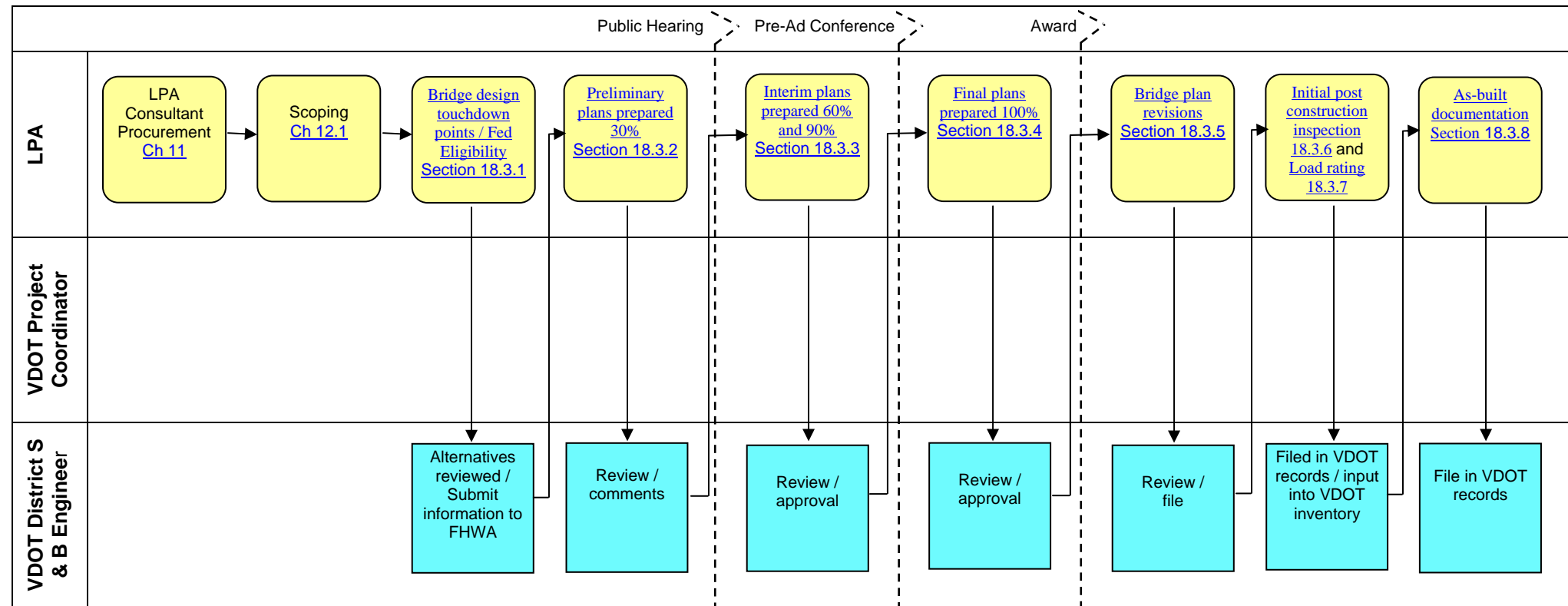


PART 3
Standards and
practices for LAP
Chapter 18
Structure and Bridge

Locally Administered Projects (LAP) Manual

CHAPTER 18 – STRUCTURE AND BRIDGE



This chapter includes the following topics:

[18.1 Introduction](#)

[18.2 Applicability](#)

[18.3 Procedures and Processes](#)

[18.3.1 Establishing Bridge Touchdown Points](#)

[18.3.2 Preliminary Bridge Plans](#)

[18.3.3 Interim Bridge Plan Development and Reviews](#)

[18.3.4 Final Bridge Plans](#)

[18.3.5 Bridge Plan Revisions](#)

[18.3.6 Initial Inspections and Inventory](#)

[18.3.7 Structure Load Ratings](#)

[18.3.8 As-Built Documentation](#)

[18.4 Key Submittals/Requirements](#)

[18.5 References](#)

[Appendix 18-A- Submittal of As-Built Bridge Documents](#)

[Appendix 18-B- Certification of As- Built Plans](#)

18.1 INTRODUCTION

The chapter sets out the processes and responsibilities associated with determining funding eligibility and touchdown points for bridges, submitting bridge plans for review at various stages of the plan development, performing the initial inspection of the bridge and establishing the structure load ratings and submitting the as-built documentation. This chapter also identifies VDOT's role in review for bridge plans and other documents. Many of the details associated with project development are not repeated in this chapter as the focus is on those additional activities required when a project includes a bridge. **The term bridge when used in this chapter will apply to any structure not defined as a culvert and typically has a deck, superstructure and substructure components.**

There are federal funds specifically designated to be used on qualifying deficient bridges. It is very important that all bridges that qualify for these federal bridge funds are evaluated to determine eligibility and the approach touchdown points for the use of federal bridge funds. It is also very important that bridge plans are reviewed at several different stages of project development to ensure any issues are addressed at the earliest point possible and that all bridges are being designed in accordance with applicable standards. All bridges must be designed in accordance with all applicable AASHTO design specifications as well appropriate VDOT design standards and specifications. Applicable references are noted in the Regulatory and Other References/Links section of this chapter. Most of the applicable VDOT manuals are available through VDOT's external Web page at <http://www.virginiadot.org/business/bridge-manuals-default.asp>.

18.2 APPLICABILITY

This chapter is applicable whenever a locally administered project includes any bridge(s).

18.3 PROCEDURES AND PROCESSES

18.3.1 Establishing Bridge Touchdown Points

Bridge Touchdown Points		
<i>Federal aid</i>	<i>State aid/VDOT</i>	<i>State aid/LPA</i>
	<i>Maintained</i>	<i>Maintained</i>
<i>X</i>	<i>N/A</i>	<i>N/A</i>

Bridge touchdown points must be established for bridges that may be eligible for the Highway Bridge Program (formerly known as the Highway Bridge Replacement/Rehabilitation Project Program) federal bridge funding. This section provides guidance on determining project eligibility, establishing project limits and requesting funding approval from the Federal Highway Administration (FHWA) for those projects.

VDOT will determine the eligibility of Highway Bridge Program (HBP) funding for those structures classified as structurally deficient or functionally obsolete in the Department's Bridge Inventory Records and will rely on the LPA to provide the necessary information to accomplish this.

For federal-aid locally maintained projects, the LPA will submit the current bridge inspection report (for bridges maintained by the LPA)

VDOT Responsibilities:

- *The project coordinator will submit scoping report and current inspection report to the Assistant State Bridge Engineer. For VDOT maintained bridges, the project coordinator will provide a copy of the latest bridge safety inspection report.*
- *The Central Office Structure and Bridge staff will be responsible for the following activities:*

- Determine project eligibility and establish project limits, if applicable.
- Complete Form LD-449 FEDERAL BRIDGE REPLACEMENT PROGRAM DETERMINATION OF TOUCHDOWN POINTS and submit to FHWA for funding approval, if applicable.
- The Assistant State Bridge Engineer will advise the VDOT project coordinator of availability of HBP Funds for the subject project.
- The VDOT project coordinator will notify the LPA of VDOT/FHWA determination and availability of HBP Funds for the project.

18.3.2 Preliminary Bridge Plans

Preliminary Bridge Plans		
<i>Federal aid</i>	<i>State aid/VDOT</i>	<i>State aid/LPA</i>
	<i>Maintained</i>	<i>Maintained</i>
X	X	X

Preliminary bridge plans (also referred to as TS&L or Stage I plans) are submitted to the project coordinator prior to the Public Hearing, posting of a willingness to hold a public hearing, or the Right of Way Authorization. In addition to applicable AASHTO and VDOT specifications, plan development will also conform to the plan requirements in the [Manual of the Structure and Bridge Division](#) Volume V – Part 2 Design Aids/Typical Details.



The LPA will submit the following for each bridge:

- Electronic files (.dgn and .pdf) of the Type Size & Location Plans (to include Grade, Profile and Elevation (GP&E), Typical Section and Typical Substructure Unit Type).
- Stage I Report
- Estimated preliminary bridge cost for each bridge alternative.

- The LPA should also submit supporting documentation to facilitate the review of the preliminary bridge plans. This may include, but not limited to the following: road plans, hydrologic and hydraulic analysis (when applicable), geotechnical report and boring logs (if available) and bridge situation plans (when necessary).

After the approval of these plans by VDOT, the LPA will be given a Notice to Proceed (NTP) to continue with the final bridge design (Stage II) for each bridge on the project. VDOT will archive the approved preliminary bridge plans in the FALCON plan system.

VDOT Responsibilities:

- *The project coordinator will submit the Preliminary Bridge Plans and supportive documentation to the District Structure and Bridge Engineer for review and approval.*
- *VDOT will review the preliminary bridge plan submittals within fifteen (15) business days upon receipt by the VDOT project coordinator.*
- *The District Structure and Bridge Engineer will review and approve the Preliminary Bridge Plans and document approval in accordance with Volume III-2-06.04 B of the Manual of the Structure and Bridge Division. Any structures requiring the Federal Highway Administration (FHWA) approval will be submitted as outlined in Volume III-02-08 of the [Manual of the Structure and Bridge Division](#).*
- *The District Structure and Bridge office will be responsible for uploading the files to the FALCON plan system.*
- *The project coordinator will authorize the LPA to proceed with final bridge design (Stage II) upon approval of the Preliminary Bridge Plans by the District Structure and Bridge Engineer and FHWA, when applicable.*

18.3.3 Interim Bridge Plans

<i>Interim Bridge Plans</i>		
<i>Federal aid</i>	<i>State aid/VDOT</i>	<i>State aid/LPA</i>
	<i>Maintained</i>	<i>Maintained</i>
X	X	X

The interim bridge plans are typically submitted at the 60 percent and 90 percent completion stages or as requested by VDOT. During the review of interim (in-progress) bridge plans (referred to as Stage II plans), VDOT provides input regarding the conformance of bridge plans and/or contract documents with AASHTO specifications and VDOT's specifications and standards to include plan requirements in the [Manual of the Structure and Bridge Division](#) Volume V – Part 2 Design Aids/Typical Details. Bridge plans completed to the 60 percent stage are submitted to VDOT for review prior to the scheduled Field Inspection (FI). Bridge plans completed to the 90 percent stage are to be submitted to VDOT for review prior to the scheduled Pre-Advertisement Conference (PAC).



The LPA will submit the following for each bridge:

- Two (2) sets of half-size prints and .pdf files on the interim bridge plans
- Estimated Construction Cost for Each Bridge

VDOT Responsibilities:

- *The project coordinator will submit the interim Bridge Plans to the District Structure and Bridge Engineer for review.*
- *VDOT will review the bridge plan submittals within fifteen business days upon receipt by the VDOT project coordinator.*
- *The project coordinator will advise the LPA of VDOT's review comments on the interim plan submittals.*

18.3.4 Final Bridge Plans

Final Bridge Plans		
<i>Federal aid</i>	<i>State aid/VDOT</i>	<i>State aid/LPA</i>
	<i>Maintained</i>	<i>Maintained</i>
X	X	X

Final bridge plans are to be submitted at the PS&E review, along with final contract documents as described in Chapter 12.6. Final bridge plans in accordance with AASHTO Specifications and VDOT Specifications, Standards and Guidelines. Plan development will also conform to the plan requirement in the [Manual of the Structure and Bridge Division](#) Volume V – Part 2 - Design Aids/Typical Details.

Final bridge plans are to be sealed and signed in accordance with [Chapter 12.5.3](#)



The LPA will submit the following for each bridge:

- Electronic files (.dgn and .pdf) of the Contract Bridge plans
- Reproducible drawing of the sealed and signed title sheet. The title block and consultant seal will conform to Chapter 2 in Volume V – Part 2 - Design Aids/Typical Details of the [Manual of the Structure and Bridge Division](#).
- Special Provision and Copied Notes (if required)
- Estimated Construction Cost for Each Bridge

VDOT Responsibilities:

- *VDOT will review ALL final bridge plans, special provisions and cost estimates prior to the advertisement of the project.*
- *The project coordinator will submit the title sheet to the Chief Engineer for approval (unless state funded and the LPA will maintain bridge).*

The project coordinator will advise the LPA of the date that the plans have been approved for Construction

- *The project coordinator will submit electronic files (.dgn and .pdf files) of the “Approved for Construction” plans to the District Structure and Bridge Engineer for archiving. The District Structure and Bridge office will be responsible for uploading the files into the FALCON plan system.*

18.3.5 Bridge Plan Revisions

Bridge Plan Revisions		
<i>Federal aid</i>	<i>State aid/VDOT</i>	<i>State aid/LPA</i>
	<i>Maintained</i>	<i>Maintained</i>
X	X	X

At times bridge plans are revised after the final bridge plan review/approval. These “field revisions” must be submitted to VDOT for review/approval in accordance with the procedures outlined in [CD 2009 – Field Change Documentation](#) and the [Manual of the Structure and Bridge Division Volume V – Part 2 Design Aids/Typical Details, Chapter 1, Section 14 \(Revisions\)](#).

The LPA must submit the electronic files (.dgn and .pdf) of the plan revision to the VDOT Construction Project Monitor and distribute plan revision to the District Structure and Bridge Engineer. The LPA will ensure that ALL required plan revisions are submitted to VDOT prior to the work being executed by the contractor. If the field revision requires a design exception or waiver, it must be submitted in accordance with [Chapter 12.2](#).

VDOT Responsibilities:

- *The project coordinator will submit electronic files (dgn and pdf files) for each plan revision to the District Structure and Bridge Engineer for archiving.*
- *The District Structure and Bridge office will be responsible for uploading the files of the revised plans into VDOT’s FALCON plan system.*

18.3.6 Initial Inspections and Inventory

Bridge Touchdown Points		
<i>Federal aid</i>	<i>State aid/VDOT</i>	<i>State aid/LPA</i>
	<i>Maintained</i>	<i>Maintained</i>
X	X	X

Before a structure is accepted into the system of state highways, an initial inspection must be performed. Each structure, whether VDOT owned or LPA owned, will be inspected in accordance with [National Bridge Inspection Standards \(NBIS\)](#) requirements. The initial inspection is the first inspection of a structure before it becomes a part of the highway system.

The LPA will be responsible for the performance of the initial inspection if the structure is owned by the LPA and they will submit the results to VDOT.

The results of the initial inspection and inventory are to be submitted for each bridge on the project. The LPA will ensure the initial inspections and findings are documented in accordance with [IIM-S&B-27](#) – Bridge Safety Inspections.



The LPA submits the following for each bridge:

- Initial inspection report
- Structure inventory and appraisal data

For structures to be maintained or owned by VDOT, the LPA must request an initial inspection prior to project close-out.

VDOT will enter the results of ALL initial inspections and inventory into VDOT's inventory database.

VDOT Responsibilities:

- *If the subject bridge will be owned and maintained by VDOT, the VDOT project coordinator will coordinate with the District Structure and Bridge Engineer to perform the initial inspections.*
- *The project coordinator will confirm that the initial inspection reports are submitted to the District Structure and Bridge Engineer on **ALL** bridges before the bridges are opened to traffic.*

18.3.7 Structure Load Ratings

Structure Load Ratings		
<i>Federal aid</i>	<i>State aid/VDOT</i>	<i>State aid/LPA</i>
	<i>Maintained</i>	<i>Maintained</i>
X	X	X

There are very specific requirements in [Section 23 Highways – Part 650](#), Subpart C of the Code of Federal Regulations that requires that all structures be load rated in accordance with the [National Bridge Inspection Standards \(NBIS\)](#). This load rating analysis will be completed in accordance with the current [IIM-S&B-27](#) – Bridge Safety Inspections. The LPA will ensure the “Load Rating Summary Form” is completed for each structure and that this form for all load ratings is sealed and signed by a licensed Professional Engineer registered in the Commonwealth of Virginia. VDOT will be responsible for filing the load rating reports and entering the data into the inventory database.



The LPA will submit the following to the project coordinator for each bridge:

- Load rating report which includes the “Load Rating Summary Form”.
- Compact disk (CD) containing the load rating’s input files for Virtis, DESCUS or other computer program approved by the department.

VDOT Responsibilities:

- *The project coordinator will provide the LPA with a copy of the latest safety inspection report if the LPA is required to load rate an existing structure.*
- *The project coordinator will submit load rating reports and supportive documentation for each bridge to the District Structure and Bridge Engineer for filing with the bridge safety inspection records.*
- *The District Structure and Bridge Engineer will confirm that load rating reports are submitted to VDOT before the bridges are opened to traffic.*
- *The District Structure and Bridge Engineer will confirm the appropriate data is submitted so that it can be entered into the inventory database by VDOT within sixty (60) days of opening the structure to traffic.*

18.3.8 As-Built Documentation

Bridge Touchdown Points		
<i>Federal aid</i>	<i>State aid/VDOT</i>	<i>State aid/LPA</i>
	<i>Maintained</i>	<i>Maintained</i>
X	X	X

Upon completion of the project, the LPA will be responsible for the development and submittal of “As-Built” documents for each bridge. The posting of finals and documentation will conform to the requirements of the [VDOT Post Construction Manual](#) and in accordance with the [Manual of the Structure and Bridge Division](#) Volume V – Part 2 Design Aids Typical Details, Chapter 1 Section 15 (As-Built Plans). The as-built documentation including plans, shop drawings and bridge situation plans (when applicable) will be submitted to VDOT prior to project close and acceptance.

The LPA will ensure that the Engineer of Record (EOR) certifies that the as-built plans accurately represent field conditions; see [Appendix 18A](#).

VDOT will be responsible for placement of as-built documentation in VDOT's Falcon system. As-Built Documentation, including as-built plans, approved shop/working drawings and Bridge Situation Plans when applicable (as required in the [VDOT Survey Manual](#)) are to be submitted for each bridge on the project.



The LPA will submit to VDOT the following for each structure:

- Electronic format of As-Built bridge plans.
- Approved Shop and Working Drawings
- Bridge Situation Plans (when applicable)

VDOT Responsibilities:

- *The project coordinator will ensure that as-built documentation for ALL bridges has been received by VDOT prior to project Close and Acceptance.*
- *The project coordinator will submit as-built documentation for each bridge to the District Structure and Bridge Engineer.*
- *The District Structure and Bridge Engineer will confirm the as-built documentation is tiffed/scanned and placed in VDOT's FALCON system.*

18.4 KEY SUBMITTALS/REQUIREMENTS

Task/Submittal/File Documentation	LPA Responsibility	VDOT PC Responsibility	Submittal Timing/Recordkeeping Requirements
Establishing Bridge Touchdown Points			
Submit preliminary information to initiate funding eligibility	LPA submits the following to VDOT PC for each bridge: <ul style="list-style-type: none"> • Scoping report • Current bridge inspection report 	Submit scoping report and current inspection report to the Assistant State Bridge Engineer. PC will communicate approval of federal funds	If VDOT determines bridge is eligible for federal bridge funds, VDOT completes Form LD-449 FEDERAL BRIDGE REPLACEMENT PROGRAM DETERMINATION OF TOUCHDOWN POINTS and submits to FHWA for funding approval.
Authorization of federal bridge funds	LPA will verify federal funds are authorized before expenditures	PC will notify LPA when funds are authorized	N/A
Reviewing Bridge Plans			
Submit preliminary bridge plans (TS&L)	LPA submits the following to VDOT PC for each bridge: Electronic files (.dgn and .pdf) of the Preliminary bridge plans (TS&L-Type Size & Location) Plans . Stage I Report Estimated cost for each bridge alternative. Supportive documentation to facilitate the review of the plans	VDOT PC submits the Preliminary Bridge Plans and supportive documentation to the District Structure and Bridge Engineer for review and approval. VDOT PC advises the LPA to proceed with final bridge design (Stage II) upon approval of the preliminary Bridge Plans by the District Structure and Bridge Engineer.	Preliminary bridge plans are to be submitted to VDOT to allow review prior to the scheduled Design Public Hearing. VDOT will review the preliminary bridge plan submittals within twenty-one (21) calendar days upon receipt by the VDOT project coordinator.

<p>Submit Stage II (60% and 90%) bridge plans; estimates.</p>	<p>LPA submits interim (in-progress) plans at the 60% and 90% completion stages for review and comments</p> <p>LPA incorporates appropriate changes in the final bridge plans.</p>	<p><u>VDOT PC submits the interim (in-progress) plans to the District Structure and Bridge Engineer for review and comments</u></p> <p><u>VDOT PC advises the LPA of VDOT's review comments on plan submittal</u></p>	<p>Stage II bridge plans are to be submitted to VDOT to allow review prior to the field inspection (60%) and pre-advertisement conference (90%).</p> <p>VDOT will review the Stage II bridge plan submittals within twenty-one (21) calendar days upon receipt by the VDOT project coordinator.</p>
<p>Submit final bridge plans</p>	<p>LPA submits the following to the VDOT PC for each bridge:</p> <ul style="list-style-type: none"> • Electronic files (.dgn and .pdf) of the contract bridge plans. • Reproducible drawing of the seal and signed tile sheet. • Special Provisions and Copied Notes (if applicable). • Estimated construction cost for each bridge 	<p>VDOT PC submits the final contract assembly to the District Structure and Bridge Engineer for review and approval</p> <p>VDOT PC submits the signed title sheet to the Chief Engineer for execution by VDOT</p> <p>VDOT PC advises the LPA the date the plans were "Approved for Construction".</p> <p>VDOT PC submits electronic files (.dgn and .pdf) of the Approved for Construction plans to the District Structure and Bridge Engineer for archiving in the VDOT's FALCON plan system</p>	<p>Final bridge plans are to be submitted to VDOT to allow review prior to advertisement.</p> <p>VDOT will review the final bridge plan submittals within twenty-one (21) calendar days upon receipt by the VDOT project coordinator.</p>
<p>Initial bridge inspection, required documentation in accordance with IIM-SB-27</p>	<p>LPA submits the following to the VDOT PC for each bridge if the subject bridge is owned and maintained by the LPA:</p>	<p>VDOT PC will coordinate with the District Structure and Bridge Engineer to perform the initial inspection if the subject bridge will be owned and maintained by VDOT.</p>	<p>Prior to the bridge being opened to traffic.</p> <p>District Structure and Bridge Engineer ensures that results of ALL initial inspections are</p>

	<ul style="list-style-type: none"> • Initial inspection report • Structure inventory and appraisal data 	VDOT PC submits initial inspection reports to the District Structure and Bridge Engineer if the subject bridge will be owned and maintained by the LPA.	entered into the VDOT's inventory database.
Load rating report to include Load Rating Summary Form (sealed and signed)	<p><i>LPA</i> submits the following to the VDOT PC for each bridge:</p> <ul style="list-style-type: none"> • Load rating report which includes the "Load Rating Summary Form". • Compact disk (CD) containing the load rating's input files 	VDOT PC submits the load rating reports and supportive documentation for each bridge to the District Structure and Bridge Engineer.	Within 60 days of opening structure to traffic District Structure and Bridge Engineer will be responsible for entering appropriate data in the VDOT's inventory database.
As-Built documentation (Appendix 18.8A)	<p><i>LPA</i> submits the following to the VDOT PC for each bridge:</p> <ul style="list-style-type: none"> • Electronic files of As-Built Bridge plans. • Approved Shop and Working Drawings • Bridge Situation Plans (when applicable) 	<p>VDOT PC submits as-built documentation for each bridge to the District Structure and Bridge Engineer</p> <p>District Structure and Bridge Engineer will be responsible for archiving the as-built documentation in VDOT's FALCON plan system.</p>	Prior to project close and acceptance

18.5 REFERENCES

General

- American Association of State Highway and Transportation Officials (AASHTO) LRFD Design Specifications, 4th Edition, current Interims and VDOT Modifications
- [Manual of the Structure and Bridge Division](#) Volume V – Part 2 - Design Aids/Typical Details
- [VDOT Road and Bridge Specifications](#), current edition, including Special Provisions and Copied Notes
- Current [Road and Bridge Standards](#)

Bridge Touchdown Points

- [23CFR650.405](#) – Eligible Projects
- [Current IIM-S&B-XX](#) - Bridge Touchdown Points (DRAFT)

Preliminary Bridge Plans

- Current [IIM-S&B-19](#) – Bridge Project/Plan Authorization and Approval Authority (DRAFT)
- [Manual of the Structure and Bridge Division](#) Volume III – Part 2 Operations and Communications Procedures
- Current [IIM-S&B-70](#) – Design Exceptions/Waivers

Interim Bridge Plans

- Current [IIM-S&B-19](#) – Bridge Project/Plan Authorization and Approval Authority (DRAFT)

Final Bridge Plans

- [23CFR635](#) – Construction and Maintenance
- Current [IIM-S&B-19](#) – Bridge Project/Plan Authorization and Approval Authority (DRAFT)

Bridge Revisions

- Current [IIM-S&B-19](#) – Bridge Project/Plan Authorization and Approval Authority (DRAFT)
- Construction Directive Memorandum ([CD 2009 – Field Change Documentation](#))

Initial Inspections and Inventory

- [23CFR650 Subpart C](#) - National Bridge Inspection Standards (NBIS)
- Current [IIM-S&B-27](#)- Bridge Safety Inspections

Structure Load Ratings

- [23CFR650 Subpart C](#) – National Bridge Inspection Standards (NBIS)
- American Association of State Highway and Transportation Officials ([AASHTO](#)) Manual for Condition Evaluation of Bridges, Second Edition, 2000, with 2001 and 2003 Interims for load rating of existing structures
- Current [IIM-S&B-27](#) - Bridge Safety Inspections

As-Built Documentation

- [VDOT Post Construction Manual](#), current edition
- Current [VDOT Survey Manual](#)

APPENDIX 18-A

SUBMITTAL OF AS-BUILT BRIDGE DOCUMENTS

Archival of Bridge Plans:

The Structure and Bridge Division utilizes the bridge plan number (Ex: 283-38) as the reference basis for the archival of bridge documents. All submittals with same bridge plan numbers should be submitted in the same assembly.

Procedure:

The following are the general guidelines to be used for the submittal of as-built bridge documents to the department:

- Plans submitted in electronic format will have the finals posted in accordance with the [Manual of the Structure and Bridge Division](#) Volume V – Part 2 Design Aids and Typical Details File Number 01.15-1 thru 01.15-11.
- Plans for a particular bridge are to be assembled in the following order:
 1. Design plans in electronic format shall not be renumbered.
 2. Shop Plans/Working Drawings (Ex. 21X – 42Z*)
 3. Bridge Situation Plan (if available) (Ex. 43Y, 44Y, 45Y, 46Z*)

* Suffix on last sheet in the set of paper plans, regardless of type, shall be “Z”.

The shop plans should be numbered consecutively and should be shown in pencil in the lower right-hand corner. The bridge plan number should be denoted on ALL drawings.

- Upon completion of the preparation of the “as-built” plans, a CD containing the electronic as-built documents and any paper copies of shop plans shall be transmitted to the Structural project coordinator for archiving.

APPENDIX 18-B

CERTIFICATION OF AS-BUILT PLANS

CERTIFICATION OF AS-BUILT PLANS

Give the name of firm posted posting the finals

name and contractor bridge

Give date the finals are

Give the address of who built the

As-Built - Finals Posted

by _____ on _____

Contractor: _____

I certify that this set of plans accurately represents the work as constructed.

Printed Name: _____

Signature: _____
((Title of Engineer of record))

_____ Name of firm

The printed name, signature and name of firm/locality employing the person certifying the finals to be placed here

This block and information shown shall be located on the title sheet of each set of bridge plans certifying that the as-built plans accurately reflect the final product.