

NEVADA DIVISION OF WATER RESOURCES
ENGINEERING REVIEW OF DAMS:
DESIGN, PLANS, AND SPECIFICATIONS

Instructions: Note page on which noted information lies. Leave no blanks.
Use check mark if page number is inappropriate.
Note deficiencies and inconsistencies on last page.

1. APPLICATION FORM

- 1.1. ____ Heading properly completed
- 1.2. ____ Location properly completed
- 1.3. ____ Dam information complete
- 1.4. ____ Engineer listing complete
- 1.5. ____ Original signature of person listed in heading

2. PLANS

- 2.1. ____ Owner names on plans and dam name
- 2.2. ____ Vicinity/location
- 2.3. ____ Survey tie to found section corner
- 2.4. ____ Plan view of watershed boundary. Tributary area _____
- 2.5. ____ Downstream hazard
- 2.6. ____ Reservoir storage capacity curve
 - 2.6.1. ____ Capacity to spillway invert _____ at elevation _____
 - 2.6.2. ____ Capacity to crest of dam _____ at elevation _____
- 2.7. ____ Reservoir area curve
 - 2.7.1. ____ Area at spillway invert _____ at elevation _____
 - 2.7.2. ____ Area at crest of dam _____ at elevation _____
- 2.8. ____ Discharge curves for outlet(s) and spillway(s)
- 2.9. ____ Plan view of dam and reservoir area
- 2.10. ____ Post-construction topography with elevation contours
- 2.11. ____ Reference point on dam. Latitude _____ Longitude _____
- 2.12. ____ Limits of stripping
- 2.13. ____ Borrow areas
- 2.14. ____ Test pits/boreholes
- 2.15. ____ Cross section alignments
- 2.16. ____ Cross sections
 - 2.16.1. ____ Along axis
 - 2.16.2. ____ At outlet
 - 2.16.3. ____ At Spillway

- 2.16.4. ___ Other
- 2.16.5. ___ Dam crest elevation _____
- 2.16.6. ___ Spillway crest elevation _____
- 2.16.7. ___ Water level elevations
 - 2.16.7.1. ___ At maximum conservation _____
 - 2.16.7.2. ___ At IDF _____
 - 2.16.7.3. ___ At minimum pool (if applicable) _____
 - 2.16.7.4. ___ Maximum flow line in spillway and elevation _____
- 2.16.8. ___ Foundation elevation (after stripping and after any improvement)
- 2.16.9. ___ Location and dimensions of core
- 2.16.10. ___ Location and dimensions of filter and drain zones
- 2.16.11. ___ Location and dimensions of shell or random fill zones
- 2.16.12. ___ Location and dimensions of erosion protection
- 2.16.13. ___ Dam face slopes
- 2.16.14. ___ Dam crest camber
- 2.17. ___ Spillway plan view and cross sections
 - 2.17.1. ___ Energy dissipation
 - 2.17.2. ___ Erosion protection
 - 2.17.3. ___ Grade control
 - 2.17.4. ___ Concrete details
 - 2.17.5. ___ Reservoir control works details
- 2.18. ___ Outlet pipe plan view and cross sections
 - 2.18.1. ___ Detail of inlet. Invert elevation _____
 - 2.18.1.1. ___ Trash rack
 - 2.18.1.2. ___ Gate(s)
 - 2.18.1.3. ___ Gate operator(s)
 - 2.18.1.4. ___ Vent
 - 2.18.1.5. ___ Protection from ice, vandalism, wave action
 - 2.18.1.6. ___ Structural details
 - 2.18.2. ___ Detail of outfall. Invert elevation _____
 - 2.18.2.1. ___ Structural details
 - 2.18.2.2. ___ Tailwater control
 - 2.18.2.3. ___ Energy dissipater. Type _____
 - 2.18.3. ___ Detail of pipe
 - 2.18.3.1. ___ Support
 - 2.18.3.2. ___ Joints

- 2.18.3.3. ____ Cut off collars (NOT ADVISED AS SOLE MEANS OF SEEP CONTROL)
- 2.18.3.4. ____ Seep control, collection and disposal
- 2.19. ____ Drains
 - 2.19.1. ____ Type and location _____
 - 2.19.2. ____ Filters
 - 2.19.3. ____ Details of construction
 - 2.19.4. ____ Access/cleanouts
- 2.20. ____ Monitoring works
 - 2.20.1. ____ Type, location and details
- 2.21. ____ Foundation improvement
 - 2.21.1. ____ Dental concrete
 - 2.21.2. ____ Grouting program
 - 2.21.3. ____ Piles
 - 2.21.4. ____ Over excavation
 - 2.21.5. ____ Consolidation
 - 2.21.6. ____ Relief wells
 - 2.21.7. ____ Drains
- 2.22. ____ Other considerations or details

3. **BASIS OF DESIGN**

3.1. **HAZARD CLASSIFICATION** _____

3.2. **HYDROLOGY**

- 3.2.1. ____ Tributary area described
 - 3.2.1.1. ____ Nature of tributary area
 - 3.2.1.2. ____ Base flow
- 3.2.2. ____ Storm recurrence interval _____
 - 3.2.2.1. ____ Appropriate for hazard/size?
 - 3.2.2.2. ____ Incremental damage analysis?
- 3.2.3. ____ Runoff calculation method utilized _____
 - 3.2.3.1. ____ Appropriate curve numbers or infiltration rates
- 3.2.4. ____ Flood routing method utilized _____
- 3.2.5. ____ Freeboard to crest of dam _____ ft.
- 3.2.6. ____ Freeboard in spillway _____ ft.
- 3.2.7. ____ Dam break analysis
 - 3.2.7.1. ____ Method utilized _____
 - 3.2.7.2. ____ Appropriate constants applied?

- 3.2.7.3. ____ Inundation maps
- 3.2.8. ____ Potential for seiche due to landslide into reservoir
- 3.2.9. ____ Reservoir fetch and wave run up calculations

3.3. FOUNDATION

- 3.3.1. ____ Geotechnical report
 - 3.3.1.1. ____ Surface conditions
 - 3.3.1.2. ____ Possible geological hazards _____
 - 3.3.1.3. ____ Stripping requirements
 - 3.3.1.4. ____ Borrow area(s)
 - 3.3.1.5. ____ Shear strength for each zone
 - 3.3.1.6. ____ Permeability
 - 3.3.1.7. ____ Grain size distribution and classification
- 3.3.2. ____ Boring/test pit logs
 - 3.3.2.1. ____ Located on plans
 - 3.3.2.2. ____ Located in report
 - 3.3.2.3. ____ Total depth
 - 3.3.2.4. ____ Stratigraphy with location of various formations and depth to groundwater
- 3.3.3. ____ Seep analysis
- 3.3.4. ____ Foundation cut-off
- 3.3.5. ____ Strength of foundation materials
- 3.3.6. ____ Foundation/abutment improvement necessary
- 3.3.7. ____ Expected settlement
- 3.3.8. ____ Overall depth to groundwater
- 3.3.9. ____ Deficiencies or special conditions

3.4. EMBANKMENT

- 3.4.1. ____ Availability of suitable materials
- 3.4.2. ____ Soil properties
 - 3.4.2.1. ____ Shear strength tests. Max. allowable shear stress
 - 3.4.2.1.1. Core _____ psi
 - 3.4.2.1.2. Shell or random fill _____ psi
 - 3.4.2.1.3. Other structural zone _____ psi _____
 - 3.4.2.2. ____ Particle size distribution and classification
 - 3.4.2.2.1. ____ Core
 - 3.4.2.2.2. ____ Drain(s)

- 3.4.2.2.3. ____ Filters
- 3.4.2.2.4. ____ Shell or random fill
- 3.4.2.2.5. ____ Erosion protection
- 3.4.2.2.6. ____ Erosion protection bedding
- 3.4.2.3. ____ Density curves. Method _____
- 3.4.2.4. ____ Filter compatibility between zones
- 3.4.3. ____ Slope stability
 - 3.4.3.1. ____ Factors of safety
 - 3.4.3.1.1. Post-construction static _____
 - 3.4.3.1.2. Steady state seep _____
 - 3.4.3.1.3. Rapid fill _____
 - 3.4.3.1.4. Rapid draw down _____
 - 3.4.3.1.5. Seismic _____
 - 3.4.3.1.5.1. Method of determining seismic stability _____
 - 3.4.3.1.5.2. Constants used _____
 - 3.4.3.1.5.3. Pseudo-static seismic coefficient _____
 - 3.4.3.1.5.4. ____ Assumptions stated?
- 3.4.4. ____ Seep analysis
- 3.4.5. ____ Armoring
 - 3.4.5.1. ____ Riprap calculations including bedding
 - 3.4.5.2. ____ Soil-cement design
 - 3.4.5.3. ____ RCC design
 - 3.4.5.4. ____ Other revetment design

4. SPECIFICATIONS

- 4.1. ____ Standard specification cited _____
- 4.2. ____ Inspection and testing schedules for all facets of work and materials
- 4.3. ____ Test or inspection failure procedure
- 4.4. ____ Clearing and grubbing construction area
 - 4.4.1. ____ Stripping unsuitable material
 - 4.4.2. ____ Identification of waste dumps
 - 4.4.3. ____ Identification of areas of over stripping
- 4.5. ____ Borrow sources
 - 4.5.1. ____ Material stockpiles
 - 4.5.2. ____ Material handling
 - 4.5.3. ____ Rejection of loads

- 4.5.4. ____ Moisture conditioning
- 4.6. ____ Foundation preparation and compaction
 - 4.6.1. ____ Relative compaction _____ Mod. Proctor/Proctor
 - 4.6.2. ____ Special requirements
- 4.7. ____ Placement of embankment materials
 - 4.7.1. ____ Lift thickness
 - 4.7.2. ____ Relative compaction _____ Mod. Proctor/Proctor
 - 4.7.3. ____ Equipment requirements
 - 4.7.4. ____ Filter and drain placement
- 4.8. ____ Concrete
 - 4.8.1. ____ Strengths
- 4.9. ____ Erosion protection
 - 4.9.1. ____ Riprap
 - 4.9.2. ____ Soil-cement
 - 4.9.3. ____ RCC
 - 4.9.4. ____ Other

NOTES ON NEXT PAGE

REVIEW NOTES:
