DAM SAFETY INSPECTION REPORT

Sippo Creek Reservoir Dam
File Number: 0614-012
Class I
Stark County, Perry Township
Inspection Date: June 16, 2015

In accordance with Ohio Revised Code Section 1521.062, the owners of dams must monitor, maintain, and operate their dams safely. Negligence of owners in fulfilling these responsibilities can lead to the development of extremely hazardous conditions to downstream residents and properties. In the event of a dam failure, owners can be subject to liability claims.

The Chief of the Division of Soil and Water Resources has the responsibility to ensure that human life, health, and property are protected from the failure of dams. Conducting periodic safety inspections and working with dam owners to maintain and improve the overall condition of Ohio dams are vital aspects of achieving this purpose.

Representatives of the Chief conducted this inspection to evaluate the condition of the dam and its appurtenances under authority of Ohio Revised Code Section 1521.062. In accordance with Ohio Administrative Code Rule 1501:21-21-03, the owners of dams must implement all remedial measures listed in the enclosed report.

Table of Contents

Section 1

Required Remedial Measures

The requirements listed below are based on observations made during inspection, calculations performed, and requirements of the Ohio Administrative Code (OAC). A checklist noting all observations made during the inspection has been enclosed in Section 3. References to right and left in this report are oriented as if you were standing on the dam crest and looking downstream.

Engineer Repairs and Investigations: The owner must retain the services of a professional engineer to address the following items. Plans, specifications, investigative reports, and other supporting documentation, as necessary, must be submitted to the Division of Soil and Water Resources for review and approval prior to construction. ***These items have been noted previously and the appropriate time period for completion has already been exceeded.*** A record of all repairs should be included in the operation, maintenance, and inspection manual.

1. This dam must have emergency action plan (EAP) in accordance with OAC Rule 1501:21-21-04. A registered professional engineer must prepare the inundation map and Section IV (Emergency Detection, Evaluation, and Classification) of the EAP. It is recommended that your engineer contact the Division of Soil and Water Resources prior to undertaking the engineering study for the inundation map.

2. The dam's discharge/storage capacity must be sufficient to safely pass the required design flood. Perform a hydrologic and hydraulic study to determine the adequacy of the dam's discharge/storage capacity to safely pass the required design flood. Prepare plans and specifications as necessary to increase the discharge/storage capacity to pass the required design flood. In accordance with OAC Rule 1501:21-13-02, the minimum design flood for Class I dams is 100 percent of the Probable Maximum Flood or the critical flood. See the Flood Routing Summary section of this report for additional information.

3. The principal spillway system must perform properly without endangering the safety of the dam. Investigate the structural integrity and undermining of the principal spillway system and, as necessary, prepare plans and specifications for the correction of any problems. The condition of the principal spillway system must be monitored weekly for further deterioration until repairs can be made. This item should be completed in coordination with Item 2 above.

4. The lake drain valve must operate properly. Investigate the integrity of the valve. If the valve does not work, you must hire an engineer to prepare plans and specifications for repair or replacement of the drain.

5. The embankment crest alignment must be uniform. Prepare plans and specifications for the correction of any irregularities. This item should be completed in coordination with Item 2 above.

6. The cut-off wall along the crest must be repaired or replaced. Prepare plans and specification for the repair or replacement of the wall. This item should be completed in coordination with Item 4 above.

7. The erosion on the upstream slope of the embankment must be repaired and the upstream slope must be protected from erosion. Prepare plans and specifications for repairing the erosion and installing erosion protection.

8. The extremely steep downstream slope to the right of the principal spillway must be regraded. Prepare plans and specifications to flatten the slope. The steepness and overall stability of the embankment must be monitored weekly until repairs can be made.

Owner Repairs: The owner must address the following items. The owner may hire a contractor or perform the work him or herself. Repair activities should be documented in the operation, maintenance, and inspection manual.

1. Remove the tree stumps and brush from the upstream slope and downstream slope. Seed all disturbed areas to establish a proper grass cover. See the "Trees and Brush" fact sheet included in this section for additional information.

2. Seed the bare and sparse areas on the upstream slope and crest to establish a proper grass cover. See the "Ground Cover" fact sheet included in this section for additional information.

3. Repair the erosion gullies on the downstream slope. See the "Ground Cover" fact sheet included in this section for additional information.

4. Repair the rodent burrow on the upstream slope adjacent to the left principal spillway side wall. See the "Rodent Control" fact sheet included in this section for additional information.

Owner Dam Safety Program: In accordance with Ohio Revised Code (ORC) Section 1521.062, the owner of a dam shall maintain a safe structure and appurtenances through inspection, maintenance, and operation. A dam, like any other part of the infrastructure, will change and deteriorate over time. Appurtenances such as gates and valves must be routinely exercised to ensure their operability. Inspection and monitoring of the dam identify changing conditions and problems as they develop, and maintenance prevents minor problems from developing into major ones. Dams must have these procedures documented in an operation, maintenance, and inspection manual.

Despite efforts to provide sufficient structural integrity and to perform inspection and maintenance, dams can develop problems that can lead to failure. Early detection and appropriate response are crucial for maintaining the safety of the dam and downstream people and property. The ORC requires the owner to fully and promptly notify the Dam Safety Program of any condition which threatens the safety of the structure. A rapidly changing condition may be an indication of a potentially dangerous problem. The Dam Safety Program can be contacted at 614/265-6731 during business hours or at 614/799-9538 after business hours. Dam owners must have emergency preparedness procedures documented in an emergency action plan.

The owner must address the following items.

1. Monitor the surface rust on the lake drain outlet pipe and valve for continued erosion.

2. This dam must have an operation, maintenance, and inspection manual (OMI) and an emergency action plan (EAP) in accordance with OAC Rule 1501:21-21-04. Prepare an OMI and an EAP including an inundation map. Guidelines for the preparation of these documents are included with this report. A registered professional engineer must prepare the inundation map and Section IV (Emergency Detection, Evaluation, and Classification) of the EAP. It is recommended that your engineer contact the Division of Soil and Water Resources prior to undertaking the engineering study for the inundation map.

Tina Griffin, P.E. 3/8/16 Date
Project Manager
Dam Safety Program
Division of Soil and Water Resources

Neil Shop, E.I. 3/8/16 Date
Project Engineer
Dam Safety Program
Division of Soil and Water Resources

This inspection was performed pursuant to the authority granted to the Chief of the Division of Soil and Water Resources in ORC Section 1521.062.

Mia P. Kannik, P.E. 3/11/16 Date
Program Manager
On behalf of Michael D. Bailey, Chief
Division of Soil and Water Resources

Ohio Department of Natural Resources
Division of Soil and Water Resources
Fact Sheet

Fact Sheet 94–30

Dam Safety: Earth Dam Failures

Owners of dams and operating and maintenance personnel must be knowledgeable of the potential problems which can lead to failure of a dam. These people regularly view the structure and, therefore, need to be able to recognize potential problems so that failure can be avoided. If a problem is noted early enough, an engineer experienced in dam design, construction, and inspection can be contacted to recommend corrective measures, and such measures can be implemented.

IF THERE IS ANY QUESTION AS TO THE SERIOUSNESS OF AN OBSERVATION, AN ENGINEER EXPERIENCED WITH DAMS SHOULD BE CONTACTED.

Acting promptly may avoid possible dam failure and the resulting catastrophic effect on downstream areas. Engineers from the Division of Soil and Water Resources, Dam Safety Engineering Program of the Department of Natural Resources are available at any time to inspect a dam if a serious problem is detected or if failure may be imminent. Contact the division at the following address and telephone number:

Ohio Department of Natural Resources
Division of Soil and Water Resources
Dam Safety Engineering Program
2045 Morse Road
Columbus, Ohio 43229-6693
Voice: (614) 265-6731 Fax: (614) 447-9503
E-mail: dswc@dnr.state.oh.us
Website: http://ohiodnr.gov/soilandwater
Emergency 24hr hotline: 614-799-9538

Since only superficial inspections of a dam can usually be made, it is imperative that owners and maintenance personnel be aware of the prominent types of failure and their telltale signs. Earth dam failures can be grouped into three general categories: overtopping failures, seepage failures, and structural failures. A brief discussion of each type follows.

Overtopping Failures

Overtopping failures result from the erosive action of water on the embankment. Erosion is due to uncontrolled flow of water over, around, and adjacent to the dam. Earth embankments are not designed to be overtopped and therefore are particularly susceptible to erosion. Once erosion has begun during overtopping, it is almost impossible to stop. A well vegetated earth embankment may withstand limited overtopping if its crest is level and water flows over the crest and down the face as an evenly distributed sheet without becoming concentrated. **The owner should closely monitor the reservoir pool level during severe storms.**

Seepage Failures

All earth dams have seepage resulting from water permeating slowly through the dam and its foundation. Seepage must be controlled in both velocity and quantity. If uncontrolled, it can progressively erode soil from the embankment or its foundation, resulting in rapid failure of the dam. Erosion of the soil begins at the downstream side of the embankment, either in the dam proper or the foundation, progressively works toward the reservoir, and eventually develops a direct connection to the reservoir. This phenomenon is known as "piping." Piping action can be recognized by an increased seepage flow rate, the discharge of muddy or discolored water, sinkholes on or near the embankment, or a whirlpool in the reservoir. Once a whirlpool (eddy) is observed on the reservoir surface, complete failure of the dam will probably follow in a matter of minutes. As with overtopping, fully developed piping is virtually impossible to control and will likely cause failure.

Seepage can cause slope failure by creating high pressures in the soil pores or by saturating the slope. The pressure of seepage within an embankment is difficult to determine without proper instrumentation. A slope which becomes saturated and develops slides may be showing signs of excessive seepage pressure.

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Structural Failures

Structural failures can occur in either the embankment or the appurtenances. Structural failure of a spillway, lake drain, or other appurtenance may lead to failure of the embankment. Cracking, settlement, and slides are the more common signs of structural failure of embankments. Large cracks in either an appurtenance or the embankment, major settlement, and major slides will require emergency measures to ensure safety, especially if these problems occur suddenly. If this type of situation occurs, the lake level should be lowered, the appropriate state and local authorities notified, and professional advice sought. **If the observer is uncertain as to the seriousness of the problem, the Division of Soil and Water Resources should be contacted immediately.**

The three types of failure previously described are often interrelated in a complex manner. For example, uncontrolled seepage may weaken the soil and lead to a structural failure. A structural failure may shorten the seepage path and lead to a piping failure. Surface erosion may result in structural failure.

Minor defects such as cracks in the embankment may be the first visual sign of a major problem which could lead to failure of the structure. The seriousness of all deficiencies should be evaluated by someone experienced in dam design and construction. A qualified professional engineer can recommend appropriate permanent remedial measures.

Any other questions, comments concerns, or fact sheet requests, should be directed to:

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Ohio Department of Natural Resources
Division of Soil and Water Resources
Fact Sheet

Fact Sheet 99–53

Dam Safety: Embankment Instabilities

The dam embankment and any appurtenant dikes must safely contain the reservoir during normal and flood conditions. Cracks, slides, and depressions are signs of embankment instability and should indicate to the owner that maintenance or repair work may be required. When one of these conditions is detected, the owner must retain an experienced professional engineer to determine the cause of the instability. A rapidly changing condition or the sudden development of a large crack, slide, or depression indicates a very serious problem, and the Dam Safety Engineering Program should be contacted immediately. A professional engineer must investigate these types of embankment stability problems because a so-called "home remedy" may cause greater and more serious damage to the embankment and eventually result in unneeded expenditures for unsuccessful repairs.

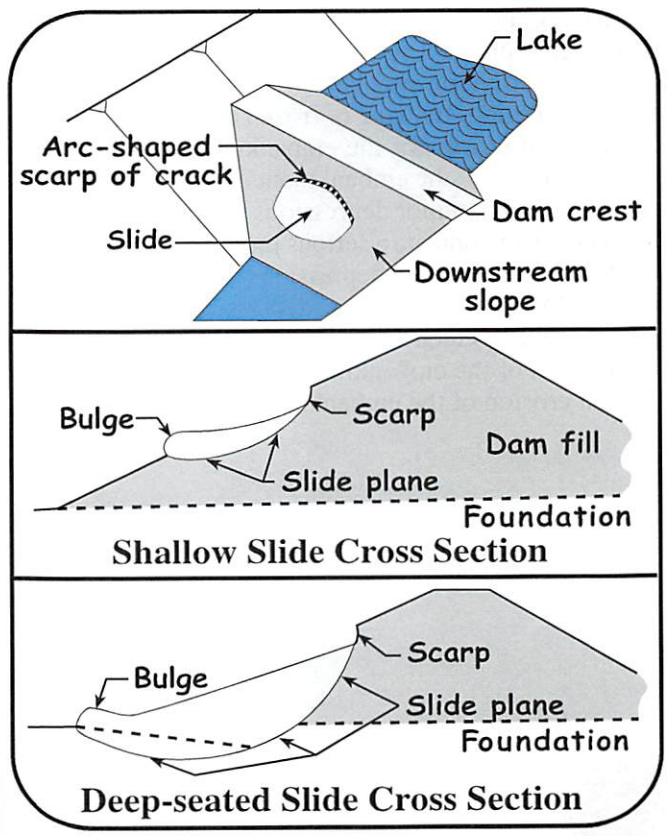
Cracks

Short, isolated cracks are commonly due to drying and shrinkage of the embankment surface and are not usually significant. They are usually less than 1 inch wide, propagate in various directions, and occur especially where the embankment lacks a healthy grass cover. Larger (wider than 1 inch), well-defined cracks may indicate a more serious problem. There are generally two types of these cracks: longitudinal and transverse. Longitudinal cracks extend parallel to the crest of the embankment and may indicate the early stages of a slide on either the upstream or downstream slope of the embankment. They can create problems by allowing runoff to enter the cracks and saturate the embankment which in turn can cause instability of the embankment. Transverse cracks extend perpendicular to the crest and can indicate differential settlement within the embankment. Such cracks provide avenues for seepage through the dam and could quickly lead to piping, a severe seepage problem that will likely cause the dam to fail.

If the owner finds small cracks during inspection of the dam, he/she should document the observations, and seal the cracks to prevent runoff from saturating the embankment. The documentation should consist of detailed notes (including the location, length, approximate elevation, and crack width), photographs, sketches, and possibly monitoring stakes. The crack must then be monitored during future inspections. If the crack becomes longer or wider, a more serious problem such as a slide may be developing. Large cracks indicate serious stability problems. If one is detected, the owner should contact the Dam Safety Engineering Program and/or retain an engineer to investigate the crack and prepare plans and specifications for repairs. When muddy flow discharges from a crack, the dam may be close to failure. The emergency action plan should be initiated immediately and the Dam Safety Engineering Program contacted.

Slides

A slide in an embankment or in natural soil or rock is a mass movement of material. Some typical characteristics of a slide are an arc-shaped crack or scarp along the top and a bulge along the bottom of the slide (see drawing). Slides may develop because of poor soil compaction, the



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gradient of the slope being too steep for the embankment material, seepage, sudden drawdown of the lake level, undercutting of the embankment toe, or saturation and weakening of the embankment or foundation.

Slides can be divided into two main groups: shallow and deep-seated. Shallow slides generally affect the top 2 to 3 feet of the embankment surface. Shallow slides are generally not threatening to the immediate safety of the dam and often result from wave erosion, collapsed rodent burrows, or saturated top soil. Deep-seated slides are serious, immediate threats to the safety of a dam. They can extend several feet below the surface of the embankment, even below the foundation. A massive slide can initiate the catastrophic failure of a dam. Deep-seated slides are the result of serious problems within the embankment.

Small slides can be repaired by removing the vegetation and any unsuitable fill from the area, compacting suitable fill and adding topsoil to make the embankment uniform, and establishing a healthy grass cover. If a shallow or deep-seated slide is discovered, the Dam Safety Engineering Program should be contacted and an engineer retained to investigate the slide. Plans and specifications may need to be prepared for its repair depending on the findings of the investigation.

Depressions

Depressions are sunken areas of the abutment, toe area, or embankment surface. They may be created during construction, or may be caused by decay of buried organic materials, thawing of frozen embankment material, internal erosion of the embankment, or settlement (consolidation) of the embankment or its foundation. To a certain degree, minor depressions are common and do not necessarily indicate a serious problem. (An embankment with several minor depressions may be described as hummocky.) However, larger depressions may indicate serious problems such as weak foundation materials, poor compaction of the embankment during construction, or internal erosion of the embankment fill.

Depressions can create low areas along the crest, cracks through the embankment, structural damage to spillways or other appurtenant structures, damage to internal drainage systems, or general instability of the embankment. They can also inhibit maintenance of the dam and make detection of stability or seepage problems difficult.

The owner should monitor depressions during the regular inspection of the dam. All observations should be documented with detailed notes, photographs, and sketches. Minor depressions can be repaired by removing the vegetation and any unsuitable fill from the area, adding fill and then topsoil to make the embankment uniform, and finally establishing a healthy grass cover. An engineer should be retained to investigate large depressions or settlement areas. Plans and specifications may need to be prepared for its repair depending on the findings of the investigation.

Importance of Inspection

Stability problems can threaten the safety of the dam and the safety of people and property downstream. Therefore, stability problems must be detected and repaired in a timely manner. The entire embankment should be routinely and closely inspected for cracks, slides, and depressions. To do this thoroughly, proper vegetation must be regularly maintained on the embankment. Improper or overgrown vegetation can inhibit visual inspection and maintenance of the dam. Accurate inspection records are also needed to detect stability problems. These records can help determine if a condition is new, slowly changing, or rapidly changing. A rapidly changing condition or the sudden development of a large crack, slide, or depression indicates a very serious problem, and the Dam Safety Engineering Program must be contacted immediately.

Any other questions, comments concerns, or fact sheet requests, should be directed to:

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Ohio Department of Natural Resources
Division of Soil and Water Resources
Fact Sheet

Fact Sheet 99–52

Dam Safety: Upstream Slope Protection

Slope protection is usually needed to protect the upstream slope against erosion due to wave action. Without proper slope protection, a serious erosion problem known as "beaching" can develop on the upstream slope.

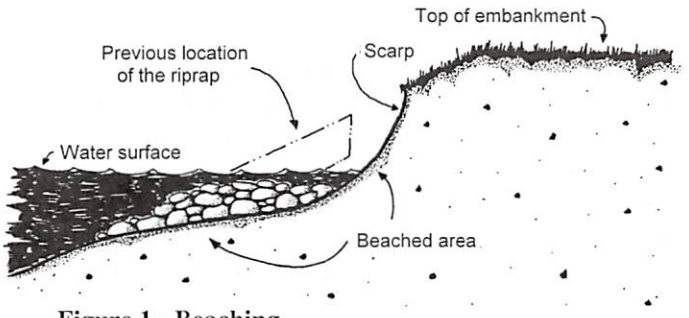

Figure 1 - Beaching

The repeated action of waves striking the embankment surface erodes fill material and displaces it farther down the slope, creating a "beach." The amount of erosion depends on the predominant wind direction, the orientation of the dam, the steepness of the slope, water level fluctuations, boating activities, and other factors. Further erosion can lead to cracking and sloughing of the slope which can extend into the crest, reducing its width. When erosion occurs and beaching develops on the upstream slope of a dam, repairs should be made as soon as possible. However, an erosion scarp less than 1 foot high may be stable and not require repair.

The upstream face of a dam is commonly protected against wave erosion by placement of a layer of rock riprap over a layer of bedding and a filter material. Other material such as concrete facing, soil-cement, fabri-form bags, slush grouted rocks, steel sheet piling, and articulated concrete blocks can also be used. Vegetative protection combined with a berm on the upstream slope can also be effective.

Rock Riprap

Rock riprap consists of a heterogeneous mixture of irregular shaped rocks placed over gravel bedding and a sand filter or geotextile fabric. The smaller rocks help to fill the spaces between the larger pieces forming an interlocking mass. The filter prevents soil particles on the embankment surface from being washed out through the spaces (or voids) between the rocks. The maximum rock size and weight must be large enough to break up the energy of the maximum anticipated wave action and hold the smaller stones in place. If the rock size is too small, it will eventually be displaced and washed away by wave action. If the riprap is sparse or if the filter or bedding material is too small, the filter material will wash out easily, allowing the embankment material to erode. Once the erosion has started, beaching will develop if remedial measures are not taken. Technical Release No. 69 developed by the USDA, Natural Resources Conservation Service can be used to help design engineers develop a preliminary or detailed design for riprap slope protection.

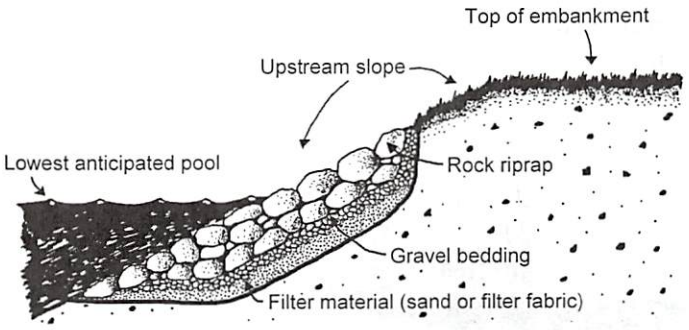

Figure 2 - Rock Riprap

The dam owner should expect some deterioration (weathering) of riprap. Freezing and thawing, wetting and drying, abrasive wave action, and other natural processes will eventually break down the riprap. Its useful life varies with the characteristics of the stone used. Stone for riprap should be rock that is dense and well cemented. In Ohio, glacial cobbles or boulders, most limestone, and a few types of sandstone are acceptable for riprap. Most sandstones and shales found in Ohio do not provide long-term protection. Due to the high initial cost of rock riprap, its durability should be determined by appropriate testing procedures prior to installation. Vegetative growth within the slope protection is undesirable because it can displace stone and disturb the filter material. Heavy undergrowth prevents an adequate inspection of the upstream slope and may hide potential problems. For additional information, see the "Trees and Brush" fact sheet.

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Sufficient maintenance funds should be allocated for the addition of riprap and the removal of vegetation. Severe erosion or reoccurring problems may require a registered professional engineer to design a more effective slope protection.

Vegetated Wave Berm

Vegetated wave berms dissipate wave energy and protect the slope from erosion. Berms are constructed on the upstream slope at the normal pool level and should be no less than 20 feet wide. This method of slope protection will not work well where the water surface fluctuates regularly from normal pool. If improper or sparse vegetation is present, the wave berm may not adequately dissipate the wave energy, allowing erosion and beaching to develop on the upstream slope. Technical Release No. 56 developed by the USDA, Natural Resources Conservation Service provides design and layout information.

The vegetation on the wave berm should be monitored regularly to verify adequate growth. Sufficient funds should be allocated for the regular maintenance of the vegetation. Severe erosion or reoccurring problems may require a registered professional engineer to design a more effective slope protection.

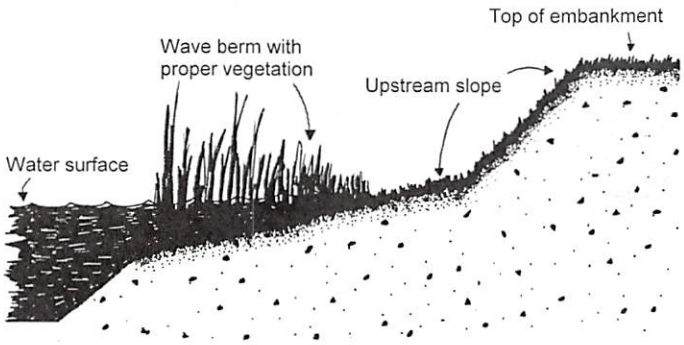

Figure 3 - Vegetated wave berm

Concrete Facing

Concrete facing can be used if severe wave action is anticipated, however, settlement of the embankment must be insignificant to insure adequate support for the concrete facing. A properly designed and constructed concrete facing can be expensive. This slope protection should extend several feet above and below the normal pool level. It should terminate on a berm or against a concrete curb or header. Granular filter or filter fabric (geotextile) is required under the concrete facing to help reduce the risk of undermining.

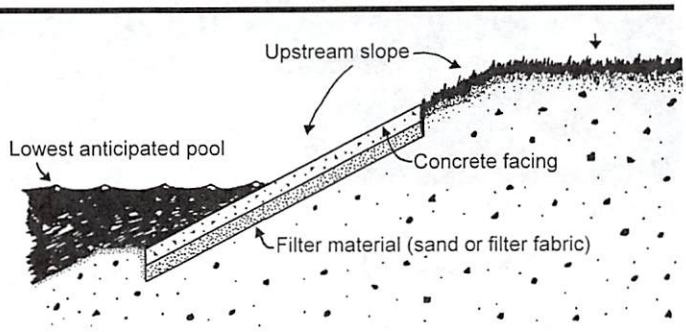

Figure 4 - Concrete facing

As with any type of slope protection, problems will develop if the concrete facing has not been properly designed or installed. Concrete facing often fails because the wave action washes soil particles from beneath the slabs through joints and cracks. This process is known as undermining, which will continue until large voids are created. Detection of voids is difficult because the voids are hidden. Failure of the concrete facing may be sudden and extensive. Concrete facing should be monitored for cracks and open joints. Open joints should be sealed with plastic fillers and cracks should be grouted and sealed. For additional information, see the "Problems with Concrete Materials" fact sheet.

Inspection and Monitoring

Regular inspection and monitoring of the upstream slope protection is essential to detect any problems. It is important to keep written records of the location and extent of any erosion, undermining, or deterioration of the riprap, wave berm or other slope protection. Photographs provide invaluable records of changing conditions. A rapidly changing condition may indicate a very serious problem, and the Dam Safety Program should be contacted immediately. All records should be kept in the operation, maintenance, and inspection manual for the dam.

Any other questions, comments concerns, or fact sheet requests, should be directed to:

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Ohio Department of Natural Resources
Division of Soil and Water Resources
Fact Sheet

Fact Sheet 93–26

Dam Safety: Lake Drains

A lake drain is a device to permit draining a reservoir, lake or pond. Administrative Rule 1501:21-13-06 requires that all Class I, Class II and Class III dams include a lake drain.

Types of Drains

Common types of drains include the following:

- A valve located in the spillway riser.
- A conduit through the dam with a valve at either the upstream or downstream end of the conduit.
- A siphon system (Often used to retrofit existing dams).
- A gate, valve or stoplogs located in a drain control tower.

Uses of Drains

The following situations make up the primary uses of lake drains:

Emergencies: Should serious problems ever occur to threaten the immediate safety of the dam, drains may be used to lower the lake level to reduce the likelihood of dam failure. Examples of such emergencies are as follows: clogging of the spillway pipe which may lead to high lake levels and eventually dam overtopping, development of slides or cracks in the dam, severe seepage through the dam which may lead to a piping failure of the dam, and partial or total collapse of the spillway system.

Maintenance: Some repair items around the lake and dam can only be completed or are much easier to perform with a lower than normal lake level. Some examples are: slope protection repair, spillway repairs, repair and/or installation of docks and other structures along the shoreline, and dredging the lake.

Winter Drawdown: Some dam owners prefer to lower the lake level during the winter months to reduce ice damage to structures along the shoreline and to provide additional flood storage for upcoming spring rains. Several repair items are often performed during this winter drawdown period. Periodic fluctuations in the lake level also discourage muskrat and beaver habitation along the shoreline. Muskrat burrows in earthen dams can lead to costly repairs.

Common Maintenance Problems

Common problems often associated with the maintenance and operation of lake drains include the following:

- Deteriorated and bent control stems and stem guides.
- Deteriorated and separated conduit joints.
- Leaky and rusted control valves and sluice gates.
- Deteriorated ladders in control towers.
- Deteriorated control towers.
- Clogging of the drain conduit inlet with sediment and debris.
- Inaccessibility of the control mechanism to operate the drain.
- Seepage along the drain conduit.
- Erosion and undermining of the conduit discharge area because the conduit outlets significantly above the elevation of the streambed.
- Vandalism.
- Development of slides along the upstream slope of the dam and the shoreline caused by lowering the lake level too quickly.

Operation and Maintenance Tips

A. All gates, valves, stems and other mechanisms should be lubricated according to the manufacturer's specifications. If you do not have a copy of the specifications and the manufacturing company can not be determined, then a local valve distributor may be able to provide assistance.

B. The lake drain should be operated at least twice a year to prevent the inlet from clogging with sediment and debris, and to keep all movable parts working easily. Most manufacturers recommend that gates and valves be operated at least four times per year. Frequent operation will help to ensure that the drain will be operable when it is needed. All valves and gates should be fully opened and closed at least twice to help flush out debris and to obtain a proper seal. If the gate gets stuck in a partially opened position, gradually work the gate in

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each direction until it becomes fully operational. Do not apply excessive torque as this could bend or break the control stem, or damage the valve or gate seat. With the drain fully open, inspect the outlet area for flow amounts, leaks, erosion and anything unusual.

C. All visible portions of the lake drain system should be inspected at least annually, preferably during the periodic operation of the drain. Look for and make note of any cracks, rusted and deteriorated parts, leaks, bent control stems, separated conduit joints or unusual observations.

D. A properly designed lake drain should include a headwall near the outlet of the drain conduit to prevent undermining of the conduit during periods of flow. A headwall can be easily retro-fitted to an existing conduit if undermining is a problem at an existing dam. A properly designed layer of rock riprap or other slope protection will help reduce erosion in the lake drain outlet area.

E. Drain control valves and gates should always be placed upstream of the centerline of the dam. This allows the drain conduit to remain depressurized except during use, therefore reducing the likelihood of seepage through the conduit joints and saturation of the surrounding earth fill.

F. For accessibility ease, the drain control platform should be located on shore or be provided with a bridge or other structure. This becomes very important during emergency situations if high pool levels exist.

G. Vandalism can be a problem at any dam. If a lake drain is operated by a crank, wheel or other similar mechanism, locking with a chain or other device, or off-site storage may be beneficial. Fences or other such installations may also help to ward off vandals.

H. The recommended rate of lake drawdown is one foot or less per week, except in emergencies. Fast drawdown causes a build-up of hydrostatic pressures in the upstream slope of the dam which can lead to slope failure. Lowering the water level slowly allows these pressures to dissipate.

Monitoring

Monitoring of the lake drain system is necessary to detect problems and should be performed at least twice a year or more frequently if problems develop. Proper ventilation and confined space precautions must be considered when entering a lake drain vault or outlet pipe. Items to be considered when monitoring a lake drain system include the stem, valve, outlet pipe and related appurtenances. Monitoring for surface deterioration (rust), ease of operation, and leakage is important to maintain a working lake drain system. If the stem or valve appears to be inoperable because of deterioration or if the operability of the lake drain system is in question, because the valve does not completely close (seal) and allows an excessive amount of leakage, then a registered professional engineer or manufacturer's representative should be contacted. Photographs along with written records of the monitoring items performed provide invaluable information. For further information on evaluating the condition of the lake drain system see the "Spillway Conduit System Problems", "Problems with Metal Materials", "Problems with Plastic (Polymer) Materials", and "Problems with Concrete Materials" fact sheets.

Conclusion

An operable lake drain accomplishes the following:

1. Makes for a safer dam by providing a method to lower the lake level in an emergency situation.
2. Allows the dam owner to have greater control of the lake level for maintenance, winter drawdown and emergency situations.
3. Meets the requirements of the Ohio Dam Safety Laws.

Any other questions, comments concerns, or fact sheet requests, should be directed to the Division of Water at the following address:

Ohio Department of Natural Resources
Division of Soil and Water Resources
Dam Safety Engineering Program
2045 Morse Road
Columbus, Ohio 43229-6693
Voice: (614) 265-6731 Fax: (614) 447-9503
E-mail: dswc@dnr.state.oh.us
Website: http://ohiodnr.gov/soilandwater
Emergency 24hr hotline: 614-799-9538

Ohio Department of Natural Resources
Division of Soil and Water Resources
Fact Sheet

Fact Sheet 94–28

Dam Safety: Trees and Brush

The establishment and control of proper vegetation is an important part of dam maintenance. Properly maintained vegetation can help prevent erosion of embankment and earth channel surfaces, and aid in the control of groundhogs and muskrats. The uncontrolled growth of vegetation can damage embankments and concrete structures and make close inspection difficult.

Trees and Brush

Trees and brush should not be permitted on embankment surfaces or in vegetated earth spillways. Extensive root systems can provide seepage paths for water. Trees that blow down or fall over can leave large holes in the embankment surface that will weaken the embankment and can lead to increased erosion. Brush obscures the surface limiting visual inspection, provides a haven for burrowing animals, and retards growth of grass vegetation. Tree and brush growth adjacent to concrete walls and structures may eventually cause damage to the concrete and should be removed.

Stump Removal & Sprout Prevention

Stumps of cut trees should be removed so vegetation can be established and the surface mowed. Stumps can be removed either by pulling or with machines that grind them down. All woody material should be removed to about 6 inches below the ground surface. The cavity should be filled with well-compacted soil and grass vegetation established.

Stumps of trees in riprap cannot usually be pulled or ground down, but can be chemically treated so they will not continually form new sprouts. Certain herbicides are effective for this purpose and can even be used at water supply reservoirs if applied by licensed personnel. For product information and information on how to obtain a license, contact the Ohio Department of Agriculture at the following address:

Ohio Department of Agriculture
Pesticide Regulation
8995 E. Main Street
Reynoldsburg, Ohio 43068
Telephone Number (614) 728-6987

These products should be painted, not sprayed, on the stumps. Other instructions found on the label should be strictly followed when handling and applying these materials. Only a few commercially available chemicals can be used along shorelines or near water.

Embankment Maintenance

Embankments, areas adjacent to spillway structures, vegetated channels, and other areas associated with a dam require continual maintenance of the vegetal cover. Grass mowing, brush cutting, and removal of woody vegetation (including trees) are necessary for the proper maintenance of a dam, dike, or levee. All embankment slopes and vegetated earth spillways should be maintained with a maximum grass height of 12 inches. Aesthetics, unobstructed viewing during inspections, maintenance of a non-erodible surface, and discouragement of groundhog habitation are reasons for proper maintenance of the vegetal cover.

Methods used in the past for control of vegetation, but are now considered unacceptable, include chemical spraying, and burning. More acceptable methods include the use of weed whips or power brush-cutters and mowers. Chemical spraying to first kill small trees and brush is acceptable if precautions are taken to protect the local environment.

It is important to remember not to mow when the embankment is wet. It is also important to use proper equipment for the slope and type of vegetation to be cut. Also, always follow the manufacturer's recommended safe operation procedures.

Any other questions, comments, concerns, or fact sheet requests, should be directed to the Division of Soil and Water Resources at the following address:

Ohio Department of Natural Resources
Division of Soil and Water Resources
Dam Safety Program
2045 Morse Road
Columbus, Ohio 43229-6693
Voice: (614) 265-6731 Fax: (614) 447-9503
E-mail: dswc@dnr.state.oh.us
Website: http://soilandwater.ohiodnr.gov/
Emergency 24hr hotline: 614-799-9538

Ohio Department of Natural Resources
Division of Soil and Water Resources
Fact Sheet

Fact Sheet 99–54

Dam Safety: Ground Cover

The establishment and control of proper vegetation are an important part of dam maintenance. Properly maintained vegetation can help prevent erosion of embankment and earth channel surfaces, and aid in the control of groundhogs and muskrats. The uncontrolled growth of vegetation can damage embankments and concrete structures and make close inspection difficult.

Grass vegetation is an effective and inexpensive way to prevent erosion of embankment surfaces. If properly maintained, it also enhances the appearance of the dam and provides a surface that can be easily inspected. Roots and stems tend to trap fine sand and soil particles, forming an erosion-resistant layer once the plants are well established. Grass vegetation may not be effective in areas of concentrated runoff, such as at the contact of the embankment and abutments, or in areas subjected to wave action.

Common Problems

Bare Areas

Bare areas on an embankment are void of protective cover (e.g. grass, asphalt, riprap etc.). They are more susceptible to erosion which can lead to localized stability problems such as small slides and sloughs. Bare areas must be repaired by establishing a proper grass cover or by installing other protective cover. If using grass, the topsoil must be prepared with fertilizer and then scarified before sowing seed. Types of grass vegetation that have been used on dams in Ohio are bluegrass, fescue, ryegrass, alfalfa, clover, and redtop. One suggested seed mixture is 30% Kentucky Bluegrass, 60% Kentucky 31 Fescue, and 10% Perennial Ryegrass. Once the seed is sown, the area should be mulched and watered regularly.

Erosion

Embankment slopes are normally designed and constructed so that the surface drainage will be spread out in a thin layer as "sheet flow" over the grass cover. When the sod is in poor condition or flow is concentrated at one or more locations, the resulting erosion will leave rills and gullies in the embankment slope. The erosion will cause loss of material and make maintenance of the embankment difficult. Prompt repair of the erosion is required to prevent more serious damage to the embankment. If erosion gullies are extensive, a registered professional engineer may be required to design a more rigid repair such as riprap or concrete. Minor rills and gullies can be repaired by filling them with compacted cohesive material. Topsoil should be a minimum of 4 inches deep. The area should then be seeded and mulched. Not only should the eroded areas be repaired, but the cause of the erosion should be addressed to prevent a continued maintenance problem.

Footpaths

Paths from animal and pedestrian traffic are problems common to many embankments. If a path has become established, vegetation in this area will not provide adequate protection and a more durable cover will be required unless the traffic is eliminated. Gravel, asphalt, and concrete have been used effectively to cover footpaths. Embedding railroad ties or other treated wood beams into an embankment slope to form steps is one of the most successful and inexpensive methods used to provide a protected pathway.

Vehicle Ruts

Vehicle ruts can also be a problem on the embankment. Vehicular traffic on the dam should be discouraged especially during wet conditions except when necessary. Water collected in ruts may cause localized saturation, thereby weakening the embankment. Vehicles can also severely damage the vegetation on embankments. Worn areas could lead to erosion and more serious problems. Ruts that develop in the crest should be repaired by grading to direct all surface drainage into the impoundment. Bare and eroded areas should be repaired using the methods mentioned in the above sections. Constructed barriers such as fences and gates are effective ways to limit access of vehicles.

Improper Vegetation

Crown vetch, a perennial plant with small pink flowers, has been used on some dams in Ohio but is not recommended (see Figure 1). It hides the embankment surface, preventing early detection of cracks and erosion. It is not effective in preventing erosion.

Continued on back!

Figure 1: Crown Vetch
(Source: http://www.vg.com)

Vines and woody vegetation such as trees and brush also hide the embankment surface preventing early detection of cracks and erosion. Tall vegetation also provides a habitat for burrowing animals. All improper vegetation must be removed from the entire embankment surface. Any residual roots that are larger than 3 inches in diameter must be removed. All roots should be removed down to a depth of at least 6 inches and replaced with a compacted clay material; then 4 inches of topsoil should be placed on the disturbed areas of the slope. Finally, these areas must be seeded and mulched to establish a proper grass cover.

Maintenance

Embankments, areas adjacent to spillway structures, vegetated channels, and other areas associated with a dam require continual maintenance of the vegetal cover. Removal of improper vegetation is necessary for the proper maintenance of a dam, dike or levee. All embankment slopes and vegetated earth spillways should be maintained with a maximum grass height of 12 inches. Reasons for proper maintenance of the vegetal cover include unobstructed viewing during inspection, maintenance of a non-erodible surface, discouragement of burrowing animal habitation, and aesthetics.

Common methods for control of vegetation include the use of weed trimmers or power brush-cutters and mowers. Chemical spraying to kill small trees and brush is acceptable if precautions are taken to protect the local environment. Some chemical spraying may require proper training prior to application. Additional information can be found on the Trees and Brush Fact Sheet.

Any other questions, comments concerns, or fact sheet requests, should be directed to:

Ohio Department of Natural Resources
Division of Soil and Water Resources
Dam Safety Engineering Program
2045 Morse Road
Columbus, Ohio 43229-6693
Voice: (614) 265-6731 Fax: (614) 447-9503
E-mail: dswc@dnr.state.oh.us
Website: http://ohiodnr.gov/soilandwater
Emergency 24hr hotline: 614-799-9538

Ohio Department of Natural Resources
Division of Soil and Water Resources
Fact Sheet

Fact Sheet 94–27

Dam Safety: Rodent Control

Rodents such as the groundhog (woodchuck), muskrat, and beaver are attracted to dams and reservoirs, and can be quite dangerous to the structural integrity and proper performance of the embankment and spillway. Groundhog and muskrat burrows weaken the embankment and can serve as pathways for seepage. Beavers may plug the spillway and raise the pool level. Rodent control is essential in preserving a well-maintained dam.

Groundhog

The groundhog is the largest member of the squirrel family. Its coarse fur is a grizzled grayish brown with a reddish cast. Typical foods include grasses, clover, alfalfa, soybeans, peas, lettuce, and apples. Breeding takes place during early spring (beginning at the age of one year) with an average of four or five young per litter, one litter per year. The average life expectancy is two or three years with a maximum of six years.

Occupied groundhog burrows are easily recognized in the spring due to the groundhog's habit of keeping them "cleaned out." Fresh dirt is generally found at the mouth of active burrows. Half-round mounds, paths leading from the den to nearby fields, and clawed or girdled trees and shrubs also help identify inhabited burrows and dens.

When burrowing into an embankment, groundhogs stay above the phreatic surface (upper surface of seepage or saturation) to stay dry. The burrow is rarely a single tunnel. It is usually forked, with more than one entrance and with several side passages or rooms from 1 to 12 feet long.

Groundhog Control

Control methods should be implemented during early spring when active burrows are easy to find, young groundhogs have not scattered, and there is less likelihood of damage to other wildlife. In later summer, fall, and winter, game animals will scurry into groundhog burrows for brief protection and may even take up permanent abode during the period of groundhog hibernation.

Groundhogs can be controlled by trapping or shooting. Groundhogs will be discouraged from inhabiting the embankment if the vegetal cover is kept mowed.

Muskrat

The muskrat is a stocky rodent with a broad head, short legs, small eyes, and rich dark brown fur. Muskrats are chiefly nocturnal. Their principal food includes stems, roots, bulbs, and foliage of aquatic plants. They also feed on snails, mussels, crustaceans, insects, and fish. Usually three to five litters, averaging six to eight young per litter, are produced each year. Adult muskrats average one foot in length and three pounds in weight. The life expectancy is less than two years, with a maximum of four years. Muskrats can be found wherever there are marshes, swamps, ponds, lakes and streams having calm or very slowly moving water with vegetation in the water and along the banks.

Muskrats make their homes by burrowing into the banks of lakes and streams or by building "houses" of bushes and other plants. Their burrows begin from 6 to 18 inches below the water surface and penetrate the embankment on an upward slant. At distances up to 15 feet from the entrance, a dry chamber is hollowed out above the water level. Once a muskrat den is occupied, a rise in the water level will cause the muskrat to dig farther and higher to excavate a new dry chamber. Damage (and the potential for problems) is compounded where groundhogs or other burrowing animals construct their dens in the embankment opposite muskrat dens.

Muskrat Control

Barriers to prevent burrowing offer the most practical protection to earthen structures. A properly constructed riprap and filter layer will discourage burrowing. The filter and riprap should extend at least 3 feet below the water line. As the muskrat attempts to construct a burrow, the sand and gravel of the filter layer caves in and thus discourages den building. Heavy wire fencing laid flat against the slope and extending above and below the water line can also be effective. Eliminating or reducing aquatic vegetation along the shoreline will discourage muskrat habitation. Where muskrats have inhabited the area, trapping is usually the most practical method of removing them from a pond.

Continued on back!

Eliminating a Burrow

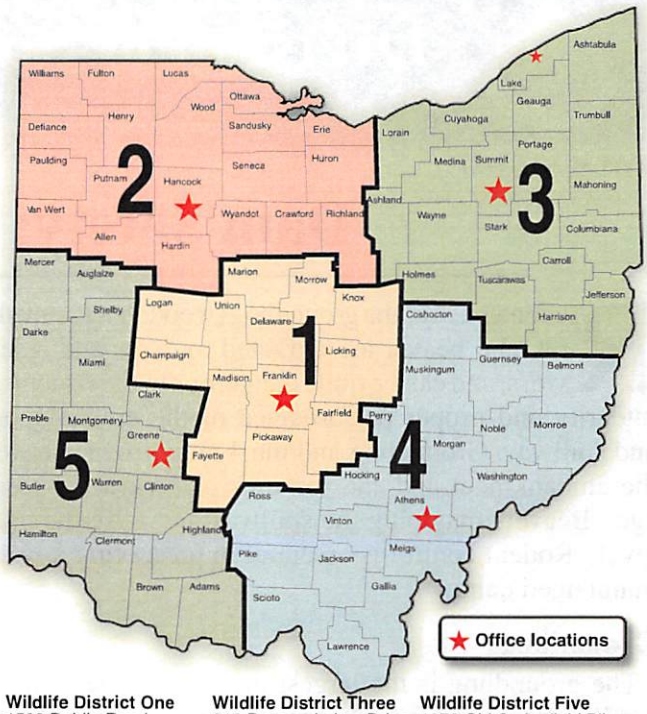
The recommended method of backfilling a burrow in an embankment is mud-packing. This simple, inexpensive method can be accomplished by placing one or two lengths of metal stove or vent pipe in a vertical position over the entrance of the den. Making sure that the pipe connection to the den does not leak, the mud-pack mixture is then poured into the pipe until the burrow and pipe are filled with the earth-water mixture. The pipe is removed and dry earth is tamped into the entrance. The mud-pack is made by adding water to a 90 percent earth and 10 percent cement mixture until a slurry or thin cement consistency is attained. All entrances should be plugged with well-compacted earth and vegetation re-established. Dens should be eliminated without delay because damage from just one hole can lead to failure of a dam or levee.

Beaver

Beaver will try to plug spillways with their cuttings. Routinely removing the cuttings is one way to alleviate the problem. Trapping beaver may be done by the owner during the appropriate season; however, the nearest ODNR, Division of Wildlife, District Office or state wildlife officer should be contacted first.

Hunting and Trapping Regulations

Because hunting and trapping rules change from year to year, ODNR, Division of Wildlife authorities at one of the following offices should be consulted before taking any action.



Wildlife District One
1500 Dublin Road
Columbus, Ohio 43215
Phone: (614) 644-3925
FAX (614) 644-3931

Wildlife District Two
952 Lima Avenue
Findlay, Ohio 45840
Phone: (419) 424-5000
FAX (419) 422-4875

Wildlife District Three
912 Portage Lakes Drive
Akron, Ohio 44319
Phone: (330) 644-2293
FAX (330) 644-8403

Wildlife District Four
360 E. State Street
Athens, Ohio 45701
Phone: (740) 589-9930
FAX (740) 589-9999

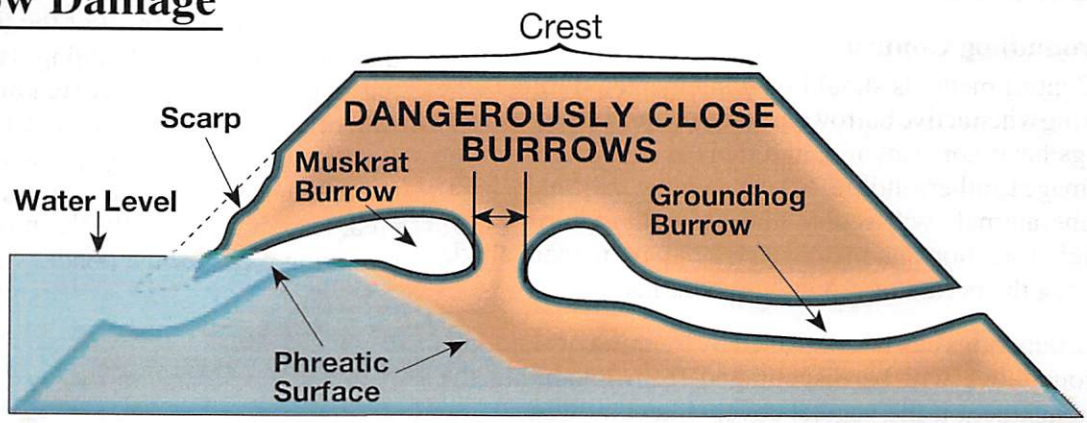
Wildlife District Five
1076 Old Springfield Pike
Xenia, Ohio 45385
Phone: (937) 372-9261
FAX (937) 376-3011

In Fairport Harbor
1190 High Street
Fairport Harbor, Ohio 44077
Phone: (440) 352-4199
FAX (440) 352-4182

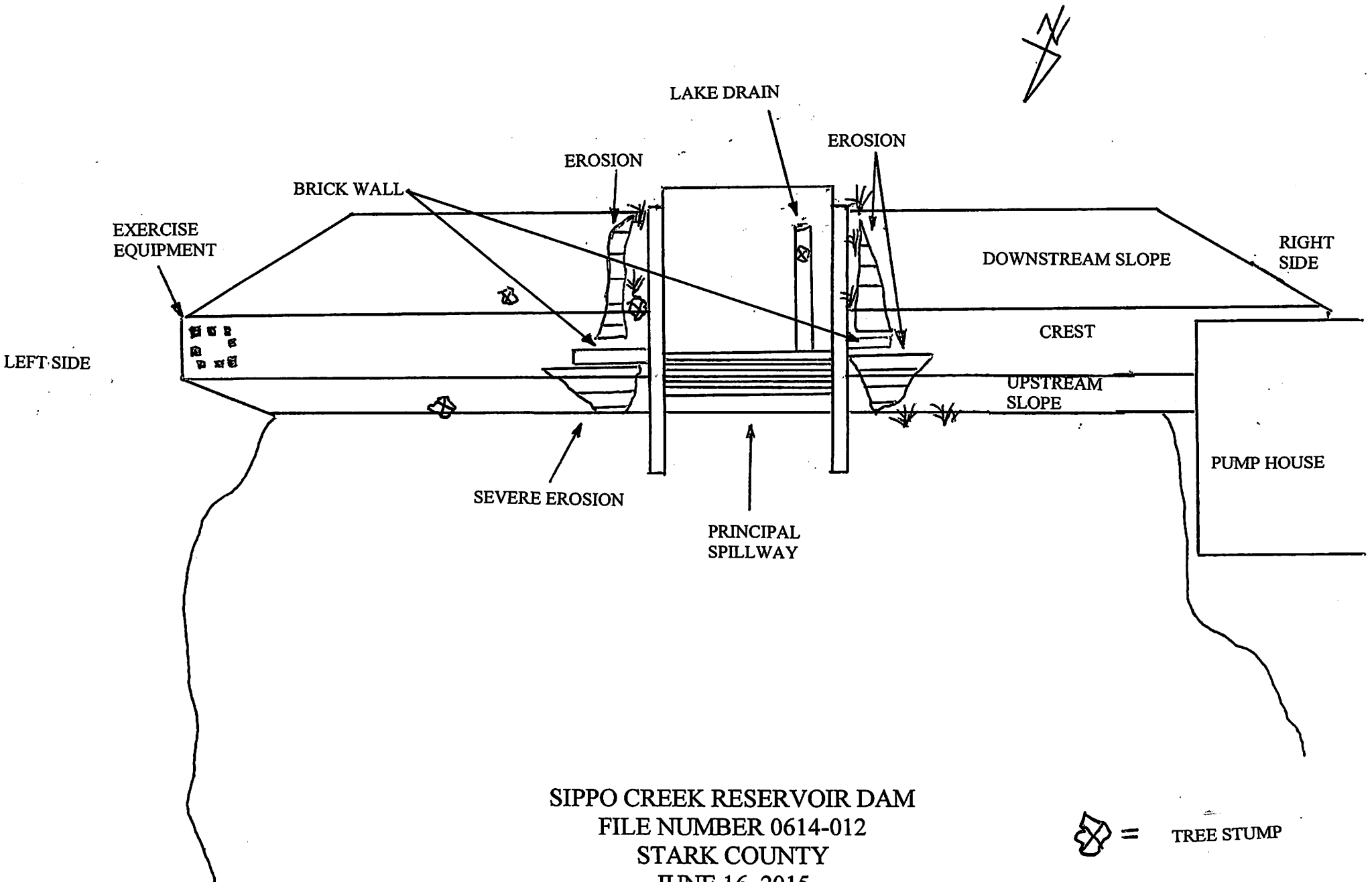
Additional questions, comments concerns, or fact sheet requests, should be directed to:

Ohio Department of Natural Resources
Division of Soil and Water Resources
Dam Safety Engineering Program
2045 Morse Road
Columbus, Ohio 43229-6693
Voice: (614) 265-6731 Fax: (614) 447-9503
E-mail: dswc@dnr.state.oh.us
Website: http://ohiodnr.gov/soilandwater
Emergency 24hr hotline: 614-799-9538

Rodent Burrow Damage



Section 2



SIPPO CREEK RESERVOIR DAM
FILE NUMBER 0614-012
STARK COUNTY
JUNE 16, 2015

(not to scale)

= TREE STUMP

= BRUSH

Photograph No. 1:

View of the upstream slope and crest. Note that trees and brush have been cleared; however, not all stumps have been removed. Arrow points to stump on slope.

Photograph No. 2:

View of active erosion immediately to the left of the principal spillway.

Photograph No. 3:

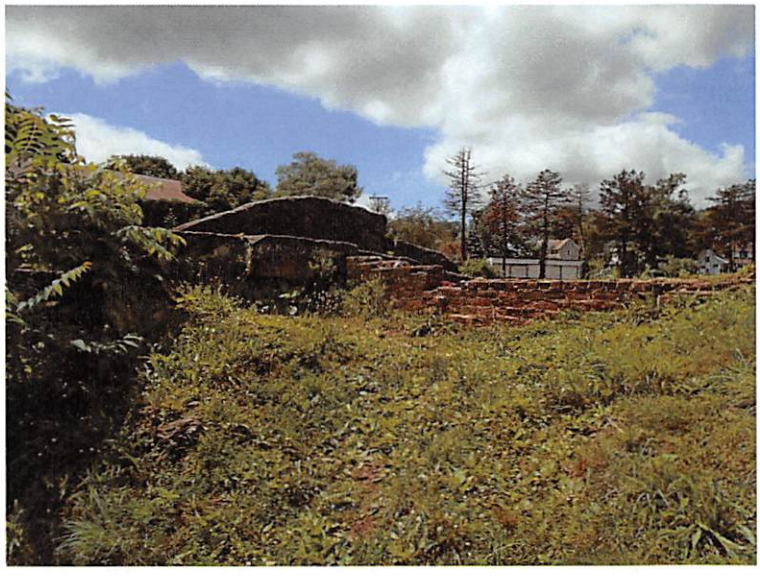
View of the crest and downstream slope on the right half of dam. Arrows point to a small amount of brush that remains on the right upstream slope.

Photograph No. 4:

Past overtopping has caused low areas on the crest and erosion gullies on the downstream slope.

Photograph No. 5:

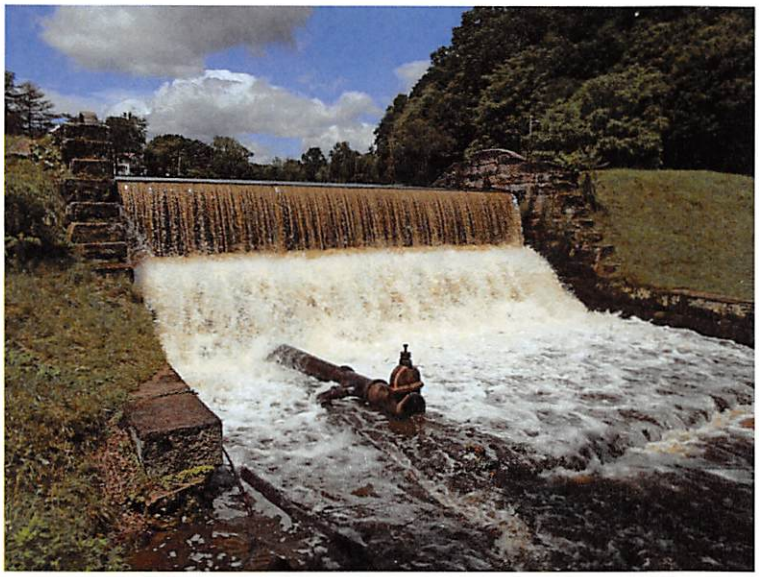
Past overtopping has caused low areas on the crest and erosion gullies on the downstream slope.



Photograph No. 6:

A close up view of the picture above.

	Photograph No. 7: Overview of the downstream slope.
	Photograph No. 8: A view of the principal spillway inlet and the brick cutoff wall. These structures are in the process of failing.
	Photograph No. 9: View of the interior side of the right principal spillway sidewall. Note the crumbling stones, the loss of joint material, and the vegetation growing in the open joints. The red circle indicates where water is coming out between the stones.



Photograph No. 10:

View of the principal spillway outlet. The lake drain can be seen at the bottom.

Photograph No. 11:

Both the right and left ends of the spillway sidewalls were severely undermined.

Photograph No. 12:

Both the right and left ends of the spillway sidewalls were severely undermined.

Dam Classification Checklist

Name of Dam:	Sippo Creek Reservoir Dam			File Number:	0614-012
County:	Stark	Date:	June 16, 2015	Engineer:	TMG

The classification of a dam is based on three factors: the dam's height, storage capacity, and potential downstream hazard. The height of the dam is the vertical distance from the crest to the downstream toe. The storage capacity is the volume of water that the dam can impound at the top of dam (crest) elevation. The downstream hazard consists of roads, buildings, homes, and other structures that would be damaged in the event of a dam failure. Potential for loss of life is also evaluated. Various dam failure scenarios must be considered, and they include failures when the dam is at normal pool level and failures during significant flood events. Each of the three factors is evaluated, and the final classification of the dam is based on the highest individual factor. Class I is the highest and Class IV is the lowest. The classification of a dam can change based on future development along the downstream channel.

This checklist is intended to establish or verify the appropriate classification in accordance with the Ohio Administrative Code – it does not necessarily show all potential hazards or the full extent of inundation. In addition, elevations are estimated.

HEIGHT CLASSIFICATION	***STORAGE CLASSIFICATION***	***EXEMPT~NON-REGULATED***
Dam Height = 18.90 feet	Stor. Capacity (top of dam)= 82.50 acre-feet	
____ > 60' - Class I	____ > 5000 acre-feet - Class I	____ Height ≤ 6 feet
____ > 40' - Class II	____ > 500 acre-feet - Class II	____ Storage ≤ 15 acre-feet
____ > 25' - Class III	X > 50 acre-feet - Class III	____ 6 ft. < Height < 10 ft. &
X ≤25' - Class IV	____ ≤ 50 acre-feet - Class IV	Stor. ≤ 50 ac-ft

Height Class:	IV		
Storage Class:	III		
Hazard Class (see next page):	I	**Estimated Population at Risk:**	16+
Final Class:	I		

Class Changed (Yes, (No))

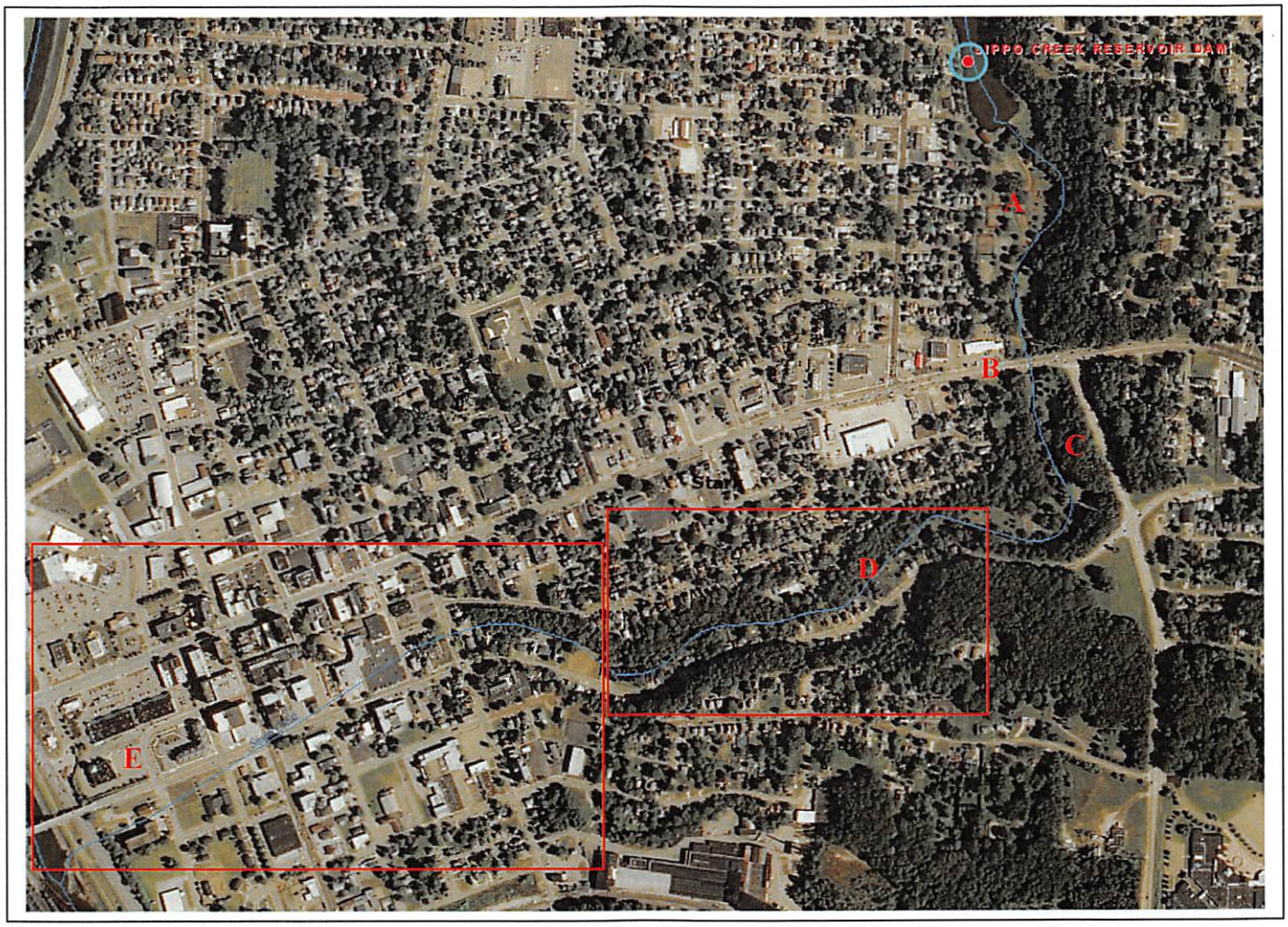
POTENTIAL DOWNSTREAM HAZARD

I	II					III		IV	-	-				
Probable loss of human life	Loss of public water supply or wastewater treatment facility, release of health hazardous waste	Flooding of structure or high-value property	Damage to high-value or Class I, II, III dam or levee	Damage to major road (US or state route), disruption of only access to residential or critical facility area	Damage to railroad or public utility	Damage to rural building, not otherwise high-valued property, or Class IV dam or levee	Damage to local road (county and township)	Loss restricted mainly to the dam or agricultural /rural land	No hazard to structure noted	*No hazard assessment; further investigation needed*	Distance downstream of dam to affected structure (feet)	Vertical distance from streambed to base of affected structure (feet)	Horizontal distance from stream to affected structure (feet)	
						A					200	3	0	Upper Park
				B							1500	26	0	SR 241
						C					2000	3	0	Lower Park
D											5300	4	Varies	Homes
E											5750	Varies	Varies	Massillon

This checklist is intended to establish or verify the appropriate classification in accordance with the OAC – it does not necessarily show all potential hazards or the full extent of inundation.

Sketch of Developments Downstream of Dam

See next page for insets D and E




D


E
Stark

Routing Summary

A dam must be able to safely pass severe flood events. A dam uses a combination of reservoir storage capacity and spillway discharge to prevent floodwater from overtopping the embankment crest. As part of this inspection, the Division of Soil and Water Resources did not thoroughly investigate the ability of this dam to safely pass the required design flood. In 2001 the Division of Soil and Water Resources performed hydrologic and hydraulic calculations to estimate the size of the design flood and the total spillway discharge capacity of the dam. These calculations combined with the reservoir storage capacity were used in the flood routings to determine the maximum water surface elevation in the reservoir for various flood events (see Table I).

Sippo Creek Reservoir Dam is a Class I dam; therefore, in accordance with OAC Rule 1501:21-13-02, the required design flood is 100% of the Probable Maximum Flood (PMF) or the critical flood. This dam and its spillway system must safely pass the design flood without overtopping the embankment crest. Flood routing calculations indicate that the dam can pass 3% of the PMF; Sippo Creek Reservoir Dam does not appear to be able to safely pass the design flood.

Table I - Flood Routing Summary

Flood Event	Maximum Inflow	Maximum WSEL[1]	Overtopping Depth[2]	Overtopping Duration
	(cubic feet per second)	(feet)	(feet)	(hours)
PMF	20180	1013.9	13.3	23.7
75% PMF	15135	1010.0	9.4	22.2
50% PMF	10090	1008.2	7.6	21.0
25% PMF	5045	1004.6	4.0	17.3
12% PMF[3]	2421	1003.2	2.6	13.0

1. WSEL – water surface elevation, in feet above the mean sea level
2. A negative number indicates that the dam does not overtop and represents the elevation difference between the Maximum WSEL and the Top of Dam Elevation (freeboard)
3. 12% PMF is similar to the 100-year flood. The 100-year flood event has a 1% chance of occurring in any given year. This is only an approximation.

Top of Dam Elevation: 1000.60 feet above msl
Normal Pool Elevation: 997.00 feet above msl

History of Sippo Creek Reservoir Dam

Date	Event
Unknown	Dam constructed.
1991	Dam safety inspection by the Division of Soil & Water Resources.
2000	Repair plans and hydrologic and hydraulic study submitted, comments provided, no resubmittal.
2001	Dam safety inspection by the Division of Soil & Water Resources.
2006	Dam safety inspection by the Division of Soil & Water Resources.
May 25, 2010	Dam safety inspection by the Division of Soil & Water Resources.
June 16, 2015	Dam safety inspection by the Division of Soil & Water Resources.

Section 3

LOCATION MAP

SIPPO CREEK RESERVOIR DAM - 0614-012

Feb 28, 2007

Dam Inventory Sheet

Name: SIPPO CREEK RESERVOIR DAM
File No: 0614-012
National #: OH02825
Permit No.: EXEMPT
Reservoir:
Class (Ht-Vol): I (IV - III)

Owner Information

Owner: City of Massillon
Owner Type: Public, Local
Address: Parks & Recreation
Multi-Dams: -
505 Erie St. North
Parcel No.:
City: Massillon **State:** OH **Zip:** 44646
Contact: Kim O'Farrell, CPRP Director **Phone No.:** 330/832-1621

Location Information

County: Stark **Latitude Deg.:** 40 **Min.:** 48 **Sec.:** 18
Township: Perry **Longitude Deg.:** 81 **Min.:** 30 **Sec.:** 30
Stream: Sippo Creek
USGS Quad.: Massillon **USGS Basin No.:** 05040001

Design/Construction Information

Designed By: Unknown
Constructed By: Unknown
Completed: **Plan Available:** NO **At:**
Failure/Incident/Breach:

Structure Information

Purpose: Recreation, Public
Type of Impound.: Dam And Spillway
Type of Structure: Earthfill
Drainage Area (sq. miles): 14.9 **or (acres):** 9566

Embankment Data

Length (ft): 265 **Upstream Slope:** 2H:1V
Height (ft): 18.9 **Downstream Slope:** 2H:1V
Top Width (ft): 6 **Volume of Fill (cub. yds.):**

Spillway Outlet Works Data

Lake Drain: 24-INCH-DIAMETER GATE VALVE
Principal: 50-FT-WIDE WEIR
Emergency: NONE
Maximum Spillway Discharge (cfs): 753 **Design Flood:** 1.0 **Flood Capacity:** 0.03

Dam Reservoir Data	Elevation (ft-MSL)*	Area (acres)	Storage (acre-feet)
Top of Dam:	1000.6	34	82.5
Emergency Spillway:			
Principal Spillway:	997	4.4	21.7
Streambed:	981.7		
Foundation:			

*Elevations are not necessarily related to a USGS benchmark

Inspection Information

Inspection History:
6/16/2015 TMG
5/25/2010 TMG
2/21/2006 TML
4/26/2001 WDE
12/19/1991

Phase I:
Other Visits:
Inspection Year: C

Operation Information/Remarks

Emergency Action Plan: Not Approved **Format:** No Plan **OMI:** No
Last Entry: 6/25/2015

Dam Safety Inspection Checklist

Complete All Portions of This Section (Pre-inspection)

Name of Dam: Sippo Creek Reservoir Dam — Stark County

Date of Inspection: JUNE 16, 2015 — Required Action: None ☐ Mon. ☐ Maint. ☐ Eng. ☒

File Number: 0614-012

Class: I — Design Flood: 1.0 — Flood Capacity: 0.03

Interview with Owner (at the site):

Owner/Representative present: (Yes, No) Name(s): OWNER HAD ANOTHER APPOINTMENT.

Owner's Name(s): City of Massillon

Address: Parks & Recreation, 505 Erie St. North,

City: Massillon — State: OH — Zip (+4): 44646

Contact Person: ~~Kenneth Kaminski~~, Director — Telephone: 330/832-1621 x114

Email Address: → KIM O'FARRELL

Purpose of dam: Recreation, Public

Owner Dam Safety Program

Emergency Action Plan

EAP (document): NO — Up-to-date? (yes, no) ☐ ☐ ☐ ☒

Exercised:

Downstream development: NO NEW DEVELOPMENT

Security: NONE

Operation, Maintenance, and Inspection

OMI (document): No — Up-to-date? (yes, no) ☐ ☐ ☒

Operation of drains/gates

All operable? (yes, no) UNKNOWN (NOT LIKELY, HASN'T BEEN OPERATED IN SEVERAL YEARS)

Normal rate of drawdown: UNKNOWN — Emerg. rate of drawdown: UNKNOWN

Accessibility for operation: FROM STILLING BASIN.

Maintenance

Frequency of mowing: SEASONABLY.

Other maintenance: REMOVED FLOWER BOXES OFF D/S SLOPE. REMOVED MOST TREE STUMPS FROM EMBANKMENT.

Inspection

Frequency and thoroughness of day-to-day & routine inspections: NONE

Frequency and thoroughness of event-driven inspections: NONE

Problems found during inspections: CONTINUED DETERIORATION OF SPILLWAY MASONRY.

Field Information

Pool Elevation (during inspection): ≈ 2" ABOVE NORMAL POOL — Time: 2:00 (a.m. p.m.)

Site Conditions(temp., weather, ground moisture): 85°F, SUNNY, DAMP

Inspection Party: TINA GRIFFIN + NEIL SHOP

Maximum Height: 18.9 Feet (measured or inventory appears correct)

Normal Pool Surface Area: 4.4 Acres (measured or inventory appears correct)

Brick cutoff walls runs across length of crest; Lake drain valve is in the stilling basin. 2012 - Principal spillway weir length is 50 feet (not 36 as previously noted).	Received Repair Plans 2000, Comments Provided, No Progress Made.

Required Action

None | Monitor | Maintenance | Engineer

UPSTREAM SLOPE

Gradient: Horizontal: 2 Vertical: 1 (est, meas.)

☒ *VEGETATION* [no problem] ☐ ☐ ☒ ☐

☒ Trees: Quantity: (<5, sparse, dense)
Diameter: (<6", 6-12" >12")
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes: ONE TREE STUMP @ SHORELINE.

☒ Brush: Quantity: (sparse, dense) ☐ ☐ ☒ ☐
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes: SMALL AMOUNT GROWING ON ® HALF + SMALL AMOUNT GROWING AROUND STUMP ON (L) HALF.

☒ Ground Cover: Type: (grass, crown vetch) Other: ☐ ☐ ☒ ☐
Quantity: (bare, sparse, adequate, dense) MAJORITY OF COVER WAS ADEQUATE,
Appearance: (too tall, too short, good) BUT SPARSE + BARE AREAS NOTED ON BOTH SIDES
Notes: NEAR PRINCIPAL SPILLWAY.

☒ *SLOPE PROTECTION* [no problem, could not inspect thoroughly] ☐ ☐ ☐ ☐

☐ ☐ ☐ ☒ None

☒ Riprap: Average Diameter: BROKEN CONCRETE SLABS
(adequate, sparse, displaced, weathered, vegetation) (bedding/fabric noted - yes, no)
Notes: INSTALLED IMPROPERLY AND HAS SLID INTO LAKE.

☐ Wave Berm: ☐ ☐ ☐ ☐
Vegetation: (adequate, bare, sparse, improper vegetation)
Notes:

☐ Concrete Slabs: (cracked, settlement, undermined, voids, deteriorated, vegetation) ☐ ☐ ☐ ☐
Notes:

☐ Other: ☐ ☐ ☐ ☐
Notes:

☒ *EROSION* [no problem, could not inspect thoroughly]

☒ Wave Erosion (Beaching): Scarp: Length: Height: 8" ☐ ☐ ☐ ☒
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes: ACTIVE WAVE EROSION. EROSION HAS GONE INTO THE CREST ON BOTH SIDES OF SPILLWAY.

☐ Runoff Erosion (Gullies): Quantity: ☐ ☐ ☐ ☐
Depth: Width: Length:
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes/Causes:

☒ *INSTABILITIES* [no problem, could not inspect thoroughly]

☐ Slides: Transverse Length: Longitudinal Length: ☐ ☐ ☐ ☐
Scarp: Width: Length:
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Crack: Width: Depth:
Notes/Causes

☐ Cracks: ☐ Transverse ☐ Longitudinal ☐ Other ☐ ☐ ☐ ☐
Quantity: Length: Width: Depth:
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes/Causes:

None | Monitor | Maintenance | Engineer

Required Action

Required Action

None | Monitor | Maintenance | Engineer

☐ Cracks: ☐ Transverse ☐ Longitudinal ☐ Other ☐ ☐ ☐ ☐
Quantity: Length: Width: Depth:
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes/Causes:

☐ Bulges ☐ Depressions ☐ Hummocky ☐ ☐ ☐ ☐
Size: Height: Depth:
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes/Causes:

☐ Bulges ☐ Depressions ☐ Hummocky ☐ ☐ ☐ ☐
Size: Height: Depth:
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes/Causes:

☒ *OTHER* [no problem, could not inspect thoroughly] ☐ ☐ ☒ ☐
☒ Rodent Burrows: (few, numerous)
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes: ONLY ONE AREA ADJACENT TO THE LEFT SIDEWALL OF PRINCIPAL SPILLWAY. UNKNOWN IF ACTIVE.

☐ Ruts: ☐ ☐ ☐ ☐
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Depth: Width Length:
Notes/Causes: (truck/auto, motorcycle, ATV, animals, pedestrian)

☐ Other: ☐ ☐ ☐ ☐
Notes:

CREST Length: 265' Width: 6' (est, meas.)

☒ *VEGETATION* [no problem] ☐ ☐ ☐ ☐
☐ Trees: Quantity: (<5, sparse, dense)
Diameter: (<6", 6-12", >12")
Location: (adj. to structure, entire crest, lt end, rt end, middle, see dwg)
Notes:

☐ Brush: Quantity: (sparse, dense) ☐ ☐ ☐ ☐
Location: (adj. to structure, entire crest, lt end, rt end, middle, see dwg)
Notes:

☒ Ground Cover: Type: (grass, crown vetch) Other: ☐ ☐ ☒ ☐
Quantity: (bare, sparse, adequate, dense) MAJORITY OF CREST HAS GOOD COVER.
Appearance: (too tall, too short, good) EROSION ON BOTH SIDES OF SPILLWAY HAVE
Notes: LEFT BARE AREAS.

☒ *EROSION* [no problem, could not inspect thoroughly] ☐ ☐ ☐ ☒
☐ Runoff Erosion (Gullies): Quantity: Depth: 2' Width: ENTIRE Length: ≈40' ON (L) 25' ON (R)
Location: (adj. to structure, entire crest, lt end, rt end, middle, see dwg)
Notes/Causes:

None | Monitor | Maintenance | Engineer

Required Action

Required Action

None | Monitor | Schedule Maintenance | Engineer

☒ *ALIGNMENT* [no problem, could not inspect thoroughly] ☐ ☐ ☐ ☒

☐ Vertical: ☒ Low Area:
Location: (adj. to structure, entire crest, lt end, rt end, middle, see dwg) ± 40' (L)
Elevation Difference: 2' Length: 25' (R)
Notes/Causes: OVERTOPPING EROSION

☐ ☐ ☐ ☐

☐ Horizontal:
Notes/Causes:

☒ *WIDTH* [no problem] ☐ ☐ ☐ ☐

☐ Too Narrow
Location: (adj. to structure, entire crest, lt end, rt end, middle, see dwg)
Notes/Causes:

☒ *INSTABILITIES* [no problem, could not inspect thoroughly] ☐ ☐ ☐ ☐

☐ Cracks: ☐ Transverse ☐ Longitudinal ☐ Other
Quantity: Length: Width: Depth:
Location: (adj. to structure, entire crest, lt end, rt end, middle, see dwg)
Notes/Causes:

☐ ☐ ☐ ☐

☐ Cracks: ☐ Transverse ☐ Longitudinal ☐ Other
Quantity: Length: Width: Depth:
Location: (adj. to structure, entire crest, lt end, rt end, middle, see dwg)
Notes/Causes:

☐ ☐ ☐ ☐

☐ Bulges ☐ Depressions ☐ Hummocky
Size: Height: Depth:
Location: (adj. to structure, entire crest, lt end, rt end, middle, see dwg)
Notes/Causes:

☐ ☐ ☐ ☐

☐ Bulges ☐ Depressions ☐ Hummocky
Size: Height: Depth:
Location: (adj. to structure, entire crest, lt end, rt end, middle, see dwg)
Notes/Causes:

☒ *OTHER* [no problem, could not inspect thoroughly] ☐ ☐ ☐ ☐

☐ Rodent Burrows: (few, numerous)
Location: (adj. to structure, entire crest, lt end, rt end, middle, see dwg)
Notes:

☐ ☐ ☐ ☐

☐ Ruts:
Location: (adj. to structure, entire crest, lt end, rt end, middle, see dwg)
Depth: Width Length:
Notes/Causes: (truck/auto, motorcycle, ATV, animals, pedestrian)

☐ ☐ ☐ ☒

☒ Other: A BRICK CUTOFF WALL IS LOCATED IN THE CREST.
Notes: EROSION HAS EXPOSED PART OF WALL BY 2'.
THE EXPOSED WALL IS CRUMBLING.

None | Monitor | Schedule Maintenance | Engineer

Required Action

Required Action

None | Monitor | Maintenance | Emergency

DOWNSTREAM SLOPE Gradient: Horizontal: 3 Vertical: 1 (est, meas.)

☒ *VEGETATION* [no problem] ☐ ☐ ☒ ☐

☒ Trees: Quantity: (<5, sparse, dense)
Diameter: (<6", 6-12", >12")
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes: ONE SMALL TREE STUMP REMAINED ON THE SLOPE. THE OTHERS HAD BEEN REMOVED SINCE THE LAST INSPECTION.

☒ Brush: Quantity: (sparse, dense) ☐ ☐ ☒ ☐
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes: SMALL AMOUNT ON BOTH SIDES OF SPILLWAY.

☒ Ground Cover: Type: (grass, crown vetch) Other: ☒ ☐ ☐ ☐
Quantity: (bare, sparse, adequate, dense)
Appearance: (too tall, too short, good)
Notes:

☒ *EROSION* [no problem, could not inspect thoroughly]
☒ Runoff Erosion (Gullies): Quantity: 2 Depth: 1' Width: 18" Length: VARIES ☐ ☐ ☒ ☐
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes/Causes: LOCATED ON BOTH SIDES NEXT TO SPILLWAY. LIKELY CAUSED BY OVERTOPPING.

☒ *INSTABILITIES* [no problem, could not inspect thoroughly]
☐ Slides: Transverse Length: Longitudinal Length: ☐ ☐ ☐ ☐
Scarp: Width: Length:
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Crack: Width: Depth:
Notes/Causes

☐ Cracks: ☐ Transverse ☐ Longitudinal ☐ Other ☐ ☐ ☐ ☐
Quantity: Length: Width: Depth:
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes/Causes:

☐ Cracks: ☐ Transverse ☐ Longitudinal ☐ Other ☐ ☐ ☐ ☐
Quantity: Length: Width: Depth:
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes/Causes:

☐ Bulges ☐ Depressions ☐ Hummocky ☐ ☐ ☐ ☐
Size: Height: Depth:
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes/Causes:

☐ Bulges ☐ Depressions ☐ Hummocky ☐ ☐ ☐ ☐
Size: Height: Depth:
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes/Causes:

None | Monitor | Maintenance | Emergency

Required Action

Required Action

None | Monitor | Maintenance | Engineer

☒ *OTHER* [no problem, could not inspect thoroughly] ☐ ☐ ☐ ☐

☐ Rodent Burrows: (few, numerous)
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes:

☒ ~~Ruts:~~ PLANTERS LOCATED ON BOTH SIDES OF SLOPE HAD BEEN REMOVED SINCE THE LAST INSPECTION. ☒ ☐ ☐ ☐
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Depth: Width Length:
Notes/Causes: (truck/auto, motorcycle, ATV, animals, pedestrian)

☒ Other: THE SLOPE ON (R) HALF IS STEEPER THAN 1H:1V. ☐ ☐ ☐ ☒
Notes: THE SLOPE ON (L) HALF IS ≈ 3H:1V.

☒ *SEEPAGE* [no problem, could not inspect thoroughly] ☐ ☐ ☐ ☐

☐ Wet Area ☐ Flow ☐ Boil ☐ Sinkhole Size:
Flow Rate
Location:
☐ Aquatic Vegetation ☐ None
☐ Rust Colored Deposits ☐ None
☐ Sediment in Flow ☐ None
☐ Other:
Notes/Causes:

☐ ☐ ☐ ☐

☐ Wet Area ☐ Flow ☐ Boil ☐ Sinkhole Size:
Flow Rate
Location:
☐ Aquatic Vegetation ☐ None
☐ Rust Colored Deposits ☐ None
☐ Sediment in Flow ☐ None
☐ Other:
Notes/Causes:

☒ *EMBANKMENT DRAINS* [none, none found, no problem, could not inspect thoroughly] ☐ ☐ ☐ ☐

Type: ☐ Toe Drain ☐ Relief Wells ☐ Other: Size: Number:
Flow Rate:
Location:
Notes:

☒ *MONITORING INSTRUMENTATION* [none, none found, no problem, could not inspect thoroughly] ☐ ☐ ☐ ☐

☐ None Found ☐ Piezometers ☐ Weirs/Flumes ☐ Other
☐ Periodic Inspections by:
Notes:

None | Monitor | Maintenance | Engineer
Required Action

Required Action

Owner Maintenance Engineer

PRINCIPAL SPILLWAY

☒ *GENERAL INLET* [no problem, could not inspect thoroughly] ☐ ☐ ☐ ☐

☐ Anti-Vortex Plate [None] Dimensions: (adequate, too small,)

Type: (steel, concrete, aluminum, stainless steel, corrugated metal wood, other):

Deterioration: (missing sections, rusted, collapsed)

Notes:

☐ ☐ ☐ ☐

☐ Flash Boards [None]

Type: (metal, wood):

Deterioration:

Notes:

☐ Trashrack [None] Opening Size: (adequate, too small, too large) ☐ ☐ ☐ ☐

Type: (metal bars, fence, screen, concrete, baffle, other):

Deterioration: (broken bars, missing sections, rusted, collapsed)

Notes:

☒ *INLET OBSTRUCTION* [no problem, could not inspect thoroughly] ☐ ☐ ☐ ☐

☐ Debris: (leaves, trash, logs, branches, ice) ☐ ☐ ☐ ☐

☐ Trees: Quantity: (<5, sparse, dense)

Diameter: (<6", 6-12", >12")

Location: (entire inlet, lt side, rt side, middle, see dwg)

Notes:

☐ Brush: Quantity: (sparse, dense) ☐ ☐ ☐ ☐

Location: (entire inlet, lt side, rt side, middle, see dwg)

Notes:

☐ Other:(beaver activity, trashrack opening too small, partially/completely blocked, i.e.) ☐ ☐ ☐ ☐

Notes:

☒ *INLET MATERIALS* [no problem, could not inspect thoroughly]

☐ Metal ☐ ☐ ☐ ☐

(loss of coating/paint, surface rust, corrosion (pitting, scaling), rusted out, pipe deformation)

Dimensions:

Location:

Notes/Causes:

☐ Concrete ☐ ☐ ☐ ☐

(bug holes, hairline crack, efflorescence) ☐ ☐ ☐ ☐

(spalling, popouts, honeycombing, scaling, craze/map cracks) ☐ ☐ ☐ ☐

(isolated crack, exposed rebar, disintegration, other)

Dimensions/Location:

Notes/Causes:

(bug holes, hairline crack, efflorescence) ☐ ☐ ☐ ☐

(spalling, popouts, honeycombing, scaling, craze/map cracks) ☐ ☐ ☐ ☐

(isolated crack, exposed rebar, disintegration, other) ☐ ☐ ☐ ☐

Dimensions/Location:

Notes/Causes:

☐ Plastic ☐ ☐ ☐ ☐

(deterioration, cracking, deformation)

Dimensions:

Location:

Notes/Causes:

Owner Maintenance Engineer

Required Action

Required Action

None | Monitor | Maintenance | Engineer

☐ Earthen

☐ Ground Cover: Type: (grass, crown vetch) Other: ☐ ☐ ☐ ☐
Quantity: (bare, sparse, adequate, dense)
Appearance: (too tall, too short, good)
Notes:

☐ Erosion: (wave, surface runoff) ☐ ☐ ☐ ☐
Description (height/depth/length/etc):
Notes:

☐ Ruts: ☐ ☐ ☐ ☐
Location: (entire inlet, lt side, rt side, middle, see dwg)
Depth: Width Length:
Notes/Causes: (truck/auto, motorcycle, ATV, animals, pedestrian)

☐ Riprap: Average Diameter: ☐ ☐ ☐ ☐
(adequate, sparse, displaced, weathered, vegetation) (bedding/fabric noted - yes, no)
Notes:

☐ Rock-Cut (weathered, erosion) ☐ ☐ ☐ ☐
Description:
Notes:

☒ Other: STONE BLOCKS ARE CRUMBLING, HAVE LOST MORTAR BETWEEN STONES, ARE UNDERMINED. ☐ ☐ ☒

☒ *OTHER INLET PROBLEMS* [no problem, could not inspect thoroughly]

☐ Mis-Alignment:(pipe, chute, sidewall, headwall) ☐ Pipe Deformation ☐ ☐ ☐ ☐
Location/Description:
Notes/Causes:

☐ Separated Joint ☐ Loss of Joint Material ☐ ☐ ☐ ☐
Location/Description:
Notes/Causes:

☒ Undermining: OF SPILLWAY SIDEWALLS. ☐ ☐ ☐ ☒
Location/Description:
Notes/Causes:

☐ Other: ☐ ☐ ☐ ☐

☐ *OPEN CHANNEL CONTROL SECTION* [no problem, could not inspect] Width (est., ms.) Brdth (est., ms.) ☐ ☐ ☐ ☐
Notes:

☒ *OUTLET OBSTRUCTION* [no problem, could not inspect thoroughly]

☐ Debris: (leaves, trash, logs, branches, ice) ☐ ☐ ☐ ☐
☐ Trees: Quantity: (<5, sparse, dense) ☐ ☐ ☐ ☐
Diameter: (<6", 6-12", >12")
Location: (entire outlet, lt side, rt side, middle, see dwg)
Notes:

☐ Brush: Quantity: (sparse, dense) ☐ ☐ ☐ ☐
Location:(entire outlet, lt side, rt side, middle, see dwg)
Notes:

Required Action

☐ Other:(beaver activity, partially/completely blocked, i.e.) ☐ ☐ ☐ ☐

Notes:

None | Monitor | Maintenance | Engineer

(Upstream Slope, Crest, Downstream Slope, Seepage, **Principal Spillway-Inlet/Outlet**, Emergency Spillway, Lake Drain)

Required Action

None | Monitor | Maintenance | Engineer

☒ *OUTLET MATERIALS* [no problem, could not inspect thoroughly] ☐ ☐ ☐ ☐

☐ Metal (loss of coating/paint, surface rust, corrosion (pitting, scaling), rusted out, pipe deformation)
Dimensions:
Location:
Notes/Causes:

☐ Concrete
(bug holes, hairline crack, efflorescence) ☐ ☐ ☐ ☐
(spalling, popouts, honeycombing, scaling, craze/map cracks) ☐ ☐ ☐ ☐
(isolated crack, exposed rebar, disintegration, other) ☐ ☐ ☐ ☐
Dimensions/Location:
Notes/Causes:

(bug holes, hairline crack, efflorescence) ☐ ☐ ☐ ☐
(spalling, popouts, honeycombing, scaling, craze/map cracks) ☐ ☐ ☐ ☐
(isolated crack, exposed rebar, disintegration, other) ☐ ☐ ☐ ☐
Dimensions/Location:
Notes/Causes:

☐ Plastic (deterioration, cracking, deformation) ☐ ☐ ☐ ☐
Dimensions:
Location:
Notes/Causes:

☐ Earthen
☐ Ground Cover: Type: (grass, crown vetch) Other: ☐ ☐ ☐ ☐
Quantity: (bare, sparse, adequate, dense)
Appearance: (too tall, too short, good)
Notes:

☐ Erosion: (other, surface runoff) ☐ ☐ ☐ ☐
Description (width/depth/length/etc):
Notes:

☐ Ruts: ☐ ☐ ☐ ☐
Location: (entire inlet, lt side, rt side, middle, see dwg)
Depth: Width Length:
Notes/Causes: (truck/auto, motorcycle, ATV, animals, pedestrian)

☐ Riprap: Average Diameter: ☐ ☐ ☐ ☐
(adequate, sparse, displaced, weathered, vegetation) (bedding/fabric noted - yes, no)
Notes:

☐ Rock-Cut (weathered, erosion)
Description/Notes: ☐ ☐ ☐ ☒

☒ Other: STONE, SEE "INLET MATERIALS". SAME PROBLEMS. ☐ ☐ ☐ ☐

☒ *OTHER OUTLET PROBLEMS* [no problem, could not inspect thoroughly] HEAVY FLOW. ☐ ☐ ☐ ☐
☐ Mis-Alignment:(pipe, chute, sidewall, headwall) ☐ Pipe Deformation
Location/Description:
Notes/Causes:

None | Monitor | Maintenance | Engineer

☐ Separated Joint ☐ Loss of Joint Material ☐ ☐ ☐ ☐
Location/Description:
Notes/Causes:

☐ Undermining: ☐ ☐ ☐ ☐
Location/Description:
Notes/Causes:

☐ Other: ☐ ☐ ☐ ☐
{Upstream Slope, Crest, Downstream Slope, Seepage, **Principal Spillway-Outlet**, Emergency Spillway, Lake Drain}

Required Action

Required Action

None | Monitor | Maintenance | Engineer

EMERGENCY SPILLWAY

☒ None Found

Notes: AN EMERGENCY SPILLWAY IS NOT REQUIRED FOR THIS DAM!

☒ ☐ ☐ ☐

Required Action

LAKE DRAIN

☒ *GENERAL*
- ☐ None Found ☐ Does not have one
- ☒ Type of Lake Drain (isolated control/intake tower, valve vault w/ outlet conduit, valve in riser/drop inlet, siphon)
  Notes:
- ☒ Operated During Inspection (yes, no)
  Notes:

☒ *ACCESS TO VALVE/SLUICE GATE* [no problem, could not inspect thoroughly]
- ☒ Type (not accessible, from shore, boat, walkway, other) FROM STILLING BASIN.
  Notes:
- ☐ Walkway/Platform:
  - ☐ Concrete Deterioration ☐ Cracks (platform, piers, end supports, railing)
    Location:
    Notes:
  - ☐ Wood Deterioration
    Notes:
  - ☒ Metal Deterioration CORROSION & SURFACE RUST.
    (minor, moderate, extensive, other) COULD NOT INSPECT BECAUSE OF
    Notes: HEAVY FLOW OVER SPILLWAY.

☒ *LAKE DRAIN COMPONENTS* [no problem, could not inspect thoroughly]
- ☐ Concrete Structure
  Location:
  Description: (deterioration, misalignment, cracks):
  Notes/Causes:
- ☒ Valve Control (Operating Device)
  ☐ No Operating Device ☐ No Stem ☐ Bent/Broken Stem ☐ Other
  Notes/Operability: UNSURE WHERE OPERATING DEVICE IS / UNKNOWN OPERABILITY.
- ☒ Valve / Sluice Gate COULD NOT INSPECT DUE TO FLOW OVER WEIR.
  - ☐ Metal Deterioration: (surface rust, minor, moderate, extensive, other)
    Location:
    Flow Rate:
    Notes/Causes:
  - ☐ Misalignment
    Notes/Causes:
  - ☐ Leakage - Flow Rate:
    Notes/Causes:
- ☐ Valve / Sluice Gate
  - ☐ Metal Deterioration: (surface rust, minor, moderate, extensive, other)
    Location:
    Flow Rate:
    Notes/Causes:
  - ☐ Misalignment - Notes/Causes:
  - ☐ Leakage - Flow Rate:
    Notes/Causes:

Required Action

None | Monitor | Maintenance | Engineer

☒ Outlet Conduit
- ☒ Metal:(loss of coating/paint, surface rust, corrosion (pitting, scaling), rusted out) — ☐ ☒ ☐ ☐
  - Location:
  - Notes/Causes:
- ☐ Concrete (bug holes, hairline crack, efflorescence) — ☐ ☐ ☐ ☐
  (spalling, popouts, honeycombing, scaling, craze/map cracks) — ☐ ☐ ☐ ☐
  (isolated crack, exposed rebar, disintegration, other) — ☐ ☐ ☐ ☐
  - Dimensions/Location:
  - Notes/Causes:
- ☐ Plastic:(deterioration, cracking) — ☐ ☐ ☐ ☐
  - Location:
  - Notes/Causes:
- ☐ Conduit Deformation ☐ Mis-Alignment: — ☐ ☐ ☐ ☐
  - Location:
  - Notes/Causes:
- ☐ Separated Joint ☐ Loss of Joint Material — ☐ ☐ ☐ ☐
  - Location/Description:
  - Notes/Causes:
- ☐ Undermining: — ☐ ☐ ☐ ☐
  - Location/Description:
  - Notes/Causes:
- ☐ Vegetation (trees, brush) — ☐ ☐ ☐ ☐
  - Notes:
- ☐ Other: — ☐ ☐ ☐ ☐
  - Notes:

☒ Energy Dissipator
- ☒ Type (endwall, plunge pool, impact basin, stilling basin, rock-lined channel, none) — ☒ ☐ ☐ ☐
  - Notes: AN ENERGY DISSIPATOR MAY BE REQUIRED W/ NEWLY DESIGNED SPILLWAY.
- ☐ Riprap: Average Diameter: — ☐ ☐ ☐ ☐
  (adequate, sparse, displaced, weathered, vegetation) (bedding/fabric noted - yes, no))
  - Notes:
- ☐ Concrete (bug holes, hairline crack, efflorescence) — ☐ ☐ ☐ ☐
  (spalling, popouts, honeycombing, scaling, craze/map cracks) — ☐ ☐ ☐ ☐
  (isolated crack, exposed rebar, disintegration, other) — ☐ ☐ ☐ ☐
  - Dimensions/Location:
  - Notes/Causes:
- ☐ Mis-Alignment: — ☐ ☐ ☐ ☐
  - Location/Description:
  - Notes/Causes:
- ☐ Separated Joint ☐ Loss of Joint Material — ☐ ☐ ☐ ☐
  - Location/Description:
  - Notes/Causes:
- ☐ Undermining: — ☐ ☐ ☐ ☐
  - Location/Description:
  - Notes/Causes:
- ☐ Other: — ☐ ☐ ☐ ☐
  - Notes:

Required Action: None | Monitor | Maintenance | Engineer

(Upstream Slope, Crest, Downstream Slope, Seepage, Principal Spillway, Emergency Spillway, Lake Drain)

Ohio Department of Natural Resources

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March 11, 2016

City of Massillon
Kim O'Farrell, CPRP, Director
Parks & Recreation
505 Erie St. North
Massillon, OH 44646

RE: Sippo Creek Reservoir Dam
File Number: 0614-012
Stark County

Dear Ms. O'Farrell:

Thank you for allowing Tina Griffin and Neil Shop of the Division of Water Resources to conduct a safety inspection of Sippo Creek Reservoir Dam on June 16, 2015. This inspection was conducted by representatives of the Chief of the Division of Water Resources under the provisions of Ohio Revised Code (ORC) Section 1521.062 to evaluate the condition of the dam and its appurtenances. The Chief has the responsibility to ensure that human life, health, and property are protected from dam failures. Conducting periodic safety inspections and working with dam owners to maintain and improve the overall condition of Ohio dams are vital aspects of achieving this purpose. A copy of the laws and administrative rules for dam safety is available on the division's web site or by request. I have enclosed guidelines for preparing an operation, maintenance, and inspection manual and guidelines for preparing an emergency action plan.

The enclosed inspection report was generated based on available information and is hereby provided for your use and study. Listed in the report are several repair, maintenance, and monitoring items that as a dam owner you are required by law to perform. Completion of these required items will improve the safety and overall condition of the dam. The Chief must approve any plans for modifications or repairs to the dam. Modifying or repairing a dam includes, but is not limited to, installing or replacing a spillway pipe or a portion of a spillway, raising the embankment crest elevation, raising the normal pool level, and placement of fill and/or piping in an open channel spillway. Following approval of the engineered plans, all necessary repairs must be implemented by the owner under the supervision of a registered professional engineer. Failure to complete the repair, maintenance, and monitoring items may result in legal enforcement of these requirements in the form of an order from the Chief of the Division.

To gain information that will help improve the inspection program, a short survey has been developed and is enclosed. Please complete the survey and return it in the self-addressed envelope provided. Your feedback is important.

It is the Division's understanding that you are the owner(s) of this dam. Under Ohio's dam safety regulations, "owners" are "those who own, or propose to construct a dam or levee." OAC Rule 1501:21-3-01(V). A "dam" is defined as "any artificial barrier together with any appurtenant works, which either does or may impound water or other liquefied material …" OAC Rule 1501:21-3-01(F). "Appurtenant works" include but are not limited to outlet works and spillway channels.

If you are not an owner of this dam, or believe that there are additional owners of the dam not addressed in this communication, please contact Tina Griffin. Please note that ORC Section 1521.062 requires a dam owner to notify the Chief of the Division of Water Resources in writing of a change in ownership of a dam prior to the exchange of the property.

Your cooperation in improving the overall condition of this dam is appreciated. Please contact Tina Griffin at 614/265-6634 if you have any questions.

Sincerely,

Mia P. Kannik, P.E.
Program Manager
Dam Safety Program
Division of Water Resources

MPK:tmg

cc/enc: Tina Griffin, P.E., Division of Water Resources, Dam Safety Program

Enclosures