Appendix D
Typical Cross Sections

Cross section requirements for roadways vary according to the capacity and level of service to be provided. Universal standards in the design of roadways are not practical. Each roadway section must be individually analyzed and its cross section determined based on the volume and type of projected traffic, existing capacity, desired level of service, and available right-of-way. These cross sections are typical for facilities on new location and where right-of-way constraints are not critical. For widening projects and urban projects with limited right-of-way, special cross sections should be developed that meet the needs of the project.

The comprehensive planning and design "typical" highway cross sections, as depicted on the following pages, were updated on May 5, 2014 in response to the Strategic Transportation Investments[1] (STI) law (House Bill 817) and are also consistent with SPOTOn!ine (used for project prioritization[2]), NCDOT's GIS-based web application for providing automated, near real-time prioritization scores and project costs. This guidance establishes design elements that emphasize safety, mobility, complete streets[3], and accessibility for multiple modes of travel. These "typical" highway cross sections should be used as guidelines for comprehensive transportation planning, project planning and project design activities. The specific and final cross section details and right of way limits for projects will be established through the preparation of the National Environmental Policy Act[4] (NEPA) documentation and through final design preparation.

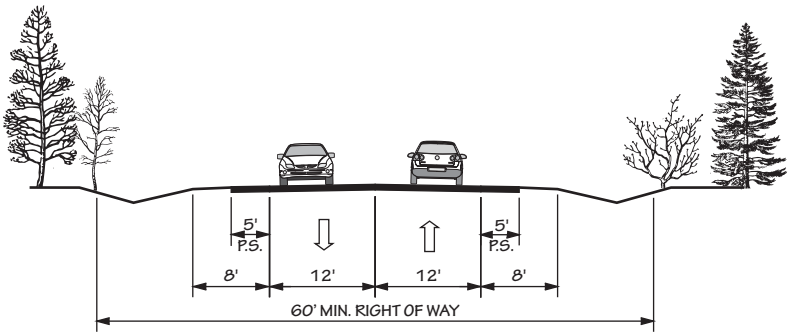
On all existing and proposed roadways delineated on the CTP, adequate right-of-way should be protected or acquired for the recommended cross sections. In addition to cross section and right-of-way recommendations for improvements, Appendix C may recommend ultimate needed right-of-way for the following situations:

- roadways which may require widening after the current planning period,
- roadways which are borderline adequate and accelerated traffic growth could render them deficient,
- roadways where an urban curb and gutter cross section may be locally desirable because of urban development or redevelopment, and
- roadways which may need to accommodate an additional transportation mode.

[1] *For more information on STI, go to:* http://www.ncdot.gov/strategictransportationinvestments/.
[2] *For more information on prioritization, go to:* https://connect.ncdot.gov/projects/planning/Pages/StrategicPrioritization.aspx.
[3] *For more information on Complete Streets, go to:* http://www.completestreetsnc.org/.
[4] *For more information on NEPA, go to:* http://ceq.hss.doe.gov/.

FIGURE 7
"TYPICAL" HIGHWAY CROSS SECTIONS

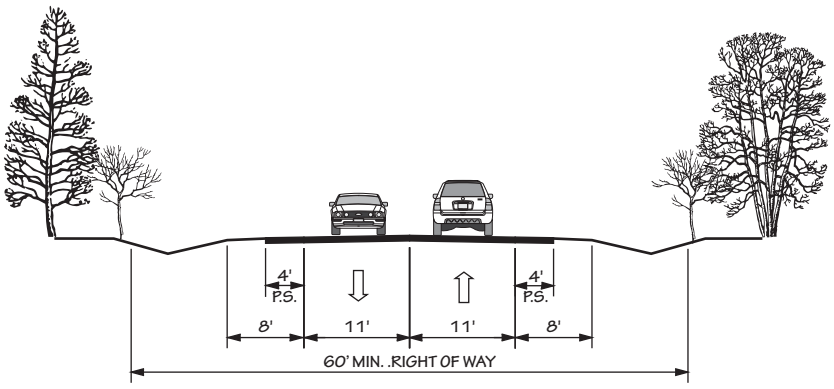
2A



2 LANE UNDIVIDED WITH PAVED SHOULDERS

POSTED SPEED 55 MPH

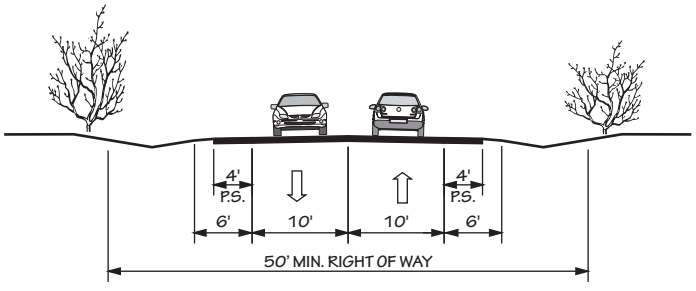
2B



2 LANES UNDIVIDED

POSTED SPEED 45 MPH OR LESS

2C



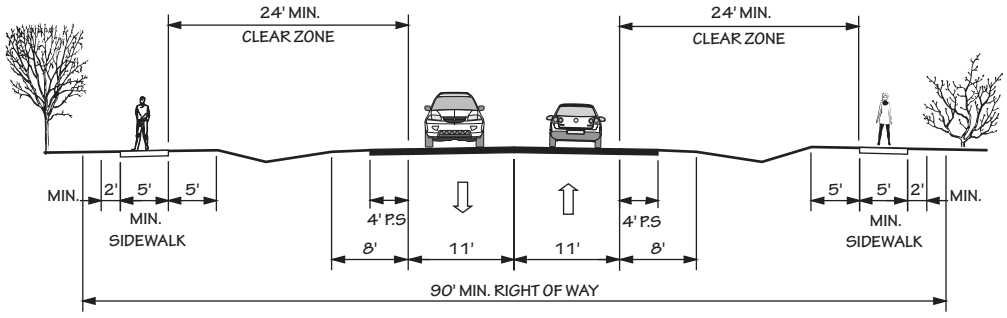
2 LANE UNDIVIDED WITH PAVED SHOULDERS

POSTED SPEED 25 - 35 MPH

Revised 05/05/2014

"TYPICAL" HIGHWAY CROSS SECTIONS

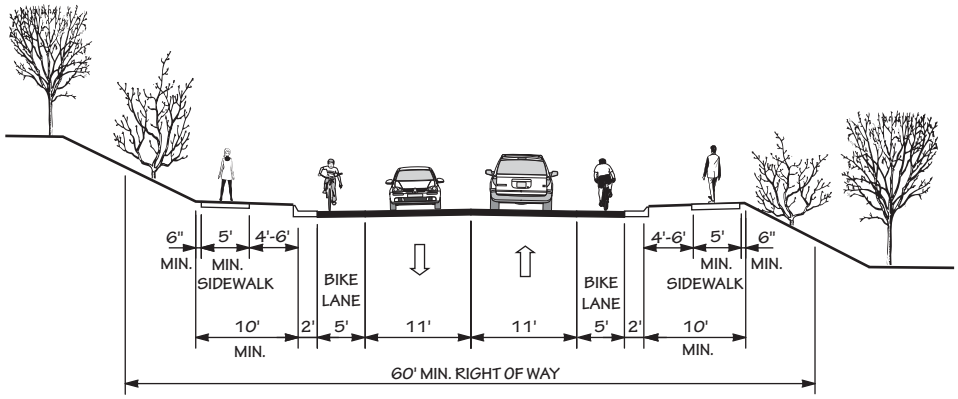
2D



2 LANE UNDIVIDED WITH PAVED SHOULDERS AND SIDEWALKS

POSTED SPEED 25-45 MPH

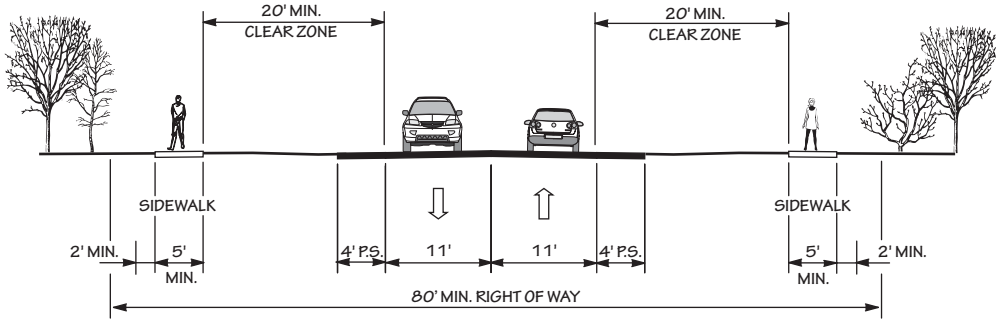
2E



2 LANE UNDIVIDED WITH CURB & GUTTER, BIKE LANES, AND SIDEWALKS

POSTED SPEED 25-45 MPH

2F



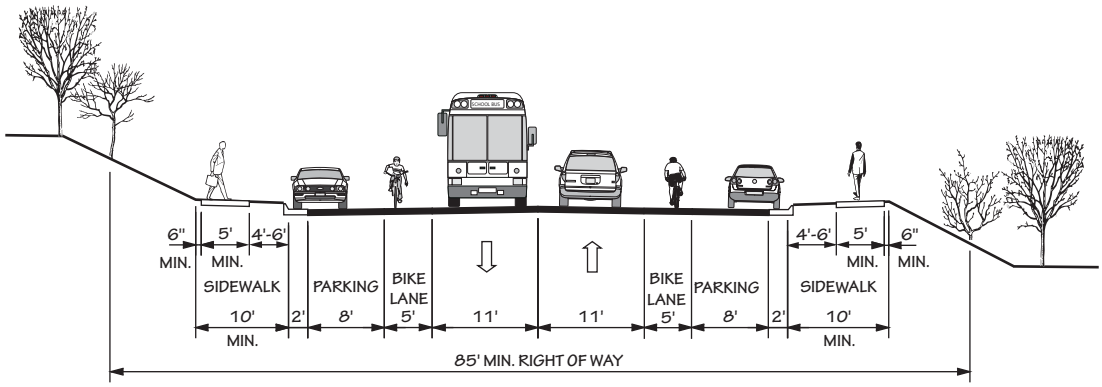
2 LANE UNDIVIDED WITH PAVED SHOULDERS AND SIDEWALKS
IN CAMA COUNTIES

POSTED SPEED 25-45 MPH

Revised 05/05/2014

"TYPICAL" HIGHWAY CROSS SECTIONS

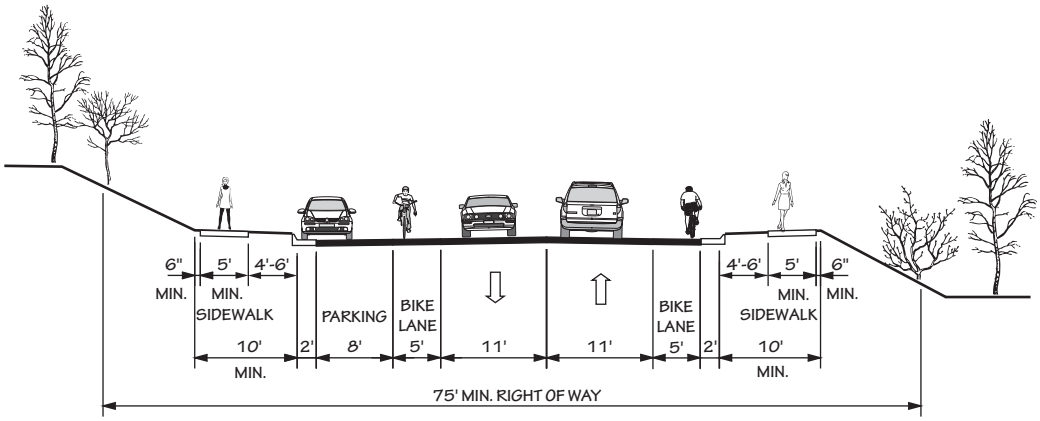
2G



2 LANE UNDIVIDED WITH CURB & GUTTER, PARKING BOTH SIDES, BIKE LANES, AND SIDEWALKS

POSTED SPEED 25-45 MPH

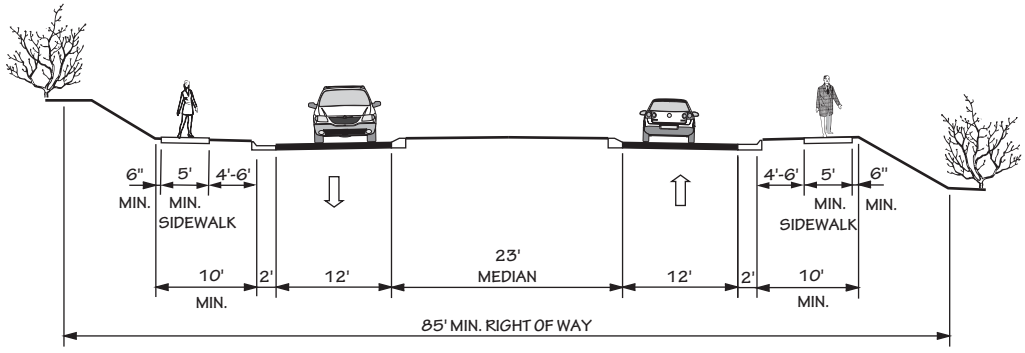
2H



2 LANE UNDIVIDED WITH CURB & GUTTER, PARKING ONE SIDE, BIKE LANES, AND SIDEWALKS

POSTED SPEED 25-45 MPH

2I



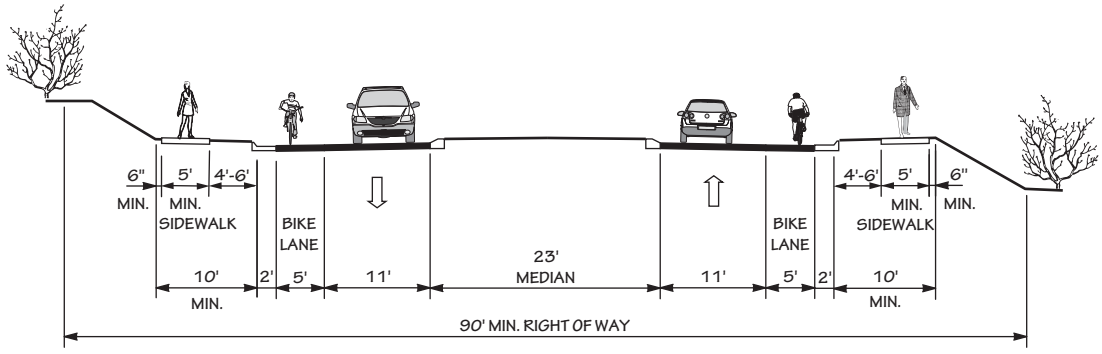
2 LANE DIVIDED (23' RAISED MEDIAN) WITH CURB & GUTTER AND SIDEWALKS

POSTED SPEED 25-45 MPH

Revised 05/05/2014

"TYPICAL" HIGHWAY CROSS SECTIONS

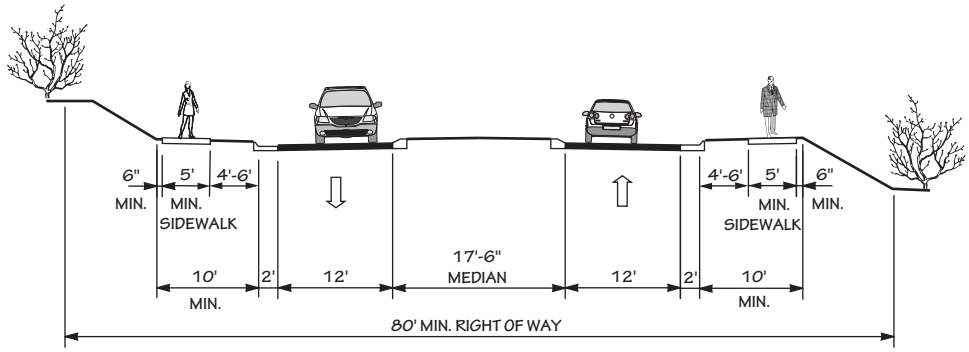
2J



2 LANE DIVIDED (23' RAISED MEDIAN) WITH CURB & GUTTER, BIKE LANES, AND SIDEWALKS

POSTED SPEED 25-45 MPH

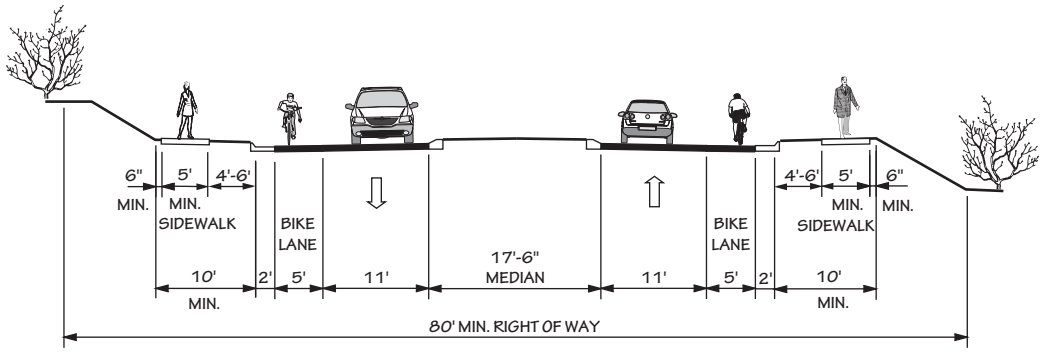
2K



2 LANE DIVIDED (17'-6" RAISED MEDIAN) WITH CURB & GUTTER AND SIDEWALKS

POSTED SPEED 25-45 MPH

2L



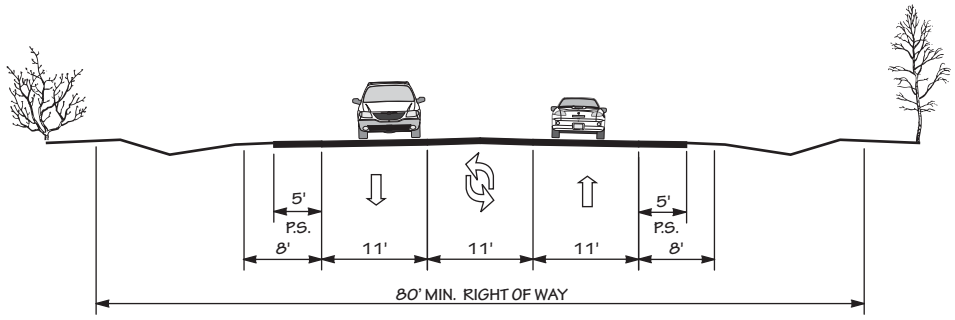
2 LANE DIVIDED (17'-6" RAISED MEDIAN) WITH CURB & GUTTER, BIKE LANES, AND SIDEWALKS

POSTED SPEED 25-45 MPH

Revised 05/05/2014

"TYPICAL" HIGHWAY CROSS SECTIONS

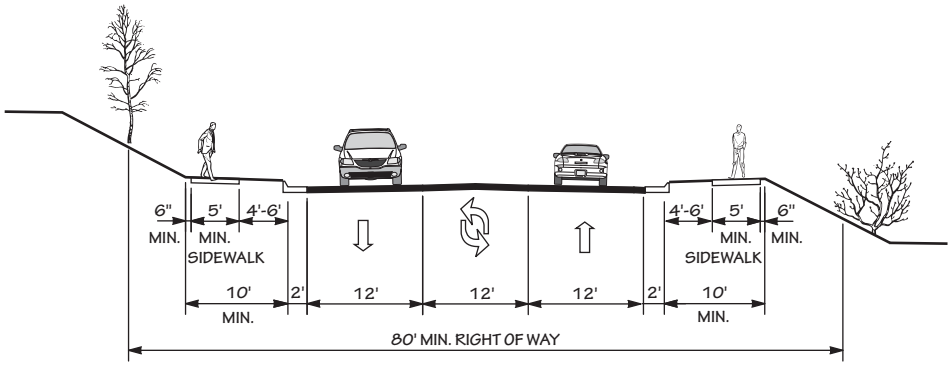
3A



2 LANE WITH TWO WAY LEFT TURN LANE, AND PAVED SHOULDERS

POSTED SPEED 25-55 MPH

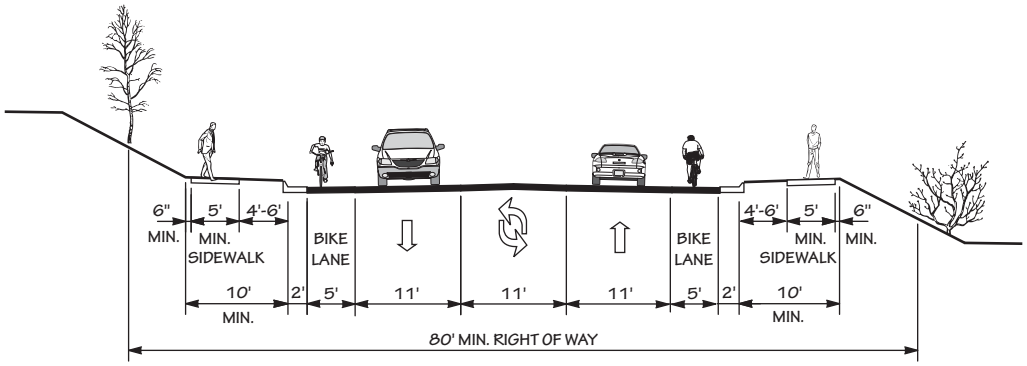
3B



2 LANE WITH TWO WAY LEFT TURN LANE, CURB & GUTTER, AND SIDEWALKS

POSTED SPEED 25-45 MPH

3C

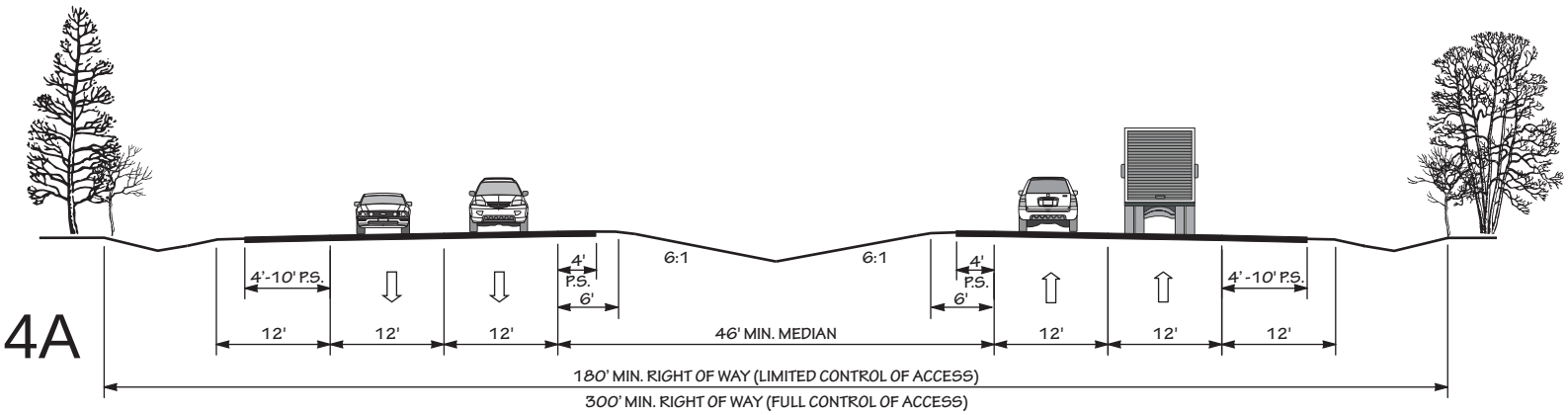


2 LANE WITH TWO WAY LEFT TURN LANE, CURB & GUTTER, BIKE LANES, AND SIDEWALKS

POSTED SPEED 25-45 MPH

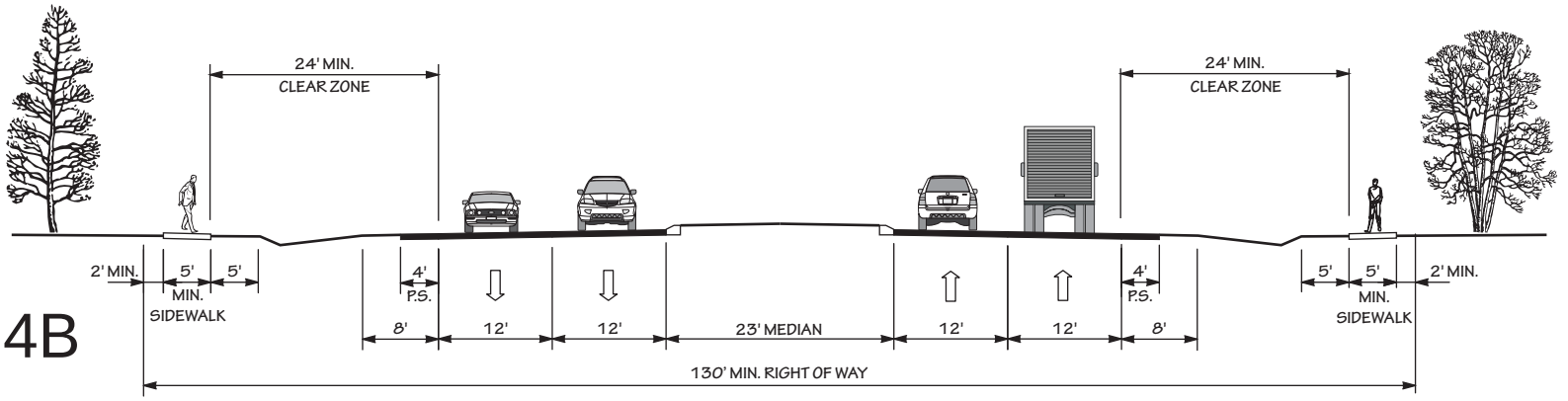
Revised 05/05/2014

"Typical" Highway Cross Sections



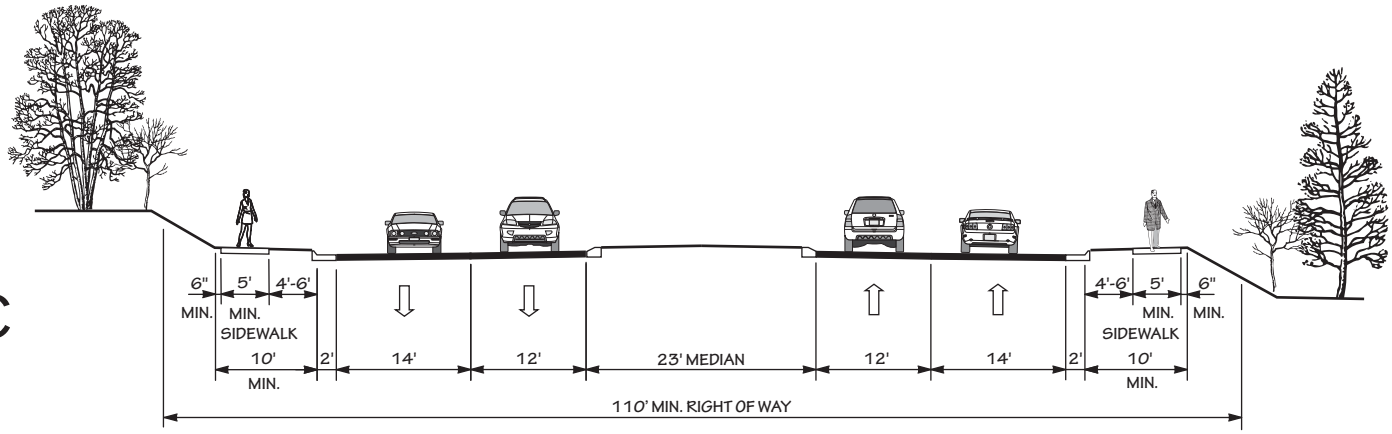
4 LANE DIVIDED (46' DEPRESSED MEDIAN) WITH PAVED SHOULDERS

POSTED SPEED 45-70 MPH



4 LANE DIVIDED (23' RAISED MEDIAN) WITH PAVED SHOULDERS AND SIDEWALKS

POSTED SPEED 35-55 MPH



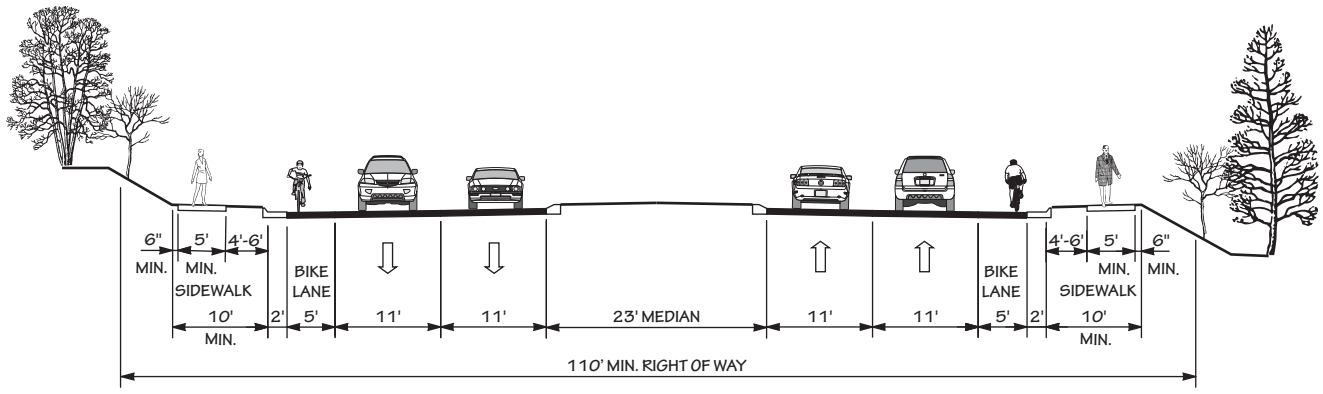
4 LANE DIVIDED (23' RAISED MEDIAN) WITH CURB & GUTTER, WIDE OUTSIDE LANES, AND SIDEWALKS

POSTED SPEED 35-45 MPH

Revised 05/05/2014

"TYPICAL" HIGHWAY CROSS SECTIONS

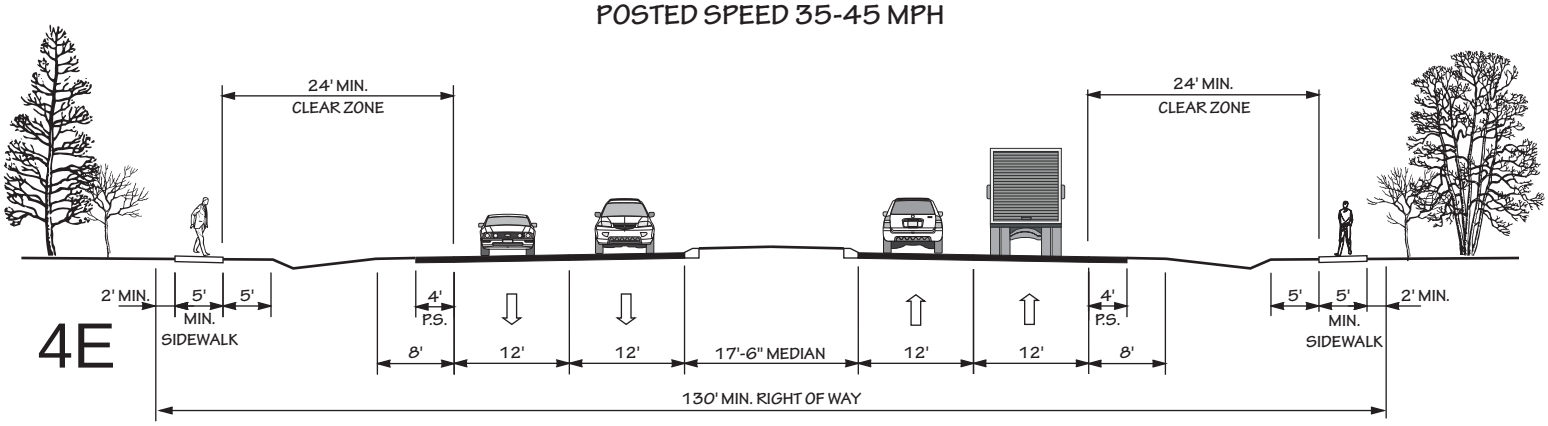
4D



4 LANE DIVIDED (23' RAISED MEDIAN) WITH CURB & GUTTER, BIKE LANES AND SIDEWALKS

POSTED SPEED 35-45 MPH

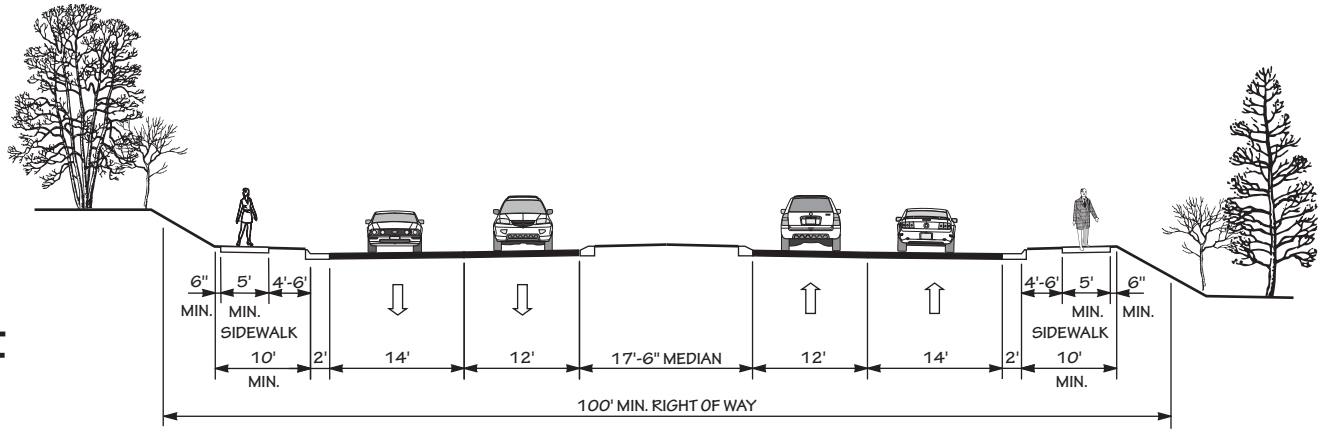
4E



4 LANE DIVIDED (17'-6" RAISED MEDIAN) WITH PAVED SHOULDERS AND SIDEWALKS

POSTED SPEED 35-55 MPH

4F



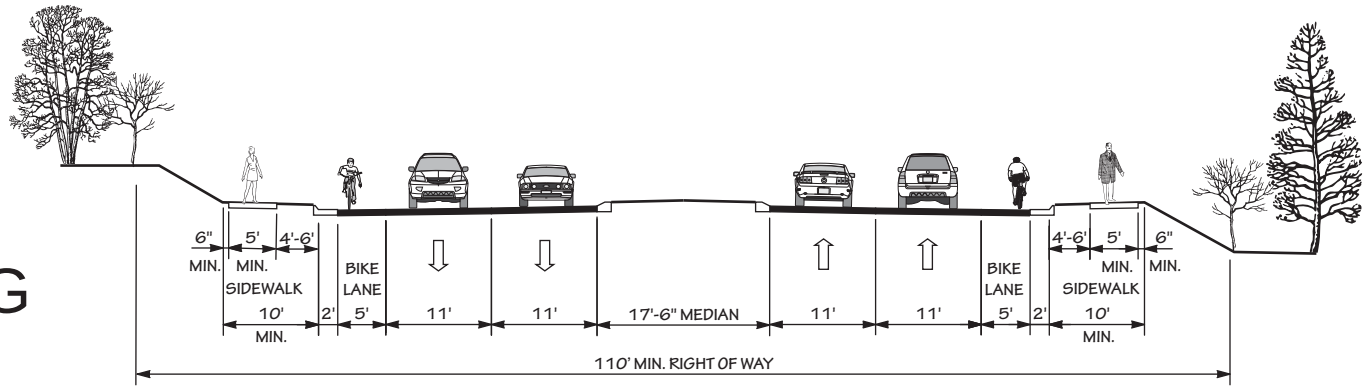
4 LANE DIVIDED (17'-6" RAISED MEDIAN) WITH CURB & GUTTER, WIDE OUTSIDE LANES AND SIDEWALKS

POSTED SPEED 35-45 MPH

Revised 05/05/2014

"TYPICAL" HIGHWAY CROSS SECTIONS

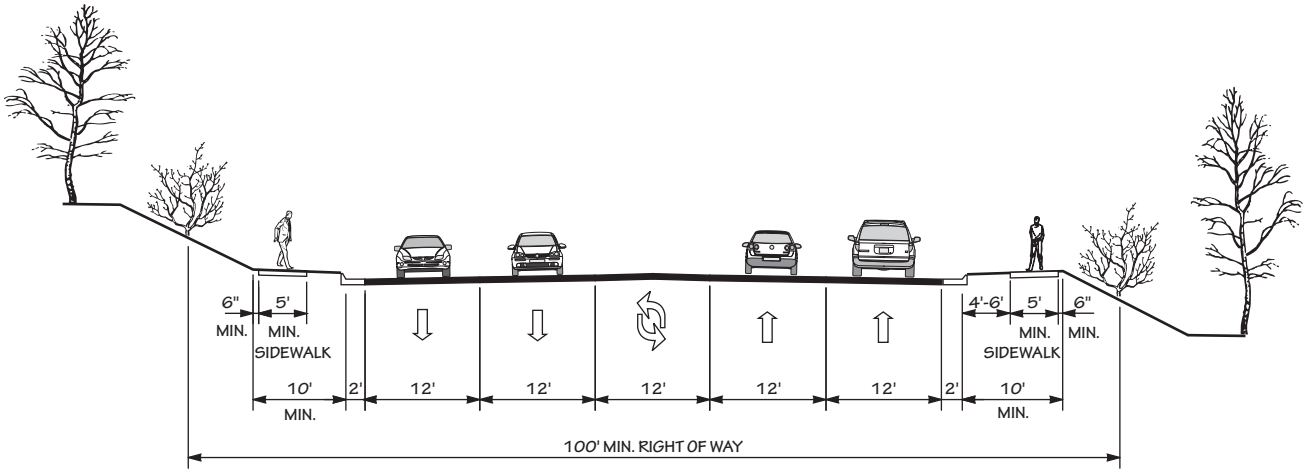
4G



4 LANE DIVIDED (17'-6" RAISED MEDIAN) WITH CURB & GUTTER, BIKE LANES, AND SIDEWALKS

POSTED SPEED 35-45 MPH

5A

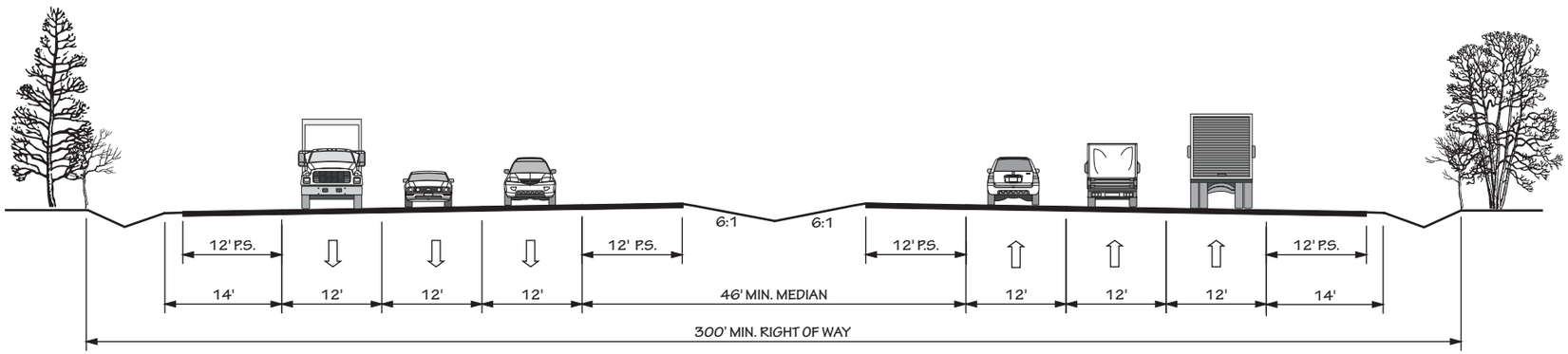


4 LANE WITH TWO WAY LEFT TURN LANE, CURB & GUTTER, AND SIDEWALKS

POSTED SPEED 35-45 MPH

Revised 05/05/2014

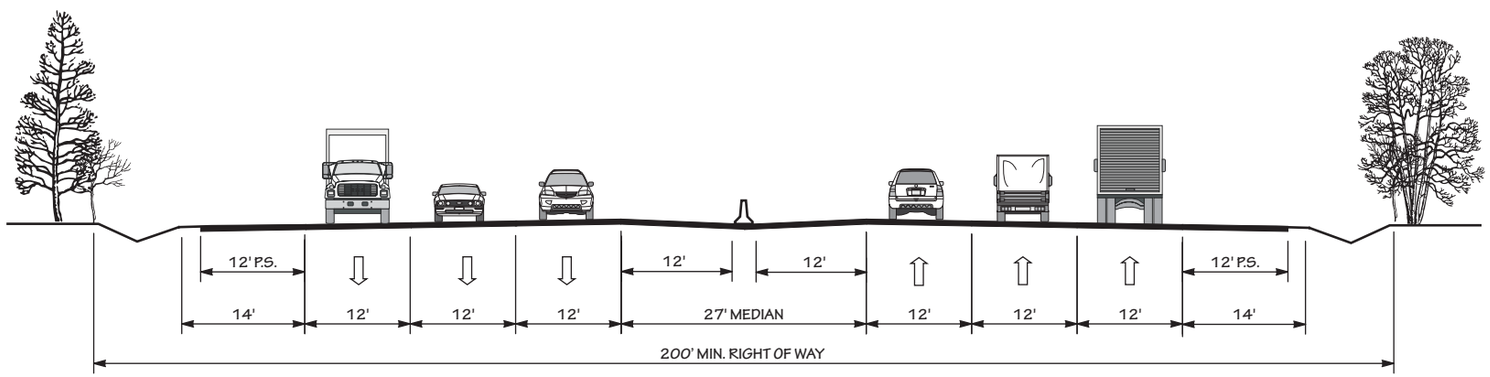
"TYPICAL" HIGHWAY CROSS SECTIONS



6A

6 LANE DIVIDED (46' DEPRESSED MEDIAN) WITH PAVED SHOULDERS

POSTED SPEED 45-70 MPH



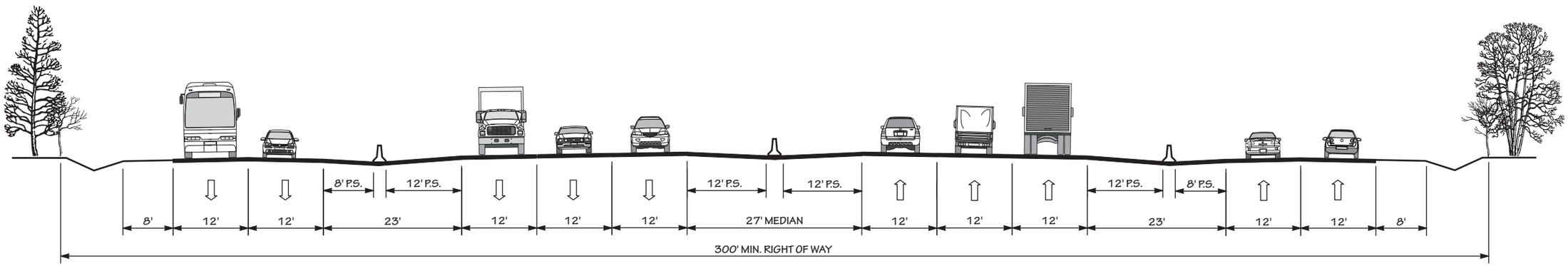
6B

6 LANE DIVIDED (27' MEDIAN WITH JERSEY BARRIER)
WITH PAVED SHOULDERS

POSTED SPEED 55-70 MPH

Revised 05/05/2014

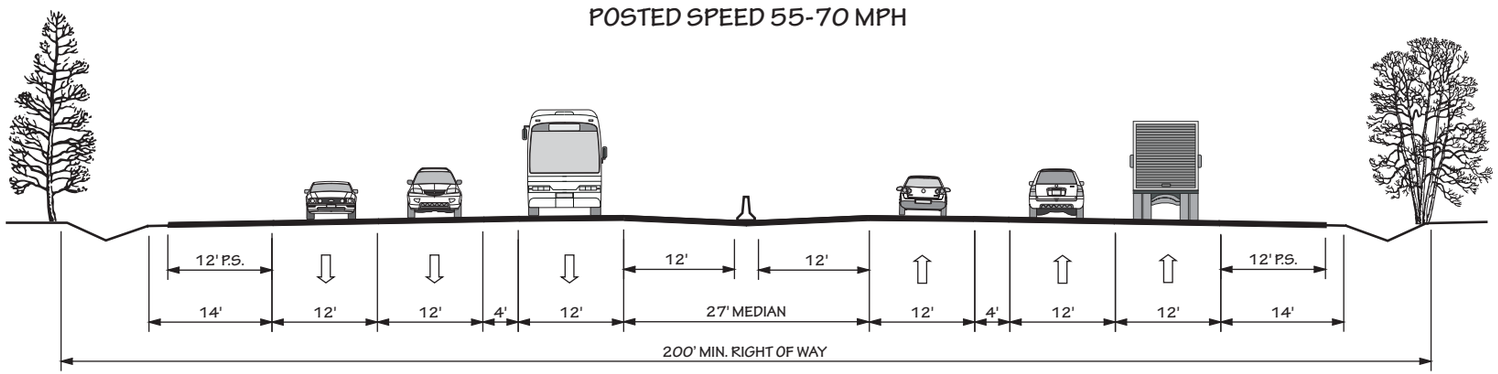
"TYPICAL" HIGHWAY CROSS SECTIONS



6C

6 LANE FREEWAY (27' MEDIAN WITH JERSEY BARRIER) WITH PAVED SHOULDERS AND 2 LANE ONE-WAY SERVICE ROADS EACH SIDE

POSTED SPEED 55-70 MPH



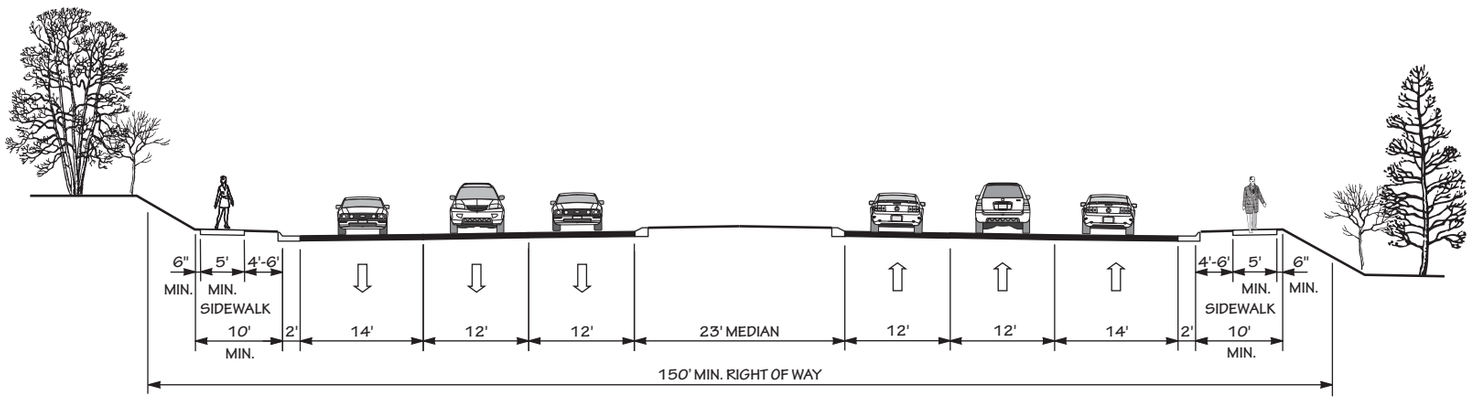
6D

6 LANE FREEWAY (4 GENERAL PURPOSE LANES, 2 MANAGED LANES, AND 27' MEDIAN WITH JERSEY BARRIER) WITH PAVED SHOULDERS

POSTED SPEED 55-70 MPH

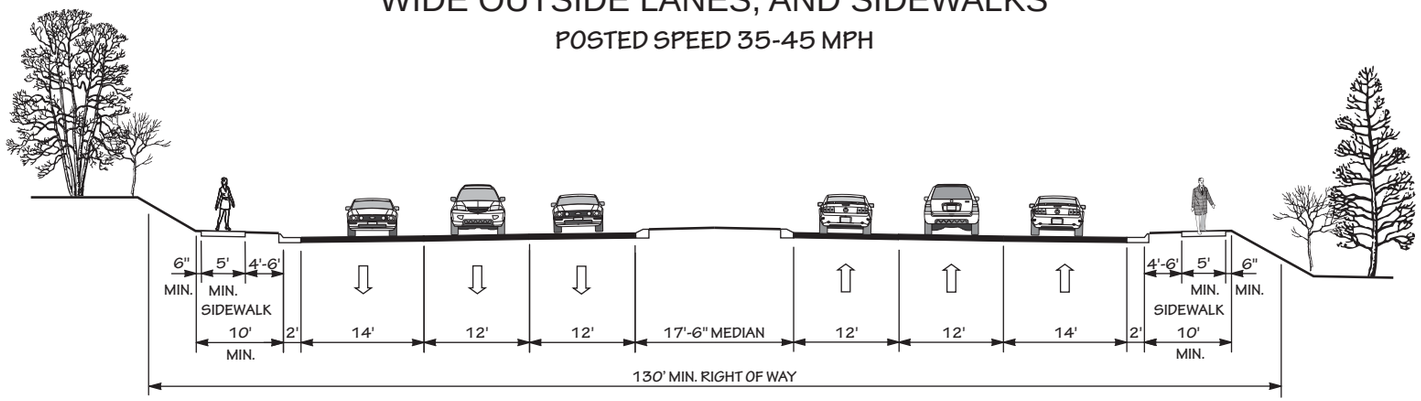
Revised 05/05/2014

"TYPICAL" HIGHWAY CROSS SECTIONS



6E 6 LANE DIVIDED (23' RAISED MEDIAN) WITH CURB & GUTTER, WIDE OUTSIDE LANES, AND SIDEWALKS

POSTED SPEED 35-45 MPH

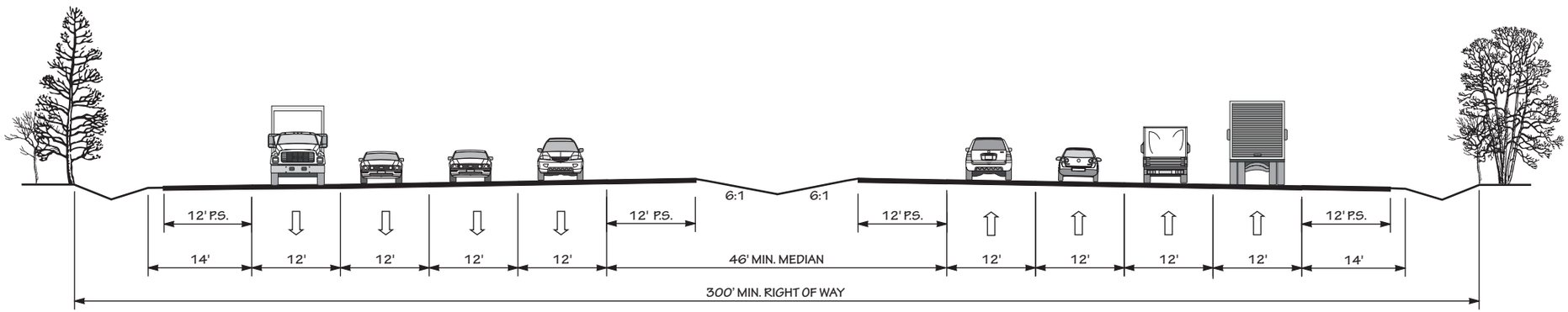


6F 6 LANE DIVIDED (17'-6" RAISED MEDIAN) WITH CURB & GUTTER, WIDE OUTSIDE LANES, AND SIDEWALKS

POSTED SPEED 35-45 MPH

Revised 05/05/2014

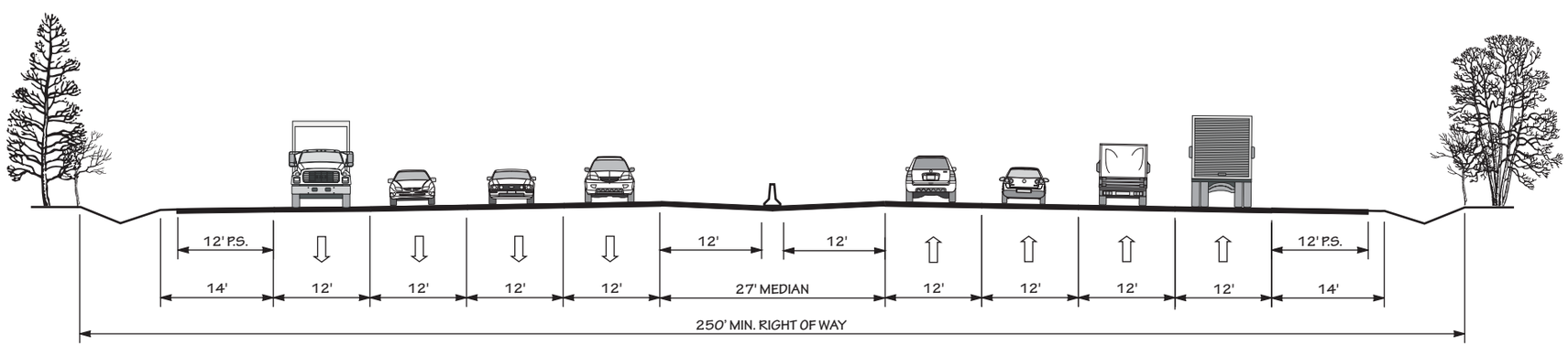
"TYPICAL" HIGHWAY CROSS SECTIONS



8A

8 LANE DIVIDED (46' DEPRESSED MEDIAN) WITH PAVED SHOULDERS

POSTED SPEED 45-70 MPH



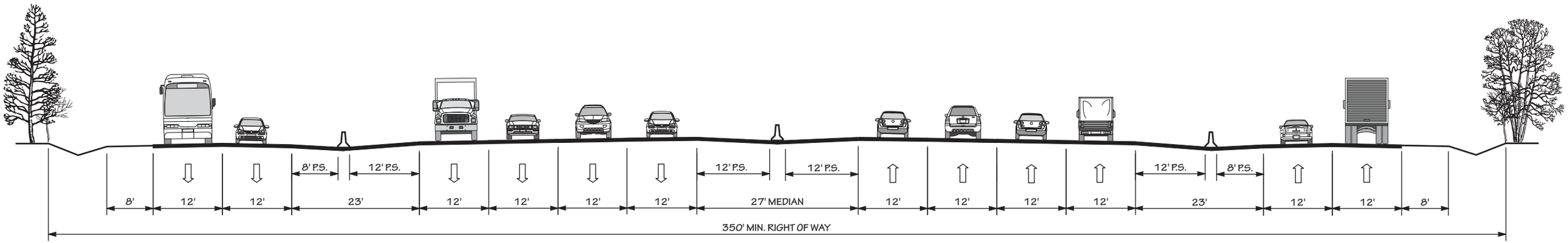
8B

8 LANE DIVIDED (27' MEDIAN WITH JERSEY BARRIER)
WITH PAVED SHOULDERS

POSTED SPEED 55-70 MPH

Revised 05/05/2014

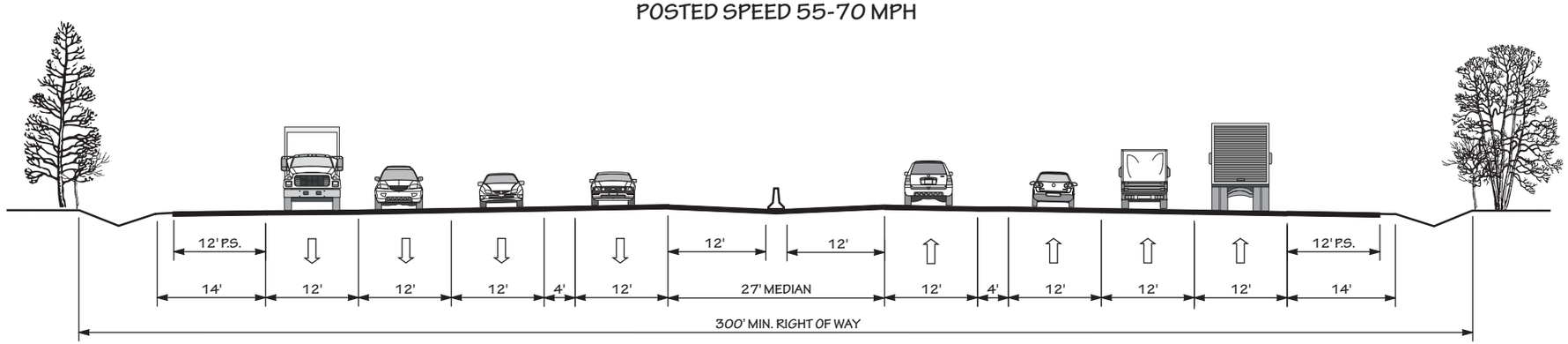
"TYPICAL" HIGHWAY CROSS SECTIONS



8C

8 LANE FREEWAY (27' MEDIAN WITH JERSEY BARRIER) WITH PAVED SHOULDERS AND 2 LANE ONE-WAY SERVICE ROADS EACH SIDE

POSTED SPEED 55-70 MPH

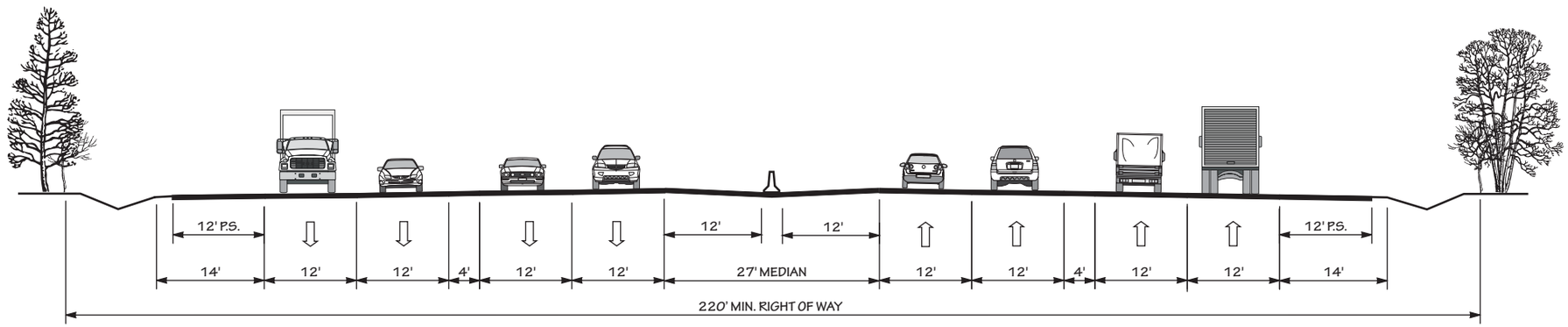


8D

8 LANE FREEWAY (6 GENERAL PURPOSE LANES, 2 MANAGED LANES, AND 27' MEDIAN WITH JERSEY BARRIER) WITH PAVED SHOULDERS

POSTED SPEED 55-70 MPH

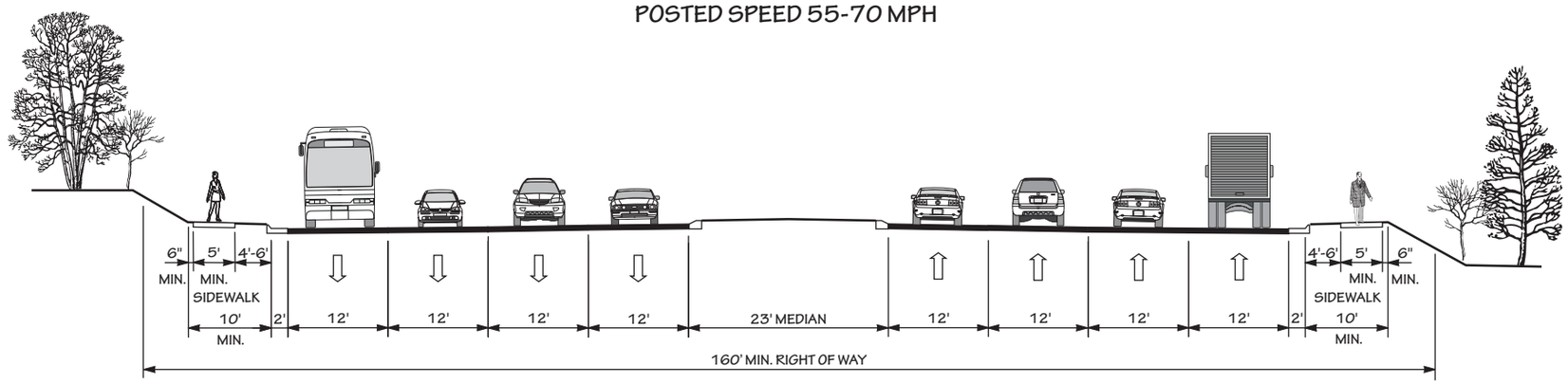
"TYPICAL" HIGHWAY CROSS SECTIONS



8E

8 LANE FREEWAY (4 GENERAL PURPOSE LANES, 4 MANAGED LANES, AND 27' MEDIAN WITH JERSEY BARRIER) WITH PAVED SHOULDERS

POSTED SPEED 55-70 MPH



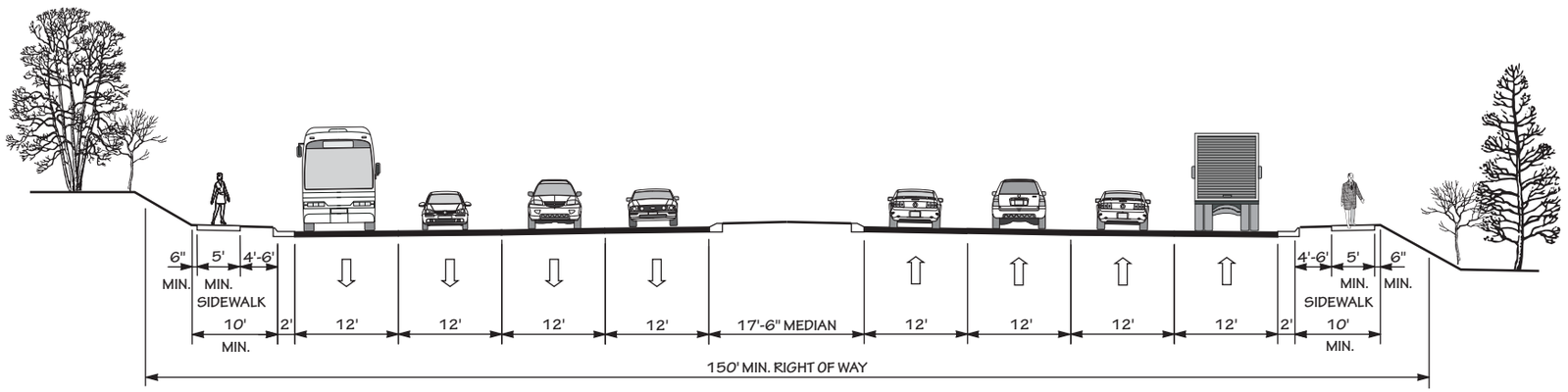
8F

8 LANE DIVIDED (23' RAISED MEDIAN) WITH CURB & GUTTER, AND SIDEWALKS

POSTED SPEED 35-45 MPH

Revised 05/05/2014

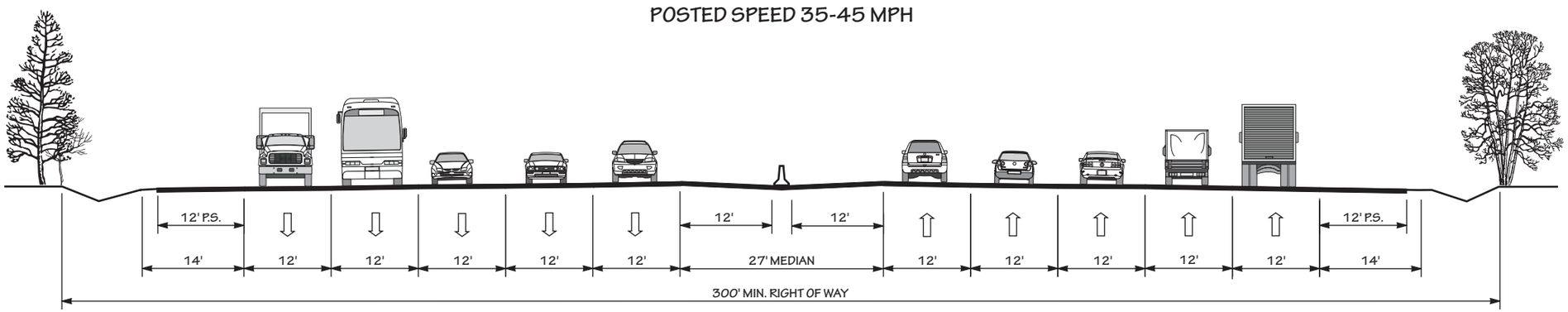
"TYPICAL" HIGHWAY CROSS SECTIONS



8G

8 LANE DIVIDED (17'-6" RAISED MEDIAN) WITH CURB & GUTTER, AND SIDEWALKS

POSTED SPEED 35-45 MPH



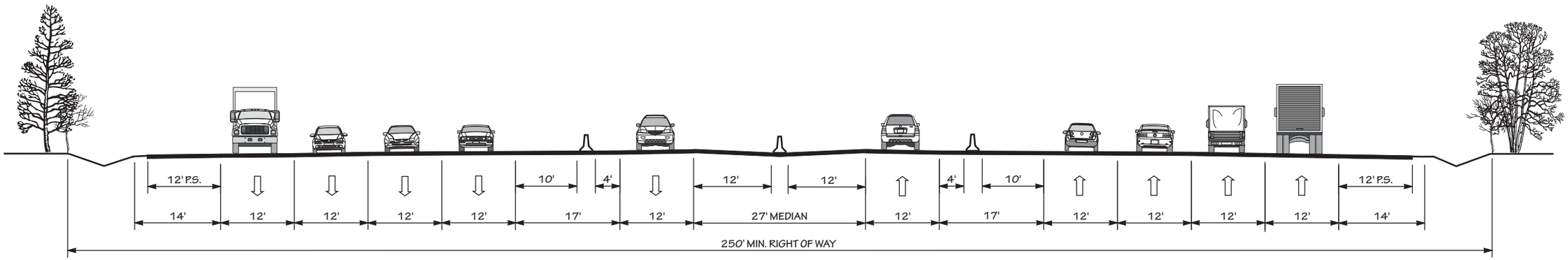
10A

10 LANE DIVIDED (27' MEDIAN WITH JERSEY BARRIER) WITH PAVED SHOULDERS

POSTED SPEED 55-70 MPH

Revised 05/05/2014

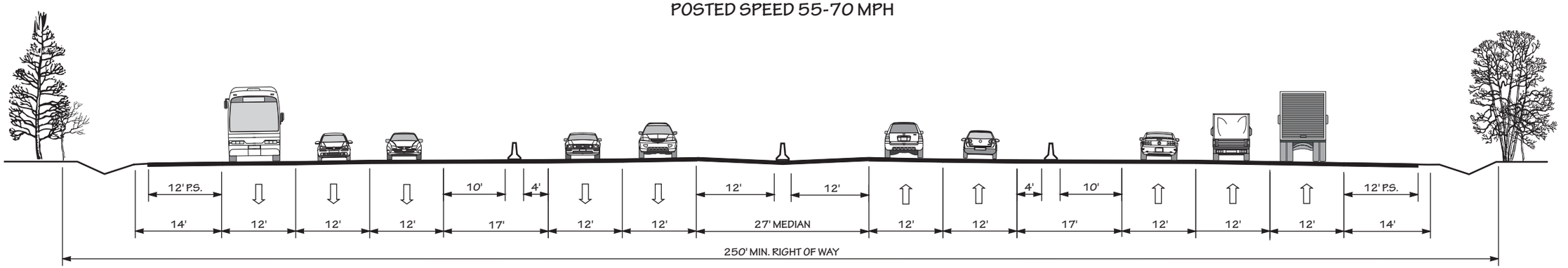
"TYPICAL" HIGHWAY CROSS SECTIONS



10B

10 LANE FREEWAY (8 GENERAL PURPOSE LANES, 2 MANAGED LANES, AND 27' MEDIAN WITH JERSEY BARRIER) WITH PAVED SHOULDERS

POSTED SPEED 55-70 MPH

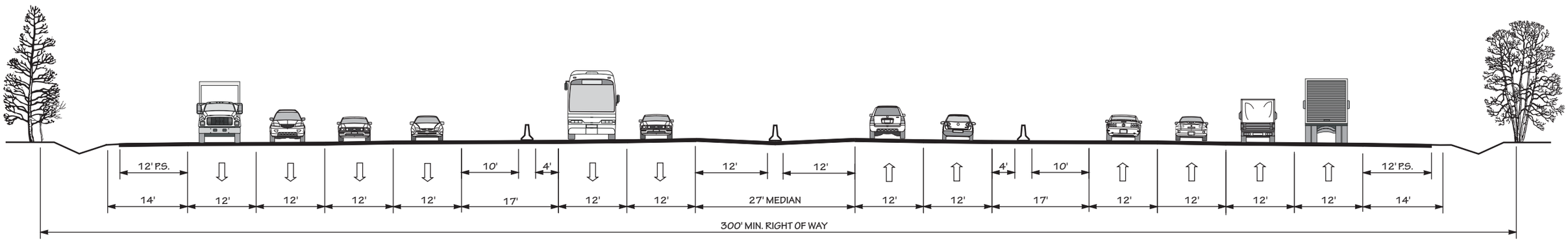


10C

10 LANE FREEWAY (6 GENERAL PURPOSE LANES, 4 MANAGED LANES, AND 27' MEDIAN WITH JERSEY BARRIER) WITH PAVED SHOULDERS

POSTED SPEED 55-70 MPH

"TYPICAL" HIGHWAY CROSS SECTIONS



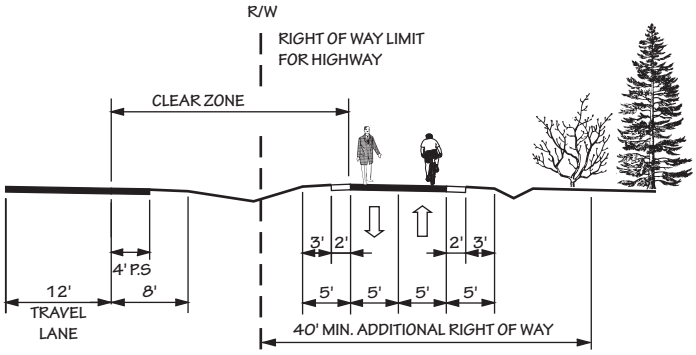
12A 12 LANE FREEWAY (8 GENERAL PURPOSE LANES, 4 MANAGED LANES, AND 27' MEDIAN WITH JERSEY BARRIER) WITH PAVED SHOULDERS

POSTED SPEED 55-70 MPH

Revised 05/05/2014

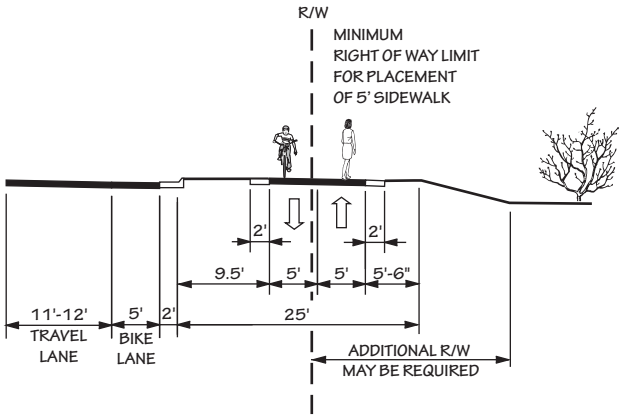
"TYPICAL" HIGHWAY CROSS SECTIONS

M A



MULTI - USE PATH
ADJACENT TO RIGHT OF WAY OR SEPARATE PATHWAY

M B



MULTI - USE PATH ADJACENT TO CURB AND GUTTER

Revised 05/05/2014

1995 Lumberton Thoroughfare Plan Recommendations

WIDENINGS

- **I-95 – Widen from 4 to 6 Lanes throughout study area**
- **US 301 – Widen from 2 to 4 Lanes from I-95 to northern area boundary (part of this is 3 Lanes today)**
- **NC 41 (Martin Luther King Jr. Drive) – Widen from 2 to 4 Lanes from US 74 to Marion Road and Widen from 4 to 6 Lanes from Lovett Road to NC 72 (2nd St)**
- **NC 41 (Elizabethtown Rd) – Widen from 2 to 4 Lanes from NC 211 (Roberts Ave.) to eastern area boundary**
- **NC 41/72 – Widen from 2 to 4 lanes from NC 41 (MLK Jr. Drive) to proposed one-way pair of 1st Street and 2nd Street west of the Lumber River.**
- **NC 72 (West) – Widen from 4 to 6 lanes from NC 711 to Dunn Road**
- **NC 72 (Roberts Ave.) – Widen from 2 to 4 lanes from Hestertown Road to southern area boundary**
- **NC 211 (Roberts Ave.) – Widen from 5 to 7 lanes from Fayetteville Road to I-95**
- **Barker Ten-Mile Road – Widen from 2 to 4 lanes from Fayetteville Road to northern area boundary (part of this is 3 lanes today)**

OUTER LOOP

- **A proposed 2 lane facility from US 301 going south along the western side of Lumberton, crossing I-95 with new interchange, then going east along the southern side of Lumberton, then going north, going along the eastern side of Lumberton, finally intersecting with Powersville Road[1] on the north side of Lumberton. This also includes the relocation of Contempora Drive (at least 1,000 feet south) as part of the outer loop due to the potential extension of the south-western runway at the Lumberton Regional Airport.**

PARTIAL LOOP

- **Construction of a loop from Carthage Road/Velcord Drive to Kenny Biggs Road at Spearman Street. This also calls for the widening of Spearman Street (from 18 feet to 24 feet) from Kenny Biggs Rd to NC 41 (MLK Jr. Drive).**

[1] A 2000 revision of the 1995 Lumberton Thoroughfare Plan removed the extension of Farringdom Street to the recommended eastern part of the loop and extended the eastern part of the loop northward to Powersville Road.

DOWNTOWN ONE-WAY PAIR

- **1st St – Convert and widen the existing 2 lane, two-way facility with parking on one side to a 3 lane, one way facility from Water Street to the intersection of 5th St (NC 41/72) and Carolina Ave., construct a 2 lane, one-way bridge over the Lumber River, extending 1st Street from 2nd Street (NC 41/72) to Water St, and realign Carolina Ave. from 1st Street to 2nd Street (NC 41/72).**

- **2nd St – Convert the existing 2 lane with center left-turn lane, two-way facility to a 3 lane, one way facility from Carolina Ave. to Water Street and a 2 lane, one-way facility from Water Street to the 1st Street Extension west of the Lumber River.**

ONE-WAY to TWO-WAY CONVERSIONS

- **Chestnut Street – Restripe the current one-way section of Chestnut Street from Elm Street to E. 15th Street to two-way traffic.**

- **Elm Street - Restripe the current one-way section of Elm Street from Chestnut Street to 15th Street to two-way traffic.**

I-95 SERVICE ROADS

- **Cupano Road/Kahn Drive/Lackey Street – Widen the existing 2 lane facilities to 2 lane facilities with center left-turn lane and continuous right-turn lane.**

- **Dawn Drive – Widen from 2 lanes to 2 lanes with a center left-turn lane.**

OTHER IMPROVEMENTS

- **Harrill Road Extension – Extend facility from E. 7th Street south to McPhail Road.**

- **Kenny Biggs Road Relocation – Relocate facility at least 1,000 feet east of the Lumberton Regional Airport to allow for a clear safe zone for airplanes.**

- **Starlite Drive Extension – Extend facility from the Kenny Biggs Road intersection to the proposed southern loop.**