



Iowa Department of Natural Resources
Flood Plain Management Program
Earth Embankment Dams

This document should be filled out when submitting a joint application for embankment dam construction. Dam construction applications can be submitted in two phases to ensure the project is on track for approval during the preliminary layout and studies of the dam site. The preliminary application packet includes filling out the online joint application form, providing the supplemental information required on this form and preliminary design data prepared by or under supervision of a qualified professional engineer licensed in the State of Iowa. The preliminary design data shall contain a report summarizing the preliminary design, hydrologic data and reservoir routing, a hazard potential analysis, preliminary design drawings, the soils and geotechnical engineering analysis and a list of the engineering references used as the basis for design and construction.

Requirements for approval of dam construction are outlined in 567 Iowa Administrative Code Chapter 72 and DNR Technical Bulletin 16. The checklist below is meant to be useful in submitting complete applications, but does not replace or supersede the full requirements outlined in Chapter 72. Bulletin 16 and dam design references can be found on our website at <http://www.iowadnr.gov/dams>

If you have questions regarding a dam construction applications you may contact:
Casey Welty, 515-725-8330, Casey.Welty@dnr.iowa.gov

Preliminary Submittal:

- Preliminary Design Report:** A report should be submitted summarizing the overall dam design and proposed construction. This report will include the purpose of the project, design assumptions, summary of results, and references for the design. The report should document ownership of the dam and impoundment area and if any easements will be required or have been obtained.
- Hydrologic data and reservoir routing:** This should include the watershed analysis and hydrologic calculations detailing runoff factors, methodology, rainfall values used, and time of concentration calculations in the determination of inflow hydrographs. The reservoir routing should detail the depth/storage properties of the impoundment, and stage discharge curves for the spillway(s). A summary report should be provided in the preliminary design report in addition to model input and output. The computer model files may be requested by the Department.
- Hazard Potential Analysis:** An analysis should be provided of the lands, infrastructure, and development that may be impacted downstream during a dam failure and a recommendation of the appropriate hazard potential classification for design. This analysis may range from a simple aerial image search verifying no or limited downstream structures/infrastructure to a detailed hydraulic breach model showing estimated breach flow elevations and the impacts to downstream structures.
- Preliminary design drawings:** Preliminary engineering plans should be submitted that provide adequate details of the embankment and spillways. They should identify key features of the dam such as proposed embankment materials, slopes and top width, core trench, internal drainage, and wave protection. Spillway details should show the layout, sizing, joint details, and bedding.
- Soils and Geotechnical Report:** The details provided in this report will depend on the size, hazard class, and complexity of the project. Smaller low hazard dams should have a summary of soils and borrow location in the preliminary design report. Significant and high hazard dams should have a geotechnical report signed by a qualified geotechnical engineer documenting the evaluation of slope stability, anticipated vertical settlement and horizontal elongation, seepage and under-seepage potential, whether cathodic protection is needed for metal pipes, and

proper construction practices for the soil types and conditions encountered. Stability evaluation shall include end of construction, steady state seepage, and sudden drawdown conditions.

- Operating plan: For any dam with movable structures which must operate or be operated during times of flood or to provide minimum downstream flow, or where the impoundment level is raised or lowered on a regular basis, an operating plan must be developed. Requirements for the plan are outlined in Bulletin 16.
- Other calculations: The preliminary submittal should include other calculations as appropriate including structural evaluations, proposed instrumentation, drawdown calculations, low flow requirements, etc.

Final Submittal

After review and concurrence of the preliminary submittal by the department, the final submittal shall include the following documentation. The engineering plans and other engineering information shall be certified by a qualified professional engineer licensed in the State of Iowa.

- One complete set of construction plans
- One complete set of construction specifications
- Operating plan, if required
- Easements, if required
- Emergency Action Plan for High Hazard Dams
- Final engineering design report documenting all aspects of the design of the dam and how the design of the dam meets the department criteria. The engineering design report shall include the following: hazard potential analysis, hydrology and hydraulic calculations, embankment design and foundation analysis, and structural calculations where applicable.

Dam Inventory Information

Dam Owner Information (Who will be responsible for the dam after construction)

Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Email: _____ Phone: _____

Dam Name: _____

Location: Qtr _____ Sec _____ T _____ N R _____ County _____

River or Tributary Impounded: _____

Latitude: _____ Longitude: _____

Design Engineer: _____

Type of Dam (i.e. compacted earth, concrete): _____

Purpose of Dam: _____

Principal spillway type and size: _____

Emergency/auxiliary spillway description: _____

Low level drain description: _____

Embankment fill volume (CY): _____ Dam Length (ft.): _____ Dam Height (ft.): _____

Water Storage Volume: @Principal spillway _____ acre-feet

@Emergency spillway _____ acre-feet

@Top of dam _____ acre-feet

Impoundment Surface Area (acres): _____

Drainage Area (acres): _____ Hazard Classification: _____

DNR Structure Class: Major Non-Major

Nearest downstream city: _____ Distance to nearest city: _____

Principal spillway design storm _____

Freeboard design storm _____

Elevation Data _____ datum

Principal spillway crest _____ ft.

Emergency spillway crest _____ ft.

Top of dam _____ ft.

Toe of dam _____ ft.

100 year pool elevation (if known) _____ ft.