MPDM Chapter 3
Engineering and Environmental Considerations

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Houston Engineering, Inc.
Chapter 3 Subcommittee Members

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• Kris Sigford, MCEA
• Les Everett, University of MN
• Nathan Kestner, DNR
• Nick Gervino, MPCA
• Rebecca Kluckhohn, Wenck
• Rob Sip, MDA
• Ron Mortenson, Meeker County
• Scott Henderson, Sauk River Watershed District
Primary Purposes of Chapter 3

• Guidance to Engineers in completing their duties
  • M.S. 103E
  • Other applicable state and federal law
• Guidance to Drainage Authority on what to expect and request from their Engineer
• Guidance to regulators on what to expect in an Engineer’s Report
• Inform stakeholders (D.A., regulators, viewers, landowners, etc.) of the Engineer’s role and basis for their recommendation
What has changed since 1991?
What has changed since 1991?

- **STATUTES**: 2016 Minnesota Statutes
  - CHAPTER 103E. DRAINAGE
  - Section 103E.045: Definitions
  - 103E.041: Drainage Authority Powers

- **AG PRACTICES**: Image of agricultural equipment and drone

- **TECHNOLOGY**: Image of drone

- **REGULATION**: Image of grass

- **COMMUNICATION**: Image of phone

- **PRIORITIES**: Image of dock
Major Changes to MPDM Chapter 3

• Environmental Considerations
  • 103E.015 considerations
  • Regulatory requirements
  • Water Quality / TMDL

• Repair Reports / As Constructed and Subsequently Improved Condition (ACSIC)

• Resources
  • Links
  • Checklists
  • Sample Reports
Points of Emphasis in Update

• Reflect changes in law
• Consistent language and “voice”
  • “May” vs. “should” vs. “must” vs. “shall”
• Consistent with current engineering practice
• Not a policy document!
Chapter 3 Organization

1. Introduction
2. Specific Environmental Considerations
3. Preliminary Survey and Engineer’s Preliminary Report
4. Detailed Survey and Engineer’s Final Report
5. Adequacy of Outlet
6. New Systems, Improvements, or Modifications of Drainage System
Chapter 3 Organization (cont.)

7. Repair/Maintenance of Drainage System
8. Redetermination of Benefits
9. Consolidation of Drainage Systems
10. Construction Plans and Specifications
11. Construction
12. Record Drawings

A. Appendices
### CHAPTER 3 CONTENT

**Auditor's Valuation Assessment Statement: In the Matter of the Petition of Hans Hanson and Others for Repair of County Ditch No. 21, by Anoka County, Minn.**

<table>
<thead>
<tr>
<th>Name of the Owners of Lands and Roads that are Assessed for the Repair of Ditch</th>
<th>Description of Each Parcel Assessed for the Repair</th>
<th>Amount of Original Assessment of Benefits by Construction</th>
<th>Amount to be Paid for Repair of Ditch Under Suit</th>
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</table>
Key Terminology in Chapter 3

• “Improvement”
• “Major Repair” vs. “Minor Repair” vs. “Petitioned Repair” vs. “Non-Petitioned Repair” vs. “Maintenance”
• “Drainage System Project”
Introduction

Roles and Responsibilities of the Engineer

• Technical expertise

• Technical application of drainage law;
• Surveying;
• Hydrology and hydraulics;
• Culvert, roadway, and structural design;
• Construction plan development;
• Construction management and observation;
• Erosion and sediment control design;
• Wetland delineation;
• Water quality analysis;
• Communication/liaison between drainage authority and other decision-makers and/or reviewers;
• Environmental review and permitting; and
• Soil and water conservation.
Introduction

Roles and Responsibilities of the Engineer

• Understanding of drainage law
• Understanding and evaluating regulatory requirements
• Evaluating environmental considerations (103E.015)
• Key technical advisor for the drainage authority
Specific Environmental Considerations
Specific Environmental Considerations

General

• Roles of Engineer and Regulatory Reviewer
• Pertinent regulations (table)
• Contact info (link)
• Early Coordination

<table>
<thead>
<tr>
<th align="center">Table 1: Pertinent Regulations</th>
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</thead>
<tbody>
<tr>
<td align="center"><strong>Agency</strong></td>
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<tr>
<td align="center"><strong>Local Government</strong></td>
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<tr>
<td align="center">Townships</td>
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<tr>
<td align="center">Counties</td>
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<tr>
<td align="center">Watershed Districts</td>
</tr>
<tr>
<td align="center"><strong>State Agencies</strong></td>
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Specific Environmental Considerations
Wetlands

- Wetland Conservation Act (WCA)
- Clean Water Act (CWA)
- Swampbuster
- Determining Wetland Impacts
- Downgradient Wetland Effects
Specific Environmental Considerations
Public Waters

• Work in public waters
• Links to DNR site
• Checklist
Specific Environmental Considerations

Other

- Environmental Review
- Threatened and Endangered Species
- Water Quality
  - NPDES
  - State Standards and Goals
Preliminary Survey and Engineer’s Preliminary Report
Preliminary Survey and Engineer’s Preliminary Report

Preliminary Survey Procedures

• Guidance vs. mandatory information
• Alternatives to traditional survey
• Consideration of BMP siting (e.g., two-stage ditch)
Detailed Survey and Engineer’s Final Report

- Few Changes to this Section
- Required content in report
- Advisory Review
- Example Engineer’s Reports (Appendix)
Adequacy of Outlet
Adequacy of Outlet
Basic Requirements

- No loss of function to downstream drainage outlets
- No excessive scour/deposition of sediment
- No flood damages, unless compensation is made

Note: These are more or less unchanged from 1991
Adequacy of Outlet Methods of Analysis

- Consider regulatory requirements in survey scope
- Modern hydrology/hydraulics techniques
- Matching rigor of analysis to nature and scope of project
New Drainage Systems, Improvements, Laterals, and Other Modifications of Drainage System

- General Information (little change)
- Engineering Requirements
  - Hydrologic and Hydraulic Analysis
  - Ditch/Tile Hydraulic Design
  - Bridge/Culvert Hydraulic Analysis and Design
  - Erosion Control for Drainage Water Entry to a Public Ditch
  - Miscellaneous Structures
  - Channel Geometry
  - Vegetated Ditch Buffer Strips
Repair/Maintenance of Drainage System

“Minor Repair” → Non-Petitioned Repair
“Major Repair” → Petitioned Repair

Contracting and Levying for Maintenance and Repair
Repair/Maintenance of Drainage Systems
Determination of the As-Built Condition

• Fore Repairs and/or Reestablishment of Drainage System Records
• Test pits
• Soil Borings
• Culvert Comparison
• Cut Sheets
• Drainage Records Modernization
Repair/Maintenance of Drainage Systems
Petitioned Repair

• Recommended examination
• Bridge/culvert capacity
• Repair report outline
• Example repair reports (Appendix)
Other Chapter 3 Sections

• Redetermination of Benefits
• Consolidation of Drainage Systems
• Construction Plans and Specifications
• Construction
• Public Drainage System Records
Chapter 3 Appendices

Checklists

- M.S. 103E.015 Criteria
- Items in a Concept Plan
- Preliminary Report Guidelines
- Key Questions for Considering Water Quality Impact
- Does Your Project Require an Environmental Review?

APPENDIX 1

M.S. 103E.015 CRITERIA

Does your report consider the following:

☐ private and public benefits and costs of the proposed drainage project;

☐ alternative measures, including measures identified in applicable state-approved and locally adopted water management plans, to:
  (i) conserve, allocate, and use drainage waters for agriculture, stream flow augmentation, or other beneficial uses;
  (ii) reduce downstream peak flows and flooding;
  (iii) provide adequate drainage system capacity;
  (iv) reduce erosion and sedimentation; and
  (v) protect or improve water quality
Chapter 3 Appendices

**Resources**

- External sources of funding
- MN water quality standards
- Sample hydraulic structures table
- Rock chute design spreadsheet
Chapter 3 Appendices

Example Reports

- Preliminary survey
- Engineer’s final report
- Repair report
- Impoundment proceedings
- Correction of public drainage system record
Questions on Content?
SUBCOMMITTEE DISCUSSION
TOPICS
Subcommittee Topics

Adequacy of Outlet

Issue: Does the Engineer need to consider nutrient and sediment loading with regard to the adequacy of the outlet?

Consensus: No subcommittee consensus. However, consensus that no case law indicates use of water quality in considering outlet adequacy under 103E.
Subcommittee Topics

Adequacy of Outlet

Issue: How far downstream does the Engineer need to consider downstream for adequacy? ¼ mile? 1 mile? 10 miles?

Consensus: No one-size-fits-all solution. Engineer needs to use judgement.
Subcommittee Topics
Downgradient Impacts

Issue: Are downgradient effects from drainage projects regulated under WCA or CWA?

Consensus: No. However, Engineer may consider these effects under M.S. 103.015 (Section II.B.5 of Chapter 3).
Subcommittee Topics
Future Regulatory Policy/Process

Issue: Should potential future regulatory changes (e.g., USACE 404 permit) be addressed in the MPDM?

Consensus: No – manual is not to presume what future decision will be. Instead, wiki format will enable “quick” changes to pages when policy/processes change

AND links provided to agency websites for first-hand information
Subcommittee Topics
Cumulative Impacts

Issue: Can/should the Engineer consider cumulative hydrology/hydraulic/water quality impacts?

Consensus: In role as advisor to Drainage Authority (and advocate for benefitting landowners) – No.

However, County or Watershed District may “wear other hats”
“HATS” A COUNTY OR WATERSHED DISTRICT BOARD WEARS

- ZONING AUTHORITY
- TAXING AUTHORITY
- LOCAL GOV. UNIT (LGU)
- LOCAL WATER PLANNER
- ROAD AUTHORITY
- RESPONSIBLE GOV. UNIT (RGU)
- DRAINAGE AUTHORITY
How a Drainage Authority May Consider Cumulative Impacts (under a different hat)

- Rules (e.g., maximum drainage coefficient)
- Cost share programs
- Regional projects
- Multi-purpose drainage management projects
Subcommittee Topics

Early Coordination

Issue: How to minimize conflict between the Engineer and regulating agencies at the 11\(^{th}\) hour of a project?

Consensus: Stress importance of early coordination in the MPDM
CHAPTER 3 FORUM
Ch. 3 Forum Topics

How can the Engineer make the most of the early coordination?

How can the regulating agency make the most of the early coordination?
Ch. 3 Forum Topics

What are common missing elements in an engineer’s report?

....from a regulatory reviewer’s perspective

....from a drainage attorney’s perspective
Ch. 3 Forum Topics

How to advise the drainage authority on differentiating between “low cost” and “best value”? 

How to advise the drainage authority on consideration of short term vs. long term cost?
Thank you!