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MINNESOTA DEPARTMENT OF TRANSPORTATION **DEVELOPED BY:** Design Standards Unit **ISSUED BY:** Office of Project Management and Technical Support	**TRANSMITTAL LETTER NO. (18-01)** **MANUAL:** Road Design English Manual **DATED:** November 28, 2018
SUBJECT: Minor corrections Chapters 0, 1, 2, 8, 11.	

A list of changes is attached to this update.

INSTRUCTIONS:

1. Record this transmittal letter number, date and subject on the transmittal record sheet located in the front of the ENGLISH manual. The last Transmittal Letter was 17-01, dated August 16, 2017.

2. Remove from the ENGLISH manual: Entire Chapters 0 and 1
   2-7(1-2)
   8-4(8-9)
   11-11(1-2)

3. Insert into the ENGLISH manual: Entire Chapters 0 and 1
   2-7(1-2)
   8-4(8-9)
   11-11(1-2)

   All updated sheets are dated November, 2018.

4. The Road Design Manual and associated Transmittal Letters are available online in PDF format at. http://roaddesign.dot.state.mn.us/roaddesign.aspx

5. Any technical questions regarding this transmittal should be directed to Mike Elle, Design Standards Engineer, at (651) 366-4622, or by email to DesignStandards.DOT@state.mn.us

Michael Elle, P.E.
Design Standards Engineer

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Summary of Changes
MnDOT Road Design Manual
18-01

Chapter 0

- New inside cover with up-to-date agency logo
- Summary of Contents
    - Entries corrected to match chapter titles in the document

Chapter 1

- Table of Contents, Section 1-2
    - Updated throughout to match agency reorganizations since last publication
        - No track changes shown due to extent of revision
- Section 1-2.0
    - Edited for completeness
- Section 1-3
    - Added Department of Health
    - Replaced Minnesota Historical Society with SHPO due to pertinence in project process
    - Edited agency names for consistency
- Section 1-4
    - Updated, edited for accuracy & completeness
- Sections 1-5 through 1-7
    - Reorganized in order to…
        - Add planning organizations
        - Relocate watershed districts and local planning agencies sections so they weren't incorrectly classified under Metro Twin Cities entities
        - Combine counties and cities into a local agency group so local planning agencies could be grouped with them
- Section 1-5
    - Added planning organizations as noted above
- Section 1-6
    - Added Indian tribal communities
    - Minor edits to heading titles
- Section 1-6.02
    - Added reference to tie this function to the parent Department of Health program
- Section 1-7.01
    - Various edits to clarify and update the Council's programs and mechanisms
- Section 1-7.01.02
    - Updated the agency's name and enhanced the description of its mission
- Section 1-8.01
    - Added pertinent publications

Chapter 2

- Section 2-7
    - Updates to office and unit names

Chapter 8

- Section 8-4.05.02
    - Changed "Soils Report" to "Materials Design Recommendation"
    - Two minor grammar/punctuation changes
- Table 8-4.04A
    - Added grate casting 817 (Standard Plate 4155) column and ADA row to Inlet Casting Assemblies table
- Figure 8-.04A
    - Added "Casting No. 817" and "Plate No. 4155" to bottom-left of diagram (bottom-right of page)

Chapter 11

- Section 11-11.01.02
    - Fixed header and formatting glitches
        - Date not advanced due to no content changes

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Road Design

MANUAL

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PREFACE

The Road Design Manual establishes uniform policies and procedures for the Minnesota Department of Transportation. The design criteria herein may also be applicable on the broader highway and street system within the state, subject to the judgment of individual localities as well as to other governing criteria.

The policy and criteria in this manual are largely adapted from the AASHTO publication, "A Policy on Geometric Design of Highways and Streets," which itself has been adopted as the design standard for the National Highway System by the Federal Highway Administration. That said, this manual is not intended as a legal standard. Rather, it presents vital engineering information normally required in the design of a new or reconstructed facility. It must be integrated with engineering judgment and balanced with social, economic and environmental factors to yield appropriate designs suitable for unique circumstances.

Each page contains the issue date in the inside upper corner and the page number in the outside upper corner. Pages are numbered consecutively through each major section.

Revisions will be provided to all holders of the manual accompanied by a numbered transmittal letter. The number of the transmittal letter should be recorded in the Transmittal Record Sheet in the front of the manual. Revised chapter indexes will be issued as necessary.

The Road Design Manual was originally issued as the Design Manual by the Department of Highways in 1961 and completely revised and republished by MnDOT in 1982.

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1-1.0 GENERAL

This chapter provides an overview of the Minnesota Department of Transportation functions and responsibilities. Special attention is given to the designer's working relationships; they are broken down accordingly in specified sections. In addition, other sources of information necessary for proper design are described including Federal and State agencies, associations, committees, policy boards, and local governmental units. Emphasis has been placed on identifying areas of responsibility, design sections that provide liaison services, and working arrangements.

The scope of coverage provided in this chapter has been limited to identifying departmental working relationships and the resources available to the designer. Not all agencies identified on the functional organization charts have been included, only those directly affecting the road design product.

1-2.0 MINNESOTA DEPARTMENT OF TRANSPORTATION (MnDOT)

MnDOT has been charged with the responsibility of providing a balanced transportation system, which includes airports, highways, streets, motor carriers, ports, public transit, non-motorized facilities, and railroads. The Department is the principal agency of the State for development, implementation, administration, consolidation and coordination of State transportation policies, plans and programs. The Department is also the principal agency for federal transportation plans and programs. The Department is supervised by a Commissioner of Transportation, who is appointed by the Governor.

To meet its charge, the Department is divided into five divisions, which are further divided into offices and sections (Figure 1-2.0A, MnDOT Organization Chart). The divisions, offices and sections that have the impact on the design process are discussed in the following sections. For the most current organization chart and a detailed description of the functions of each division, office, or section, visit the Department's web site at http://www.dot.state.mn.us.

1-2.01 Corporate Services Division

1-2.01.01 Office of Human Resources

This office conducts the work of staffing, labor relations, training and employee development and continually improves their process for supporting districts and offices.

1-2.01.02 Office of Administration

This office combines the shared business operations, administrative services functions and materials management.

1-2.02 Modal Planning & Program Management Division

1-2.02.01 Office of Transportation System Management

The Office is comprised of the Statewide Planning and Analysis, Program Development and Management, Research Services, Library, and Transportation Data & Analysis (transportation data, traffic forecasting and analysis, weight data and enforcement policy, and geographic information systems (GIS).

1-2.02.02 Office of Transit and Active Transportation

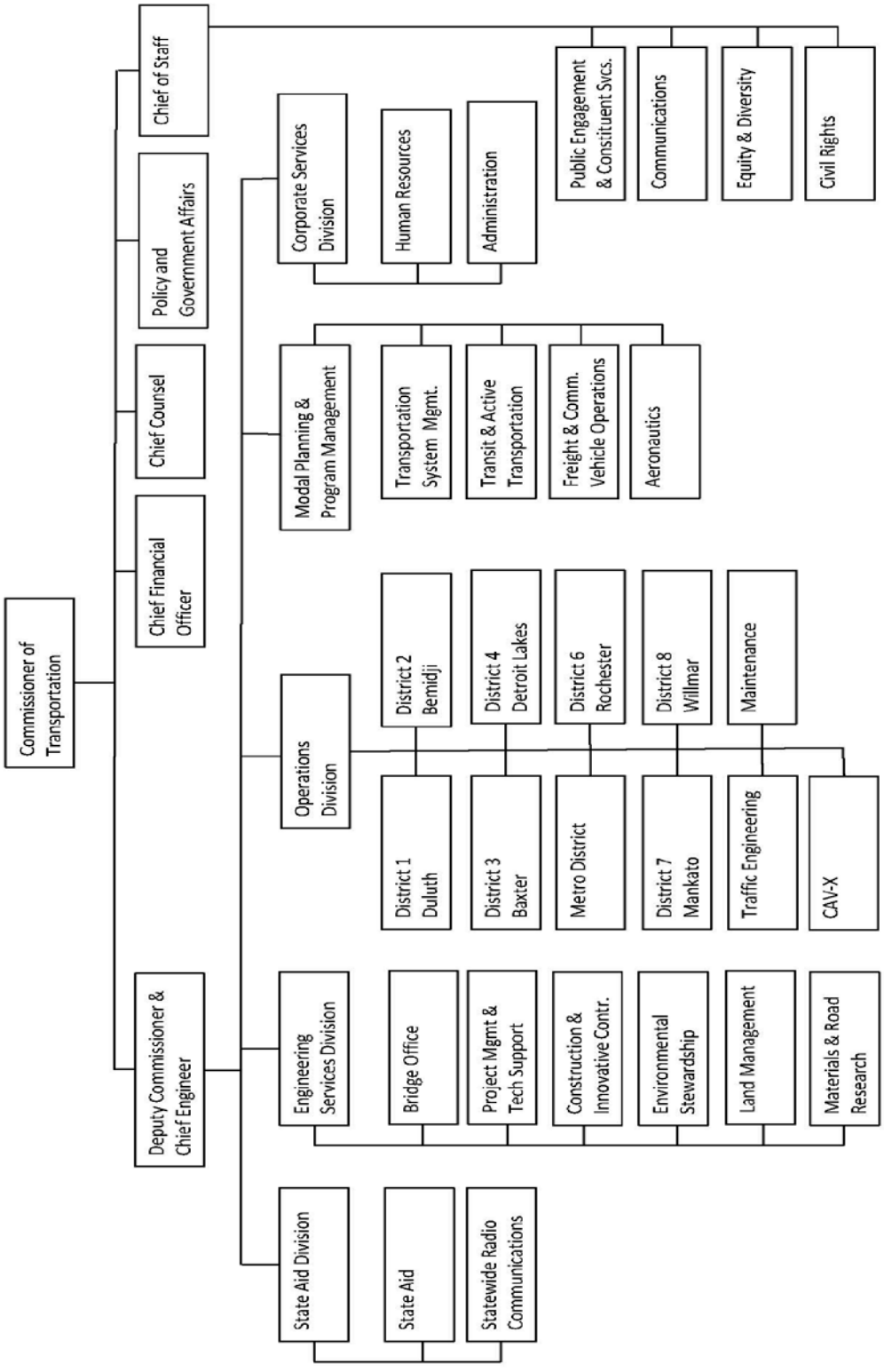
This office conducts its core function of transit services in Greater Minnesota. The office also includes bicycle, pedestrian and other non-motorized transportation.

1-2.02.03 Office of Freight & Commercial Vehicle Operations

This office focuses on surface freight movement by combining the functions of Commercial Vehicle Operations and Freight, Rail and Waterways.

1-2.02.04 Office of Aeronautics

This office conducts the core function of supporting civil aviation.



MnDOT ORGANIZATION CHART
Figure 1.2.0A

1-2.03 Engineering Services Division

1-2.03.01 Bridge Office

This office focuses on planning and design of structures, structure standards, structure inspections, structural fabrication inspection and hydraulic design.

1-2.03.02 Office of Project Management & Technical Support

This office provides support and services related to project delivery, project management and design policy and practice.

1-2.03.03 Office of Construction & Innovative Contracting

This office focuses on construction contracting (including Design/Build), technical training and assistance in administering construction contracts.

1-2.03.04 Office of Environmental Stewardship

This office focuses on environmental policy and relations with environmental agencies, providing technical assistance on cultural and environmental issues, as well as landscape architecture.

1-2.03.05 Office of Land Management

This office focuses on right-of-way policy and processes for acquisition, management and reconveyances of property; as well as survey standards, controls and high accuracy mapping.

1-2.03.06 Office of Materials & Road Research

This office coordinates pavement design, standards, research, laboratory testing, and substructure investigations. It also conducts research in pavement materials and construction, and operates the MnROAD research test facility.

1-2.04 State Aid Division

1-2.04.01 Office of Statewide Radio Communications

This office manages the MnDOT-owned public safety radio communication system, which is shared between MnDOT, other state agencies and local governments.

1-2.04.02 State Aid for Local Transportation

The office supports the delivering of the secondary roads program of cities and counties. It sets standards and policies required by the program and seeks opportunities to work with cities and counties on projects and issues that benefit taxpayers.

1-2.05 Operations Division

The district offices deliver roads and bridges to Minnesota citizens and focus on strong, constructive working relationships with local partners. MnDOT uses a decentralized project development process based on geographical boundaries. The Department has divided the state into eight districts. The boundaries for each district and maintenance areas within the districts are shown in Figure 1-2.06A.

In addition to the offices listed below, the Operations Division also houses Electrical Services and Americans with Disabilities Act (ADA) implementation functions.

1-2.05.01 Office of Maintenance

This office provides expertise, leadership, direction and statewide coordination of the eight districts to maintain and preserve Minnesota highways. Specialty functions include: fleet management, statewide building improvement program, research, training, performance measurement, and management systems support. Production functions include: state sign shop, striping, snowplow fabrication, and fleet maintenance.

1-2.05.02 Office of Traffic Engineering

This office provides uniform standards and specifications for traffic safety and operations. Functions include work zone safety, pavement markings research and product selection, signing, lighting and signal policies, standards and specifications, traffic safety, and tort claims.

1-2.05.03 CAV-X Office

This office explores research, implementation, and policy implications associated with the emerging connected and automated vehicle fleet.

1-2.05.04 District One: Duluth

1-2.05.05 District Two: Bemidji

1-2.05.06 District Three: Baxter (Brainerd)

1-2.05.07 District Four: Detroit Lakes

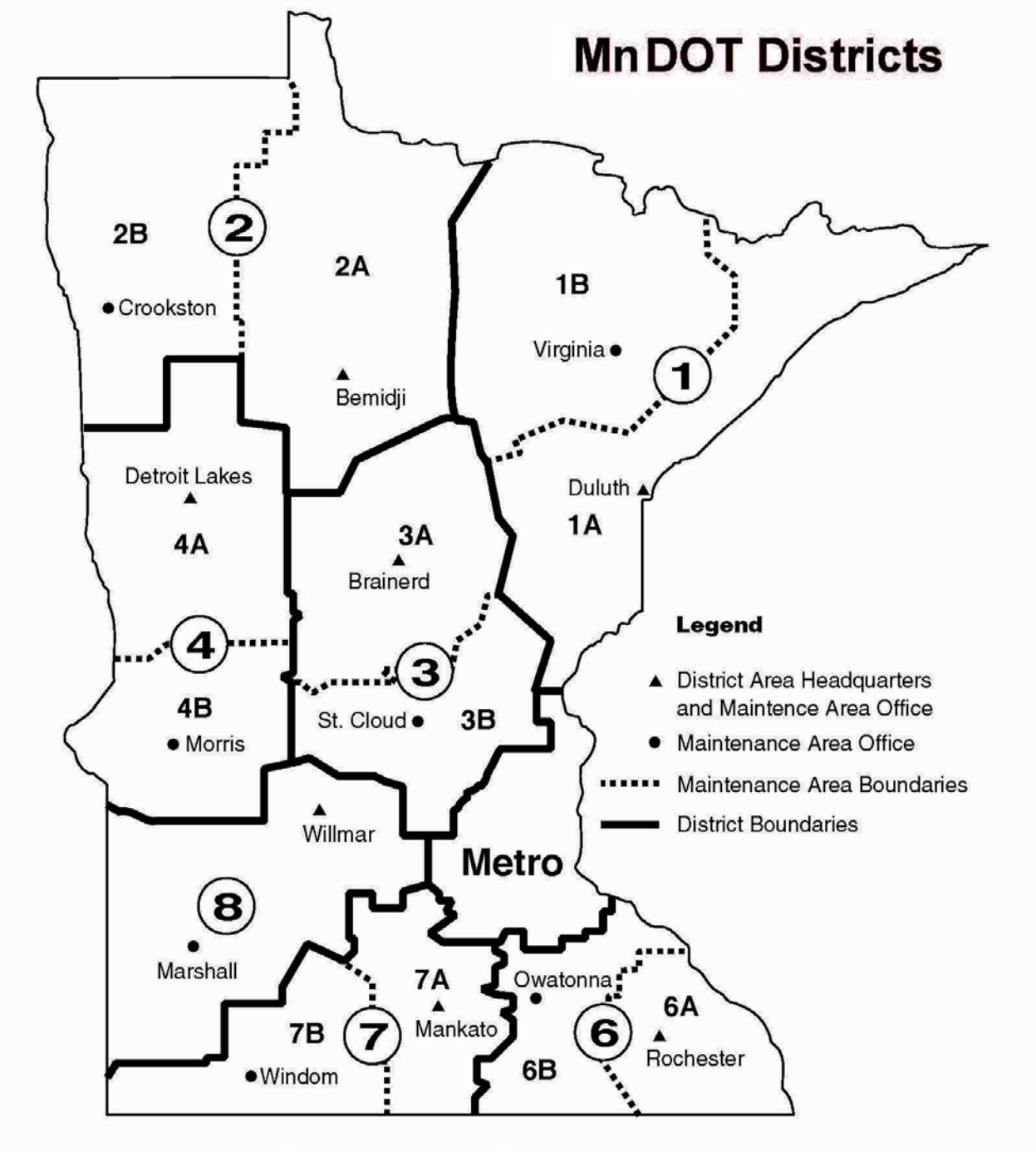
1-2.05.08 Metropolitan (Metro) District

Metro District includes the Regional Transportation Management Center (RTMC).

1-2.05.09 District Six: Rochester

1-2.05.10 District Seven: Mankato

1-2.05.11 District Eight: Willmar



MnDOT DISTRICT MAP
Figure 1-2.06A

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1-3.0 OTHER STATE AGENCIES

Frequently it is necessary to coordinate the development of a highway project with other state agencies. The designer does not need to know about every contact or contact agency. Therefore, this section only includes a brief overview of the functions and responsibilities of the more frequently contacted State Agencies.

1-3.01 Department of Health (MDH)

The mission of the Department of Health is to protect, maintain and improve the health of the State's citizens. MDH administers the Statewide Health Improvement Program (SHIP), among whose goals is to expand opportunities for residents to be more active in their everyday lives. This includes partnering with MnDOT and local communities to increase access to active transportation options.

1-3.02 State Historic Preservation Office (SHPO)

Every state is required by the National Historical Preservation Act of 1966 to have a historic preservation office to spearhead state preservation initiatives and help carry out the nation's historic preservation program. Minnesota's SHPO works with all jurisdictions to protect identified historic properties. On MnDOT projects, they identify historic properties in the project areas and advise on ways to avoid or reduce adverse effects on those properties. MnDOT's Cultural Resources Unit is the main coordination office with SHPO. For more information, the office's website is https://mn.gov/admin/shpo/.

1-3.03 Department of Natural Resources (DNR)

The Minnesota Department of Natural Resources (DNR) works with public agencies, private organizations, and citizens to protect and manage the state's natural resources, to provide outdoor recreation opportunities, and to provide for commercial uses of natural resources in a way that creates a sustainable quality of life. Whenever a road improvement is proposed, the DNR should be contacted for early coordination and input related to state-owned public lands, public waters, wetlands and other significant fish, wildlife, and plant species and habitat, and timber and mineral resources of the state. Impacts to land, water, and other natural resources may require environmental review and/or DNR permits; notification, document preparation, and application submittals are the responsibility of MnDOT. For further information, go to http://www.dnr.state.mn.us.

1-3.04 Department of Public Safety (DPS)

The Department of Public Safety administers and enforces laws relating to drivers, vehicles, traffic, liquor, natural and man-made disasters, criminal activities and fire risks. Its principal responsibility is to maintain a safe environment for citizens by developing, operating and coordinating programs and activities relating to the safety and convenience of the public. The Department's website is http://www.dps.state.mn.us.

1.3.05 Pollution Control Agency (MPCA)

The MPCA was established in 1968 to meet the variety and complexity of problems relating to water, air and land pollution. The agency seeks to achieve a reasonable purity of water, air and land resources, which provide for their maximum enjoyment and use, which furthers the welfare of the people of Minnesota. The agency enforces statutes pertaining to water and air pollution control, solid waste disposal, noise pollution control and toxic/hazardous waste disposal.

This Agency should be contacted to coordinate all project development that may have an impact on the water, air or land. In addition, when discharging storm water or wastewater into the water bodies under the control of this agency, a permit is required. The Agency administers the National Pollutant Discharge Elimination System (NPDES) and Section 401, Clean Water Act. The Agency can be reached electronically at http://www.pca.state.mn.us.

1-3.06 Environmental Quality Board (MEQB)

The MEQB was established in 1973 to avoid and minimize damage to Minnesota's environmental resources caused by public and private development. This program does this by requiring that proposed actions, which have or may have the potential for significant environmental impacts undergo environmental review procedures in addition to other approvals and permits required. The procedures are intended to disclose information so the environmental impacts of a proposal can be assessed and ways to minimize or avoid any significant impacts can be identified and implemented.

The environmental review rules can be found under Minnesota Rules, Part 4410. The rules assign a particular unit of government to prepare the review. For further information, the board's official website is http://www.eqb.state.mn.us.

1-3.07 Board of Water and Soil Resources (BWSR)

The BWSR administers the Wetland Conservation Act (WCA). The WCA requires any party proposing to drain, fill or excavate a wetland to first try to avoid disturbing the wetland; second, to try to minimize any impact on the wetland; and finally, to replace any lost wetland acres, functions and values. Although MnDOT is its own approving authority under the WCA, documents describing proposed impacts to wetlands must be released for public review and comment prior to construction. The MnDOT district offices are responsible for preparing and distributing WCA documents. The district also develops the WCA Replacement Plans, any mitigation requirements, and any wetland banking proposals. The MnDOT Office of Environmental Stewardship is responsible for approving WCA Replacement Plans and WCA Bank Plans.

1-4.0 FEDERAL AGENCIES

Coordination of project development with federal agencies depends on the specific conditions encountered. This section is used to identify the major areas of responsibility and the interest of federal agencies frequently involved in the project development process.

1-4.01 U.S. Department of Transportation

1-4.01.01 Federal Highway Administration

The Federal Highway Administration (FHWA) is a unit of the Department of Transportation (DOT) of the United States Government. They administer the Federal-Aid Highway Program, which makes funds available for many transportation purposes to all the states. Highway projects, which are federally funded, must comply with a number of regulations, procedures, and policies. The responsibilities of FHWA and MnDOT are defined in the "Stewardship and Oversight Agreement" executed by the two agencies. The Letter of Agreement and Stewardship Plan are available at https://www.fhwa.dot.gov/federalaid/stewardship/agreements/mn.pdf. MnDOT has the responsibility to develop, design, construct, and maintain Federal-Aid highways subject to federal requirements.

The Stewardship and Oversight Agreement allows MnDOT to assume certain review and approval actions for the FHWA depending on whether the project is on the Interstate System, National Highway System, or off the National Highway System (and off the Trunk Highway System). MnDOT works directly with the FHWA Minnesota Division Office in St. Paul. The early and continuous involvement of FHWA during the project development process and during design is important. The primary FHWA contact is the Area Engineer. With some exceptions, Federal-Aid funds are limited to projects in the federal aid system. The system designations are developed in cooperation with FHWA, and they define the National Highway System and the Surface Transportation Program. Federal funding categories range from general system funds to special purpose funds such as safety and bridge replacement. These funds are available for planning, design, right-of-way acquisition, and construction. Projects must first be authorized by FHWA before any funding is made available. The federal-aid program is a reimbursement program, meaning the State must first incur the cost before a request for payment may be submitted to FHWA for reimbursement costs. Federal participation varies from project to project.

Most pertinent FHWA requirements are discussed in the Code of Federal Regulations (23 CFR) at www.fhwa.dot.gov/legsregs/directives/cfr23toc.htm. Part 625 designates the design standards adopted for use on the National Highway System. §625.3(f) provides for exceptions that may be given on a project-by-project basis for designs that do not conform to the minimum criteria in the standards. The Stewardship and Oversight Agreement describes the approval authority for design exceptions within MnDOT and the types of projects that require formal approval of design exceptions by the FHWA. Part 630, "Preconstruction Procedures," discusses the many technical, legal, and procedural federal requirements that govern the development and content of the Plans, Specifications and Cost Estimates (PS&E).

An all-purpose resource containing laws, policies and guidance pertaining to the Federal-aid Highway Program may be found at http://www.fhwa.dot.gov/pgc/.

1-4.02 U.S. Coast Guard

The Coast Guard deals in matters relating to safety, navigation, policing, and determination of environmental effects along the U.S. coast line. The Coast Guard is responsible for issuing a bridge permit when a navigable waterway is being crossed. The permit applications are prepared and submitted by the Office of Bridges and Structures. Section 9 of the Harbors and Rivers Act of 1899 gives the Coast Guard the right to regulate the bridge clearance above navigable waters.

1-4.03 U.S. Department of Agriculture

The Department of Agriculture has an interest in the effect of highway systems on agricultural land resources, water supplies and wetlands, soils and subsoils. Agencies within the Department of Agriculture most directly concerned with these impacts include the Forest Service and the Natural Resources Conservation Service.

The Forest Service is responsible for multi-use management of natural resources such as timber, vegetation, wildlife, minerals, and public campgrounds within federally owned National Forests. Road designs emphasize aesthetically pleasing corridors that minimize impacts to the surrounding landscape within the boundaries of National Forests. The Forest Service also partners with local road agencies to provide a seamless transportation network to the public while ensuring a consistent level of service along all roads across jurisdictions. This includes coordination of long range planning efforts and generation of the Transportation Investment Programs (TIPs). The

Department of Agriculture also maintains an extensive collection of air photos and soil maps, which can be of value to the designer.

1-4.04 U.S. Army Corps of Engineers

The Corps is responsible for maintaining the channels of navigable waterways and flood control. Section 10 of the Harbors and Rivers Act of 1899 directs the Corps to regulate filling or dumping into the navigable waters. The Corps must issue a permit before the channel of any navigable waterway may be changed, unless the change is caused by the erection of a bridge. For a bridge, the permit is issued by the Coast Guard Section. If the project will be crossing a wetland area, a permit must be obtained from the Corps subject to Section 404 of the Clean Water Act. The Corps is interested in the amount of fill that will result from construction and how the effects will be mitigated. All Corps permits are prepared by the district and submitted to the Corps Regional Office. The affected district must notify MnDOT Office of Land Management of permit approval by the Corps of Engineers.

1-4.05 U.S. Environmental Protection Agency (EPA)

The EPA establishes and enforces environmental protection standards consistent with national environmental goals. In addition, the EPA assists others through grants, technical assistance and other means in arresting pollution of the environment. Principal areas of environmental concern are air, noise, and water quality. Most of the EPA Federal Permitting Authority has been delegated to the State agencies.

1-4.06 U.S. Fish and Wildlife Service

The Fish and Wildlife Service is concerned with the impact roadway improvements will have on the habitat of fish and wildlife. The service is most interested in the scope of highway improvement and the resulting impact during and after construction. The Fish and Wildlife Service is also very interested in wetland impacts, and in threatened and endangered species impacts. The Fish and Wildlife Service reviews permit applications sent to the Army Corps of Engineers and the DNR when protected endangered species are involved.

1-4.07 Federal Transit Administration (FTA)

The FTA is one of the modal administrations within the U.S. Department of Transportation. Headed by an Administrator who is appointed by the President of the United States, FTA functions through a Washington, DC, headquarters office and ten regional offices which assist transit agencies in all 50 states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, Guam, Northern Mariana Islands, and American Samoa. Public transportation includes buses, subways, light rail, commuter rail, monorail, passenger ferryboats, trolleys, inclined railways, and people movers.

The Federal Government, through the FTA, provides financial assistance to develop new transit systems and improve, maintain, and operate existing systems. The FTA oversees thousands of grants to hundreds of state and local transit providers, primarily through its ten regional offices. These grantees are responsible for managing their programs in accordance with federal requirements. The FTA is responsible for ensuring that grantees follow Federal mandates along with statutory and administrative requirements. The FTA website is at http://www.fta.dot.gov and contains further information.

1-5.0 REGIONAL AGENCIES

1-5.01 Metropolitan Planning Organizations

Metropolitan Planning Organizations (MPO) have lead responsibility for the development of a metropolitan area's transportation plans and to coordinate the transportation planning process. Urban areas over 50,000 in population are required to have an MPO if the agencies spend Federal funds on transportation improvements. There are eight Metropolitan Planning Organizations in Minnesota, each of whom maintain a Long Range Transportation Plan and develop a Unified Planning Work Program and a Transportation Improvement Program.

1-5.02 Regional Development Organizations

Minnesota's twelve Regional Development Organizations (RDOs) / Regional Development Commissions (RDCs) are partners in statewide transportation planning and programming. Each RDO/RDC works with MnDOT through an annual work program; work may include Area Transportation Partnership (ATP) coordination and technical assistance, assistance with statewide and regional planning efforts, and Safe Routes to School planning.

1-5.03 Area Transportation Partnerships

An Area Transportation Partnership (ATP) is a group of interested entities that develops a regional transportation improvement program for their area of the state. ATPs typically include representatives from MnDOT, metropolitan planning organizations, regional development commissions/organizations, counties, cities, tribal governments, special interests, and the public. The ATP solicits for projects that are eligible for federal funding. The resulting project lists are reviewed and integrated into the Area Transportation Improvement Program to be included in the State Transportation Improvement Program (STIP).

1-5.04 Watershed Districts

The Minnesota watershed districts have been established to ensure the best use and protection of creeks, streams, and lakes. United States Geological Service maps are used to generally define the watershed districts, which are more precisely defined in more developed areas. An overall watershed plan is prepared for each district with its primary purpose to prevent encroachment onto a flood plain. Local governments pay the cost of maintaining a district.

Highway projects will occasionally have a major impact on a watershed. MnDOT district offices generally handle the coordination with the watershed districts. In less developed areas of the state, the Department of Natural Resources will provide the necessary coordination with MnDOT. The designer must realize that there is an important distinction between the potential impacts on a watershed and the hydraulic design of a highway project.

1-6.0 LOCAL AGENCIES AND COMMUNITIES

1-6.01 County Engineering Office

Each county in Minnesota has a County Engineer. This individual must be consulted when highway work will affect a County State Aid Highway (CSAH) or county road. The purpose of this contact is to ensure that highway improvements are in the best interest of both the state and the local community, and that the appropriate design standards are used. Floodplain, Zoning and Permits may have either separate environmental offices or part of the County Engineering Office.

1-6.02 County Health Agencies

The local county health agency should be contacted when the road improvement being designed may have an impact on potable water sources or interfere with sanitary lines or systems. The purpose of this contact is to prevent accidents or circumstances which could affect public health. Most counties have a Statewide Health Improvement Program (SHIP) coordinator.

1-6.03 Native American Tribal Communities

Minnesota is home to 11 American Indian reservations and 12 federally-recognized sovereign tribal nations. Each tribe is a separate sovereign nation having an independent relationship with the United States and the State of Minnesota. MnDOT, FHWA, and Minnesota tribes have agreed to combine their efforts in an inter-governmental partnership to create transportation projects and services. Information on MnDOT's tribal partnerships can be found here: http://www.dot.state.mn.us/mntribes/.

1-6.04 Incorporated Cities

When roadway improvements are to be made within the boundaries of incorporated cities, the City Engineer must be consulted. In addition, it is necessary to coordinate the improvement with the local planning agency, City Administration, City Clerk and Mayor. Community land use plans, as well as street and utility plans, must be consulted to ensure that state projects are compatible with local needs.

1-6.05 Unincorporated Communities

When roadway improvements are made outside the boundaries of incorporated areas, the County Engineer must be consulted. The County Planning Agency should also be consulted. The purpose of coordinating the improvement is to ensure that projects are compatible with local needs.

1-6.06 Townships

When roadway improvements are to be made within the boundaries of a township, the Township Board should be consulted. In addition, it is necessary to coordinate the improvement with the local planning agency, Township Chairman or Clerk. Of particular interest would be community land use plans as well as street and utility plans.

1-6.07 Local Planning Agencies

Most Minnesota cities and counties have a Planning Agency or a Regional Development Center with a planning staff. They prepare a comprehensive plan which identifies the general public work needs of their jurisdiction and provides a broad framework with which to make funding decisions. The City Councils and County Boards usually approve all highway projects in their area.

The MnDOT district offices have the greatest amount of contact with local planning agencies. The scoping and preliminary design phase of a planned highway project is the appropriate time to contact the local agencies. There are considerable differences among the local agencies, so early contact is important. Also, the anticipated highway project may impact several local jurisdictions, requiring greater coordination efforts.

1-7.0 METROPOLITAN TWIN CITIES REGIONAL GROUPS

1-7.01 Metropolitan Council of the Twin Cities Area

The Metropolitan Council is the regional policy-making body, planning agency, research organization, and provider of essential services for the Twin Cities, Seven County Metropolitan Region. The Council prepares the long-range plan for the Twin Cities area, called the Regional Development Guide, and reviews a wide variety of development and human service related proposals in the Twin Cities area to ensure their compatibility with the development guide. The Council is responsible for regional transportation planning. The Transportation Policy Plan (TPP) sets policies based on goals and objectives for the regional transportation system. MnDOT, in cooperation with the Council, identifies and estimates the revenues and costs for state highway operations, maintenance, and capital investments in the TPP.

As the region's federally-designated Metropolitan Planning Organization (MPO) the Council and the Transportation Advisory Board (TAB) are responsible for the continuing, cooperative and comprehensive transportation planning process in the Twin Cities Metropolitan Area. Among its roles, the TAB solicits and evaluates applications for federal transportation funding, and conducts public hearings and adoption of the region's Transportation Improvement Program. When roadway improvements are being developed in the area covered by the Council, the Council and/or TAB must be contacted to determine the level of coordination required.

1-7.01.01 Metropolitan Council Environmental Services (MCES)

The overall theme of the Council’s Water Resources Policy Plan is to move further toward integrating planning for wastewater, water supply, and surface water management. MCES constructs and operates the regional water pollution control program in the Twin Cities metropolitan area. MCES owns, operates and maintains various kinds of water pollution control facilities. These include interceptor sewers, lift stations and waste water treatment plants each designed as part of the metropolitan collection and disposal system. When roadway improvements are being developed in the Twin Cities, MCES must be contacted to determine the coordination required.

1-7.01.02 Metro Transit

The Council works with partners to build and operate the region’s bus and rail system. The Council, including its Metropolitan Transportation Services, works with Metro Transit and other regional transit operators, MnDOT, and county regional railroad authorities on planning, environmental and engineering studies for

transitway corridors. Metro Transit is an operating division of the Metropolitan Council. Metro Transit prepares a transit development program covering the detailed technical planning, engineering, and the financial and scheduling information necessary to implement the Metropolitan Council's transportation policy plan. All decisions are made by the Metropolitan Council. When roadway improvements are being developed in the Twin Cities, Metropolitan Transportation Services, and/or Metro Transit staff should be contacted to determine the coordination required.

1-7.02 Metropolitan Airports Commission (MAC)

The Commission has jurisdiction over seven airports in the Minneapolis and St. Paul area:

1. Minneapolis - Saint Paul International
2. Saint Paul Downtown (Holman Field)
3. Lake Elmo
4. Flying Cloud
5. Crystal
6. Anoka County – Blaine
7. Airlake (Lakeville)

Whenever road improvements are planned in the area of one of these airports, the Commission should be contacted to determine the proper level of coordination required. Whenever road improvements are planned in the area of the South St. Paul Airport (Fleming Field), which is not operated by the MAC, contact should be made directly with that facility. Designers should consult the MnDOT Office of Aeronautics for coordination.

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1-8.0 TRANSPORTATION SERVICE GROUPS

1-8.01 American Association of State Highway and Transportation Officials (AASHTO)

AASHTO has been organized to foster the development, operation and maintenance of a nationwide integrated transportation system and to cooperate with other appropriate agencies in considering matters of mutual interest in serving the public need. Therefore, the Officers of the states, Puerto Rico, and the District of Columbia departments or agencies responsible for transportation, and the United States Department of Transportation, pledge their cooperation:

1. To develop and improve methods of administration, planning, research, design, construction, maintenance and operation of facilities,
2. To provide for the efficient and effective transportation of persons and goods in support of national goals and objectives,
3. To study all problems related to highway transport and other modes of transportation,
4. To advise Congress on transportation legislation, and
5. To develop technical, administrative and operational standards and policies.

Minnesota standards and policies adhere closely to policies established by AASHTO. Numerous AASHTO publications provide background on accepted highway design practices in greater detail than is appropriate in this manual. Designers should be thoroughly familiar with the publications listed below. These sources are to be used as guides on details not covered in this manual and for in-depth explanation of the concepts that serve as bases for policies and procedures:

1. A Policy on the Geometric Design of Highways and Streets (commonly known as the "Green Book")
2. Roadside Design Guide
3. Guide for the Planning, Design, and Operation of Pedestrian Facilities
4. Guide for the Development of Bicycle Facilities

Many other AASHTO publications are available to provide authoritative guides and policies in pavement design, traffic barriers, drainage, lighting, landscaping, rest areas, bikeways, utilities, etc. AASHTO maintains a list of the available publications and provides order forms and ordering instructions.

1-8.02 Transportation Research Board (TRB)

The Transportation Research Board is an agency of the National Research Council, which serves the National Academy of Sciences and the National Academy of Engineering. The Board's purpose is to stimulate research concerning the nature and performance of transportation systems, to disseminate information that the research produces, and to encourage the application of appropriate research findings. The program is supported by state transportation and highway departments, the U. S. Department of Transportation, and other organizations interested in the development of transportation systems. The Transportation Research Board publishes research in three types of publications:

1. The Transportation Research Record is used to present papers on a given subject,
2. The Special Report is used to present papers limited to a specific subject area or the topic of a conference, and
3. The Synthesis of Highway Practice is used to report the findings of a particular subject study.

1-8.02.01 National Cooperative Highway Research Program (NCHRP)

The National Cooperative Highway Research Program, administered by TRB, provides valuable design information. Systematic, well-designed research provides the most effective approach to the solution of many problems facing highway administrators and engineers. Often, highway problems are of local interest and can best be studied by highway departments individually or in cooperation with their state universities and others. However, the accelerating growth of highway transportation develops increasingly complex problems of wide interest to highway authorities. These problems are best studied through a coordinated national program of cooperative research.

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1-9.0 PROJECT ADMINISTRATION

1-9.01 Project Development Process (General)

Projects are planned improvements to the highway system. A project may be as simple as an overlay of an existing pavement or as complex as a major new freeway at a new location. A MnDOT transportation project is affected by many influences, both internal and external to the Department, which mold and shape it. It may be significantly changed, dropped or deferred as a result of these influences. No two projects are exactly alike because of the differences in the project work type and project impacts. Thus, the Highway Project Development Process must be a flexible process that allows project managers to creatively adapt to many individual project circumstances.

The MnDOT Highway Project Development Process (HPDP) Handbook is a web-based guidance manual that documents the basic framework within which MnDOT can develop diverse types of transportation improvement projects. It also provides information for individuals and organizations involved in the MnDOT project development process. The process begins after system planning and ends after the construction plans, specifications and cost estimates (PS&E) are prepared for construction and a project is ready for bidding. The Highway Project Development Process Handbook is a valuable reference for the designer, and it can be accessed electronically at http://www.dot.state.mn.us/planning/hpdp/.

1.9.02 Project Management

The Department's highway pre-construction role has become more complex due to environmental concerns, governmental regulation and the increasingly difficult engineering, funding and management decision-making process. MnDOT's Program and Project Management System (PPMS) is designed to provide adequate and timely information for decision making at all levels of department management. The system encompasses two broad areas: scheduling and funding. It provides a method for continuous operation of a multi-year, multi-project program planning and control process in which work progress and financial resource requirements are constantly monitored and related. The integration of the three areas provides the capability of relating work plans to the available financial and human resources. Goals based on the ability to relate resources include: (1) assuring that the number of projects programmed are within appropriation limits; and (2) better identifying which projects a pre-construction group should be working on to meet contract lettings.

PPMS can provide the Department with many advantages. Some of the more important advantages include:

1. Providing timely information on present and projected work programs and funding levels.
2. Providing documentation on the status of funds and schedules. This information enables the project, program and functional group managers to analyze workloads.
3. Providing a clear illustration of the commitments which pre-construction groups must satisfy in order for the district project managers to meet their schedule. Notification is given to functional groups of letting date changes or cost estimate changes.
4. Providing for program simulations.

1.9.03 Project Manager Responsibility

The Project Manager must always be aware of the status of the project and comply with policy, procedure, design criteria and standards in the development of the project.

The project status is an assessment of how much progress has been made toward project completion and a determination of whether the project is reasonably close to the planned time schedule. Many records, forms, and documents of all kinds relate to project progress. The responsibilities of the project manager are to maintain the record system (explained under PPMS), to ensure project progress, and to deliver the project on time and within the allowed budget.

Policy, procedure, criteria and standards are communicated in various ways from various sources. The Project Manager must know which are directives and which are to be used as guidelines with judgment. If they appear unclear, and in the absence of higher authority, the Project Manager must interpret the instruction to his/her best ability and know where to seek guidance or assistance in these areas among the various Department offices.

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2-7.0 DESIGN PROCEDURES

2-7.01 Design Memorandums

Design Memorandums document project design concepts, standards and exceptions, and indicate whether a project will meet or exceed the minimum standards of the thirteen critical design elements. MnDOT's Highway Project Development Process Handbook contains further clarification on the use of Design Memorandums.

2-7.02 Coordination with Functional Groups

The designer is responsible for properly coordinating with functional groups by contacting them and providing and/or receiving information and guidance concerning specific areas of a project. The functional groups that need to be involved will vary from project to project. Some of the common ones are:

1. Materials;
2. Hydraulics / Water Resources;
3. Bridge;
4. Cooperative Agreements;
5. Utilities Agreements & Permits;
6. Special Provisions;
7. Engineering Cost Data & Estimating;
8. Surveying & Mapping;
9. Traffic Engineering;
10. Maintenance;
11. Construction & Innovative Contracting;
12. Environmental Stewardship;
13. Cultural Resources;
14. Right of Way / Land Management; and
15. State Aid.

2-7.03 Intermodal Coordination

The designer is responsible for properly coordinating with intermodal groups inside and outside the Department by contacting each group that the project may affect in the present or the future. Proper coordination with intermodal groups reduces costly mistakes and may save dollars by combining projects. The intermodal groups are able to determine proper procedures, directions**,** and time frames needed to complete reviews of each project. The intermodal offices to consider contacting for each project are:

1. Freight & Commercial Vehicle Operations;
2. Transit and Active Transportation; and
3. Aeronautics.

2-7.04 Agency/Department Coordination

The designer is responsible for coordinating with the different agencies and/or departments that a project may affect. Some of them are:

1. Federal agencies
   a. United States Department of Transportation
   b. U.S. Coast Guard
   c. U.S. Department of Agriculture, Natural Resources Conservation Services
   d. U.S. Army Corps of Engineers
   e. U.S. Environmental Protection Agency
   f. U.S. Fish and Wildlife Service
2. State agencies
   a. Minnesota Historical Society
   b. Minnesota Department of Natural Resources (DNR)
   c. Minnesota Department of Public Safety (DPS)
   d. Minnesota Pollution Control Agency (MPCA)
   e. Minnesota Environmental Quality Board (MEQB)
   f. Minnesota Board of Water and Soil Resources

3. Counties
4. Municipalities
5. Metro and other regional groups
   a. Metropolitan Council of the Twin Cities
   b. Metropolitan Airports Commission (MAC)
   c. Local planning agencies
   d. Watershed districts
6. National Transportation service groups
   a. American Association of State Highway and Transportation Officials (AASHTO)
   b. Transportation Research Board (TRB)

8-4.05.02 Designer Awareness of Subsurface Drainage Needs

Changes in project limits and design concept after completion of the Materials Design Recommendation could lead to situations where the need for subsurface drainage facilities might go undetected by the Office of Materials & Road Research. As those most familiar with the design of any given project, design personnel should be aware of conditions which warrant further investigation in the area of subsurface drainage. The following are some locations of potential concern:

1. areas where springs are observed;
2. areas where existing pavement cracks show continued drainage long after other areas are dry;
3. areas where cross sections and/or profiles show no means of positive drainage from the pavement structure; and
4. any location where there is evidence that water entering the pavement structure may exceed that structure's ability to drain the water quickly while maintaining its ability to support traffic.

Evolution in pavement structure design has brought increasing emphasis on highly permeable roadway bases in recognition of the fact that water in the structure cannot be effectively prevented. Because of the cost and magnitude of potential problems, it is important to locate and provide facilities that can adequately handle subsurface flow.

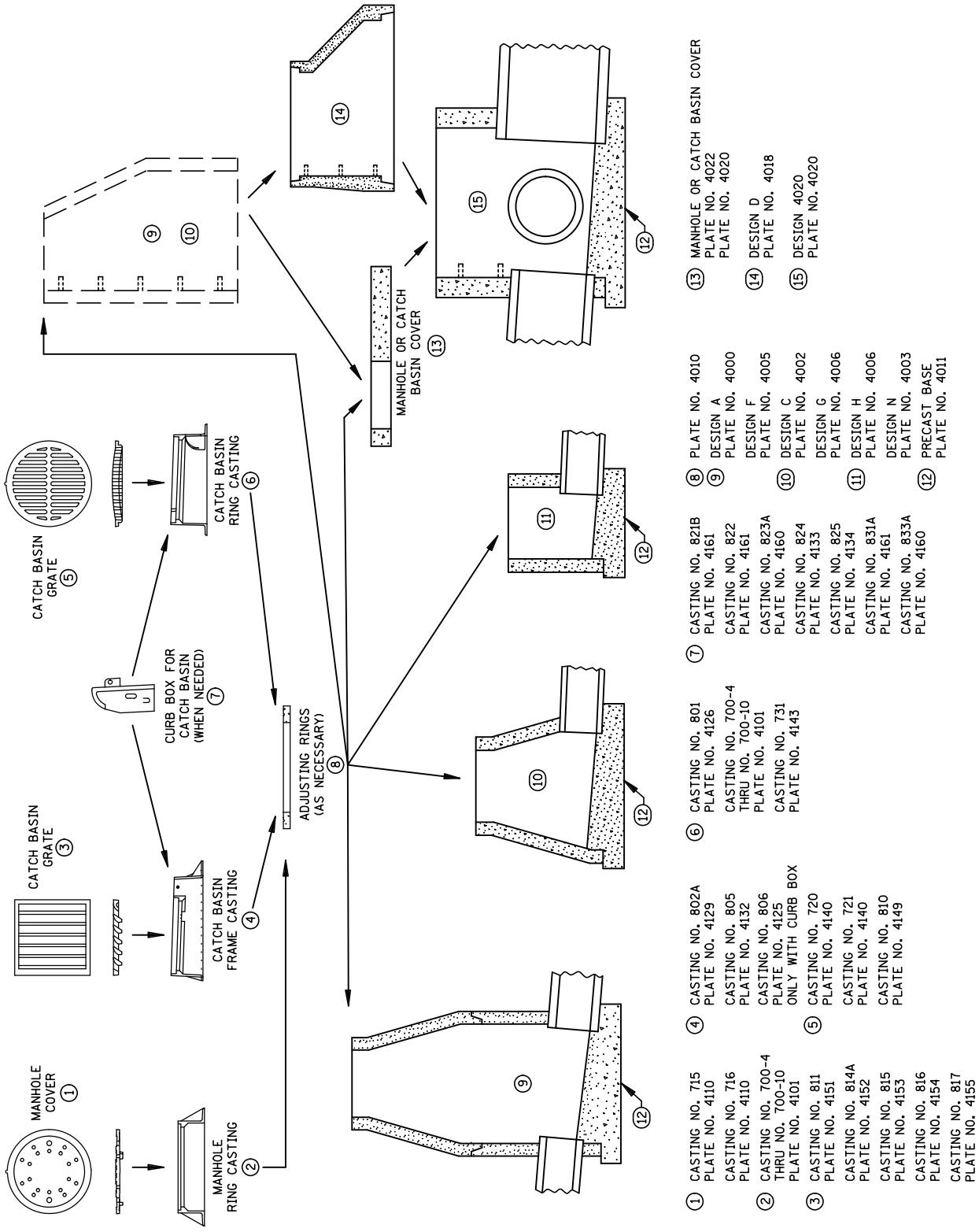
Table 8-4.04A
STANDARD CASTING ASSEMBLIES

INLET CASTING ASSEMBLIES

TYPE	RING OR FRAME CASTING NO. (Std. Plate No.)	CURB BOX NO. (Std. Plate No.)	GRATE CASTING NO. (Std. Plate No.)									
			810 (4149)	811 (4151)	814A (4152)	815 (4153)	816 (4154)	817 (4155)	720 (4140)	721 (4140)	731 (4143)	REMARKS
B-Curb	801 Round (4126)	821B (4161)	**B-1**									
	802A Square (4129)	823A (4160)		**B-2**	**B-3**	**B-4**	**B-5**					
	805 Square (4132)	N/A		**B-6**	**B-7**	**B-8**	**B-9**					
	806 Square (4125)	824 (4133)		**B-10**	**B-11**	**B-12**	**B-13**					
	806 Square (4125)	825 (4134)		**B-14**	**B-15**	**B-16**	**B-17**					
D-Curb	805 Square (4132)	N/A		**D-1**	**D-2**	**D-3**	**D-4**					
V-Curb	801 Round (4126)	831A (4161)	**V-1**									
	802A Square (4129)	833A (4160)		**V-2**	**V-3**	**V-4**	**V-5**					
	805 Square (4132)	N/A		**V-6**	**V-7**	**V-8**	**V-9**					
S-Curb	801 Round (4126)	822 (4161)	**S-1**									
	805 Square (4132)	N/A		**S-2**	**S-3**	**S-4**	**S-5**					
ADA	805 Square (4132)	N/A						**ADA-1**				
Misc.	700-4 Round (4101)	N/A							**M-1**	**M-6**		720 convex
	700-7 Round (4101)	N/A							**M-2**	**M-7**		721 concave
	700-8 Round (4101)	N/A							**M-3**	**M-8**		
	700-9 Round (4101)	N/A							**M-4**	**M-9**		
	700-10 Round (4101)	N/A							**M-5**	**M-10**		
	Round Conc. (4143)	N/A									**M-11**	731 Stool

MANHOLE CASTING ASSEMBLIES

RING CASTINGS (Std. Plate No.)	COVER CASTING NO. (Std. Plate No.)	
	715 (4110)	716 (4110)
700-4 Round (4101)	**A-4D**	**A-4**
700-7 Round (4101)	**A-7D**	**A-7**
700-8 Round (4101)	**A-8D**	**A-8**
700-9 Round (4101)	**A-9D**	**A-9**
700-10 Round (4101)	**A-10D**	**A-10**



TYPICAL CONCRETE MANHOLE OR CATCH BASIN AND CASTING COMBINATIONS
Figure 8-4.04A

11-11.0 ROADSIDE APPURTENANCES

11-11.01 Mailbox Supports

MnDOT has developed this policy regarding mailbox supports on the Trunk Highway System. Minnesota Rules Chapter 8818, "Mailbox Installation and Support Standards" is used as a reference to the MnDOT policy.

This policy provides guidance to location and installation of accepted mailbox supports on highways with speed limits of 40 mph (65 km/h**)** or greater.

11-11.01.01 Policy

1. Mailbox installations and supports that have been accepted by the FHWA as meeting the NCHRP Report 350 crash worthiness criteria, meet Minnesota Rules Chapter 8818, U.S. Post Office recommendations, and are in compliance with MnDOT Policy are acceptable. To obtain a drawing with an example of a crash tested mailbox support, which satisfies the above requirements, contact the Design Standards Unit, Office of Technical Support.
2. All mailbox supports should be a breakaway design and support a standard mailbox size T2 with a 10 lb (4.5 kg) load.
3. Mailbox supports should consist of corrosion resistance materials, which, in accordance with project/site specific conditions, may be required to include, but not limited to, the following:
   a) Post, pipes and other steel components galvanized per Spec. 3392.
   b) Pipes conforming to Spec. 3362, Schedule 40 of ASTM A53/A53M.
   c) All fasteners conforming to Spec. 3391.
4. The installation should include the following:
   a) Location of the face of mailbox should be 8 in. to 12 in. (200 mm to 300 mm) outside the edge of the shoulder or 6 in. to 12 in. (150 mm to 300 mm) behind the face of the curb.
   b) The height of the mailbox bottom should be 42 in. to 48 in. (1 m to 1.2 m) above the pavement in rural and urban areas. Postal Service regulations will determine the height. The local mail carrier post office should be consulted to determine if any changes need to be made to the installation regarding height and offset distances.
   c) Adequate embedment depths of the mailbox support should be provided so that the structure does not sag or fall over. The embedment depths will vary from each installation by the type of support, the location of the structure on inslope, the steepness of the inslope, and soil condition or type. The details for the supports should include the proper embedment depths in the plans or have provisions in the plans for the embedment depth to be decided in the field. Preferably, the embedment depth shall not be less than 48 in. (1.2 m).
   d) The spacing between mailboxes should be a minimum of 30 in. (760 mm) from center to center of the supports. A multiple mailbox support can be considered if two or more mailboxes are at one location.
5. Alternate support designs may be approved by the Design Standards Engineer or the Project Engineer in consultation with the Design Standards Engineer.

11-11.01.02 Unlawful Supports

The following mailbox installations and supports are considered a road hazard, and a danger to the safety of the traveling public.

1. An installation that contains more than one vertical support;
2. A single support containing more than two mailboxes;
3. A wooden support with a cross-sectional area greater than 16 $in.^2$ (100 cm^2) at any above-ground point along the support (for example, the maximum allowable square and round support dimensions are 4 in. x 4 in. (100 mm x 100 mm) and 4.5 in. (114 mm) in diameter, respectively), except that larger wooden supports are acceptable if, at a height 4 in. (100 mm) above the ground, the support cross-sectional area is altered in some fashion so as to reduce the cross-sectional area at that point to 16 $in.^2$ (100 cm^2) or less;

4. A metal support of a weight of 4 lb/ft (6 kg/m) or more for any 1 ft (300 mm) of vertical measurement above ground (for example, a standard steel pipe of up to 2 in. (50 mm) inner diameter would be acceptable), except that larger metal supports are acceptable if, within the first 3 in. (75 mm) above ground the metal support is less than 4 lb/ft (6 kg/m), or less than 1 lb (0.45 kg) for the 3 in. (75 mm) length;

5. Adjacent mailbox installations whose respective supports are spaced closer than 30 in. (760 mm), as measured from center of support to center of support;

6. Neighborhood delivery and collection box units, whether or not United States Postal Service approved;

7. A support comprised of material other than solely wood or metal posts that either exceeds 16 $in.^2$ (100 cm^2) in total cross-sectional area at a height of 4 in. (100 mm) above ground or a weight of 4 lb/ft (6 kg/m) or more for any 1 ft (300 mm) of vertical measurement above ground, unless within the first 3 in. (75 mm) above ground the support is less than 4 lb/ft (6 kg/m)**,** or less than 1 kb, (0.45 kg) over the 3 in. (75 mm) distance. Examples of such nonconforming supports could include supports such as filled milk cans, brick structures, plows, and concrete-filled pipe, etc.; and

8. An installation, whether a support or closed mailbox, that encroaches the usable roadway or its airspace.