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*MONTANA DEPARTMENT OF
TRANSPORTATION*

ROAD DESIGN MANUAL

Chapter Two
ROAD DESIGN COORDINATION

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Chapter Two

ROAD DESIGN COORDINATION

During the development of a road design project, the road designer must coordinate with many units internal and external to the Road Design Section. Chapter One presented a synopsis of the Project Management System (OPX2) in which the progress of transportation projects are tracked from inception to design to construction. Chapter Two outlines the Highways and Engineering Division and discusses the project development sequence including the responsibilities of the road designer to coordinate specific activities between Road Design and other units. Together, the two chapters will provide an understanding of the necessary interaction among the various units in project development

2.1 INTERNAL MDT UNITS

This section discusses the specific coordination responsibilities between the road designer and other MDT units. Figure 2.1A presents an organizational chart for the Highways and Engineering Division of the Montana Department of Transportation.

2.1.1 PRECONSTRUCTION

The Preconstruction Program is comprised of the Highways, Traffic and Safety, Environmental Services, Right-of-Way, Consultant Design, and Bridge bureaus; and the Engineering Information Management Section.

2.1.1.1 Highways Bureau

The Highways Bureau is comprised of the Hydraulics, Photogrammetry and Mapping, and Road Design Sections. The Highways Bureau handles technical activities on highways from the time a project is programmed until the start of actual construction.

2.1.1.2 Hydraulics Section

The Hydraulics Section is responsible for hydrologic and hydraulic analyses for both roadway drainage appurtenances and bridge waterway openings. The following summarizes the coordination between the Road Design Section and Hydraulics Section:

1. Culverts. For all box culverts and all pipe culverts with diameters greater than 24” (600 mm), the Hydraulics Section will perform all work on the culvert design. This includes:
 - a. hydrological analysis to calculate design flow rate based on the drainage basin characteristics;
 - b. hydraulic analysis to select culvert dimensions and layout (e.g., longitudinal slope);
 - c. selection of culvert material (e.g., reinforced concrete, corrugated metal);
 - d. structural/service life design of the culvert; and
 - e. end treatments.

The road designer is responsible for the design of minimum-sized pipes [24 “ (600 mm)]. These may be judged to be adequate based on input from the District maintenance personnel that an existing 24” (600 mm) pipe culvert has performed adequately. However, the Hydraulics Section will provide assistance as required to support the decision to use a 24” (600 mm) culvert.

2. Storm Drainage Trunk Line. The road designer will present the proposed roadway design to the Hydraulics Section documenting, for example, pavement widths, cross slopes, longitudinal grades, location of intersecting roads and approaches, etc. Based on this information, the Hydraulics Section is responsible for all work related to the design of a closed drainage system. This includes:
 - a. flow calculations in the system,
 - b. pipe size and material (including optional material),
 - c. spacing of inlets,
 - d. pipe slopes, and
 - e. outfall location and design.

The road designer will determine the exact location of inlets to ensure that the inlets are located at low spots and to avoid conflicts with utilities, curb ramps, etc. The road designer will also calculate the quantities for the storm drain facility.

3. Irrigation/Sprinkler Systems. The Hydraulics Section is responsible for all designs related to an irrigation system (e.g., siphon details) for pipes larger than 18" (450 mm) in diameter and for the design of sprinkler systems. The road designer is responsible for relocating minor irrigation lateral ditches outside of the R/W. The Hydraulics Section will assist the road designer as required during the design of these minor irrigation facilities.
4. Roadside Ditches. The road designer determines the dimensions of the roadside ditch based on the criteria presented in Chapters Eleven and Twelve of the *Road Design Manual*. Typically, no analysis is performed to determine hydraulic capacity. However, where determined necessary, the Hydraulics Section will evaluate the potential for erosion in the ditch and, if needed, recommend a permanent protective lining.
5. FEMA Regulations. The Hydraulics Section is responsible for determining that the project design is consistent with regulations promulgated by the Federal Emergency Management Agency (e.g., development within regulatory flood plains).
6. Curb Ramps. To meet the requirements of the *Americans with Disabilities Act*, a project may require the installation of curb ramps which may, in turn, interfere with an existing curb inlet. In this case, the road designer and Hydraulics Section will work together to resolve the conflict.
7. Documentation. The following will apply to roadway drainage appurtenances:
 - a. The Hydraulics Section will submit the necessary information documenting its recommendations for the roadway drainage design.
 - b. The road designer will incorporate all details into the road design plans and cross sections.

The road designer will calculate all quantities for the roadway drainage appurtenances.

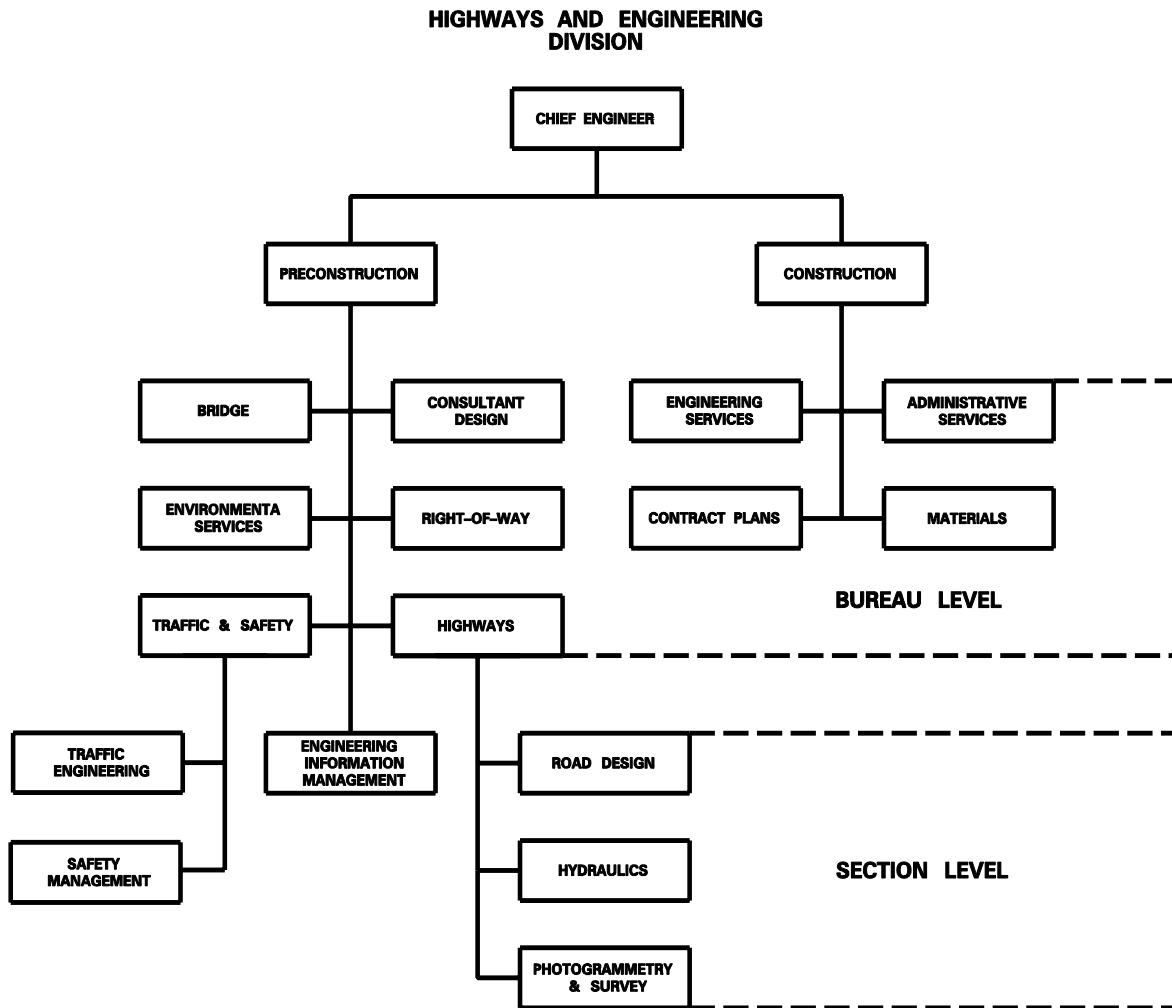


Figure 2.1A

2.1.1.3 Photogrammetry and Survey Section

The Photogrammetry and Survey Section is responsible for conducting aerial and field surveys, in coordination with the District Office, for all Department projects. The following summarizes the coordination with the Road Design Section:

1. Field Surveys. The decision that a field survey is needed is made at the Preliminary Field Review. The survey is then conducted by the District survey crews. The Survey Section checks the survey for accuracy and completeness. For data collector surveys, the information will be submitted in a MicroStation design file with a DGN extension. The road designer and surveyor will coordinate to finalize the DGN file and create the Digital Terrain Model file. The surveyor will place the file on the network, notify the road designer, and the road designer will notify the appropriate personnel that the survey information is available. For manually conducted surveys, the designer will be responsible for plotting the survey data using the Department's CADD system. In addition to the field notes, the designer should obtain a copy of the as-built plans (if available) for informational purposes. The as-built plans can be obtained at the MDT Central Office in Helena.
2. Aerial Surveys. The decision that an aerial survey is needed is made at the Preliminary Field Review. The Photogrammetry and Survey Section plots the necessary flight lines and requests that targets be provided. A District survey crew will conduct the control survey and will provide any needed additional survey information. The Photogrammetry and Survey Section will prepare a strip map and a digital terrain model of the project. The road designer will strip cross sections from the DTM as needed.
3. Control Diagram. The Photogrammetry and Survey Section checks the control survey data and then plots the control diagram. The road designer will retrieve the control plot and coordinates table for inclusion in the plans.

2.1.1.4 Traffic and Safety Bureau

The Traffic and Safety Bureau is responsible for managing and coordinating highway safety programs and for providing management, design and technical support with respect to traffic engineering within the department. The Bureau is responsible for developing and reviewing plans and specifications for highway safety projects including signing, geometric features, pavement marking, lighting, signals and hazard elimination.

2.1.1.5 Traffic Engineering Section

The Traffic Engineering Section is responsible for all capital improvement projects for which the Section serves as the lead unit, and the Section provides a variety of traffic engineering services to other Department units (e.g., traffic control devices, highway capacity analyses, traffic engineering studies). The following describes the road designer's coordination with the Traffic Engineering Section.

1. Traffic Control Devices. The Traffic Engineering Section is responsible for the selection, design and placement of all permanent traffic control devices within the project limits. This includes traffic signals, signs, pavement markings and highway lighting. The Section is also responsible for the structural design of supports for small signs, traffic signals and highway lighting appurtenances.

The Traffic Engineering Section will prepare the permanent traffic control plans. The road designer will review the traffic control plans for any potential conflicts with the roadway design. For example, the road designer will coordinate with the Traffic Engineering Section to ensure that the curb ramp locations do not interfere with the traffic control devices and that they are compatible with the pavement markings. The Traffic Engineering Section will also provide quantities for the pavement markings, which the road designer will incorporate into the summaries. The plans, quantities and special provisions for the remaining permanent traffic control devices will be submitted directly to the Contract Plans Bureau.

When railroad crossings are located within the project limits, coordination between the road designer, the Traffic Engineering Section and the Utilities Section will be necessary to ensure that an agreement with the railroad company for signing/signalization at the crossing is secured.

2. Geometrics. The following summarizes the coordination between the Traffic Engineering Section and road designer for the geometric design of a roadway:
 - a. Highway Capacity. The Traffic Engineering Section performs all needed highway capacity analyses for the project. This includes, for example, the warrants and limits of truck climbing lanes. The Traffic Engineering Section incorporates the results of its analyses into the design of intersections. The road designer incorporates the results into the design of other highway elements (e.g., number of lanes).
 - b. Intersections At-Grade. The Traffic Engineering Section performs all work on the geometric design of major intersections at-grade. The Section

- prepares all necessary detail sheets to clearly identify all geometric features. The road designer will place these in the final plans and will calculate all roadway quantities for intersection work. The Traffic Engineering Section will revise the details as needed.
- c. Interchanges. The Traffic Engineering Section determines the interchange type and basic geometric configuration, and the road designer prepares the detailed design of the interchange. Note that, for most interchange projects, the Road Design Section will be the lead.
 - d. Medians. The Traffic Engineering Section is responsible for selecting the median type and for determining the basic geometric dimensions of the median (e.g., width, location of openings, width of openings). The road designer prepares the detailed design of the median.
 - e. Other Geometric Design Features. The Traffic Engineering Section will review and comment on the other proposed geometric design features (e.g., horizontal and vertical alignment).
3. Traffic Engineering Investigations. The Road Design Section is responsible for reviewing the project to determine if any traffic engineering investigations are needed (e.g., speed studies, school zone studies). The Traffic Investigations Unit will collect and analyze the necessary data, review warrants and prepare a report on the findings. This investigation will include a review of potential conflicts with other projects.

2.1.1.6 Safety Management Section

The Safety Management Section is responsible for reviewing the crash history on projects. The review should identify correlations between crash characteristics and existing roadway features and should identify any crash cluster areas. The Section will provide the road designer with the crash data, collision diagrams and statistical trends for use in project design. The Safety Management Section is also responsible for reviewing the preliminary plans and providing comments on features which would improve the safety of the traveling public and the safety needs of special user groups.

2.1.1.7 Environmental Services Bureau

The Environmental Services Bureau is responsible for a variety of activities related to environmental impacts and procedures. This includes air, noise and water quality analyses; biological, archeological and historical impacts; preparation of environmental

documents for MDT projects; evaluation and mitigation of hazardous waste sites; and the public's involvement with the environmental document. The following summarizes the coordination between the Road Design Section and the Environmental Services Bureau:

1. Permits/Approvals: The road designer provides Environmental Services with the project information needed for securing several environmental permits/approvals (when needed):
 - a. Section 402, Temporary Erosion Control permit (from the Montana Department of Environmental Quality or the Federal EPA);
 - b. U.S. Army Corps of Engineers Section 404/Section 10 permit(s);
 - c. U.S. Fish and Wildlife, U.S. Forest Service, Bureau of Land Management approvals; and
 - d. any applicable regional, tribal and State permits (see Comments #9 and #11).

Environmental Services coordinates with the applicable Federal or State agency and processes the permit information and gains agency approval. Environmental Services notifies the Road Design Section when the permit or approval is received.

2. NEPA/MEPA Requirements. The Road Design Section works with Environmental Services to ensure that the project meets the Department's environmental and public input criteria pursuant to the National Environmental Policy Act and the Montana Environmental Policy Act. This includes project documentation (i.e., categorical exclusion, EA, EIS), water quality impacts, biological impacts, historical impacts, archeological impacts, and the need for public hearings. In general, Environmental Services makes its determination of impacts based on input from the Road Design Section.
3. Section 4(f). A Section 4(f) approval is required if a project will impact publicly owned land (e.g., public park, recreational area, wildlife/waterfowl refuge). An approval will be granted only if there is no feasible and prudent alternative. Where a Section 4(f) approval is required, the road designer will provide the necessary project information to Environmental Services, who will secure the approval.

4. Section 6(f). Federal law places restrictions on the use of land acquired with funds authorized by the Land and Water Conservation Act of 1965 as administered by the U.S. Department of Interior (Section 6(f) of the LWCF). Where a Section 6(f) approval is required, the road designer will provide the necessary project information to Environmental Services, who will secure the approval.
5. Mitigation Features. Environmental Services and Road Design Section work together on the plan for mitigation of environmental impacts.
6. Early Coordination. Environmental Services determines the need for early coordination on environmental issues with other State, Federal and public entities and makes all direct contacts, with input from the Road Design Section.
7. Hazardous Wastes. Environmental Services identifies all hazardous waste sites and determines any needed mitigation measures. Environmental Services will coordinate the mitigation if it will be performed before letting the construction project to contract. They will provide the Road Design Section with any necessary provisions, and the road designer is responsible for incorporating these into the construction plans and specifications, if the hazardous waste removal or site mitigation will be accomplished by the road contractor.
8. Erosion Control During Construction. The road designer is responsible for providing the Environmental Services Bureau with construction plans showing the as-designed contours. The Environmental Services Bureau will then develop a plan for temporary erosion control during construction. The road designer may be requested to place the BMP symbols on the erosion control plans. The Environmental Services Bureau will secure approval from the Montana Department of Health and Environmental Sciences or Federal EPA.
9. Montana Department of Fish, Wildlife and Parks (MDFWP). The need for coordination with the MDFWP will be determined by Environmental Services on a project-by-project basis. If needed, the road designer will provide a set of plans to Environmental Services, who will submit them to MDFWP as part of the Stream Protection Act 124 notification. Environmental Services will coordinate with the MDFWP to secure approval and notify the Road Design Section when approval is received.
10. Section 106. For all Federally funded projects, MDT must identify archeological and historic sites in the vicinity of the project. The identified sites must be evaluated to determine if they are eligible for the National Register of Historic Places (NRHP). MDT submits recommendations for eligibility to the State

Historic Preservation Officer (SHPO) for its concurrence. If a site is considered eligible for the NRHP and if the project will impact the site, the Department is mandated to mitigate the adverse effects. Mitigation is accomplished through written agreements among MDT, the Advisory Council on Historic Preservation and the Montana SHPO. A project cannot proceed unless the MDT's NRHP determination and any necessary mitigation measures are approved by SHPO.

11. Wetland Mitigation. For wetland mitigation sites, Environmental Services will determine the location of the site, review the hydrology with the Hydraulics Section to ensure an adequate water supply, and provide a conceptual plan of the site. The road designer is responsible for the preparation of plans, cross sections and summaries of quantities and for providing any special provisions that apply to construction items.

2.1.1.8 Right-of-Way Bureau

The Right-of-Way Bureau is responsible for all activities related to the legal right-of-way for the State highway system. This includes appraisals, acquisitions, relocation, property management and agreements with utility companies and railroad companies. The following summarizes the coordination between the Road Design Section and Right-of-Way Bureau:

1. Coordination. The Road Design Section provides R/W with the needed design information to determine the right-of-way, utilities and railroad impacts.
2. Plan Preparation. The road designer provides the R/W Bureau with a strip map and preliminary construction limits. The R/W Bureau is responsible for determining the R/W design, and the Bureau prepares a separate set of right-of-way plans for each project where right-of-way impacts exist. The road designer should notify R/W Design when the following changes are made after Alignment and Grade:
 - a. Changes are made to the const. limits due to grade changes, back slopes or fill slopes.
 - b. New pipes added or old pipes removed.
 - c. Any changes to the horizontal or vertical alignment.
 - d. Any changes to irrigation or drainage facilities.
 - e. When final const. limits are complete.

- f. If a project has been put on hold for some reason.
 - g. Change in Scope.
 - h. Determination that additional wetlands are needed.
 - i. Approach Changes
 - j. Changes to Riprap (especially at pipe ends)
3. Acquisition. The R/W Bureau performs all right-of-way work and procures all takings and easements needed for the project. The Bureau notifies the Road Design Section of any design considerations resulting from negotiations with the property owners, and the Bureau will provide copies of signed agreements.
4. Utility Coordination. After the Alignment Review, the Road Design Section will notify the Utilities Section and will provide the R/W Plans Section with a set of plans with the existing utilities and conflicts plotted as determined from the survey. The road designer will list the utility conflicts by station and offset from centerline and place the utilities on the cross sections. The R/W Plans Section will prepare the Utility Plans and submit these to the Utilities Section. Based on the Scope of Work Report and the initial utility plans, the Utilities Section will work with any impacted utility companies and municipalities to implement the utility process. This process may include the following:
- a. Plan Preparation. The utility companies are responsible for preparing all utility adjustment/relocation plans, based on the initial utility plans. The plans will be developed according to the criteria in the *Montana Utility Accommodation Policy*.
 - b. Funding. Depending on the right-of-way ownership for existing and proposed utility locations, highway funds may be eligible for utility adjustment/relocation required by the highway project. The utilities pay for all betterments.
 - c. Agreements. The Utilities Section will prepare a Utility Agreement for each affected utility and will work with the utility companies to gain their input and approval.
5. Railroad Coordination. Based on the Alignment Review, the Utilities Section will work with any impacted railroad companies, the Road Design Section and other

Department units to implement the railroad coordination process. For road projects, this process may include the following:

- a. The Utilities Section will prepare the Railroad Agreements and work with the railroad companies to gain their input and approval.
- b. For any work at the crossing itself (e.g., replacing the railroad crossing surface, improving drainage), the railroad company will advise the Department of its requirements to be incorporated into the plans.
- c. For any active traffic control devices (e.g., flashing lights, automatic gates), the Utilities Section will verify the warrants for these devices. The Road Design Section will design the crossing in coordination with the railroad company. The Traffic Engineering Section will recommend locations of the railroad signals or recommend protection if they must be located within the clear zone. The railroad companies will perform the design work and construction of the electrical components of the active traffic control devices.
- d. The Road Design Section is responsible for the detailed design of the roadway approaching the crossing.

2.1.1.9 Consultant Design Bureau

The Department may use a consultant for a road design project. When a consultant is used, the Consultant Design Bureau is the primary contact with the consultant. The Highways Bureau will provide technical support on the project and review the plans prepared by the consultant.

2.1.1.10 Bridge Bureau

The Bridge Bureau is responsible for the structural design of all bridges [longer than 20' (6 m)] and concrete retaining walls on State-maintained highways. The following describes the coordination between the Road Design Section and Bridge Bureau:

1. Roadway Geometrics. The road designer provides the Bridge Bureau with preliminary horizontal and vertical alignments. The bridge designer determines a preliminary structure length and depth of superstructure, and the bridge designer provides approximate bridge end elevations. The road designer modifies the alignment as necessary, based on the preliminary grade recommendations from

the bridge designer. The Bridge Bureau reviews and comments on the proposed roadway geometrics.

The Bridge Bureau determines the bridge width according to criteria in the *Montana Structures Manual*. The proposed bridge width will not be less than the roadway width summarized in the Geometric Design Tables in Chapter Twelve.

2. Approach Roadway. Even where only minor roadway work is necessary at, for example, a bridge replacement, the Road Design Section is responsible for all roadway work.
3. Roadside Safety Appurtenances. The Bridge Bureau will select the type and design of the bridge rail. The road designer will determine the design of the approaching guardrail transition into the bridge rail.
4. Sidewalks. Sidewalk requirements on bridges will be determined jointly by the Bridge Bureau, the Road Design Section and the District.
5. Traffic Control Plan (TCP). The road designer is typically responsible for developing a strategy for the maintenance and protection of traffic during construction across any bridges within the project limits. This may include, for example, providing one lane of traffic across a two-lane, two-way bridge, providing a detour around the bridge or, on a multilane facility, providing a crossover between the two roadways. The Bridge Bureau assists in the development of the proposed TCP. The Bridge Bureau may prepare additional TCP requirements.

The Bridge Bureau will develop a traffic control requirements across the structure when part-width construction is used or when the removal of an existing structure (and the construction of the new structure) must be performed in a specific sequence.

6. Plan Preparation. The Bridge Bureau prepares all necessary structural design plan sheets and submits these to the Contract Plans Section for direct insertion into the final plan assembly.

2.1.1.11 Engineering Information Management Section

The Engineering Information Management Section monitors and updates the Preconstruction Management System, (OPX2 program) which is used to schedule projects and develop preconstruction manpower needs. Project Managers have been assigned the responsibility to monitor the design of Highway Projects from inception

until they are let to contract. Functional Managers have been assigned the everyday responsibility of completing the project activities set forth in the OPX2 program schedule.

After the Preliminary Field Review Report has been transmitted for comment and the Functional Managers have submitted overrides for their activities, the Project Manager releases the approved project schedule back to the Functional Managers who manage the project activities assigned to their unit. The Functional Managers then are charged with regularly reporting the status of said activities to the OPX2 system and thus to the Project Manager. The computerized OPX2 program compiles a standardized list of activities and anticipated man-hours that must be performed before the submittal of the final plan package to the Contract Plans Section. The Project Design Manager, who acts as both the Project Manager and Functional Manager for Road Design modifies the list and required man-hours as dictated by the proposed scope of the project. The Engineering Information Management Section is charged with maintenance of the OPX2 System and is available for technical assistance to the managers in statusing their projects.

The Project Design Manager and the Design Supervisor acting as functional managers are responsible for:

1. monitoring the OPX2 program by entering completion dates into the system when activities are completed, and coordinating changes to the project schedules with other Functional Managers if additional activities or durations must be added due to a change in project scope, and
2. Providing updates to the Engineering Information Management Section on construction cost estimates.

2.1.2 Tribal Coordinator

The Tribal Coordinator answers to the Director's office. Coordination with the Tribal governments is an essential element of the project development process. When a road design project is on tribal land, the road designer coordinates with the Tribal Coordinator, the District and the Tribe.

The Project Design Managers will generally be responsible for ensuring that the Tribes are receiving the appropriate reports and documentation throughout the project development process. However, this should be verified with the District Administrator, since the MDT contact with the Tribes varies with each District. The Tribal representatives who typically receive these documents are listed below:

1. TERO Director
2. Planning Director (or Transportation Planner)
3. Tribal President (or Chairman)

Once again this will vary with each Tribe. A list of the appropriate contact people should be obtained from the District Administrator or the Tribal Coordinator.

The information should be sent to each individual. Do not send it to one person and expect them to distribute it to the other Tribal representatives. We also recommend that documents be accompanied with cover letters that provide a more in-depth explanation of the information than is necessary for MDT personnel. For plans distributions it is not necessary to send plans to the Tribal Presidents. Sending them cover letters will be sufficient.

2.1.2.1 Tribal Coordination Checklist

The following is a checklist of documents and plans that should be sent to the Tribes.

- Preliminary Field Review
- Invitation to the field review
- PFR Report
- Alignment & Grade Review
- Invitation to the review accompanied by plans
- A & G Report
- Scope of Work Report
- Report distributed for comments (not signatory approval)
- Final Scope of Work Report with final approval
- Plan-in Hand

PIH review invitation accompanied by plans, cost estimate, special provisions. (There has been some question about whether or not we should send the cost estimates to the Tribes. This issue should be resolved with the individual District Administrator.)

1. PIH Review Report. It may not be necessary to send the PIH Report to the Tribes. The need will be determined on a project-by-project basis.
2. Final Plan Review. If a field review will be conducted, an invitation, plans and the report should be sent to the Tribes. If the FPR is just a send-out of plans for review, it will not be necessary to send anything to the Tribes.
3. Blue Sheets. Contact the Contract Plans Bureau to determine if plans need to be sent to the tribal representatives.

4. Comments to reports. – Comments should be sent to the Tribes only if they affect previous decisions, are major changes or affect tribal property. The decision to send these memos should be made on a case-by-case basis and should generally be discussed with the District Administrator.

2.1.3 Construction

The Construction Program in the Central Office in coordination with the District Offices is comprised of the Construction Engineering Services Bureau, the Construction Administration Services Bureau, Materials Bureau and the Contract Plans Bureau, and is responsible for all construction activities on all State-administered projects.

2.1.3.1 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 as well as administering current projects, and ensuring that projects in development reflect the most recent standards for administration purposes. The bureau also directs the development and administration of construction and contract administration computer programs and automated systems, and manages the Department's general Construction staffing and equipment budgets, as well as the Construction Administration Services Bureau's budget, policies, and equipment.

The road designer's coordination with the Construction Administration Services Bureau is generally indirect. The Construction Administration Services Bureau provides updates to the Standard Specifications, the Supplemental Specifications, Standard Special Provisions and Detailed Drawings.

2.1.2.2 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 reviews, implementation and follow-up of constructability and post construction review findings, change order discussions, value engineering proposal investigation and recommendations, non-uniformity complaint resolution and implementation of new construction processes, procedures and specifications. The following summarizes the coordination between the Road Design Section and the Construction Engineering Services Bureau.

The Construction Engineering Services Bureau will conduct constructability reviews on projects at various milestones during the project development process. They will also

conduct Value Analyses of selected projects. These activities will require close coordination between the road designer and the Construction Engineering Services Bureau personnel.

The Construction Engineering Services Bureau receives copies of the Preliminary Field Review Report, Alignment Review Report, Scope of Work Report and the Plan-in-Hand Report. In addition, they receive the preliminary plans, which are distributed for the plan-in-hand review, and the final plan review. The Construction Engineering Services Bureau will review the plans and provide recommendations for changes to the Road Design Section.

The road designer is responsible for developing the initial proposal for the maintenance and protection of traffic through the construction zone, including the sequence of construction operations and the need for any detours. The Construction Engineering Services Bureau and District construction personnel will review and revise the road designer's proposed strategy, and the Road Design Section is responsible for placing the necessary information into the final contract document.

2.1.2.3 Materials Bureau

The Materials Bureau is responsible for testing and certifying all materials used on Department projects. This includes geotechnical analyses and materials for pavements and structures. Normally, the District materials personnel perform the field sampling. The following summarizes the coordination between the Road Design Section and Materials Bureau:

1. Geotechnical. The Geotechnical Section prepares a Geotechnical Report for roadway projects when deemed necessary. The Report presents the soil and rock types, bearing capacities, slope stability, rock cut recommendations, muck excavation, subdrainage needs, erosion control strategies, etc. Road Design comments on the Geotechnical Report and works with the Geotechnical Section to resolve any conflicts. The road designer incorporates the geotechnical recommendations into the road design plans.
2. Pavement Design. The Materials Bureau recommends alternative pavement types (concrete or bituminous) and surfacing treatments (e.g., recycling, crack and seat) and designs the pavement structure. The road designer coordinates with the District to determine the most appropriate surfacing section and incorporates the final pavement design into the road design plans.

3. Walls. Where needed, the Geotechnical Section is responsible for preparing the design of retaining walls, reinforced earth walls, bin walls and gabions. The road designer incorporates this information into the road design plans.

New Materials/Experimental Items. The Materials Bureau determines the need for any new materials and/or experimental items in the project, and it develops the specifications and special provisions for the items. The road designer incorporates this information into the final contract document.

2.1.2.4 Contract Plans Bureau

After the road design plans have been finalized, the Project Design Manager will transmit the entire project package to the Contract Plans Bureau for final processing. The package will include the following items:

1. final, original construction plans,
2. road design cost estimate, and
3. any Special Provisions.

The Contract Plans Bureau will review the final construction plans and distribute the plans for review by other MDT sections. The Project Design Manager will review the comments and suggestions and determine if changes or corrections are warranted. The Project Design Manager will be responsible for incorporating any appropriate revisions into the plans resulting from this review.

2.2 OTHER COOPERATING INTERNAL MDT UNITS

2.2.1 Rail, Transit and Planning Division

The Rail, Transit and Planning Division is responsible for all MDT planning functions including developing the Department's program of projects, performing initial planning studies and coordinating with the Metropolitan Planning Organizations (e.g., on the Transportation Improvement Program). The following describes the coordination between the Road Design Section and the Rail, Transit and Planning Division:

1. Traffic Data. The road designer requests traffic data for projects. The Rail, Transit and Planning Division obtains the data which includes average annual daily traffic, design hourly volume, percentage of trucks, and the daily equivalent single-axle loads (ESAL). The data should also include any major changes in traffic volumes within the project limits. The Division also provides the traffic volumes of the various directional movements at intersections as required.
2. Programming. The Rail, Transit and Planning Division provides the Road Design Section with the necessary programming papers to initiate the road design project. The Road Design Section submits the following to the Rail, Transit and Planning Division:
 - a. the Preliminary Field Review Report, and
 - b. the Project Scope of Work Report.

2.2.2 Public Affairs

The Public Affairs Unit is the primary focal point for all contact with the general public. This includes preparing news releases of upcoming MDT work and coordinating the presentation of public hearings and informal public meetings. On road design projects, the Road Design Section coordinates with the Public Affairs Unit on any public contacts.

2.2.3 MDT District Offices

The Department's five District Offices (Missoula, Butte, Great Falls, Glendive and Billings) provide the field services needed within each geographic area. Their responsibilities include maintenance of the State highway system, construction inspection services, contacts with county and city governments, and traffic-related activities (e.g., approach permits). Specifically for preconstruction activities, the

following summarizes the coordination between the Road Design Section and District Offices:

1. Design. Some road design projects are assigned to Project Design Managers in the District Offices. This work is coordinated with the Project Design Managers in the Central Office who is responsible for projects in that District.
2. Coordination. In general, for all projects designed in Helena, the Central Office will maintain a steady contact with the District Office. The District Office, for example, will be invited to all field reviews and will receive all project-related correspondence.
3. Aerial Survey. When an aerial survey is conducted, the District Office is responsible for the control traverse and "pick-up" field survey to locate items which may be missed by the aerial survey (e.g., underground utilities). For projects designed in the Central Office, the District conveys this information to the Road Design Section for plotting.
4. Soils. The District Office is responsible for all soils surveys. Its report is submitted to the Materials Services Section in the Central Office. The District Office will also provide recommendations for shrink/swell factors for project soils.
5. Informal Public Meetings. The District Office, in coordination with the Area Project Supervisor, is responsible for scheduling and conducting informal public meetings.
6. Construction Cost Estimate. The District Office will provide the Central Office with unit prices to assist in the preparation of the construction cost estimate.
7. Temporary Traffic Control. District personnel review the proposed temporary traffic control plan and modify it as needed. The District also provides a quantity estimate for traffic control units required for the project.

2.2.4 Motor Carrier Services

Motor Carrier Services is responsible for monitoring and regulating truck traffic within the State of Montana. If it initiates work for a new weigh station or an existing weigh station, the Road Design Section is responsible for the design of the weigh station. The road designer should contact Motor Carrier Services whenever a weigh station or portable scale site is located within the project limits.

2.2.5 Legal Services

Legal Services is responsible for providing all legal counsel required by MDT (e.g., interpretation of State laws on highway work). In its administration of road design projects, the Road Design Section is responsible for preparing and processing, where applicable, agreements with other entities. Once prepared, Legal Services reviews, comments on and approves the text of the proposed Agreement.

Legal Services is also responsible for resolving R/W parcels that are in condemnation. When a parcel is in condemnation the road designer must not to provide the landowner with any additional design features or concessions without involving the staff attorney. The attorney is typically negotiating with the landowner and changes without the attorney's approval can cause problems.

When any information is provided to Legal Services, include the name of a contact person (generally the Project Design Manager), so that Legal Services will know who should be contacted for additional information or who to respond to.

2.2.6 Human Resources

The Road Design Section coordinates with the Human Resources, Civil Rights Bureau, to ensure compliance with the *Americans with Disabilities Act*. The Civil Rights Bureau will, for example, provide interpretations on the intent and application of the Act.

2.3 EXTERNAL UNITS

This Section discusses the specific coordination activities between the Road Design Section and selected major units external to MDT.

2.3.1 Federal Agencies

2.3.1.1 Federal Highway Administration

The Federal Highway Administration (FHWA) administers the Federal-aid program which funds eligible highway improvements nationwide. Their basic responsibility is to ensure that the State DOT's comply with all applicable Federal laws in their expenditure of Federal funds and to ensure that the State DOT's meet the applicable engineering requirements for their proposed highway projects. FHWA maintains a Division Office within each State, and this is the primary point of contact for a State DOT. Section 8.7 describes FHWA's involvement in project development.

2.3.1.2 United States Forest Service (USFS)

The USFS is responsible for the management of all national forests. The USFS and the MDT currently have a Memorandum of Understanding (MOU) and approved procedures that describe the coordination between the two agencies for the planning and the development of projects having USFS involvement. If a proposed road design project will impact a national forest, the Road Design Section must coordinate the project development with the USFS. The USFS will, for example, be invited to any field reviews and receive copies of major project reports (e.g., Scope of Work Report). In some cases, project actions will require USFS approval (e.g., right-of-way acquisition).

2.3.1.3 U.S. Postal Service (USPS)

Coordination with the USPS may be necessary to determine location of mail delivery points and mailbox turnouts and to ensure that crash-tested mailboxes are installed on the project. The District will contact the USPS for all projects designed by MDT. The consultant will be responsible for projects designed by consultants.

2.3.1.4 Federal Aviation Administration (FAA)

Coordination may be necessary with the FAA when road projects are located in the vicinity of airports. The anticipated development of the airport and existing traffic patterns which involve the airport should be considered during the design process.

2.3.1.5 National Park Service (NPS)

Coordination with the NPS will be necessary where road projects are in the vicinity of land under the jurisdiction of the NPS. Although the Department has no formal agreement with the NPS, the level of involvement on projects will be similar to that between the MDT and the USFS.

2.3.2 State Agencies

2.3.2.1 Department of Fish, Wildlife and Parks (FWP)

Coordination with the FWP will be necessary where a proposed project is in the vicinity of land under the jurisdiction of the FWP. Although the Department has no formal agreement with the FWP, the level of involvement on road design projects will be similar to that between the MDT and the USFS.

2.3.2.2 Other State Agencies

The Road Design Section coordinates with other State agencies on an as-needed basis.

2.3.3 Local Governments

The following describes the coordination between the Road Design Section and local governments:

1. **Design.** The Road Design Section solicits input from the local government on road design projects in that locality and, in general, keeps the local governments up-to-date on any current or planned activities. For example, the decision on whether to provide open or closed drainage on an urban street is heavily influenced by input from the locality. In addition, larger municipalities may have their own design criteria, which must be considered during the design process.

2. Coordination. The Road Design Section typically invites the local government to any field reviews and provides the local government with copies of major project reports (e.g., Scope of Work Report).
3. Assistance. The Road Design Section provides technical assistance to the city and county governments, upon request. Road Design responds to any verbal or written inquiries from local governments on road design issues.
4. Information From Locals. Where applicable, the Road Design Section will need to obtain information from local governments.
5. Agreements. All projects within the limits of an incorporated city or town require a City/Town Agreement. This agreement is typically prepared near the end of the project development process. Memorandums of Understanding (MOU) are also need for projects that involve major improvements. MOU's should generally be prepared prior to the plan-in-hand. The Project Design Manager should coordinate with the District to determine who will prepare the agreements. All agreements must be sent to Legal Services for their review and approval prior to sending them to the local government.

