

Dam Safety Inspection Report

Fischer Park No 1 Dam

TX07410

GENERAL INFORMATION

INVENTORY No.:	TX07410	WATER RIGHT AUTHORIZATION:	N/A
OWNER:	CITY OF NEW BRAUNFELS		
STREAM:	OFF-CHANNEL RESERVOIR		
BASIN:	GUADALUPE	COUNTY:	COMAL
GENERAL LOCATION:	LAT. 29.676521 LONG. -98.108313 WITHIN CITY OF NEW BRAUNFELS, TEXAS		
DAM HEIGHT:	29 FT	DOWNSTREAM HAZARD RATING:	HIGH
NORMAL CAPACITY:	22.6 AC-FT	MAXIMUM CAPACITY:	25 AC-FT
NORMAL WATER LEVEL:	646 FEET (NAVD88)		
CURRENT WATER LEVEL:	645.5 FEET		
PREVIOUS INSPECTION DATE:	JULY 12, 2016		
CURRENT INSPECTION DATE:	NOVEMBER 30, 2017		
INSPECTION BY PERSONNEL:	GRADY HILLHOUSE, P.E. AND GEORGE KELLEY, P.E. FREESE AND NICHOLS, INC.		
OWNER'S REPRESENTATIVE:	MARK ENDERS WATERSHED PROGRAM MANAGER – CITY OF NEW BRAUNFELS		

SUMMARY

The City of New Braunfels (City) contracted with Freese and Nichols, Inc. (FNI) to perform an inspection of Fischer Park Dam No. 1, a small sized, high hazard dam in Comal County. The dam was inspected by Grady Hillhouse, P.E. and George Kelley, P.E. on November 30, 2017. The structure was in overall fair condition. An aerial photograph of the dam and surrounding area is shown in Figure 1. Appendix A includes photographs and a sketch showing where they were taken. Appendix B includes the standard TCEQ inspection checklist. All references to left and right are from the perspective of facing downstream.

BACKGROUND

Details about the original construction of Fischer Park No. 1 Dam are unknown. The dam was modified as a part of development of Fischer Park in New Braunfels. TCEQ approved the plans and specifications for the modifications in December 2013. Substantial completion for the project was in May 2015, and the Engineer's Notification of Completion was submitted in June 2015.

Fischer Park No. 1 Dam consists of a 350-foot-long earthen embankment with a crest width of approximately 12-15 feet and a maximum height of approximately 29 feet. The upstream slope is approximately 2:1 (H:V), and the downstream slope is approximately 1.5:1. The dam's only spillway consists of a 150-foot-wide low area along the embankment protected from erosion by turf reinforcement matting (TRM). Fischer Park No. 2 Dam maintains a pond directly downstream of Fischer Park No. 1 Dam, and the normal pool of the downstream pond is impounded along the downstream slope of the Fischer Park No. 1 Dam embankment.

TCEQ performed an inspection of the dam on July 12, 2016. The primary issues of concern included the following:

- Portions of the embankment lacked suitable vegetative cover for erosion protection.
- The upstream slope of the embankment was overgrown with woody vegetation.
- The downstream slope had signs of erosion and woody vegetation and non-uniform slope.
- Erosion was noted around and below the turf reinforcement matting (TRM) at the spillway.
- The dam does not have an approved Emergency Action Plan (EAP).

Recommendations from TCEQ's inspection included the following:

- Prepare an EAP for the dam
- Clear woody vegetation from the dam
- Re-evaluate the condition of dam after clearing
- Repair erosion and grading issues along embankment
- Install additional erosion control measures on the spillway and evaluate TRM
- Provide a written operation and maintenance (O&M) plan

The City had cleared much of the woody vegetation and small trees (less than 4" in diameter) along the dam in preparation for FNI's inspection.

CURRENT EVALUATION

Embankment

The earthen embankment has an overall length of approximately 350 feet (including the spillway) with a crest width of approximately 12-15 feet. The embankment was found to be in fair condition. Photos 1 through 4 show the crest and slopes of the embankment. The following observations were noted:

- City of New Braunfels staff had cleared the majority of the woody overgrowth and small trees (below 4" in diameter), vines, and brush. Many trees remain along the slopes of the embankment, including below the spillway.
- The concrete sidewalk along the crest was in good condition.

- Some areas along the slopes and crest of the embankment lacked a good cover of grass.
- Isolated areas of minor erosion rills were noted on the downstream slope.

Spillway

The auxiliary spillway consists of a 150-foot-wide low area along the embankment protected from erosion by TRM. The sidewalk serves as the crest and control section of the spillway. The spillway was found to be in poor condition. Photos 5 through 9 show the spillway.

- The TRM lacked an adequate cover of grass which is necessary for proper performance of the matting. Isolated areas on the upstream portion of the spillway had adequate cover.
- The TRM did not have intimate contact with the soil along nearly the entire downstream portion of the spillway. Intimate contact is necessary for proper performance of TRM. Erosion below the TRM was evident along the entirety of the downstream slope of the spillway.
- The area immediately downstream of the TRM anchor trench was eroded, creating a benched area.
- Regular flow over the sidewalk has resulted in growth of algae which can present a safety hazard to pedestrians. The spillway was not overflowing at the time of the inspection.

Site Security

The dam site is located in a park open to the public.

- Park curfew is 12 midnight to 6:00 am. The park does not have a gate or fence.
- The dam has gates on either side of the spillway that can be closed if the spillway is flowing.

Downstream Channel

Fischer Park No. 2 Dam maintains a pond directly downstream of Fischer Park No. 1 Dam, and the normal pool of the downstream pond is impounded along the downstream slope of the Fischer Park No. 1 Dam embankment.

Downstream Hazards

The dam is classified as high hazard because its failure could result in failure of the downstream Fischer Park No. 2 Dam. The area downstream of Fischer Park No. 2 Dam is heavily populated with residential and commercial development. A breach study has not been performed for the dam.

HYDROLOGIC / HYDRAULIC ANALYSES

As a small, high hazard structure, the dam is required to safely pass the 75% of the Probable Maximum Flood (PMF). TCEQ approved the hydrologic and hydraulic design of the current improvements in June 2013. The dam is considered hydraulically adequate. Additional requirements from TCEQ for a high hazard dam include:

1. Approved EAP on file with TCEQ
2. O&M plan on file with owner
3. Implementation of a routine inspection program by owner
4. Annual reporting to TCEQ documenting compliance with above

OPERATION AND MAINTENANCE (O&M)

A written O&M plan has not been prepared for the dam.

EMERGENCY ACTION PLAN

An EAP has not been prepared for the dam.

RECOMMENDATIONS

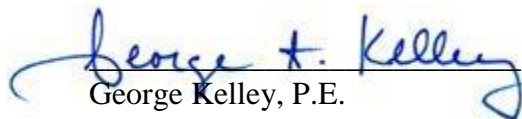
1. A breach analysis and EAP should be developed for the dam.
2. A written O&M plan should be prepared for the dam. The O&M plan should include implementation of a routine inspection program and annual reporting to TCEQ.
3. The City has cleared all woody vegetation and small trees less than 4" in diameter from the dam. However, not all the trees within the area of the spillway have been removed. This area should be cleared to provide proper hydraulic performance of the spillway. The O&M plan should include regular control measures to prevent regrowth of woody vegetation.
4. To the extent that it is feasible, bare areas along the embankment should be seeded with grass. It is unlikely that establishment of high-quality grass cover will be possible on the shady slopes and crest of the embankment. Regular monitoring of the embankment will be required to identify and repair erosion before it becomes significant.
5. The TRM spillway has failed and requires modifications or repairs:
 - a. TRM over an earthen embankment is not appropriate for the service spillway to maintain the normal level in the pond because regular flows prevent establishment of grass cover over the matting. Flows over the spillway, shade, and loss of intimate contact with the subgrade have limited the effectiveness of the TRM to prevent erosion of the embankment.
 - b. This configuration also presents a safety hazard because the water regularly passing over the sidewalk results in growth of algae which can be slippery to pedestrians.
 - c. FNI recommends that the spillway be repaired or modified to address these issues for improved long-term performance. At a minimum, repairs should include measures to pass normal flows below the sidewalk, additional erosion protection downstream of the spillway, and repair/replacement of the failed TRM.

CONCLUSIONS

The owner should address the recommendations made in this report. A response to this inspection report, including a plan and schedule to address the issues noted, may be required by TCEQ. As the City is aware, it is the owner's responsibility to maintain the dam in a safe condition in order to prevent loss of life and limit the potential for property loss. In doing so, the owner will reduce liability exposure and, with regular maintenance, will minimize costs.



Grady Hillhouse, P.E.
Freese and Nichols, Inc
TX Firm F-2144



George Kelley, P.E.
Freese and Nichols, Inc.

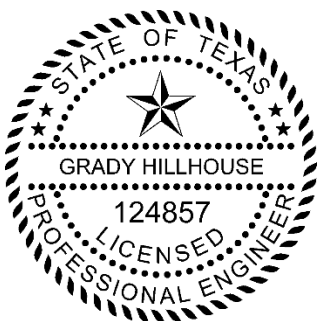




Figure 1: Site Aerial Photograph

APPENDIX A PHOTOGRAPHS

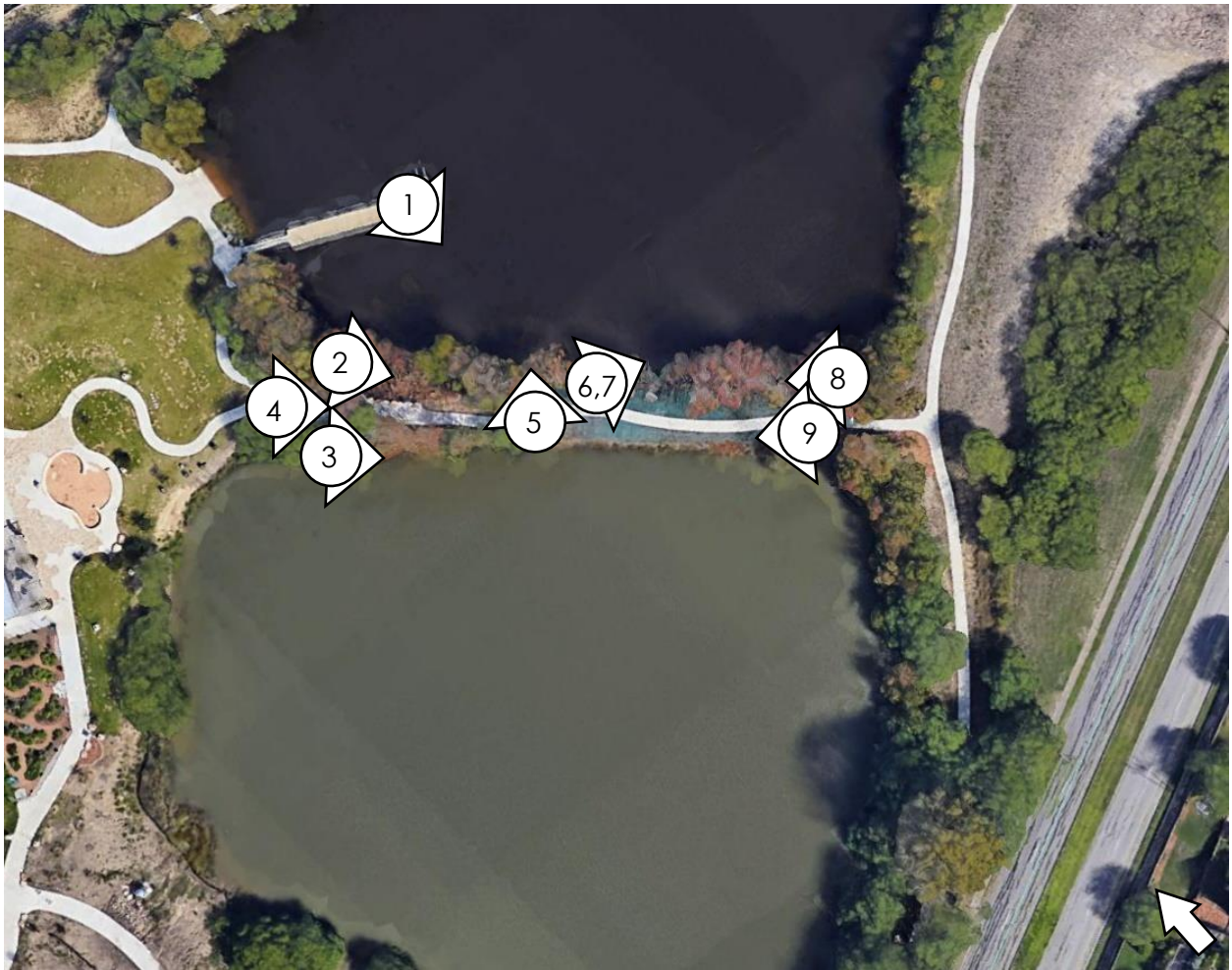




Photo 1: Embankment Overview (Looking Upstream)



Photo 2: Downstream Slope



Photo 3: Upstream Slope



Photo 4: Embankment Crest



Photo 5: Spillway Pedestrian Gate



Photo 6: Erosion at Downstream Toe of Spillway



Photo 7: Downstream Slope of Spillway



Photo 8: Spillway Crest and Downstream Slope



Photo 9: Upstream Slope of Spillway

APPENDIX B INSPECTION CHECKLIST

Inspection Results—Dam Conditions

Dam Name: Fischer Park No. 1 Dam Inventory No: TX07410
Name of Inspector/s: Grady Hillhouse, P.E. and George Kelley, P.E.
Name of Contact/s: Mark Enders
Date of Inspection: 11/30/2017 Start Time: 8:30 AM End Time: 9:30 AM Weather: Mostly Cloudy
Crest level (at center) above water: ~4 feet
Service spillway level ☒ Above or ☐ Below water: Spillway not flowing
Emergency spillway level above water: Service spillway and emergency spillway are combined
Ground Moisture Condition: ☒ Dry ☐ Damp ☐ Wet ☐ Snow ☐ Other: _____

Crest of Dam General Condition: ☐ Good ☒ Fair ☐ Poor Width: 12-15 feet
Problems Noted: ☐ None ☐ Rutting ☒ Erosion ☐ Poor Drainage Height: 29 feet
☒ Trees ☐ Depressions ☐ Bulges ☐ Livestock Damage ☐ Cracks Length: 350 feet
☐ Misalignment of Crest ☐ Misalignment of Utility Poles ☐ Misalignment of Fences or Rails ☐ Sinkhole
☐ Burrows ☐ Breached ☐ Other: _____
Comments: Lack of grass

Upstream Face General Condition: ☐ Good ☒ Fair ☐ Poor Slope: 2H:1V
Problems Noted: ☐ None ☐ Rip-Rap ☐ Erosion ☐ Too Steep ☐ Burrows ☒ Trees ☐ Cattails
☐ Depressions ☐ Bulges ☐ Livestock Damage ☐ Slides ☐ Concrete Decay ☐ Cracks ☐ Sinkhole
☐ Benching ☐ Misalignment of Rip-rap ☐ Open Joints in Concrete ☐ Other: _____
Comments: Lack of good grass cover

Downstream Face General Condition: ☐ Good ☒ Fair ☐ Poor Slope: 1.5H:1V
Problems Noted: ☐ None ☐ Riprap ☐ Sloughing ☒ Erosion ☐ Too Steep ☐ Burrows ☒ Trees ☐ Cattails
☐ Depressions ☐ Bulges ☐ Livestock Damage ☐ Slides ☐ Concrete Decay ☐ Cracks ☐ Sinkhole
☐ Other: _____
Comments: Lack of good grass cover

Seepage on Downstream Slope Amount: ☐ Major ☐ Moderate ☐ Minor ☒ None Found
Problems Noted: ☒ None ☐ Saturation Starts at _____ % up Embankment
☐ Presence of Sediment in Flow ☐ Cattails at Toe of Dam ☐ Surface Water at Toe of Dam
☐ Seepage Associated with Sloughing ☐ Continuous Flow ☐ Sporadic Flow
Comments: None

Downstream Hazard Conditions ☐ Narrow Canyon ☐ Wide Canyon ☒ Lightly Sloping Prairie
☐ Pastureland ☐ Large Trees and Forest ☐ Brushy and Scrubby Forest ☐ No Homes
☐ Lightly Populated ☐ Moderately Populated ☒ Densely Populated ☐ Industrial ☐ Businesses Estimated

number of homes: Not noted
Comments: None

Spillway Condition: ☐ Good ☐ Fair ☒ Poor Depth: ~2 feet Width: 150 feet
Problems Noted: ☐ None ☐ Blockage ☐ Not Located ☒ Trees ☐ Burrows ☒ Back-Cutting Erosion
☐ Inaccessible ☐ Livestock Damage ☐ Concrete Cracking ☐ Concrete Spalling
☐ Reinforcement ☐ Corrosion ☐ Damaged Water-stops ☐ Open Joints ☐ Sinkholes
☐ Holes in Spillway Chute ☐ Seepage ☐ Misalignment of Walls/Slabs ☐ Damaged Gates
☐ Nonfunctional Gates ☐ Lubrication of Gates ☐ Testing of Gates
Comments: Failure of TRM erosion protection.

Other Items ☐ Major road along crest of dam ☐ Private road or driveway along crest of dam
☐ Vehicle bridge along crest of dam ☐ Culverts built into crest of dam
☐ Pipeline immediately downstream from dam - Type of pipeline: _____
☐ Water supply line in crest of dam ☐ Other: _____
Comments: None

Repair Items Ranked by Priority

Item 1: TRM failure
Item 2: Lack of adequate grass cover
Item 3: _____
Item 4: _____

Security Issues ☐ Vehicle Accessible ☐ Vehicle Gates ☐ Vehicle Fences and Railing
☒ Pedestrian Accessible ☐ Pedestrian Gates and Fences ☐ Obscured from Surveillance ☐ Locks
☐ Breaches in Fence ☐ Evidence of Parties ☐ Graffiti ☐ Security System
Comments: Public park

Operational Procedures ☐ SOP Available Location Kept: _____
☐ Logbook Location of Logbook: _____
☐ Major Events Noted ☐ Staff Training
Topics of Training: N/A
☐ Manual Gate Operations ☐ Powered Gate Operations ☐ Automated Gate Operations
Comments: None

Communications ☐ Directory Available ☐ 24-Hour Coverage ☐ Telephone Available at Dam
☒ Cell Phone Coverage—Provider: Cell phone service available.
Comments: None

Emergency Action Plan ☐ Available ☐ Filed with TCEQ ☐ Change in Downstream Hazard
Frequency of Update: N/A Date of Last Revision: N/A

Date of Last Exercise: _____

Comments: EAP is required by TCEQ

Instrumentation ☐ Present ☐ Adequately Maintained ☐ Inadequately Maintained ☐ Operational

☐ Data Collected ☐ Data Analyzed ☐ Adequately Protected

Comments: None.

Early Warning System ☐ Present ☐ Adequately Maintained ☐ Inadequately Maintained ☐ Operational

Frequency of Maintenance: _____

Date of Last Exercise: _____

Comments: None.

Reservoir Drawdown Capability Method of Drawdown: N/A

Maximum Drawdown: N/A c.f.s. Frequency of Testing: N/A

Comments: None

Backup Power ☐ Present ☐ Adequately Maintained ☐ Inadequately Maintained ☐ Operational

Frequency of Maintenance: _____

Date of Last Exercise: _____

Comments: N/A
