

### **Categorical Permission Alteration Description – 13. Gravity Pipes**

The categorical permission covers the installation, modification, and replacement of gravity pipes and culverts that comply with certain terms and conditions. The total area of disturbance, including staging and access areas, must not exceed 5 acres.

Generally, cast-in-place reinforced concrete pipes are preferable for gravity lines where considerable settlement is expected. No plastic pipes are allowed in the levee embankment or its foundation unless they are embedded in concrete or encased in a steel conduit with the annular space completely grouted.

Backfill under and around (to 1 foot over) the proposed pipe must be controlled low-strength material (CLSM).

Suitable material must be used as levee fill materials. Fill must be free from: roots and other organic matter, contaminated hazardous or toxic material, trash, debris, and frozen materials. Satisfactory fill material must have a plasticity index between 8 and 25, have a liquid limit less than 45, a minimum fines content of 20%, and 100% passing the 3-inch sieve.

Fill must be free of deleterious materials and construction debris and placed in 4- to 6-inch-thick loose lifts and compacted to not less than 95% of the maximum density at moistures between -2 and +3 percent of optimum moisture content obtained from ASTM D698 (USACE preferred method), or alternately, 90% of the maximum density at moistures between -2 and +3 percent of optimum moisture content obtained from ASTM D1557.

Pipe joints must have sufficient flexibility to adjust under expected settlement and stretching of the pipe. Pipes should be designed to counteract uplift of the empty pipe at the design high water stage. If a chemical or electrochemical reaction is expected, the pipe and pipe couplings must be protected.

All new and existing gravity-flowing culverts must have a flap gate on the waterside end with provisions for positive closure (slide gate or sluice gate). The slide gate or sluice gate should be housed in a gatewell at the waterside edge of the levee crown to provide access.

Internal inspections must occur to ensure the pipes are in good condition. Video inspection of the internal condition of the pipe or pressure testing should be undertaken at least once every five years. Valves and gates should be periodically inspected and tested to ensure they are functioning properly. If the inspection indicates corrosion, alignment sag or heave, or separation at joints, corrective action must be taken as soon as possible. In most cases, once a pipe begins to oval or flatten at the crown or has lost more than 5% of its original interior height, it should be replaced.

Periodically, debris must be removed and corrosion or other damage on trash screens repaired.

If maintenance indicates that pipe replacement is necessary, all replacement parts must be of equivalent or better quality than those to be replaced. All repairs must restore pipes and associated equipment to the standards of the original design, or better.

### **Categorical Permission Alteration Checklist – 13. Gravity Pipes**

Please note, the following checklist is intended for planning purposes only and reflects information that USACE reviewers will look for when considering a Section 408 request for gravity pipes under the Categorical Permission. To be reviewed under the Categorical Permission, the proposed project must adhere to all requirements of the Categorical Permission, including the full alteration description (see previous page). The plans and narrative project description should reflect this information.

Installation  Modification  Replacement

Maximum total area of disturbance is 5 acres:

Plastic pipes within the levee embankment or foundation will be embedded in concrete or encased in a steel conduit with the annular space completely grouted: Yes  NA

Pipe joints will have sufficient flexibility to adjust under the expected settlement and stretching of the pipe:

Backfill under and around (to 1 foot over) the proposed pipe must be controlled low-strength material (CLSM).

Fill will be compacted to at least 95% of maximum density as determined by ASTM D698, between -2 and +3% of optimum moisture content:

Satisfactory fill material must have a plasticity index between 8 and 25, have a liquid limit less than 45, a minimum fines content of 20%, and 100% passing the 3-inch sieve.

All fill will be free of organics or other inappropriate materials:

New and existing gravity-flowing culverts will have a flap gate on the waterside end with provisions for positive closure:  NA

If a chemical or electrochemical reaction is expected, the pipe and pipe couplings must be protected: Yes  NA

Any work within the levee embankment or foundation? Yes  No

Hydraulic blockage calculation  $\geq 1\%$ ? Yes  No

Hydraulic model used for hydraulic analysis? Yes  No