

Chapter Eight
PROJECT DEVELOPMENT PROCESS

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Chapter Eight

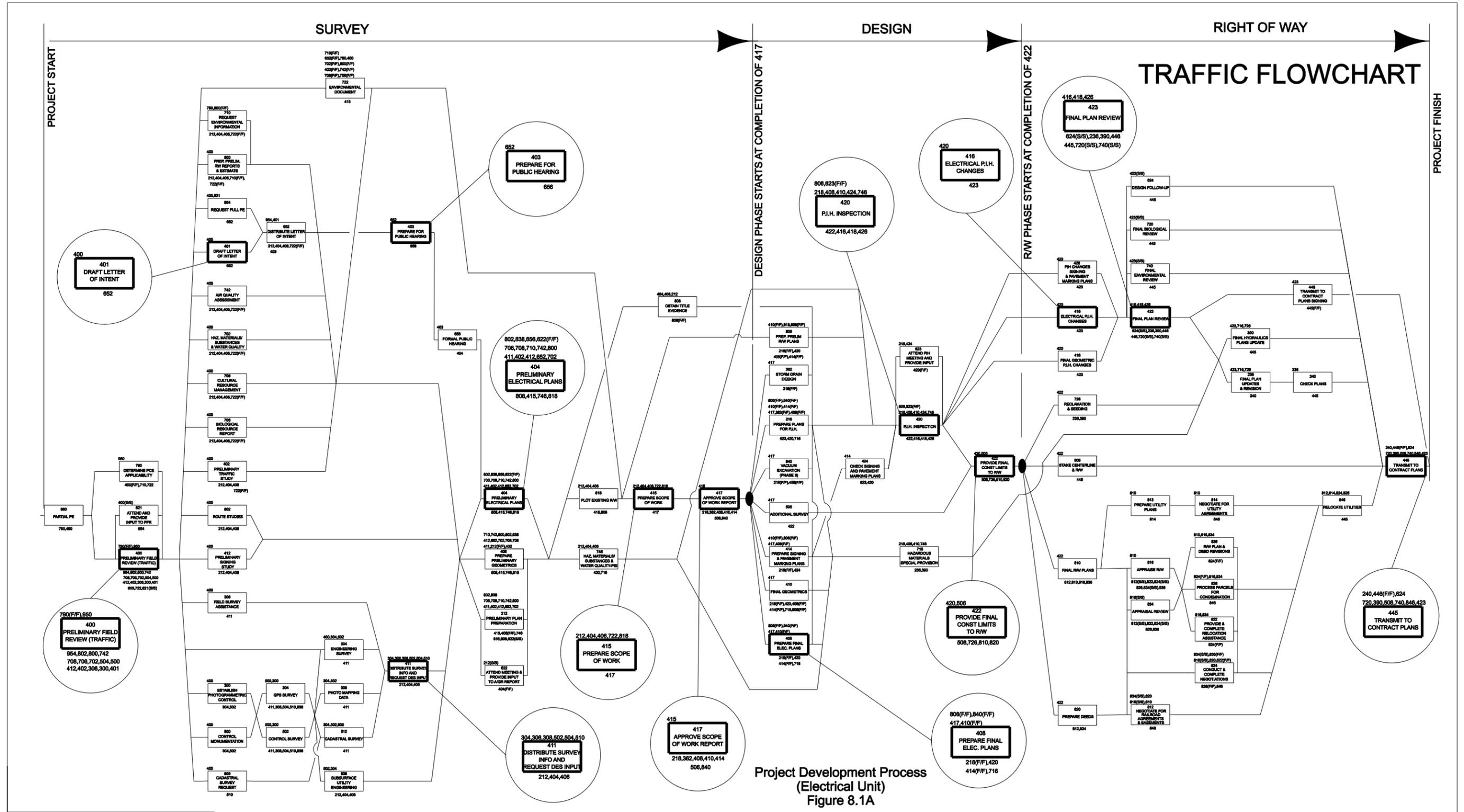
PROJECT DEVELOPMENT PROCESS (Management Unit 4400 — Electrical)

8.1 GENERAL

Figure 8.1A illustrates the basic project development approach used by MDT for a typical project. Chapter Eight discusses the activities of the Traffic Engineering Section's Electrical Unit within this project development process. For a complete description of the activities for all the Units and Sections, the user should review activity numbers and titles located on the Engineering Information Management Services Section webpage located on the Department's intranet. In using Chapter Eight, the user should consider the following:

1. Precedence Activity Network. The network or flowchart in Figure 8.1A is a precedence activity network. An "activity" occurs when a significant, discrete event occurs and/or when the responsibility for the project (activity) is transferred from one unit to another. The "precedence" nature of the network implies that an activity cannot occur until all activities preceding that one have been completed. However, the user must be aware that some flexibility is necessary to apply this network to project development.
2. Project Application. The network represents the typical process where the Electrical Unit would be involved in the project. Not every activity will be applicable to every project; i.e., some activities will represent "zero" time on relatively minor projects. Also, not all activities that may be required on a project are shown. However, the user should find that projects which are developed according to this process will have fewer management problems.
3. Lines of Communication. The rigid application of the network would lead to predetermined, precise points at which communication occurs between units. This is neither realistic nor desirable. Communication between units must be continuous. This will result in fewer problems and fewer "surprises" in project development.
4. Electrical Unit. The Electrical Unit's activities have been highlighted on the network shown in Figure 8.1A. Note that in some instances the Lead Design Group will be the Electrical Unit. In these cases, the Unit will need to closely review the project development process to ensure all appropriate activities are conducted.

5. Other Manual Chapters. The Montana Traffic Engineering Manual contains several other chapters which provide complementary information to [Chapter Eight](#). The designer should review these chapters for more information on the project development process. In particular, Chapter Eight should be used in combination with Chapter Nine “Project Coordination (Electrical).”
6. Position Definitions. For the use of this network, the following definitions for personnel positions or project roles will apply:
 - a. Project Design Manger. The Project Design Manager is the individual from the Lead Design Group assigned to oversee the project scoping and manage the project development. The Project Design Manager is the team leader responsible for the district in which the project is assigned. This individual directs or oversees the work of the subordinate design staff and is also responsible for a proportion of the direct design load.
 - b. Designer. The designer is the individual responsible for direct preparation of the specific plan package.



8.2 ACTIVITIES

8.2.1 Activity 400 — Preliminary Field Review Report

8.2.1.1 Purpose

The purpose of Activity 400 is to request, gather and develop information to define the project type, preliminary scope, project limits, major design features, right-of-way and utility issues and the process to be used for the projects' development. For the Electrical Unit, Activity 400 involves determining major traffic signal or highway lighting features, project-related issues and any potential problems.

The Preliminary Field Review Report documents the results of the Preliminary Field Review and request FHWA and/or in-house approval. [Section 2.1.2](#) documents the format, required content and distribution of the Preliminary Field Review Report.

8.2.1.2 Tasks

The Project Design Manager and/or designer are responsible for the following tasks:

1. conducting the Preliminary Field Review, see [Section 2.1.2](#) for a list of individuals who should attend the Preliminary Field Review;
2. determining the potential environmental impacts of all alternatives and a formulating a preliminary determination as to the level of environmental document required;
3. deciding the extent of field survey or mapping required;
4. reviewing the extent and mitigation of constructability issues; and
5. developing a Preliminary Field Review Report for all projects where an approved program has been received.

8.2.1.3 Preceding/Succeeding Activities

[Figure 8.2A](#) illustrates the preceding activities that should occur prior to Activity 400 and the succeeding activities that rely on the results of this activity. For additional guidance, see [Figure 8.1A](#).

Preceding Activities	Activity Description	Succeeding Activities	Activity Description
790	PCE Applicability	954	Request Full PE Program
		742	Air Quality Assessment
		702	Hazardous Mat./Subst. & Water Quality
		706	Biological Resource Report
		708	Cultural Resource Management
		800	Prepare Prelim. R/W Reports & Est.
		306	Field Survey Assistance
		300	Establish Photogrammetric Control
950	Prepare Project Development Schedule	500	Control Monumentation
		402	Preliminary Traffic Study
		412	Preliminary Signing Study
		504	Engineering Survey
		401	Draft Letter of Intent
		802	Route Studies
		722	Environmental Document
		805	Request Cadastral Survey
		621	Attend Meeting and Provide Input to PFR

**PRECEDING/SUCCEEDING ACTIVITIES
(ACTIVITY 400)**

Figure 8.2A

8.2.2 Activity 401 — Draft Letter of Intent

8.2.2.1 Purpose

The News Release outlines the general project scope, alerts various entities a project is being initiated and starts the information gathering process from the public to determine what concerns and impacts must be considered. On projects where significant outside input is anticipated, a Letter of Intent may be more appropriate than a News Release.

8.2.2.2 Tasks

The Project Design Manager or designer drafts the News Release or Letter of Intent and sends the draft to the Public Information Program. The Public Information Program finalizes and distributes the Letter of Intent or distributes the News Release.

8.2.2.3 Preceding/Succeeding Activities

Figure 8.2B illustrates the preceding activities that should occur prior to Activity 401 and the succeeding activities that rely on the results of this activity. For additional guidance, see [Figure 8.1A](#).

Preceding Activities	Activity Description	Succeeding Activities	Activity Description
400	Preliminary Field Review Report	652	Distribute News Release/ Letter of Intent

PRECEDING/SUCCEEDING ACTIVITIES (ACTIVITY 401)

Figure 8.2B

8.2.3 Activity 403 — Prepare For Public Hearing

8.2.3.1 Purpose

The purpose of Activity 403 is to develop and assemble displays and other information required to present the project at a Public Hearing. The information for the Public Hearing is developed after receiving the following information:

1. aerial photography and/or field survey,
2. approved draft or final environmental document, and
3. completion of alternative studies.

8.2.3.2 Tasks

The Project Design Manager and/or designer are responsible for the following tasks:

1. preparing the displays for the public hearing,
2. developing cost estimates for the alternative being considered, and
3. requesting the Public Information Program to schedule the Public Hearing.

8.2.3.3 Preceding/Succeeding Activities

Figure 8.2C illustrates the preceding activities that should occur prior to Activity 403 and the succeeding activities that rely on the results of this activity. For additional guidance, see [Figure 8.1A](#).

Preceding Activities	Activity Description	Succeeding Activities	Activity Description
652	Distribute News Release/Letter of Intent	656	Formal Public Hearing

PRECEDING/SUCCEEDING ACTIVITIES (ACTIVITY 403)

Figure 8.2C

8.2.4 Activity 404 — Preliminary Electrical Plans

8.2.4.1 Purpose

The purpose of Activity 404 is to prepare the preliminary traffic signal, flasher and/or highway lighting plans. These plans are distributed, as necessary, to the Right-of-Way — Utilities Section and to the Road Design Section for information and possible inclusion into these Sections' plans. [Chapter Three](#) and [Chapter Ten](#) present the Department's criteria on the preparation of traffic signals and highway lighting plans.

8.2.4.2 Tasks

The tasks involved with Task 404 typically include:

1. checking the Warrant Study,
2. obtaining the necessary utility information,
3. preparing the preliminary electrical plans,
4. determining the preliminary highway lighting alternatives, and
5. reviewing and determining the preliminary right-of-way needs.

8.2.4.3 Preceding/Succeeding Activities

[Figure 8.2D](#) illustrates the preceding activities that should occur prior to Activity 404 and the succeeding activities that rely on the results of this activity. For additional guidance, see [Figure 8.1A](#).

Project Type	Preceding Activities	Activity Description	Succeeding Activities	Activity Description
Bridge Replacement Project	562	Distribute Survey Info and Request Design Input	214	Prepare Scope of Work Report
			566	Bridge Scope of Work Report
Road Design Project	210	Distribute Survey Info and Request Design Input	214	Prepare Scope of Work Report
			566	Bridge Scope of Work Report
Traffic Engineering Project	702	Hazardous Mat./Subst. and Water Quality	417	Approve Scope of Work Report
	706	Biological Resource Report		
	708	Cultural Resource Management		
	742	Air Quality Assessment		
	402	Preliminary Traffic Study		
	800	Prepare Preliminary R/W Reports and Estimates		
	838	Subsurface Utility Engineering		
	802	Route Studies		
	710	Request Environmental Information		
	652	Dist. News Rel./Letter of Intent		
	411	Distribute Survey Info and Request Design Input		
	412	Preliminary Signing Study		
	656	Formal Public Hearing		
	622	Attend Meeting and Provide Input to Align/Grade Review		

**PRECEDING/SUCCEEDING ACTIVITIES
(ACTIVITY 404)**

Figure 8.2D

8.2.5 Activity 408 — Prepare Final Electrical Plans

8.2.5.1 Purpose

The purpose of Activity 408 is to prepare the final electrical design plans to be included with total project design plans that are reviewed in the Final Plan Review.

8.2.5.2 Tasks

The tasks involved with Activity 408 typically include:

1. reviewing the Scope of Work Report;
2. meeting and corresponding with local officials;
3. conducting field reviews or site inspections;
4. checking the capacity and operating potential;
5. coordinating the electrical plans with the utility companies;
6. coordinating the electrical plans with the Road Design Section;
7. coordinating the electrical plans with railroad companies;
8. determining the final highway lighting design;
9. completing the draft final plans, specifications and cost estimates; and
10. reviewing the plans for accuracy.

8.2.5.3 Preceding/Succeeding Activities

Figure 8.2E illustrates the preceding activities that should occur prior to Activity 408 and the succeeding activities that rely on the results of this activity. For additional guidance, see Figure 8.1A.

8.2.6 Activity 411 — Distribute Survey Information, Map File and Request Design Input

8.2.6.1 Purpose

The purpose of Activity 411 is to assemble the basic design data required to initiate the preliminary plan development.

8.2.6.2 Tasks

The tasks involved with Activity 411 typically include:

1. creating the map file,
2. notifying the pertinent Units that the map files is on the DMS, and
3. request design input.

Project Type	Preceding Activities	Activity Description	Succeeding Activities	Activity Description
Bridge Replacement Project	656	Formal Public Hearing	572	Bridge Plan-in-Hand Inspection
			220	Plan-in-Hand Inspection
	576	Approve Bridge Scope of Work	623	Attend PIH Meeting and Provide Input
Road Design Project	222	Approve Scope of Work Report	220	Plan-in-Hand Inspection
Traffic Engineering Project	410	Prepare Final Geometrics	420	Plan-in-Hand Inspection
			716	Hazardous Material Special Provisions
	417	Approve Scope of Work Report	218	Prepare Plans for Plan-in-Hand
			414	Prepare Signing and Pavement Marking Plans
Safety Project	968	Approve Scope of Work Report	806	Prepare Preliminary R/W Plans
	960	Design Preliminary Plans	988	Final Plan-in-Hand Inspection

**PRECEDING/SUCCEEDING ACTIVITIES
(ACTIVITY 408)**

Figure 8.2E

8.2.6.3 Preceding/Succeeding Activities

Figure 8.2F illustrates the preceding activities that should occur prior to Activity 411 and the succeeding activities that rely on the results of this activity. For additional guidance, see Figure 8.1A.

8.2.7 Activity 415 — Prepare Scope of Work Report

8.2.7.1 Purpose

The purpose of the Scope of Work Report is to document all major design features for the proposed project. Unless opposition is received, the Report will form the basis for all detailed design work required for the project. After concurrence from all applicable MDT Bureau Chiefs, the Scope of Work Report is distributed as discussed in Section 2.1.3. Section 2.1.3 also discusses the format and required content of the Report.

Preceding Activities	Activity Description	Succeeding Activities	Activity Description
304	GPS Survey	212	Preliminary Plan Preparation
306	Field Survey Assistance		
308	Photogrammetry Mapping Data	404	Preliminary Signal & Lighting Study
502	Control Survey		
504	Engineering Survey	406	Prepare Preliminary Geometrics
510	Cadastral Survey		

**PRECEDING/SUCCEEDING ACTIVITIES
(ACTIVITY 411)**

Figure 8.2F

8.2.7.2 Tasks

The tasks involved in developing the Scope of Work Report typically include:

1. gathering information from all applicable units, including:
 - a. preliminary utilities evaluation,
 - b. geometrics scoping,
 - c. signing and markings inventory,
 - d. identification of any highway/railroad grade crossing impacts,
 - e. preliminary results of any coordination with outside agencies,
 - f. gathering of traffic data,
 - g. geotechnical considerations,
 - h. right-of-way acquisition needs,
 - i. field survey,
 - j. initial environmental determination,
 - k. initial hydraulics review,
 - l. proposed temporary traffic control,
 - m. input from the public, and
 - n. processing of any proposed design exceptions;
2. determining the cost estimate, see [Section 4.3](#);
3. preparing the Scope of Work Report;
4. distributing the Report for comment; and

5. submitting the final Scope of Work report to the Chief Engineer, Engineering Division for approval.

8.2.7.3 Preceding/Succeeding Activities

Figure 8.2G illustrates the preceding activities that should occur prior to Activity 415 and the succeeding activities that rely on the results of this activity. For additional guidance, see [Figure 8.1A](#).

Preceding Activities	Activity Description	Succeeding Activities	Activity Description
212	Preliminary Plan Preparation	417	Approve Scope of Work Report
404	Preliminary Signal and Lighting Study		
406	Prepare Preliminary Geometrics		
722	Environmental Document		
818	Plot Existing Right-of-Way		

PRECEDING/SUCCEEDING ACTIVITIES (ACTIVITY 415)

Figure 8.2G

8.2.8 Activity 416 — Electrical Plan-in-Hand Changes

8.2.8.1 Purpose

The purpose of Activity 416 is to prepare the final electrical plans and incorporate the changes and corrections from the Plan-in-Hand review. These plans, along with the specifications and cost estimate, are sent to Contract Plans Bureau for processing. For guidance on preparing contract documents for processing, see [Chapter Four](#).

8.2.8.2 Tasks

The tasks involved in developing the final plans include:

1. reviewing all related electrical related plans;
2. making all necessary corrections and changes;

3. finalizing the plans, special provisions and cost estimates; and
4. reviewing the contract documents for accuracy.

8.2.8.3 Preceding/Succeeding Activities

Figure 8.2H illustrates the preceding activities that should occur prior to Activity 416 and the succeeding activities that rely on the results of this activity. For additional guidance, see [Figure 8.1A](#).

Project Type	Preceding Activities	Activity Description	Succeeding Activities	Activity Description
Bridge Replacement Project	220	Plan-in-Hand Inspection	230	Final Plan Review
	572	Bridge Plan-in-Hand Inspection		
Road Design Project	220	Plan-in-Hand Inspection	230	Final Plan Review
	572	Bridge Plan-in-Hand Inspection		
Traffic Engineering Project	420	Plan-in-Hand Inspection	423	Final Plan Review
Safety Project	924	Req. Prelim. Util. and/or R/W Est.	998	Final Plan Review

PRECEDING/SUCCEEDING ACTIVITIES (ACTIVITY 416)

Figure 8.2H

8.2.9 Activity 417 — Approve Scope of Work Report

8.2.9.1 Purpose

The Scope of Work Report defines the project scope, design criteria and special features. For information on the content of the Scope of Work Report, see [Section 2.1.3](#).

8.2.9.2 Tasks

Once the Chief Engineer, Engineering Division approves the Scope of Work Report, it then distributed to all applicable individuals involved in the projects. See [Section 2.1.3](#) for the distribution list of the Scope of Work Report.

8.2.9.3 Preceding/Succeeding Activities

Figure 8.2I illustrates the preceding activities that should occur prior to Activity 417 and the succeeding activities that rely on the results of this activity. For additional guidance, see [Figure 8.1A](#).

Preceding Activities	Activity Description	Succeeding Activities	Activity Description
415	Prepare Scope of Work	218	Prepare Plans for Plan-in-Hand
		362	Storm Drain Design
		408	Prepare Final Electrical Plans
		410	Prepare Final Geometrics
		414	Prepare Prelim. Signing and Pavement Markings Plans
		506	Additional Survey
		840	Vacuum Excavation (Phase II)

PRECEDING/SUCCEEDING ACTIVITIES (ACTIVITY 417)

Figure 8.2I

8.2.10 Activity 420 — Plan-in-Hand Inspection

8.2.10.1 Purpose

The purpose of Activity 420 is to ensure the design criteria have been met and incorporated into the plans. After completion of the Plan-in-Hand Inspection, the designer will prepare the Plan-in-Hand Report. For guidance on the preparation and distribution of the Plan-in-Hand Report, see [Section 2.1.4](#).

8.2.10.2 Tasks

The tasks involved in Activity 420 typically include:

1. The designer prepares the plans and related information for the Plan-in-Hand Inspection.
2. The Project Design Manager and/or designer develop the cover letter setting the proposed date for the Plan-in-Hand Inspection and distribute prints of the plans and related information.
3. The Project Design Manager conducts the office and field review of the Plan-in-Hand plans and obtains decisions on design details in sufficient detail to prepare final construction plans.
4. The designer prepares the Plan-in-Hand Report documenting the decisions made and further studies agreed upon during the Plan-in-Hand Inspection.
5. The Project Design Manager submits the Plan-in-Hand Report to the Traffic and Safety Bureau Chief and requests approval.
6. The approved Plan-in-Hand Report is distributed and comments requested by a specific date.
7. The Project Design Manager receives comments and approval of the Plan-in-Hand Report, amends the Report, if required, and redistributes.

8.2.10.3 Preceding/Succeeding Activities

[Figure 8.2J](#) illustrates the preceding activities that should occur prior to Activity 420 and the succeeding activities that rely on the results of this activity. For additional guidance, see [Figure 8.1A](#).

Preceding Activities	Activity Description	Succeeding Activities	Activity Description
408	Prepare Final Electrical Plans	422	Final Construction Limits to R/W
746	Haz. Matl'/Subs & Water Quality PSI		
410	Prepare Final Geometrics	416	Electrical Plan-in-Hand Changes
218	Prepare Plans for Plan-in-Hand		
806	Prepare Preliminary R/W Plans	418	Final Geometric Plan-in-Hand Changes
424	Check Signing and Pavement Marking Plans		
623	Attend PIH Meeting and Provide Input	426	PIH Changes Signing and Pavement Marking Plans

**PRECEDING/SUCCEEDING ACTIVITIES
(ACTIVITY 420)**

Figure 8.2J

8.2.11 Activity 422 — Provide Final Construction Limits to Right-of-Way Bureau

8.2.11.1 Purpose

The purpose of Activity 422 is to provide the Right-of-Way Bureau with plans indicating the final construction limits. Based on these plans, the Right-of-Way Bureau will implement the right-of-way process. If necessary, the Right-of-Way Bureau will prepare a separate set of right-of-way plans. From these the Bureau, will implement the right-of-way functions of appraisal, negotiation, acquisition, relocation and, if necessary, condemnation. The Right-of-Way Bureau will also negotiate the terms of any construction permits, permanent right-of-way easements, temporary right-of-way easements and identify access control limits.

8.2.11.2 Tasks

The designer finalizes the design and provides the final construction limits to the Right-of-Way Bureau.

8.2.11.3 Preceding/Succeeding Activities

Figure 8.2K illustrates the preceding activities that should occur prior to Activity 422 and the succeeding activities that rely on the results of this activity. For additional guidance, see [Figure 8.1A](#).

Preceding Activities	Activity Description	Succeeding Activities	Activity Description
420	Plan-in-Hand Inspection	508	Stake Centerline and R/W
		726	Reclamation and Erosion Control
506	Additional Survey	810	Prepare Final R/W Plans
		820	Prepare Deeds

PRECEDING/SUCCEEDING ACTIVITIES (ACTIVITY 422)

Figure 8.2K

8.2.12 Activity 423 — Final Plan Review

8.2.12.1 Purpose

The purpose of Activity 423 is to ensure the agreed to changes from the Plan-in-Hand Inspection have been incorporated into the final plans and to receive recommendations on any unresolved issues. After the review, the designer will prepare the Final Plan Review Report. For guidance on the preparation and distribution of the Final Plan Review Report, see [Section 2.1.5](#).

8.2.12.2 Tasks

The tasks involved in Activity 423 typically include:

1. The designer prepares the plans and related information for the Final Plan Review.
2. The Project Design Manager and/or designer develop the cover letter setting the proposed due date for comments and distributes prints of the plans and related information.
3. The Project Design Manager offers anyone on the distribution the opportunity to have a meeting to consider suggestions and comments relative to the project.

8.2.12.3 Preceding/Succeeding Activities

Figure 8.2L illustrates the preceding activities that should occur prior to Activity 423 and the succeeding activities that rely on the results of this activity. For additional guidance, see [Figure 8.1A](#).

Preceding Activities	Activity Description	Succeeding Activities	Activity Description
416	Electrical Plan-in-Hand Changes	390	Final Hydraulics Plans Update
		236	Final Plan Updates and Revisions
418	Final Geometric Plan-in-Hand Changes	740	Final Environmental Review
		720	Final Biological Review
426	PIH Changes Signing and Pavement Marking Plans	446	Transmit to Contract Plans - Signing
		624	Design Follow-Up
		445	Transmit to Contract Plans - Electrical

PRECEDING/SUCCEEDING ACTIVITIES (ACTIVITY 423)

Figure 8.2L

8.2.13 Activity 445 — Transmit to Contract Plans Bureau — Electrical

8.2.13.1 Purpose

Upon completion of the construction plans, quantities, special provisions and cost estimate, these contract documents are submitted to the Contract Plans Bureau for processing for letting. For guidance on the preparation of contract plans, see [Chapter Three](#) and [Ten](#). For guidance on the preparation of quantities, special provisions and cost estimates, see [Chapter Four](#).

8.2.13.2 Tasks

The tasks involved in Activity 445 typically include:

1. The designer verifies that the CADD CPB file for printing of the construction plans is complete and correct.

2. The designer transmits a cover memorandum, quantities, special provisions and cost estimate by email to the Contract Plans Bureau.

8.2.13.3 Preceding/Succeeding Activities

Figure 8.2M illustrates the preceding activities that should occur prior to Activity 445 and the succeeding activities that rely on the results of this activity. For additional guidance, see [Figure 8.1A](#).

Project Type	Preceding Activities	Activity Description	Succeeding Activities	Activity Description
Bridge Replacement Project	230	Final Plan Review	595	Transmit to Contract Plans
Road Design Project	230	Final Plan Review	245	Transmit to Contract Plans
Traffic Engineering Project	846	Relocate Utilities	None	N/A
	740	Final Environmental Review		
	508	Stake Centerline and R/W		
	390	Final Hydraulics Plan Update		
	720	Final Biological Review		
	446	Transmit to Contract Plans – Signing		
	240	Check Plans		
	624	Design Follow-Up		
	423	Final Plan Review		
Safety Project	240	Check Plans	995	Transmit to Contract Plans

PRECEDING/SUCCEEDING ACTIVITIES (ACTIVITY 445)

Figure 8.2M