOT TO SCALE

DATE: 02/10/09

APPROVED:

TST INC. OF DENVER
TOWN ENGINEER

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