NTTA Projects	Original Issue Date: 06/05/2008	SD-03
Resource: Schematic Design	Revision 2 Issue Date: 07/07/2025	Page 1 of 3
Title: Schematic Geometric Design		

1.0 PURPOSE:

The purpose of this procedure is to define the requirements for producing schematic geometric design including associated cost estimates, cross-sections, hydraulic analysis and preliminary drainage design.

All schematic geometric design for NTTA projects shall comply with the procedures established herein.

2.0 RESPONSIBILITIES:

2.1 Corridor Manager (CM)/Project Manager (PM) – The CM/PM shall be responsible for:

- Overseeing the efforts of the DSE to ensure compliance with the requirements of this procedure

2.2 Design Section Engineer (DSE) – The DSE shall be responsible for:

- Performing all processes listed below in the procedure

2.3 NTTA Design Manager – The NTTA Design Manager shall be responsible for:

- Assisting the CM/PM with ensuring the understanding and implementation of this procedure

3.0 SCOPE/APPLICABILITY:

This procedure shall apply to all NTTA projects and corridors within the Project Delivery Department.

4.0 REFERENCES:

- A Policy on Geometric Design of Highways and Streets, AASHTO
- Conceptual Alternatives Evaluation Report
- NTTA CAD Guidelines
- NTTA and TxDOT CAD Standards (local municipal, if applicable)
- NTTA Design Guidelines
- NTTA Sign and Traffic Control Device Guidelines Manual
- NTTA Sign Policy Manual
- NTTA Design Criteria Manual
- Texas Manual on Uniform Traffic Control Devices
- TxDOT Access Management Manual
- TxDOT Bridge Project Development Manual
- TxDOT Design Exception Questionnaire
- TxDOT Hydraulic Design Manual
- TxDOT Roadway Design Manual
- PC-02 Cost Estimate procedure
- PC-02-F1 NTTA Cost Estimating Template
- SD-03-A1 TxDOT Advance Project Development Design Schematic Checklist

- SD-04 Schematic Review Process
- SD-05 Value Engineering

5.0 DEFINITIONS & ACRONYMS:

N/A

6.0 PROCEDURES:

6.1 Schematic Design Criteria – The DSE shall establish design criteria in accordance with *TxDOT's Roadway Design Manual, A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials (AASHTO), and NTTA's Design Criteria Manual*. Design criteria shall include roadway classification, horizontal alignment, vertical alignment, and cross section design elements. The source (reference, page or figure/table number) of each design criteria element shall be documented in the design criteria table.

6.2 Schematic Geometric Design – The geometric design schematic shall include the items described in SD-03-A1, Advance Project Development Design Schematic Checklist and SD-04-F2, Draft Final and Final Schematic Checklist.

6.3 Level E Cost Estimate – The DSE shall develop a Level E cost estimate – current dollars/year and escalated to mid-term of construction – in accordance with PC-02, *Cost Estimate procedure,* and based on dates provided by the NTTA. The estimate shall include ROW and utility relocation costs in accordance with the *NTTA Cost Estimating Template* and shall be submitted with the design schematic submittal.

6.4 Cross Sections – The DSE shall prepare "working" cross sections at approximately 100-foot intervals to confirm proposed ROW, where necessary, and to detail preliminary earthwork.

6.5 Construction Staging Schematic – The DSE shall develop a simple sequence of construction, including the method for handling traffic during each phase of the design schematic using colorization for traffic and construction areas, if applicable.

6.6 Preliminary Signing Schematic – The DSE shall prepare a preliminary signing schematic for the entire project in accordance with *A Policy on Geometric Design of Highways and Street, AASHTO* and/or the *Texas Manual of Uniform Traffic Control Devices*.

6.7 Design Exceptions – In the event the geometric design requires design exceptions, design exception documentation, in a similar format to TxDOT, shall be prepared.

6.8 Hydraulic Analysis/Preliminary Drainage Design – A preliminary hydraulic modeling/analysis shall be performed within the approved study area. This analysis shall be conducted utilizing topographic maps and available contour data, determine preliminary drainage areas, 50-year and 100-year discharges using

rational or regression methods, as well as size of preliminary cross drainage structures to verify roadway profile. Preliminary drainage design shall be in accordance with TxDOT's *Hydraulic Design Manual*. It is important to note that if affected, local municipalities have more stringent design standards and therefore, NTTA requires the adoption of more stringent standards. This task is necessary for proper vertical design of applicable and anticipated bridges and hydraulic structures.

6.9 Structure Layout/Design – A preliminary structure layout shall be provided within the approved study area. This layout shall establish all structure locations within the project limits.

6.10 Submittal of Geometric Schematic for Review and Approval – Once complete, the DSE shall submit to CM/PM, the geometric schematic design and appropriate checklists which will be distributed to PD design staff for review and comment in accordance with SD-04*, Schematic Review Process*.

7.0 REGULATORY REQUIREMENTS:

N/A

8.0 RELATED BOARD POLICY:

N/A

9.0 COMPONENT DOCUMENTS:

- SD-03-A1 TxDOT Advance Project Development Design Schematic Checklist
- SD-04-F2 Draft Final and Final Schematic Checklist

10.0 FLOWCHART:

N/A

11.0 REVISION HISTORY:

Revision	Revised by:	Date Issued	DRN	Reason for Revision
0	Dave Clarke	06/05/2008		Original Issue
1	Darla Payberah	04/28/2011	10288	Removed "Guiding Principle". Updated 3.0 Scope/Applicability and 6.0 Procedures
2	Kelly Johnson	07/07/2025	11122	Revised References and Component Documents