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Chapter 1
MDT ORGANIZATION

Chapter 1 discusses the organization and functional responsibilities of:

- the units within the Geotechnical Section, and
- selected units within the Montana Department of Transportation.

1.1 GEOTECHNICAL SECTION

The Geotechnical Section is responsible for all subsurface investigations and geotechnical engineering analyses required for Department highway projects and, in coordination with other MDT units, the design of all highway geotechnical features. This applies fully to the State-maintained system and, for the locally maintained system, off-System bridges that are being designed and constructed with Federal and/or State funds.

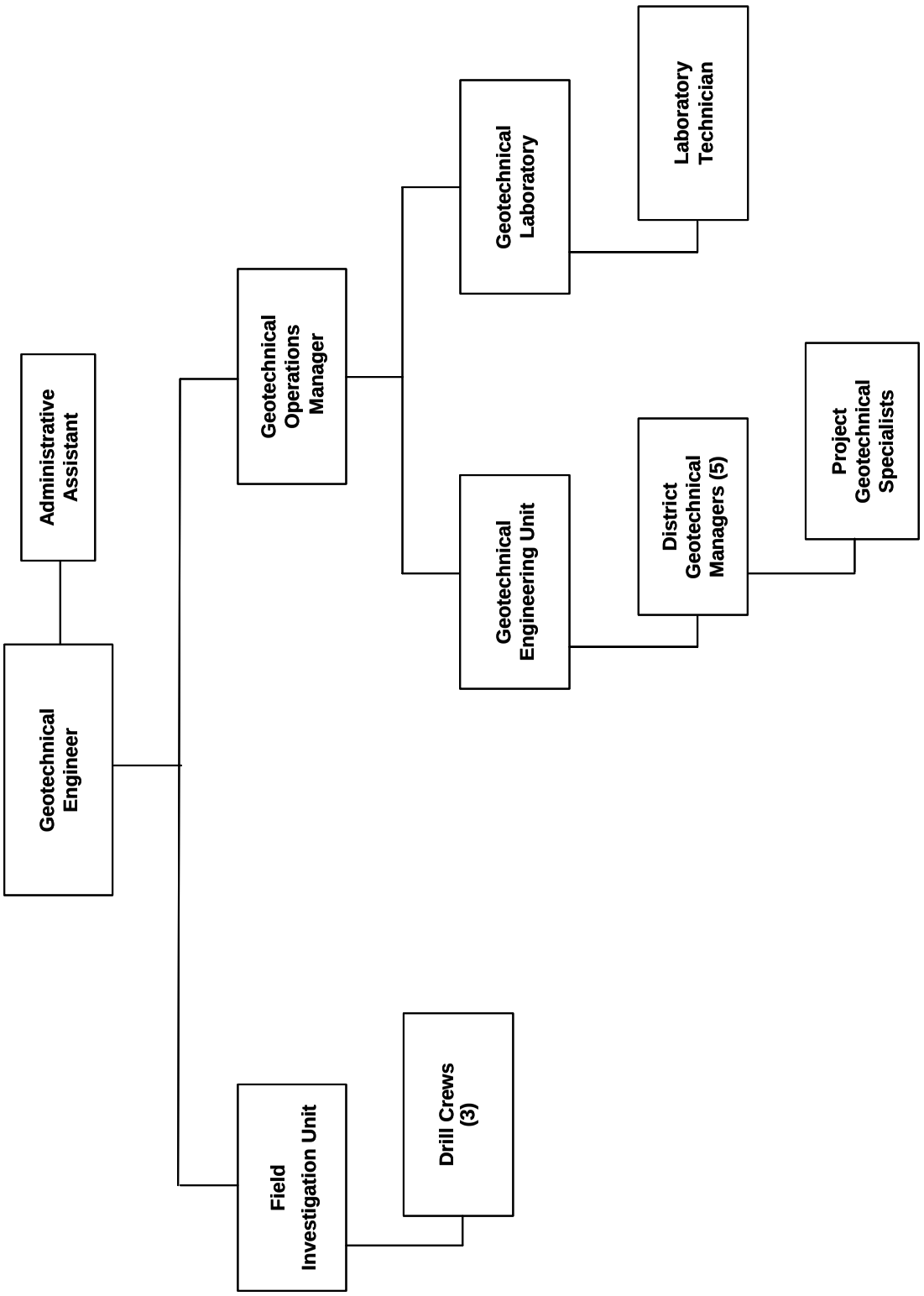
Figure 1.1A presents the organizational structure of the Geotechnical Section. The figure presents the functional units within the Section. The following discusses the specific responsibilities of each functional unit in Figure 1.1A.

1.1.1 Geotechnical Engineer

The Geotechnical Engineer is responsible for the overall administrative/management/ engineering activities of the Geotechnical Section. The Geotechnical Engineer establishes overall Department geotechnical policies and determines the Section's coordination with units outside of the Geotechnical Section.

The functional responsibilities of the Geotechnical Engineer are to:

- develop work programs for geotechnical activities based on the Department's project schedules.
- direct the use of the available manpower within the Geotechnical Section;
- participate in professional organizations related to geotechnical engineering (AASHTO, TRB) to represent the Department's interests and concerns;
- oversee the development of:
  - + *Standard Specifications* related to geotechnical items,
  - + special provisions related to geotechnical items,
  - + geotechnical engineering criteria, and
  - + the *MDT Geotechnical Manual*;
- represent the Department in all litigation related to geotechnical issues;



MDT GEOTECHNICAL SECTION

Figure 1.1A

- remain abreast of the key geotechnical issues on individual MDT projects;
- initiate special studies;
- oversee coordination with other MDT units;
- approve Geotechnical Reports;
- approve geotechnical designs; and
- determine the need for geotechnical contractors and consultants and oversee the consultant selection process.

1.1.2 Geotechnical Operations Manager

The Geotechnical Operations Manager is responsible for administering the operations and activities of the Geotechnical Engineering Unit and the Geotechnical Laboratory, as well as numerous subprograms (e.g., Environmental Review, Consultant Design Review, Specification Development, Legal Review, Construction and Maintenance Support) as they relate to the Geotechnical Section. The Geotechnical Operations Manager also:

- directs and oversees the implementation of various design, consultant review, research and development and related projects;
- manages project budgets, timelines and procedures;
- manages consultant geotechnical term contracts;
- manages rock fall and mitigation projects; and
- performs a variety of other duties as assigned.

The Geotechnical Operations Manager also assists the Geotechnical Engineer as needed.

1.1.3 Field Investigation Unit

The Field Investigation Unit includes three Drill Crews that are responsible for all in-house subsurface geotechnical investigations and geotechnical field tests for MDT highway projects. Chapter 8 presents an in-depth discussion on MDT geotechnical practices. Under the direction of the Geotechnical Engineer and/or Geotechnical Operations Manager, the following summarizes the functional responsibilities of the Field Investigation Unit:

1. Pre-Field Work. The Unit performs the pre-field investigation activities related to subsurface investigations, which include:
    - processing right-of-entry forms,
    - contacting affected landowners before entering property,

- arranging for control of traffic,
- acquiring any necessary permits,
- ensuring that the utilities location checks have been performed, and
- coordinating with any affected railroad companies.

2. Field Work. The Unit performs the subsurface investigation field work, which includes:

   - based on direction from the District Geotechnical Managers or the project geotechnical specialists identifying the location of all borings;
   - selecting and transporting the appropriate drill rig equipment to the site;
   - preparing the site for drilling;
   - extracting the soil and rock samples;
   - performing the necessary field in-situ tests on the samples;
   - preparing and transporting the field samples back to Helena if a project geotechnical specialist is not on site;
   - where applicable, performing the necessary field work for installation of piezometers, monitoring/observation well installations, inclinometers and other instrumentation; and
   - as practical, restoring the borehole site to its original condition.

3. Post-Field Work. The Geotechnical Engineering Unit performs the post-field work for subsurface investigations, which includes presenting the field data on the Boring Log.

1.1.4 Geotechnical Lab

As part of the geotechnical engineering unit, the Geotechnical Lab is responsible for conducting all necessary laboratory tests to identify the engineering properties that are needed by the project geotechnical specialists to conduct their engineering analyses and design. Chapter 9 "Laboratory Testing" presents an in-depth discussion on the lab testing responsibilities for the Geotechnical Lab. The Physical Test Section conducts various index tests (e.g., grain size, Atterberg limits, asphalt, chemical tests).

The following summarizes the responsibilities of the Geotechnical Lab:

- ensuring the proper handling and storage of the field samples in the lab;
- performing specific soil tests (e.g., unit weight, moisture content, specific gravity) in support of the engineering property tests;

- performing the laboratory tests to identify the engineering properties of the field samples, including:

  + strength,
  + compressibility or swell, and
  + permeability; and

- reporting the laboratory test results to the District Geotechnical Managers or project geotechnical specialists.

1.1.5 Geotechnical Engineering Unit

A District Geotechnical Manager is assigned to each of the five geographic MDT Districts:

- Butte,
- Glendive,
- Billings,
- Great Falls, and
- Missoula.

A project geotechnical specialist is also assigned to each District. These specialists include both geotechnical engineers and engineering geologists. The Geotechnical Engineer has the flexibility to assign the Unit's personnel to any geotechnical district considering, for example, workload and special geotechnical expertise.

The District Geotechnical Managers and their project geotechnical specialists serve as the focal points for all project-specific activities performed by the MDT Geotechnical Section. With assistance from the project geotechnical specialists, the Managers are responsible for:

- planning the geotechnical work to meet specific project needs;

- directing the Field Investigation Unit in its subsurface investigations;

- attending and monitoring on-site the work of the Drill Crews;

- directing and monitoring the work of the Geotechnical Lab; and

- performing the geotechnical engineering evaluation, analysis and design based on Part III of the *MDT Geotechnical Manual* for the following:

  + pavement subgrade,
  + roadway slopes and embankments,
  + bridge foundations,
  + earth retaining systems,
  + seismic design, and
  + geosynthetics.

In addition to the above geotechnical responsibilities in preconstruction, the District Geotechnical Managers and their project geotechnical specialists are the primary point of contact between the MDT field construction personnel and the Geotechnical Section. In this capacity, the Managers serve as "technical advisors" to the Project Managers on geotechnical issues related to:

- review of plans and specifications,
- interpretation of special provisions,
- response to RFIs,
- evaluation of contractor claims,
- review of change orders,
- preparation of reports/documentation,
- develop and interpret of instrumentation,
- verification of deep and shallow foundation capacity, and
- construction problems/issues.

Chapter 22 discusses the role of the Geotechnical Section during construction in detail.

1.1.6 Administrative Assistant

The Administrative Assistant is available to all personnel within the Geotechnical Section to perform a variety of administrative, clerical and technical support functions. The Administrative Assistant:

- directly assists the project geotechnical specialist in the:
  - + development of budgets,
  - + management of Section personnel,
  - + administration of payroll activities,
  - + scheduling of meetings, and
  - + arranging travel for all Section personnel;
- maintains a variety of Section files, including project files, personnel files and correspondence files;
- prepares and processes purchase orders and vouchers payable (e.g., for office and engineering supplies, for travel);
- provides word processing services, when needed;
- assists with the preparation of GINT boring logs, as requested by the District Geotechnical Managers;
- processes all incoming and outgoing mail;
- performs miscellaneous errands as needed;

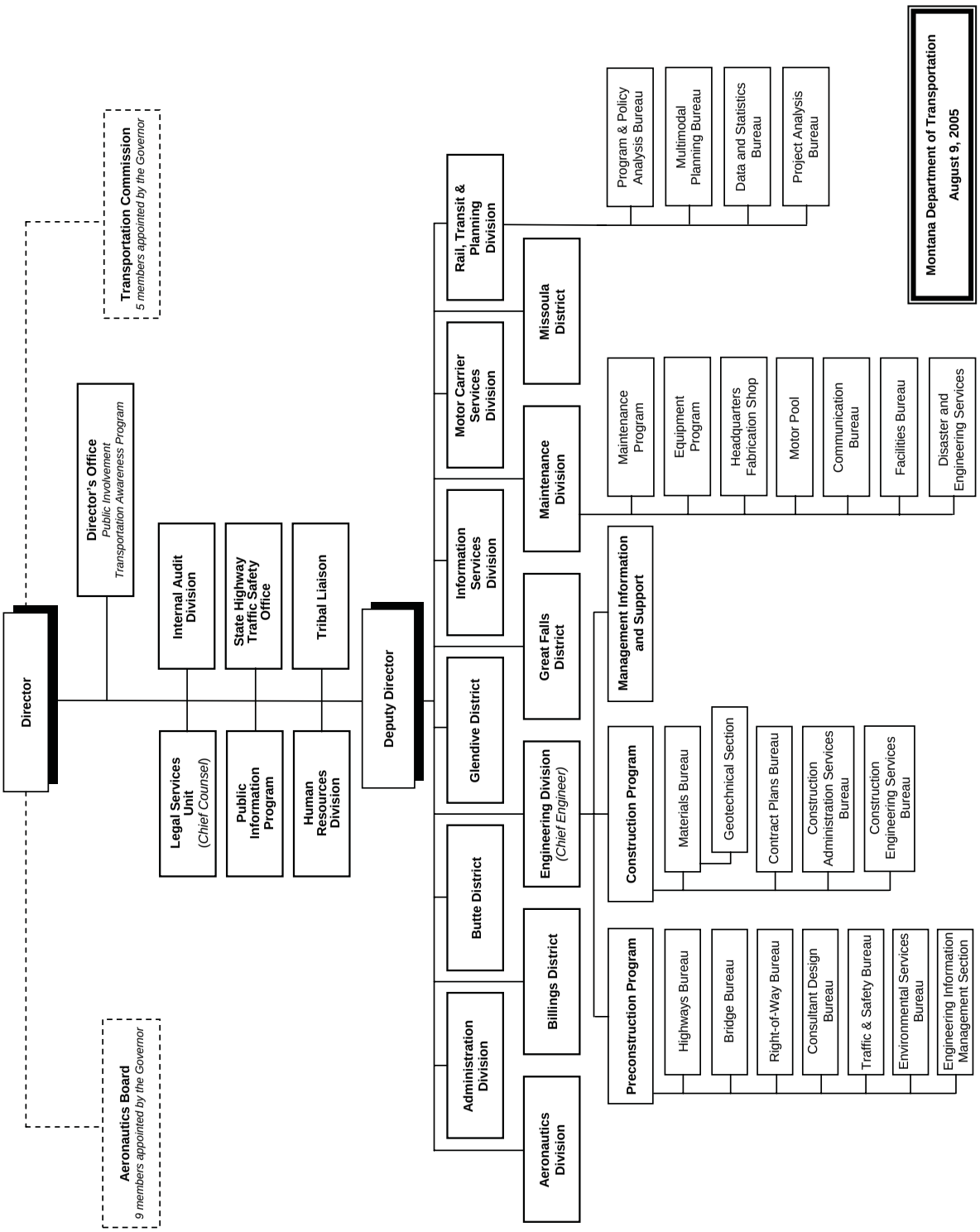
- maintains office supply inventory; and
- serves as a receptionist for the Geotechnical Section.

1.2 MDT UNITS

Section 1.2 discusses the functional responsibilities of selected units within MDT. Chapter 2 of the *MDT Geotechnical Manual* discusses the specific coordination between these units and the Geotechnical Section.

1.2.1 Organizational Chart

Figure 1.2A presents the organization of the Montana Department of Transportation as of August 9, 2005.



MONTANA DEPARTMENT OF TRANSPORTATION

Figure 1.2A

1.2.2 Director and Transportation Commission

The Transportation Commission is composed of members appointed by the Governor; the Commission reports to the Director of the Montana Department of Transportation. The duties and responsibilities of the Transportation Commission are delineated in the *Montana Code Annotated.*

1.2.3 District Offices

The Department maintains five District Offices based on geographic areas in the cities of Missoula, Butte, Great Falls, Glendive and Billings. The basic function of each District Office is to provide the necessary field services for the Department within their geographic boundaries. Some of the responsibilities include:

- maintaining the State highway system (e.g., snow removal, roadway and bridge maintenance);
- providing construction inspection for Department construction projects;
- nominating projects for capital improvements and identifying the Project Scope of Work;
- designing selected projects;
- reviewing and approving requests for private access onto the State highway system;
- serving as liaison between the local governments and Department Central Office;
- performing field surveys;
- performing soils surveys;
- scheduling and conducting public hearings and public informational meetings;
- reviewing and commenting on the proposed traffic control plan during construction;
- assisting in the preparation of construction cost estimates;
- responding to public inquiries; and
- assisting in the maintenance of the Department's Sign Inventory.

1.2.4 Preconstruction Program

This Section briefly discusses the functions and responsibilities of the Bureaus and Sections within the Preconstruction Program.

1.2.4.1 Highways Bureau

The Highways Bureau is responsible for all technical activities on highways from the time a project is programmed until the start of actual construction.

1.2.4.1.1 Road Design Section

The Road Design Section is responsible for all capital improvement projects for which the Section serves as the lead unit for project development. The Section has five Area Engineers who are assigned to each of the five geographic Districts within the State. The functions of the Section include:

- coordinating all activities necessary for the design of a roadway project (e.g., surveying, geotechnical, environmental, right-of-way, hydraulics, traffic engineering, bridge);
- preparing the detailed roadway design plans, quantities, special provisions, etc., to advance the project to advertisement;
- maintaining the Department's *Detailed Drawings*, which documents the details for roadway design elements;
- providing road design support as needed on projects for which another Department unit is lead (e.g., roadway approaches for bridge replacement projects);
- developing and promulgating Department policies and procedures on road design issues (e.g., sidewalk warrants, roadside barrier end treatments, geometric design policies); and
- maintaining the Department's *Road Design Manual*.

1.2.4.1.2 Hydraulics Section

The Hydraulics Section is responsible for the hydrologic and hydraulic analyses for roadway drainage appurtenances and bridge waterway openings. The Section's responsibilities include:

- developing and promulgating Department policies and procedures on hydraulics (e.g., hydrologic methods, hydraulic scour, culvert hydraulics, design of closed drainage systems);
- providing hydraulics input to the project lead units (e.g., Road Design Section, Bridge Bureau) as needed during project development;
- evaluating proposed project features to be consistent with FEMA-adopted floodplain regulations and obtaining floodplain permits from local jurisdictions as required;
- coordinating and providing input to the Environmental Services Bureau for environmentally sensitive hydraulic designs, and providing technical input and background on designs as needed to assist in obtaining environmental permits;

- determining field surveying needs for hydraulic analyses and working with the District Offices to secure the field information;
- providing technical assistance on hydraulics as needed to other Department units;
- evaluating existing bridges for scour problems and recommending scour countermeasures for scour-critical structures; and
- reviewing consultant design project submittals and recommending approvals and/or revisions regarding hydraulic-related design.

1.2.4.1.3 Photogrammetry and Survey Section

The Photogrammetry and Survey Section, in combination with the District field survey crews, is responsible for all surveying needs required for the Department's program of projects. The Section's responsibilities include:

- developing and promulgating Department policies and practices for surveying activities on Department projects for both design and construction;
- maintaining survey datums and coordinate systems for a reference or base for all surveys in the State;
- checking the District's control traverse survey data and plotting the control traverse diagram;
- coordinating as necessary with the National Geodetic Survey; and
- providing technical assistance on surveying as needed to other Department units and local jurisdictions.

1.2.4.2 Bridge Bureau

The Bridge Bureau is responsible for the design and operation of bridges and other structures on Montana's highway system, and provides input into the construction and maintenance of these structures. The following briefly discusses the sections within the Bridge Bureau.

1.2.4.2.1 Bridge Design Section

The Bridge Design Section manages and develops the Department's capital improvement program for new and rehabilitated bridges and other structures. This includes the coordination of preliminary design work among other Department Bureaus and Sections and the coordination of documents, approvals, permit acquisition, etc., that are necessary for project development. The Bridge Design Section has five Bridge Design Units, which are assigned to specific geographic regions within the State. The Units have the day-to-day responsibility to develop structural plans from project inception to PS&E advertisement. The following summarizes the specific functional responsibilities of the Bridge Design Section:

1. Bridges. Prepare in-house structural designs for all types of highway bridges including:

    - the determination of applicable loads to the bridge;
    - the design of concrete and steel superstructures (e.g., structural analysis, reinforcement, shear);
    - in coordination with the Geotechnical Section, the design of substructures and foundations (e.g., piers, bents, piles, footings, abutments);
    - in coordination with the Road Design Section, the geometric design of the structure (e.g., bridge widths, vertical clearances);
    - the design of bridge accessories (e.g., bridge rails, sidewalks, curbs, fencing, lighting, signing); and
    - the rehabilitation of existing bridges (e.g., condition surveys, bridge deck rehabilitation, superstructure rehabilitation).

2. Other Structures. Check in-house designs for bridges and other structures, including culverts, retaining walls (in coordination with the Geotechnical Section), sound barriers and, sometimes, supports for roadside appurtenances (e.g., signs, luminaires).

1.2.4.2.2 Bridge Management Section

The Bridge Management Section is responsible for the operational programs administered by the Department for the State's bridges. This includes:

- Bridge Management System (PONTIS),
- National Bridge Inspection Standards (NBIS),
- review of shop drawings,
- critical bridge maintenance, and
- seismic analysis.

1.2.4.3 Right-of-Way Bureau

The Right-of-Way Bureau is responsible for designing right-of-way, acquiring land for highway facilities, managing acquired land, and providing assistance and payments to individuals, businesses and utilities that are relocated as a result of highway construction. Right-of-way operations are partially decentralized. The administrative organization and all functional sections are located in the Department's headquarters in Helena. Field right-of-way operations are performed by personnel working in the Right-of-Way sections of the five District Offices. The Right-of-Way Bureau includes the following:

- Appraisal Section,
- Acquisition Section,
- Design/Plans Section,

- Real Estate Services Section,
- Special Programs Section,
- Access Management Section, and
- Utilities Section.

1.2.4.4 Consultant Design Bureau

The Consultant Design Bureau manages consultant projects including coordinating design work between consultants and the MDT, compiling road plan packages and obtaining, reviewing and distributing consultant work products. The Bureau also manages the Community Transportation Enhancement Program (CTEP). Consultant services include but are not limited to:

- road design,
- bridge design,
- traffic engineering,
- location surveys and ground control,
- legal land surveys and monumentation,
- hydraulics,
- soils and pavements,
- geotechnical,
- materials,
- utilities,
- construction,
- exploration, and
- environmental issues.

1.2.4.5 Environmental Services Bureau

The basic function of the Environmental Services Bureau is to provide guidance for all units within the Department on all environmental issues. Environmental issues normally include Federal and State environmental laws, and the Bureau represents the Department on these laws with other agencies, States and private entities.

1.2.4.5.1 Engineering Section

The Engineering Section is directly involved with the project lead unit in project development to ensure that the project complies with Federal and State environmental laws and regulations. The Section's responsibilities include:

- determining the application of the National Environmental Policy Act (NEPA) to all Department projects;

- the need for early coordination with other State and Federal agencies and initiating contacts;

- identifying and contacting the cooperating agencies;
- preparing or reviewing the environmental document;
- coordinating with the applicable State or Federal agency to secure the necessary project permits/approvals, including:
    + Section 404 permit,
    + Section 401 certification,
    + Section 402 (NPDES) permit,
    + farmland preservation impacts (NRCS), and
    + Stream Preservation Act (SPA) permit.
- reviewing and commenting on the plan for temporary erosion control during construction.

1.2.4.5.2 Resources Section

The Resources Section is responsible for identifying all environmental resources within the proposed project limits and for evaluating the potential project impacts on these resources. The Bureau's responsibilities include:

- conducting environmental surveys and inventories or supervising contractor's surveys and inventories;
- evaluating potential project impacts on biological resources, including:
    + wetlands,
    + fish habitat,
    + water quality, and
    + threatened and endangered species;
- evaluating potential project impacts on cultural resources, including:
    + historical,
    + archaeological, and
    + socio-economic.

1.2.4.5.3 Hazardous Waste Section

The Hazardous Waste Section is responsible for identifying and evaluating various potential project impacts, including:

- evaluating the potential project impacts on air quality,
- evaluating the potential noise impacts,
- identifying hazardous waste sites and determining the needed mitigation measures, and
- implementing the Montana clean-up program for underground storage tanks.

1.2.4.6 Traffic and Safety Bureau

1.2.4.6.1 Traffic Engineering Section

The Traffic Engineering Section is responsible for:

- traditional traffic engineering activities (e.g., signals, signing, speed studies);
- selected geometric design elements (e.g., intersections, interchanges); and
- detailed design of safety improvement projects.

1.2.4.6.2 Safety Management Section

The Safety Management Section is responsible for three major Department functions:

- Safety Improvement Program,
- Crash Surveillance System, and
- Safety Management System.

1.2.4.6.3 Rail/Highway Safety

The Rail/Highway Safety Section is responsible for identifying appropriate safety improvements to public highway-rail grade crossings to reduce the number of train vehicle collisions across the State.

1.2.5 Construction Program

This Section briefly discusses the functions of the Construction Program within the Engineering Division.

1.2.5.1 Materials Bureau

The Materials Bureau is responsible for ensuring the quality of all materials, through testing and certification, pavement and geotechnical design incorporated into the State highway system. The Geotechnical Section is within the Materials Bureau; see Section 1.1 for a discussion on the Geotechnical Section. The following summarizes the functions of the other Sections within the Bureau.

1.2.5.1.1 Physical Testing Section

The primary responsibility of the Physical Testing Section is to perform the laboratory testing of all materials required for construction, either through providing guidance to the District labs or performing the testing itself. The Section also performs many of the basic Index Tests for field samples collected by the Geotechnical Section. All testing is based on the AASHTO *Standard Specifications for Transportation Materials and Methods of Sampling and Testing (Parts I & II)*, adapted for application in Montana. The Physical Testing Section is also responsible for

conducting lab inspections and maintaining the *Materials Manual*. The tests include but are not limited to:

- chemical,
- quality control,
- asphalt,
- concrete/aggregates, and
- geosynthetics.

1.2.5.1.2 Materials Services Section

This Section is responsible for:

- determining the pavement design for Department projects;
- conducting non-destructive testing on existing pavements to determine, for example, the bearing capacity of the existing pavement structure;
- providing quality control and certification for materials used in Department projects; and
- determining the need for any new materials and/or experimental items in the project and developing the specifications and special provisions for the items.

1.2.5.1.3 Pavement Management Section

This Section operates the Department's Pavement Management System (PMS). The overall objective of the PMS is to develop a strategy for the preservation and improvement of the pavement structures on the State highway system that optimizes the Department's expenditure of funds on pavements.

1.2.5.2 Contract Plans Bureau

The Contract Plans Bureau lets to contract all highway projects in Montana. The Bureau:

- completes and produces final engineering documents, plans, specifications and estimates;
- advertises, amends, lets to contract and recommends the award of contracts;
- completes the award process for a multitude of civil engineering and highway construction projects for the Department;
- maintains and distributes detailed drawings, plan holders lists, standard road and bridge specifications and posts to website; and
- is responsible for revising, maintaining and updating the Contract Management System (CMS) and other automated systems associated with the contract letting process.

1.2.5.3 Construction Administration Services Bureau

The Construction Administration Services Bureau is responsible for planning and administering construction program operations and contract administration activities including:

- developing and implementing new standards and methods;
- ensuring that projects in development reflect the most recent standards for administration purposes;
- directing the development and administration of construction and contract administration computer programs and automated systems; and
- managing the Department's general construction staffing and equipment budgets.

1.2.5.4 Construction Engineering Services Bureau

The Construction Engineering Services Bureau is responsible for:

- issuing direction on technical construction issues;
- general construction issue resolution;
- construction oversight and uniformity;
- construction project review findings;
- implementation and follow-up of constructibility and post construction review findings;
- change orders;
- non-uniformity compliant resolution; and
- implementation of new construction processes, procedures and specifications.