Texas Department of Transportation
Dallas District
Advanced Project Development
Design Schematic Checklist

Roadway Name: _____

Limits: _____

Control-Section-Job: _____ Date: _____

Title Block

- ☐ Title Block on both ends of each roll (Recommend Rolls be no longer than 10') ☐ Title Sheet for 18" x 120" or 22" x 120" roll plots
- ☐ Term "Texas Department of Transportation"
- ☐ Term "Dallas District"
- ☐ Term "Design Schematic"
- ☐ Ceason Clemens, P.E. District Engineer
- ☐ County or Counties
- ☐ Project Name*
- ☐ Project Limits*
- ☐ Control-Section-Job (CSJ) Number* or Numbers for multiple CSJ's
- ☐ Functional Classification* (use following text not the number below)
  1) Interstate (main lanes, frontage road, loop, direct connector, or ramp)
  2) Other urban freeway or expressway
  3) Rural principal arterial, urban principal arterial
  4) Minor arterial
  5) Rural major collector, urban collector street
  6) Rural minor collector
  7) Local
- ☐ Design Speed (mph)*; Design speeds should be listed for all roadway: mainlanes, frontage roads, ramps, direct connectors, intersecting streets, u-turns, cross streets
- ☐ Project Length (miles)*
- ☐ Location map of projects
- ☐ Date (month and year)
- ☐ Use comparable scale (Horizontal and Vertical); i.e.
  Horiz: 1" = 40'; vert: 1" = 4'
  Horiz: 1" = 60'; Vert: 1"= 6'
  Horiz: 1" = 100'; Vert: 1"=10'
- ☐ Roll # of # (for rolls)
- ☐ Sheet # of # (for sheets); Provide a table of contents for sheets
- ☐ Copyright (© 20## by Texas Department of Transportation; all rights reserved)
- ☐ P.E. signature block

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*Items should match the TxDOTCONNECT

Typical Sections
- ☐ Provide existing and proposed roadway typicals. Pavement depth and materials do not need to be shown on schematics.
- ☐ Provide Station limits for each typical section
- ☐ Dimension elements (i.e. lanes, border width, median, ROW). If element width varies, show for example *varies from 2' to 4'*
- ☐ Label centerlines, baselines, and profile grade lines
- ☐ Provide directional arrows for each lane & lane designation (i.e. general purpose or HOV)
- ☐ Dimension curb offsets & offsets from nominal face of traffic barriers and bridge rails
- ☐ Provide type of curb (mountable or barrier), traffic barriers, retaining walls, bridge rails, and guardrails if warranted next to steep embankment slopes.
- ☐ Label ROW as existing or proposed
- ☐ Label pavement cross slopes & Side slopes ratio for cut & fill
- ☐ Show guard rails for slopes greater than 3:1
- ☐ Show concrete riprap for slopes greater than 2:1
- ☐ If pedestrian traffic exists provide 5' sidewalks when sidewalk is separate from curb and 6.5' sidewalk when walk is up against the back of curb. Show pedestrian handrails if required; or provide room for future sidewalks.
- ☐ Cross slope on walk should be 1.5% usual, 2.0% maximum.

Traffic
- ☐ Average Daily Traffic (ADT) diagram with existing and projected 20 year traffic data (30 yr data not needed)
- ☐ Source of data (for example: Texas Department of Transportation; Transportation Programming and Planning Division Memorandum, January 1, 20##)
- ☐ All traffic data should be approved by TP&P
- ☐ If proposed improvements involve signalized intersections, run HCM to check signal timings impact.

Plan
General
- ☐ Add note showing latest date for existing topographical information.

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☐ Label streets, buildings, parks, railroads, airports, waterways and known utilities.

☐ Show number of lanes using a directional arrow for each lane including turn lanes.
☐ Show and label the beginning and end stations of pavement transitions and tapers
☐ Label turning roadways and intersection corner radii
☐ Provide adequate turning radii for large trucks & buses (WB-62)
☐ Show north arrow
☐ Provide a legend
☐ Label existing signalized intersections
☐ Show and label match lines with CSJ # and station
☐ Show superelevation transitions with beginning and end stations
☐ If pedestrian traffic exist provide a 5 foot sidewalks, or provide room for future sidewalks
☐ Provide ADA curb ramps with a slope of 1.5% if sidewalks are being shown

Main Lanes
☐ Mark and label beginning and ending stations with:
- o "Begin Project" or "End Project"
- o CSJ #
- o Station
- o "Match Existing Pavement" or "Match CSJ # By Others"

☐ Show median openings for highways at street intersections
☐ Provide adequate turn bay lengths (dimension storage and taper lengths)
☐ Separation width of 42' between main lane edge and frontage road edge for adequate gores without attenuation
☐ Show and label existing and proposed centerline
☐ Provide bearing angle of centerline
☐ Label any portions of roadway to be removed

Ramps
☐ Provide 1500' weaving length from tip to tip of intersecting travel lanes between exit and entrance ramps on frontage roads with auxiliary lane
☐ Provide 1500' weaving length from tip to tip of Intersecting travel lanes between entrance and exit ramps on main lanes with auxiliary lane or 2000'+ without auxiliary lane

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☐ Provide adequate taper and deceleration/acceleration lengths for all ramps

☐ Provide adequate separation distance along frontage road from ramp gore to intersection to provide an adequate weave distance.

☐ Show and label ramp alignment between gores.

☐ For exit ramps, provide lane add on frontage road (District Policy is to drop the inside lane on the FR if ramp volume is 2 times the FR)

☐ Show appropriate mainlane taper for entrance ramps

☐ Provide superelevation for ramps with curves between gores of a radius less than 6030' (DS=50mph)

Cross Streets/Arterials

☐ Show and label project and cross street stationing at intersecting points

☐ Label begin and end construction stations at cross streets

☐ Provide transition pavement or striping to match existing section

☐ Intersection curb radius of at least 50' at city streets

☐ Provide 5' sidewalks or space for future sidewalks

☐ Provide adequate site distances; especially if noise walls are being proposed.

☐ Provide 15' minimum parkway width, 20' desirable.

Bridge Structures

☐ Label existing and proposed bridges beginning and ending stations

☐ Show and label retaining walls and noise walls beginning and ending stations and offsets right or left of centerline.

☐ Provide 5' to 8' sidewalk on proposed arterial bridges

☐ Show Column locations

☐ Provide space in median for columns

☐ Label bridge, span length, and combined bridge deck and beam depths as appropriate

☐ Show and label concrete riprap.

ROW and COA

☐ Show and label proposed, existing ROW and any drainage easements (dimension at certain locations)

☐ Show and label City/County limits

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☐ Show and label control of access (COA) for proposed ROW at ramps
☐ Label station and offsets for COA begin and end points
☐ Provide sufficient ROW at intersections for sidewalks/ADA ramps. Show corner clips if applicable.
☐ Label property owners
☐ Identify properties to be displaced including due to COA land locking
☐ Provide at least 10 feet of space with ROW and/or drainage easements for construction of sound walls

Horizontal Geometry

☐ Show and label proposed centerline, stationing, PI curve data, PC points, PT points, bearings, PI points. Annotate PI, PC, and PT's with a circle.
☐ Show and label ramp, frontage roads, and direct connector centerlines and stationing
☐ Create table to show curve data.
☐ Provide a superelevation transition table. Superelevation transition lengths should be given in round numbers (preferably 100-foot increments) that are easily divisible by three (e.g., a calculated transition length of 582 feet should be rounded up to 600 feet, placing 400 feet outside the curve and 200 feet inside the curve). Transitions should be referenced from the nearest whole station to the PC / PT - not exactly at the PC / PT station (e.g., if the PC Sta. for the previous example is 515+12.49, begin PC transition at 511+00 and end PC transition at 517+00). This can be adjusted in reverse curve situations where transitions would overlap. Superelevation transitions should be given in table format for both the PC and PT, and for both left and right sides.
☐ Horizontal curve radii must meet required minimum for design speed. If not, a design exception will be required.

Drainage

☐ Provide Preliminary Drainage/Hydraulic analysis
☐ Show area of Wetlands impacted (if there are any)
☐ Show existing normal high water elevation at all stream crossings. At major stream crossings, show 100 year flood elevation.
☐ Show that proposed major cross drainage structures are adequate

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☐ Show and label proposed and existing culverts

☐ Check Bridge Brinsap files to determine if structures can be widened or lengthened or need replacement.

☐ Ensure adequate drainage to outflow creek or storm sewer system can be obtained. Provide stations and elevations for verification.

☐ Provide off-site drainage system if required.

☐ Maintain acceptable ditch slopes and depths. Use special ditch grades that differ from profile grades if necessary.

☐ Show and dimension drainage easements.

☐ Provide adequate protection (concrete riprap, metal beam fence, pedestrian handrail, etc.) for culvert safety end treatments.

☐ Provide adequate ROW to grade ditches to the flow line of the safety end treatment.

☐ Maintain existing off-site drainage patterns onto State ROW to ensure water will not back up onto private property.

Guide Signs

☐ Show proposed major guide signs and label station location

☐ Insure District Traffic Operations review all proposed signing for schematics

Driveways

☐ Make sure driveways can be constructed with reasonable grade. Less than 12%. Verify ADA ramp compliance.

☐ Show and label driveways that will remain open

☐ Show construction easements and retaining walls outside of State ROW if applicable.

☐ Label or color code driveways to be removed

☐ Maintain a clear sight distance.

Utilities

☐ Check for major utilities and show locations in the plan and profile.
- o Gas Line 30" and over
- o Water and Waste Water over 40"
- o Underground major electrical line.

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   o TxDOT owned lighting, traffic signals and ITS

<u>Profile</u>

- □ Mark and label beginning and ending main lane stations with:
  - o "Begin Project" or "End Project"
  - o CSJ #
  - o Station
  - o Elevation
  - o "Match Existing Pavement" or "Match CSJ # By Others"
- □ Mark and label beginning and ending of cross street, ramp, direct connector, etc stations with:
  - o "Begin Construction" or "End Construction"
  - o Profile Chain Name
  - o Station
  - o Elevation
- □ Show and label existing and proposed profile grade line
- □ Show and label existing ground line
- □ Show annotation listed below on proposed profile
  - o VPC and VPT – annotate with a circle
  - o VPI – annotate with a circle
  - o VPI curve data
  - o Curve length
  - o Grades (prefer no grades less than 0.5% for schematic designs)
  - o K values
- □ Place VPI's on whole stations, and at one-foot increments (e.g. Sta 1014+00, elev. 590.0 ft, not Sta. 1014+02.67, elev. 499.89).
- □ Design vertical curves so that the sag and crest K values meet the design speed requirements
- □ Place proposed vertical curves on even 100' stationing
- □ Lengthen vertical curves to the nearest 50' increment
- □ Design with even grades
- □ Design with even elevations
- □ Color code or separate multiple roadway profiles

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☐ Show design elevations on the left (0.<u>00</u>) and existing elevations (0.<u>0</u>) on the right of the grid line.

☐ Label elevations on the y axis

☐ Label stations on the x axis

☐ Show and label existing and proposed drainage structures include flow line elevations

☐ Provide at least 2' cover over existing and proposed drainage structures

☐ Show and label existing and/or proposed bridges begin and end stations

☐ Label vertical clearance for bridge/structure (16.5' min over roads, 23' min over railroads). Verify and label clearance of U-turns.

☐ Show and label centerlines, baselines and cross sections of cross streets, railroads, frontage roads, ramp, direct connectors, major utilities and culverts to existing ground.

☐ Show tie-in profiles beyond match points and label grades

☐ In cases where existing vertical profile is maintained or matched, provide vertical profile data and superelevation data in table format to verify adequate design speed

☐ Verify grade breaks are appropriate for design speed

☐ Show ramps tie to mainlanes at theoretical gores (grade, station and elevation)

☐ Verify ramps tie to main lanes do not create a low point to cause ponding of water or hydroplaning.

*DSR Report – Page 1

Cross Sections

☐ Provide cross sections for information on 11"x17" sheets. Show offset distances and elevations and flow line elevations of ditches.

☐ Use 4:1 or flatter for embankment slopes

☐ Cross-sections should have labels for: all side slope values, beginning and ending of retaining walls, existing ROW, and proposed ROW.

Level of Service

☐ Provide Level of Service document as appropriate

Miscellaneous

☐ Provide explanation how the project will be constructed

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1002 Form

☐ Check information in DCIS, on schematic and on page 3 of 3 on 1002 Form. The information must be exactly the same.

Value Engineering Study (VE)

☐ If the Project is on the NHS system and the combined construction and ROW cost are over $50 Million a VE Study is required prior to public hearing.

☐ Project is not on the NHS system. No VE Study is required.

Schematic Submittal

☐ Enclose 7 copies of the design schematic for District review, 2 copies for the Design Division (DES), 1 copy for FHWA and a PDF of the schematic submittal.

☐ Include 2 hard copies of the cross sections (11"x17") and a PDF copy.

☐ Enclose 3 copies of page 3 Form 1002. After project schematic is approved, page 3 of Form 1002 must be sent to PS&E so that the same form can be used throughout the whole project life span.

☐ Submit a Design Summary Report to the District for approval.

☐ Submit Interstate Access Justification report if required.

☐ Submit Frontage Road Request document if new frontage roads are planned with the project.

☐ Submit Cost Estimate.

Schematic Reviewed By _____

Title _____   Date _____