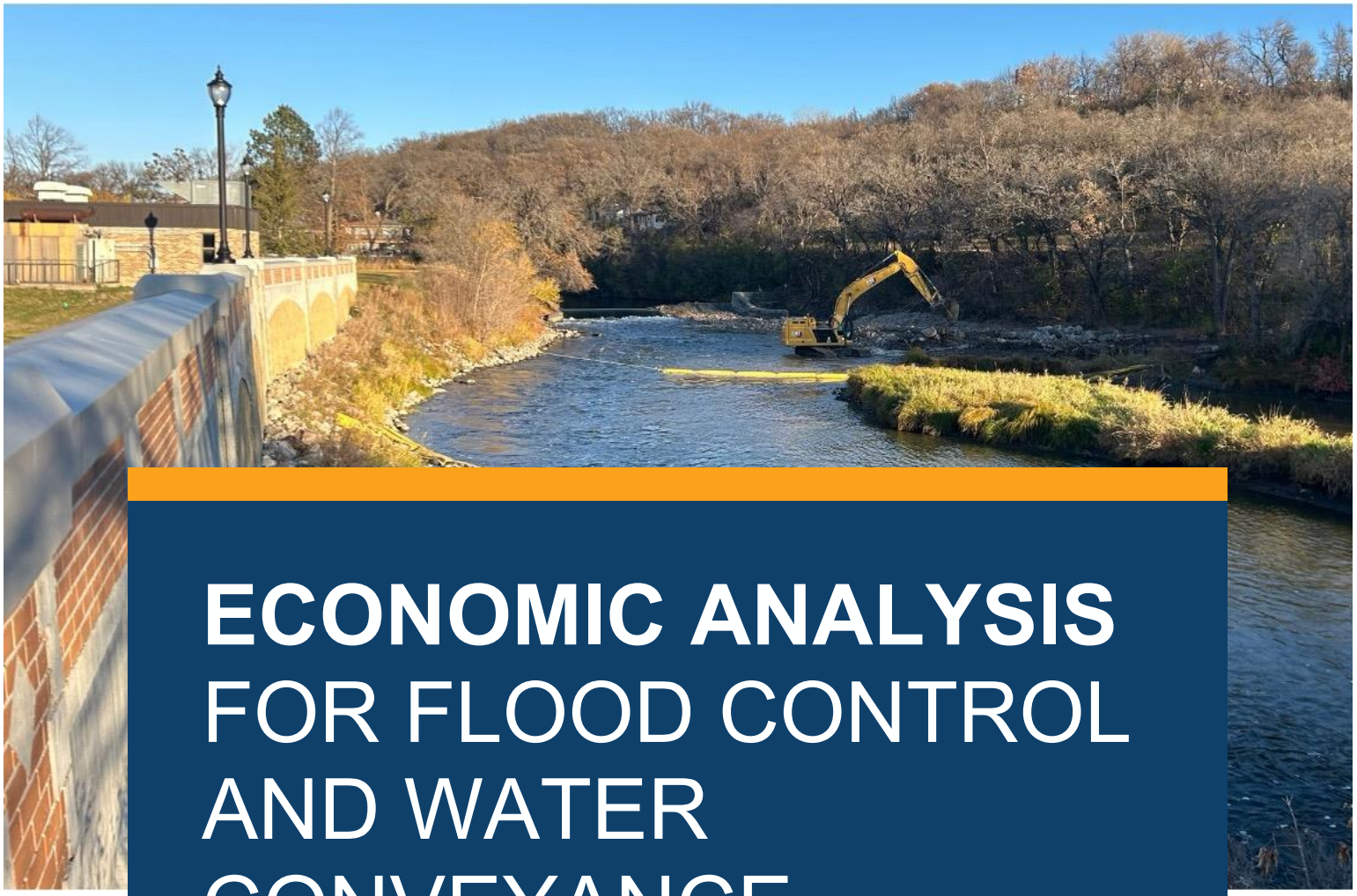

ECONOMIC ANALYSIS FOR FLOOD CONTROL AND WATER CONVEYANCE

POLICY | PE_03.2026

NORTH Dakota | Water Resources

Be Legendary.

Effective Date 07/15/2026

POLICY OUTLINE

1 POLICY STATEMENT

The North Dakota State Water Commission (SWC) prioritizes the efficient allocation of state resources and proper investment of ND tax-payer dollars. As such, the SWC implements Economic Analysis (EA) in compliance with North Dakota Century Code (N.D.C.C.) § 61-03-21.4 to inform and support its project funding decisions through the Department of Water Resources (DWR) Cost-Share Program.

This document outlines the policies, requirements, processes, and functions of the EA Workbook.

1.1 POLICY AUTHORITY OR IMPLEMENTATION

This policy garners authority from N.D.C.C. §§ 61-02-02 and 61-03-21.4 and is implemented through the DWR Cost-Share Program.

1.2 ACCEPTANCE

The SWC and DWR reserve the right to change this policy as necessary to ensure the SWC and DWR fulfill their statutory duties.

The SWC and DWR reserve the right to return any EA submitted under this policy to the applicant for correction if, in DWR's sole determination, it does not comply with the policy's intent, conform to the objective principles of economic efficiency analysis, or is insufficient for the SWC or DWR to make an informed decision.

1.3 APPEALS

Decisions may be appealed per the process outlined in N.D.C.C. § 61-02-76.

1.4 POLICY DEVIATIONS

The SWC and DWR reserve the right to deviate from policy as deemed appropriate and within requirements outlined in N.D.C.C.

Policy deviation requests from an applicant may be considered by the SWC or DWR if the applicant can justify why requirements of this policy are not necessary or applicable. Such a deviation will not be granted without significant justification. Additionally, a deviation request does not guarantee that a deviation will be granted.

1.5 PROFESSIONAL JUDGEMENT

DWR recognizes that projects are complex and require the application of best professional or engineering practices under specific project or area conditions (Professional Judgement).

Professional Judgement must be used while completing the EA workbook. Professional Judgement is subject to review by DWR staff. All decisions made will need to be fully documented, supported, and justifiable. The DWR reserves the right to overrule decisions made under this section.

1.6 DEPARTMENT CONTACT

Please contact the DWR's Planning and Education Division at (701) 328-4989 or dwrcostshare@nd.gov for questions regarding this policy or the Cost-Share Program.

2 SUBMISSION TO THE DWR

The DWR developed an Excel workbook (EA workbook), which hosts the DWR economic model (Section 3). The EA workbook is designed to assist sponsors with economic modeling best practices to comply with requirements in N.D.C.C., while ensuring comparable analysis between projects.

SWC Cost-Share Policy Section 3.11 (SWC 01) dictates which projects are required to complete and submit an EA.

Additionally, an applicant requesting an increase in Cost-Share assistance may be required to submit or update an EA when (1) the project has already submitted an EA and is requesting a scope change or cost increase, or (2) a cost increase results in the total cost of a project exceeding the EA threshold.

2.1 PRE-APPLICATION CONSULTATION

DWR strongly encourages pre-application consultation with DWR Cost-Share staff prior to application submittal. Early consultation between the applicant and DWR staff will support early understanding and compliance with this policy to limit unexpected project costs or delays.

2.2 APPLICATION SUBMISSION

A completed EA workbook must be provided with the Cost-Share application. The applicant is responsible for communicating any relevant project context to DWR that may inform the analysis.

The applicant is required to use the most recent version of the EA workbook for submission of results, unless otherwise approved, in writing, by DWR staff. The EA workbook can be downloaded from the DWR's website.

2.3 DWR REVIEW

The DWR will complete a comprehensive review of the EA workbook and coordinate with the applicant any clarifying questions or revision requests. The applicant is encouraged to respond to questions in a timely manner. Response delays may impede DWR review and may result in missing Cost-Share application submission deadlines.

DWR staff may contact the applicant and request approval to revise inputs rather than returning the EA workbook for revisions. Changes in this manner are at the applicant's discretion. The DWR may revise the EA workbook without consulting the applicant when the DWR data inputs change or require updates.

2.4 DWR RECOMENDATION

The EA workbook is a tool utilized by the SWC to satisfy statutory requirements, and the results may be used to inform funding decisions. EA results are one of many factors presented to the SWC when considering project eligibility or funding participation.

Analyses using modeled data may include uncertainty from inputs, parameters, and input model applications and will be interpreted accordingly. The applicant may coordinate with DWR staff to assess model sensitivity to input uncertainty and its effect on results. DWR staff may consider variability in modeled inputs when preparing results for the SWC.

DWR staff will present the EA results, including the benefit-cost ratio (BCR), to the SWC. DWR staff will present funding amounts for SWC consideration based on current Cost-Share Policy. The DWR may recommend rounding the BCR in accordance with Professional Judgment. Final funding decisions are made at the discretion of the SWC.

3 ECONOMIC ANALYSIS FRAMEWORK

The SWC has determined benefit cost analysis to be a reasonable, broadly accepted, and defensible method of economic efficiency evaluation for infrastructure projects, and it serves as the primary model for the DWR EA.

The EA model and workbook are developed and maintained by DWR to ensure a consistent review process. It incorporates federal guidance and standards of practice supported in peer-reviewed literature. The DWR updates the EA workbook to reflect most-recent data, as it becomes available. Annually, the DWR does a comprehensive review and update to incorporate additional data improvements and modern research. Updated EA workbooks are posted to the DWR website and communicated publicly to ensure transparency in the process.

3.1 EA MODEL ASSUMPTIONS

The EA model includes the following underlying assumptions that enable a transparent, consistent, and reliable process necessary to maintain comparability across projects:

a. All impacts can be reasonably measured in monetary terms;
b. Costs incurred prior to the original project application (sunk costs) are excluded from analysis;
c. The level of effort to determine economic efficiency is appropriate to the project scope and scale;
d. Data inputs are defensible and avoid selective sampling bias;
e. Variation across applications is limited to changes in inputs, not model functions or methodology;
f. Inputs are structured to eliminate double counting of benefits; and
g. Applicants exercise Professional Judgement (Section 1.5) for inputs in which simple estimation is justifiable.

3.2 SCENARIO ANALYSIS

The EA workbook evaluates two scenarios: “Without Project” and “With Project.” The comparison of scenarios captures the benefits of protection or conveyance provided by the project.

The “Without Project” scenario reflects current conditions and, for repair, replacement, or rehabilitation projects, it assumes the infrastructure has been properly operated and maintained.

The “With Project” scenario reflects projected conditions with the proposed changes or infrastructure in place.

3.3 ACCEPTABLE DATA

All data inputs are direct costs and benefits, defined as objective, measurable, and directly attributable to the project.

Indirect costs and benefits are excluded from the analysis to ensure reasonable work, timelines, and analytical feasibility in compliance with N.D.C.C. § 61-02-02.

The applicant is expected to use best publicly available information from relevant local, state, or federal agencies. Other sources may be used by requesting a Policy Deviation (Section 1.4).

3.4 SET MODEL VALUES

Set model values are utilized in the EA workbook to maintain consistency with data source credibility and independence. These cells are locked within the EA workbook to reduce calculation errors and guide worksheet users through the required inputs.

An applicant may request changes to the set model values by requesting a Policy Deviation (Section 1.4).

4 EA WORKBOOK

The EA workbook is organized into worksheets for use by the applicant.

The EA workbook includes hidden worksheets that contain background model calculations. The applicant may reach out to DWR staff for in-depth review of the complete EA workbook.

The summary below lists inputs that are available to the applicant to capture the costs and benefits of their project. Not all variables are applicable to every project. DWR staff are available to assist the applicant in determining parameters and fields that are applicable to their project.

1. **Project Overview:**
    a. Name of project
    b. Project description
    c. Sponsor information
    d. Project construction cost estimate, including costs of construction; real estate; planning, engineering, and design; construction management; and contingency
    e. Annual operations and maintenance costs
    f. DWR has filled in and locked the Study Area Data inputs

2. **Inputs:**
    a. Project base year
    b. Years of construction
        - Must be greater than 0 and rounded to nearest whole number
    c. Designed project useful life, if applicable
    d. Current age of infrastructure, if applicable
    e. Current operational capacity percentage, if applicable
    f. Flood return periods for evaluation
        - Worksheet defaults to 5-, 10-, 25-, and 100-year intervals with a 100-year level of protection. The applicant may adjust these intervals to their needs.
    g. Lodging and meal costs per day, if applicable
        - Worksheet defaults to most-recent federal General Services Administration meal and lodging reimbursement rates for North Dakota
    h. Consumptive and non-consumptive use metrics, if applicable
        - Worksheet defaults to recreational benefit values, but may be updated by the applicant to include additional benefits based on Professional Judgement (Section 1.5)
        - Avoided infrastructure damages may be captured in this worksheet
    i. Travel delays, if applicable
        - Information to include vehicles per day, normal drive and detour drive times, and the duration of the roadway closure

j. The Inputs worksheet automatically inputs the capital investment project costs; annual operations and maintenance costs; structure composition; and additional benefits based on user inputs from different sections of the EA workbook.
k. DWR has filled in and locked the following data inputs: project life, discount factor, residential value per square foot, cropland damage per acre, erosion damage per foot, clearing cost per foot, sediment removal cost per ton, stored water cost per acre-foot, and federal mileage rate.

3. EA Rural Flood Damages

a. For each flood event probability, enter the following flood damages, if applicable: total acres flooded; cropland acres flooded; pasture acres flooded; number of farmsteads flooded; feet of bank erosion; length of snagging and clearing; tons of sediment removal; and detour costs based on miles, vehicles, and number of days.
    - Inputs must be entered in both the “Without Project” section and the “With Project” section.
    - Avoided infrastructure damages are able to be captured in this worksheet.
    - Acreage inputs must represent new acres protected by the proposed project and must not include acres currently served by an existing drainage system assumed to be properly designed, operated, and maintained. Prospective future acres dependent on future action and not represented in cost of the project cannot be included as direct benefits of the project.
b. Capacity Modification Trigger: The worksheet automatically calculates a capacity modifier to adjust average annual flood damages for repair, replacement, or rehabilitation of projects beyond their useful life.
    - The modifier is calculated based on applicant inputs to Worksheet “2 – Inputs” items c, d, and e.
    - Projects within their designed useful life will not have the capacity modifier applied automatically. If updated data or modeling since the original design of the infrastructure affects the protection level of the project, the applicant may request a Policy Deviation from DWR (See Sections 1.4 and 3.3).
c. The EA Rural Flood Damages worksheet automatically calculates event frequency and average annual damages to cropland, pastureland, and farmsteads, as well as erosion damage, clearing costs, sediment removal costs, detour costs, and stored water benefits.

4. EA Urban Flood Damages

a. Benefits in this model are represented as avoided infrastructure damages and avoided costs associated with urban flood damage.
b. For each structure in the project impacted area, input a structure identifier (ID), occupancy category, square footage, structure value (if known), the existing flood depth in feet, and the mitigated flood depth in feet.

- Occupancy categories include residential (1 story with basement and 2 story with basement), public, commercial, apartment, and industrial structures
- For cells where no damage occurs, enter '-9'

c. The EA Urban Flood Damages worksheet automatically calculates building damages, content damages, and displacement days for each flood interval.

5. Results Summary:

a. The EA workbook automatically calculates the present value and average annual benefits and costs of the project, benefit-to-cost ratio, net benefit, internal rate of return, and payback year. No applicant input is needed on this worksheet.

6. EA Detail:

a. The EA workbook automatically calculates the present value calculations of project costs and benefits. This worksheet shows more granular detail than the Results Summary.

7. EA Urban Other Calculations:

a. This worksheet conducts background calculations for urban flood damages, travel time delays, and social benefits. This worksheet is locked by the DWR. No applicant input is needed on this worksheet.

8. Model Definitions:

a. A listing of variables, units, and a description to be used across the entire EA workbook.

5 POLICY HISTORY

Policy Adopted: 2017
Policy Version PE_03.2026 Adopted: 07/15/2026
Policy Version PE_03.2026 Effective: 07/15/2026

Previous Revision(s):
07/15/2026: PE_03.2026 updates and replaces 2019 EA Guidance; Incorporates capacity modifier for drains
2019: North Dakota Guidance for Economic Analysis of Flood Control and Water Conveyance Projects
2017: Policy informally adopted