ROADWAY LIGHTING DESIGNER / REVIEWER CHECKLIST

The following checklist provides both the lighting designer and the TE/L&D Manager guidelines for preparing roadway lighting plans during the different phases of design. The checklist correlates with the Project Development Process discussed in the TEDM Section I – General, Chapter 2.

Project Name: _____

Project No: _____ UPC/PPMS No: _____

TE/L&D Manager: _____

Lighting Designer: _____

Advertisement Date: _____

SCOPING TEAM MEETING **DATE OF MEETING:** _____

- *The following actions should take place prior to or during the Scoping Team Meeting.*

- ❑ 1) Ensure that adequate space for lighting has been incorporated into the conceptual roadway typical section(s).
- ❑ 2) Ensure there are no major utilities such as overhead power lines that will inhibit installation of the lighting system.
- ❑ 3) Identify the limits of the project to be lighted.
- ❑ 4) Ensure that the limits of survey will accommodate the lighting design.
- ❑ 5) Identify the type of lighting poles to be considered. [Sec. V, Chapter 2, 2.8.2]
- ❑ 6) Identify the type of luminaire to be considered (conventional, offset, architectural, highmast, etc.) and associated construction costs and maintenance requirements (identify mounting height of luminaire that can be maintained). [Sec. V, Chapter 2, 2.8.3]
- ❑ 7) Determine if underpass or pedestrian lighting is to be considered.
- ❑ 8) Identify other design elements that require early coordination with the lighting design, (traffic signals, signs, etc.)
- ❑ 9) Determine the agency and contact person that will own and maintain the lighting system.
- ❑ 10) Determine the agency and contact person that will be responsible for the lighting design and plans.
- ❑ 11) Identify items to be installed by the VDOT Contractor and items to be installed by Others [Sec. V, Chapter 3, 3.10.1].
- ❑ 12) Prepare project budget estimate.

Scoping review completed by: _____
Dated reviewed: _____

PRELIMINARY FIELD INSPECTION TEAM MEETING DATE OF MEETING: _____

- *The following actions should take place prior to or during the Preliminary Field Inspection Team Meeting.*

❑ 1) Send the Lighting Design Questionnaire to the agency responsible for maintaining lights (District, Residency, Municipality, etc). [Appendix VB-1.]

Sent To: _____ Date Sent: _____

❑ 2) Evaluate the roadway geometry and typical sections to ensure that appropriate right of way and (or) easements have been provided for the light system installation.

❑ 3) Perform lighting warrant analysis, if necessary. [Sec. V, Chapter 3, 3.2]

❑ 4) Establish the following lighting design criteria for each roadway and intersection. [Sec. V, Chapter 2, 2.5, Appendix VB-1]

Roadway: _____

Illuminance Criteria

a. Roadway & Pedestrian Conflict Area: _____
b. Pavement Classification: _____
c. Maintained Average Illuminance: _____
d. Uniformity Ratio (Ave./Min.): _____

Luminance Criteria

a. Average luminance: _____
b. Average/Minimum Uniformity Ratio: _____
c. Maximum/Minimum Uniformity Ratio: _____
d. Veiling Luminance Ratio: _____

Intersection: _____

Illuminance Criteria

a. Functional Classification: _____
b. Average Maintained Illumination: _____
c. Uniformity Ratio (Ave.\Min.): _____

❑ 5) Address proprietary equipment requests.

❑ 6) Update project budget estimate.

Pre-F.I. review completed by: _____
Dated reviewed: _____

PUBLIC HEARING TEAM MEETING **DATE OF MEETING: _____**

- *The following actions should take place prior to or during the Public Hearing Team Meeting.*

- ❑ 1) Perform a lighting inventory, to identify existing lighting systems to be removed or coordinated with the proposed lighting system (if necessary).
- ❑ 2) Develop lighting base plans. [Sec. V, Chapter 4, 4.8.1]
- ❑ 3) Develop conceptual lighting design. Identify typical pole spacing, luminaire mounting height, luminaire arm length, type luminaire and wattage.
- ❑ 4) Identify potential electrical control center locations.
- ❑ 5) Verify right of way and (or) easements are provided for proposed roadway lighting infrastructure.
- ❑ 6) Coordinate lighting design with structure and bridge designer when pole foundations and conduits or any other lighting equipment will be located on bridges.
- ❑ 7) Coordinate lighting plans with landscape, utility, median barriers, retaining walls and noise walls, etc.
- ❑ 8) Ensure coordination of all TCD plans.
- ❑ 9) Update project budget estimate.

Public Hearing review completed by: _____
Dated reviewed: _____

FIELD INSPECTION TEAM MEETING **DATE OF MEETING: _____**

- *The following actions should take place prior to or during the Field Inspection Team Meeting.*

Lighting Plan General Overview

- ❑ 1) Address public hearing comments.
- ❑ 2) Update conceptual lighting design plans with current roadway & utility design plans.
- ❑ 3) Ensure that the lighting design criteria established at PFI Meeting is acceptable before starting detail lighting design.

Lighting Plan Coordination Issues

- ❑ 1) Determine local power provider contact person.
- ❑ 2) Coordinate power distribution with other TCD designers that require electrical service.
- ❑ 3) Verify the proposed or existing grade is accessible for lighting maintenance and suitable for installation of lighting equipment. [Sec. V, Chapter 3, 3.4]
- ❑ 4) Evaluate whether sufficient access is provided to VDOT personnel for service of lighting equipment around noise walls. [Sec. V, Chapter 3, 3.8]
- ❑ 5) Verify light poles do not conflict with overhead or underground utilities.
- ❑ 6) Review light pole locations for compatibility with noise walls, median barriers, retaining walls, landscaping, etc.

Construction Cost Estimate

- ❑ 1) Update project budget estimate.

F.I. review completed by: _____
Dated reviewed: _____

80% PLAN SUBMITTAL **DATE OF SUBMISSION: _____**

- *Advance to preliminary lighting design plans for review by Maintaining Jurisdiction, Residency, Regional Traffic and Utility Sections and Central Office. Plans are approximately 80% complete such that the reviewer can provide guidance.*

80% DESIGN ELEMENTS

Lighting Plan General Overview [Sec. V, 4.11]

Stand alone Lighting Plans

- ❑ 1) Provide Title Sheet - includes latest design standard and specifications.
- ❑ 2) Provide Location Map.
- ❑ 3) Provide Revision Data Sheet.
- ❑ 4) Provide Survey & Alignment Data Sheets, if applicable. [Sec. V, Chapter 4, 4.8.4]
- ❑ 5) Provide Maintenance of Traffic Sheets.

Requirements for all Lighting plans

- ❑ 1) Use Sheet Cell from the VDOT Cell Libraries.
- ❑ 2) Incorporate design guidance provided in Lighting Questionnaire. [Appendix VB-1]
- ❑ 3) Provide Index of Sheets. [Appendix VA-1]
- ❑ 4) Provide Insertable Sheets.
- ❑ 5) Provide General Notes. [Appendix VB-5]
- ❑ 6) Provide Control Center, Pole & Luminaire details. [Appendix VA-4]
- ❑ 7) Provide Legend Sheet. [Appendix VA-2]
- ❑ 8) Show Project Data on plan sheets, (Project No., Series and Page No., etc.)
- ❑ 9) Show Scale, North Arrow, Match Lines, etc.

Lighting Plan Coordination Issues

Roadway Plans

- ❑ 1) Ensure that poles, conduit and junction boxes are not in conflict with drainage structures, retaining wall tiebacks, noise wall footers, etc. [Sec. V, Chapter 3, 3.4]
- ❑ 2) Evaluate proposed or existing grades for suitable installation of the pole foundations and trenching of conduit. [Sec. V, Chapter 3, 3.4]
- ❑ 3) Reference associated roadway plan sheets in the reference box on lighting plan sheet, (Series No. and Page No.). [Appendix VA-5]

Structure and Bridge Plans

- ❑ 1) Ensure that poles, conduit and junction boxes are not in conflict with bridge wing walls. [Sec. V, Chapter 3, 3.4]
- ❑ 2) Discuss method of attaching exposed conduit, junction boxes, under bridge conduit support systems and under bridge luminaires with VDOT Structure and Bridge Section. [Sec. V, Chapter 2, 2.8.5.7], [Sec. V, Chapter 3, 3.10.2]
- ❑ 3) Verify light pole foundations, conduit runs and pre-cast junction chamber locations with bridge designer. [Sec. V, Chapter 3, 3.6]

80% PLAN SUBMITTAL (CONTINUED)

- ❑ 4) Ensure dimensions of pre-cast junction chambers meet NEC requirements. [Appendix VB-4]
- ❑ 5) Reference associated structure and bridge plan sheets in the reference box on lighting plan sheet, (Series No. and Page No.). [Appendix VA-5]

Landscaping Plans

- ❑ 1) Coordinate lighting design pole placements and luminaire mounting heights with landscaping plans and ensure tree canopy does not block light from roadway or sidewalk. [Sec. V, Chapter 3, 3.11]
- ❑ 2) Route conduit around proposed tree pits. [Sec. V, Chapter 3, 3.11]

Utility Plans

- ❑ 1) Ensure poles are not in conflict with underground or overhead utilities.

Sign Plans

- ❑ 1) Coordinate lighting plans with sign plans to show luminaire wattage, phase, and position on the lighted sign structures. [Sec. V, Chapter 3, 3.12]
- ❑ 2) Coordinate lighting plans with sign plans to provide power to lighted sign structures.
- ❑ 3) Locate light poles at least 50 feet before or 15 feet behind overhead sign structures and do not obstruct ground-mount sign structures. [Sec. V, Chapter 4, 4.5]
- ❑ 4) Reference associated sign plan sheets in the reference box on lighting plan sheet, (Series No. and Page No.). [Appendix VA-5]

Traffic Signal Plans

- ❑ 1) Coordinate lighting plans with the signal plans for combination luminaire signal pole locations to show luminaire wattage, arm length, tilt angle, mounting height, and orientation of the luminaire on the signal pole. [Sec. V, Chapter 4, 4.5.2]
- ❑ 2) Reference associated traffic signal plan sheets in the reference box on lighting plan sheet, (Series No. and Page No.). [Appendix VA-5]

Verify Lighting Performance Criteria

Roadway: _____

Illuminance Criteria

a. Roadway & Pedestrian Conflict Area: _____
b. Pavement Classification: _____
c. Maintained Average Illuminance: _____
d. Uniformity (Ave./Min.): _____

Luminance Criteria

a. Average luminance: _____
b. Average/Minimum Uniformity Ratio: _____
c. Maximum/Minimum Uniformity Ratio: _____
d. Veiling Luminance Ratio: _____

Intersection: _____

Illuminance Criteria

a. Functional Classification: _____
b. Average Maintained Illumination: _____
c. Uniformity Ratio (Ave.\Min.): _____

Electrical Distribution Plan [Appendix VB-4]

Voltage Drop Calculations [Sec. V, Chapter 4, 4.7]

- ❑ 1) Base wire sizing on 3% voltage drop.
- ❑ 2) Equipment grounding conductor same size as larges phase conductor.
- ❑ 3) Base conduit fill calculations on NEC 40% fill rule.
- ❑ 4) Base junction box sizes on NEC recommendations.
- ❑ 5) Include junction box details with plan sheets at complicated splice points.

Electrical Service Control Center

- ❑ 1) Ensure electrical service point and control panel are easily accessible by VDOT electrician and local power company meter reader. [Sec. V, Chapter 3, 3.8]
- ❑ 2) Ensure Panel Board detail includes breaker size and interrupting capacity, wire size, and contactor size, main breaker size, voltage and number of phases. [Appendix VA-10].
- ❑ 3) Identify electric service type on plan sheet and ensure it agrees with Summary of Quantities pay items.

Lighting System Layout

- ❑ 1) Update lighting plan base sheets with most current roadway design plan sheets.
- ❑ 2) Ensure plan sheet items match legend and notes are applicable.

Luminaire Annotations

❑ 1) Include in the luminaire annotations: luminaire wattage, tilt angle or bracket arm length, mounting height or pole length, and electrical circuit, phase, and control center. [Sec. V, Chapter 4, 4.8.2.1] [Appendix VA-2]

Pole Locations

❑ 1) Ensure light infrastructure is accessible for maintenance. [Sec. V, Chapter 3, 3.4]

❑ 2) Locate poles within right of way and (or) easements. [Sec. V, Chapter 3,3.4]

❑ 3) Locate poles outside gore areas or use breakaway bases. [Sec. V, Chapter 3, 3.5]

❑ 4) Locate poles outside clear zone or use breakaway bases. [Sec. V, Chapter 3, 3.5]

❑ 5) Identify special pole foundations; (e.g., barrier mount poles, spread footer foundation, etc.) [Sec. V, Chapter 3, 3.6]

❑ 6) Include in the pole annotations: station and offset with reference baseline, pole number, and lighting standard pay item type. [Sec. V, Chapter 4, 4.8.2.2], [Appendix VA-2], [Appendix VB-2]

Conduit and Junction Box Locations [Sec. V, Chapter 4, 4.5, 4.6]

❑ 1) Locate conduit and junction boxes within right of way and (or) easements.

❑ 2) Include in the conduit annotations: conduit size, wire size and number, and any special type of installation, e.g., “Attached to bridge abutment”, “Installed in bridge conduit system”. [Sec. V, Chapter 4, 4.8.2.3]

❑ 3) Identify jacked pipe, pipe sleeve, or under bridge conduit support systems on the plan sheets. [Sec. V, Chapter 4, 4.8.2.4]

❑ 4) Include in the under bridge conduit support systems the total number of harnesses needed to support the conduit run. Note the bridge type on the plan sheet, (i.e., steel or concrete) with under bridge conduit support system. [Sec. V, Chapter 2, 2.8.5.7]

❑ 5) Include in the junction box annotations: size, type, and any special means for drainage. Station and offset with baseline reference may be necessary on an individual basis. [Sec. V, Chapter 2, 2.8.5.5]

Under Bridge Lighting Systems [Appendix VA-7]

❑ 1) Include in details for under bridge lighting systems the method of attaching conduit, luminaires, and junction boxes to bridge structures, (e.g. wedge anchor or epoxy anchor).

❑ 2) Include pier cap and abutment detail dimensions for placement of luminaires.

❑ 3) Include electrical schematic in detail.

❑ 4) Provide clear details for the location of the junction box used to tie-in the under bridge lighting system to the roadway lighting plan.

Overhead Sign Lighting [Sec. V, Chapter 4, 4.5.1]

❑ 1) Include on plan sheets wattage, circuit, phase, and control center for each sign luminaire.

❑ 2) Locate a junction box at the base of each overhead sign structure.

Construction Cost Estimate

- ❑ 1) Show all Standard and Non-Standard Pay Items in the Summary of Quantities sheet. [Sec. V, Chapter 4, 4.9]
- ❑ 2) Unit quantities do not need to be shown on Summary of Quantities sheet for this submittal.
- ❑ 3) Prepare construction cost estimate.

Submit Plan To: (If Applicable)	Contact Person	Date Sent
Municipality	_____	_____
VDOT, Residency	_____	_____
VDOT, Regional Traffic Engineering	_____	_____
VDOT, District Utilities Section	_____	_____
VDOT, CO – Traffic Engineering (L&D)	_____	_____
VDOT, CO – Traffic Engineering Division	_____	_____
VDOT, Scheduling and Construction	_____	_____
FHWA	_____	_____

80% review completed by:_____

Dated reviewed: _____

QC PLAN SUBMITTAL **DATE OF SUBMISSION: _____**

- *Advance the 80% lighting design plans to 100% design completion.*

Respond / Incorporate Review Comments From:

- ❑ 1) Municipality (if applicable)
- ❑ 2) VDOT, Residency
- ❑ 3) VDOT, Regional Traffic Engineering
- ❑ 4) VDOT, District Utilities Section
- ❑ 5) VDOT, CO – Traffic Engineering (L&D)
- ❑ 6) VDOT, CO – Traffic Engineering Division
- ❑ 7) VDOT, Scheduling and Construction
- ❑ 8) FHWA

Constructability check

- ❑ 1) Ensure clear zone requirements are met. [Sec. V, Chapter 3, 3.5]
- ❑ 2) Verify lighting infrastructure is outside of the deflection clearance of guardrails. [Sec. V, Chapter 3, 3.5]
- ❑ 3) Update plans with other design disciplines to ensure that conflicts with drainage, utilities (overhead or underground) and landscaping have not been created with design revisions. [Sec. V, Chapter 3, 3.4]
- ❑ 4) Verify right of way and (or) easements remain sufficient to install lighting infrastructure. [Sec. V, Chapter 3, 3.4]

Plan Sheets

- ❑ 1) Finalize General Notes and Plan Notes.
- ❑ 2) Ensure plan sheet call-outs are consistent with legend and Summary of Quantities pay items, and Transport pay items. [Sec. V, Chapter 4, 4.8]
- ❑ 3) Verify each pay item is clearly identified.
- ❑ 4) Perform quantity take-offs and verify each pay item in the project is accounted for in the Summary of Quantities.

Plan Details Sheets

- ❑ 1) Luminaire details.
- ❑ 2) Iso-footcandle diagrams.
- ❑ 3) Typical pole details.
- ❑ 4) Special plan details (e.g., median barrier pole foundation details included).
- ❑ 5) Under bridge details.
- ❑ 6) Panel Board details.
- ❑ 7) Insertable sheets.

Summary of Quantities / Special Provisions

- ❑ 1) Finalize Summary of Quantities Sheets. [Sec. V, Chapter 4, 4.10]
- ❑ 2) Cross check measurement and payment for each pay item matches the VDOT standard items or non-standard items as discussed in the Specifications, Special Provisions and/or Special Provision Copied Notes. [Sec. I, Chapter 3, 3.8], [Sec. V, Chapter 2, 2.8]
- ❑ 3) Discuss in detail the Special Provisions and Special Provision Copied Notes with TE/L&D Manager and Traffic Engineering Division Specifications Section. [Sec. I, Chapter 3, 3.8], [Sec. V, Chapter 4, 4.9, 4.10]

Construction Cost Estimate

- ❑ 1) Verify Transport quantities match Summary of Quantities sheet.
- ❑ 2) Develop costs estimates per unit price for non-standard pay items and review with TE/L&D Manager.

Plan Set Submitted

- ❑ 1) Title Sheet (Stand alone project)
- ❑ 2) Location Map (Stand alone project)
- ❑ 3) Index of Sheets
- ❑ 4) Revision Data Sheet (Stand alone project)
- ❑ 5) Survey & Alignment (Stand alone project)
- ❑ 6) Maintenance of Traffic (Stand alone project)
- ❑ 7) General Notes
- ❑ 8) Summary of Quantities Sheet
- ❑ 9) Plan Detail Sheets
- ❑ 10) Insertable Sheets
- ❑ 11) Legend Sheet
- ❑ 12) Plan Sheets
- ❑ 13) Under Bridge Lighting Details
- ❑ 14) Panel Board Details

Special Provisions Submitted

- ❑ 1) Special Provisions: _____
- ❑ 2) Non-Standard Items: _____

Up-Load Plans to Falcon in TIF format. **Date complete:** _____

- ❑ 1) Create Plan Index in Excel format.

QA review completed by: _____
Dated reviewed: _____

PRE-ADVERTISEMENT CONFERENCE DATE OF MEETING: _____

- *Advancing 100% design plans and specifications to construction plan set.*

Respond / Incorporate Review Comments From:

- ❑ 1) Municipality (if applicable)
- ❑ 2) VDOT, Residency
- ❑ 3) VDOT, Regional Traffic Engineering
- ❑ 4) VDOT, District Utilities Section
- ❑ 5) VDOT, CO – Traffic Engineering (L&D)
- ❑ 6) VDOT, CO – Traffic Engineering Division
- ❑ 7) VDOT, Scheduling and Construction
- ❑ 8) FHWA

Update Plans on Falcon. **Date complete: _____**

Up-Load Plans to Falcon in TIF format. **Date complete: _____**

- ❑ 1) Up-date Plan Index.

Revise Special Provisions. **Date complete: _____**

Update TRNS-PORT Cost Estimate. **Date complete: _____**

- ❑ 1) Verify updated TRNS·PORT quantities match Summary of Quantities sheet.

PAC review completed by: _____
Dated reviewed: _____