MANUAL FOR OPERATIONS AND MAINTENANCE OF DAMS

LOWER BRUSHY CREEK
WATER CONTROL AND IMPROVEMENT DISTRICT

CREATED
JUNE 2024

Version Information

This document is intended to be updated periodically as the data and procedures revisions are being made to the operation and maintenance of the Dams. The table below provides the published version dates for the Lower Brushy Creek Manual for Operations and Maintenance of Dams.

June 2024	K·FRIESE + ASSOCIATES A LOCHNER COMPANY	Initial Manual for Operations and Maintenance of Dams in collaboration with Lower Brushy Creek Staff. Effort led by Carolina Lara, P.E. with K Friese + Associates.
Jan 2025	K·FRIESE + ASSOCIATES A LOCHNER COMPANY	Added new Appendix A to include Guidelines for Access to District's Easements. Revised Appendices order. Effort led by Carolina Lara, P.E. with K Friese + Associates.

Approval and Implementation

The Manual for the Operations and Maintenance of Lower Brushy Creek Dams is hereby approved.

This plan is effective immediately and supersedes al previous editions.

Additionally, information contained in the various Appendices are subject to federal and state confidentiality laws and are not to be made available.

Edmond S. Komandosky — 1/27/25

Edmond S. Komandosky – LBC Board of Directors - President — Date

Monica P Masters — 1/27/25

Monica P. Masters – LBC Board of Directors - Secretary/Treasurer — Date

1/27/25

Mark J Schroeder – LBC Board of Directors - Board Attorney — Date

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Appendix A Dam Access Summary and USGS Contact Information (confidential)

Appendix B Access Routes (confidential)

Appendix C Site inventory and Shredding Boundaries (confidential)

Appendix D Dam Inspections Calendar

Appendix E Guidelines for Access to District's Easements

Section 1: Introduction

The purpose of this Manual is to list and describe the operations and maintenance needs and processes for management of the dams within the Lower Brushy Creek Water Control and Improvement District (the District) with assistance from K Friese + Associates (District's Consultant). There are twenty-three dams in total located within the District, which lies within Williamson and Milam Counties. **Figure 1** below shows the District boundary and the dam locations. This manual will cover the subjects of vegetation management, dam inspections, intake structures inspections, and USGS inspections of the District dams.

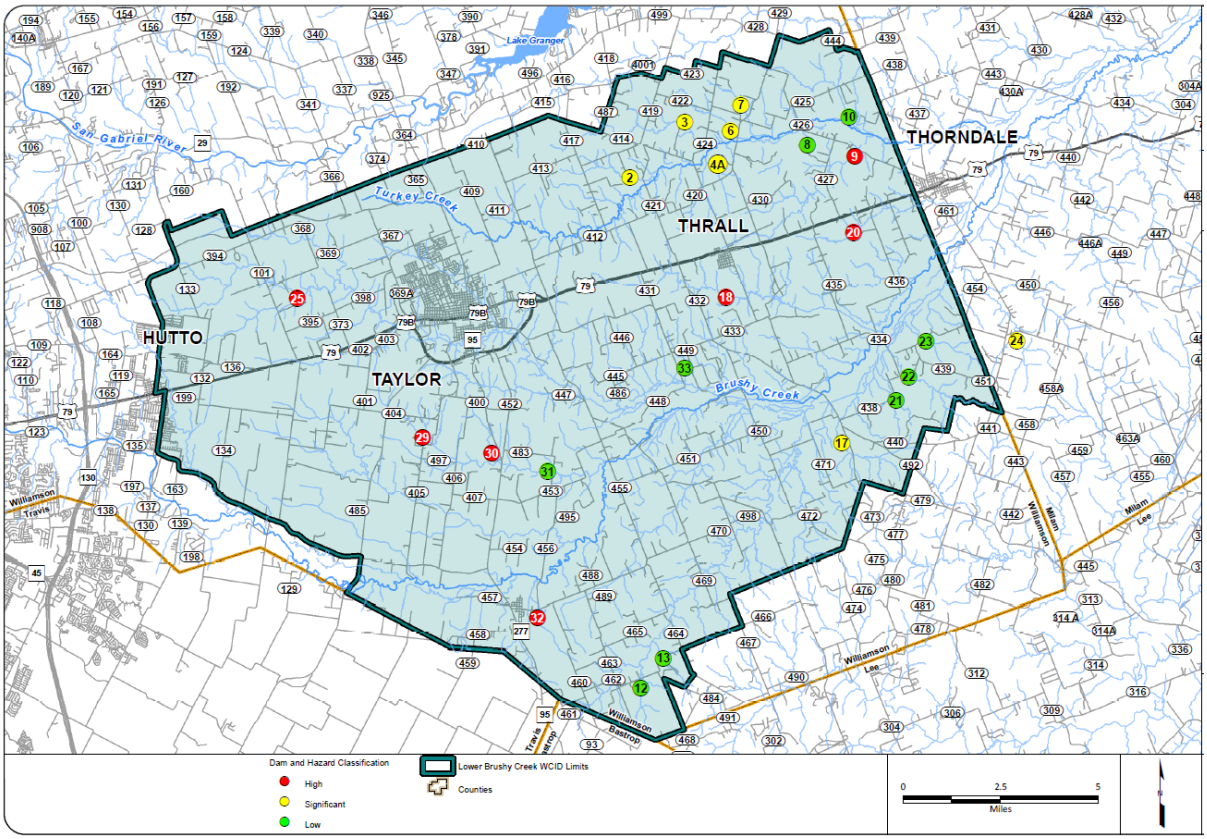

Figure 1: LBCWCID Boundary

Section 2: Overall Maintenance

Regular ongoing maintenance will be performed by the District's maintenance contractor(s) and include the following:

- Shredding grass embankments and primary structure easement area.
- Brush and tree removal from embankments, auxiliary spillway, and principal spillway inlet and outlet works.
- Vegetation removal from crest access roads.

Other maintenance items will be performed on an as-needed basis (based on maintenance contractor input, informal observations, maintenance inspections, and technical dam inspections):

- Maintaining adequate grass cover.
- Fence, gate and lock repairs and replacements.
- Eliminating animal burrows.

Recurring items:

- The dam trash racks and valves will be inspected and valves exercised annually.
- USGS operations, including inspections and maintenance of USGS owned equipment.

Please note:

1. Confirmation with the District is required before carrying out any maintenance activities to ensure that there are no conflicts with any Repair, Rehabilitation and Development Projects.
2. Entry to District easements on some dams require advance property owner notifications. Contact information for dams with property owners requiring notifications for access can be found in **Appendix A**. Guidelines for Access to District's Easements can be found in **Appendix E.** These guidelines apply to both District's Consultants and Contractors.
3. Access routes for each dam site are provided in **Appendix B** and upon request in KMZ format.
4. Although the Dam Access Summary is provided in **Appendix A**, the District must be notified of the advance notice and the intent for any access other than routine vegetation maintenance and USGS inspections. The District (or District's Consultant) will coordinate the access request with the property owners.

Section 3: Vegetation Management

Shredding

Beginning in October each year, shredding is done along the earthen dam embankments, auxiliary spillways, and additional open areas within the structure easement areas of the dams. There are typically two shredding cycles a year per dam. The shredding boundary for each dam is depicted by the green boundaries included in **Appendix C**.

For shredding, the grass should not be cut to a height of less than 6". Weeds are removed through shredding and herbicide programs that take place each spring.

To combat future vegetation growth, broadcast applications of fertilizers and herbicides are used in the areas as depicted by the green shredding boundaries shown in **Appendix C** and, where necessary, spot spray applications are used for any resilient brush or weeds. along riprap areas shown as the red boundaries in **Appendix C**. After shredding at each dam is complete, it is required for the entity hired to send pictures for confirmation. When applying herbicides, extreme caution should be taken to not impact adjacent crops due to wind or overspray.

Some District dams have rip rap on the dam embankments including dam sites 4A, 9, 12, 20, 22, 31, and 32. Spot spray applications are used for any resilient brushes or weeds.

There are locations where there is minimal grass growth due to the cattle on the property which may not require shredding twice a year. Some locations don't require shredding or other maintenance on the embankments and auxiliary spillway since they are maintained by the property owners.

Table 1 lists shredding anticipated for the District dams.

Brush and Tree Removal

In addition to vegetation maintenance, it is important to prevent the growth of brush and trees on the dam embankment and auxiliary spillway. Existing tree and brush growth may be removed mechanically or by hand as appropriate. Trees growing in open areas and along fence lines should be cut off as close to the ground level as possible and the stump chemically treated. Trees and brush on or near the embankments should be cut off and chemically treated. It is not recommended to remove the stump as it can damage the embankments.

When chemically treating trees and brush near houses in urban settings, extreme caution should be taken to not accidentally treat anything that has roots extending within dam easement boundaries. Similar caution should be taken to accidently treat surrounding fields and/or crops.

Table 1: Shredding for District Dams
(*Updated as of May 2024*)

Dam No.	Upstream Dam Embankment (SHRED)	Downstream Dam Embankment (SHRED)	Auxiliary Spillway (SHRED)	Notes
2	Yes	Yes	Yes	Check with property owner before shredding.
3	Yes	Yes	NO	Do not use herbicide or spot spray in auxiliary spillway in spring.
4A	Yes	Yes	NO	Check with property owner before shredding.
6	Yes	Yes	Yes	
7	Yes	Yes	Yes	
8	Yes	Yes	Yes	
9	Yes	Yes	Yes	
10	Yes	Yes	Yes	
12	Yes	Yes	Yes	
13	Yes	Yes	Yes	
17	Yes	Yes	Yes	
18	Yes	Yes	NO	
20	Yes	Yes	NO	
21	Yes	Yes	Yes	
22	Yes	Yes	Yes	
23	NO	NO	NO	Owner maintains site.
24	Yes	Yes	NO	Call before entering the Smith property.
25	Yes	Yes	Yes	
29	Yes	Yes	Yes	
30	Yes	Yes	NO	Shred only berms of auxiliary spillway. Property owner maintains flat areas.
31	Yes	Yes	NO	Shred only berms of auxiliary spillway. Property owner maintains flat areas.
32	Yes	Yes	Yes	Call before entering the Schmidt property.
33	Yes	Yes	Yes	

Section 4: Dam Inspections

Inspection Program

(1) Periodic Maintenance Inspections (Every 2 years)

The District will typically all dams every other year. See **Appendix D** for the Dam Inspection Calendar.

Maintenance inspections will consist of:

- Visual inspection of the dam embankment, inlet, and outlet structures.
- Report any abnormal conditions and problematic vegetation.
- Document any observations with photographs and recommendations.

(2) Periodic Technical Inspections (5-year rotation):

Per the Texas Administrative Code, *Technical Inspections* of dams are required every 5 years. The United States Department of Agriculture (USDA), The District (or District's consultant) will typically inspect five to six dams per year resulting in each dam being inspected on average every 5 years. See **Appendix D** for the Dam Inspection Calendar.

Technical Inspections will consist of:

- Detailed visual inspection of the dam
- Report documenting observations in TCEQ format, including photo documentation and recommendations of corrective actions and maintenance/monitoring actions
- Signed and sealed by Texas Registered Professional Engineer

(3) Periodic Post Storm Event Inspections

Post Storm Event Inspections will be performed after major floods and/or the spillways engage. For additional information, the Emergency Action Plan can be provided upon request.

(4) Informal Observations

This will be a continuing effort performed by the District (or District's consultant or contractors) when they visit the dam sites, and by the landowners. The purpose of regular observation is to identify and report abnormal conditions.

(5) Principal Spillway Conduits

Principal spillway conduits inspections will be performed on an as needed basis.

Triggers for Extra Activity

For more information regarding the events that would cause follow-up inspections and investigation outside of the regular schedule, see the Lower Brushy Creek Emergency Action Plan, which can be provided upon request.

Section 5: Intake Structures

The dam valves will be inspected annually, and the inspections typically take place during late summer months (August-September), since a lower lake level is ideal to accurately inspect the intake structure. To ensure that the valves are properly working, they are operated during the inspection.

The following should be checked (and if possible, immediately resolved) during valve inspections:

- Debris blocking the port entrances or covering the trash racks.
- Signs of restricted flow
- Gathering of silt in and around the riser
- Structural damage
- Securing the intake structure and manhole covers with locks if lock is present.

If deficiencies are found that cannot be immediately remedied, the District shall be notified to determine a plan and timeline to resolve the issue. **Table 2** is included to indicate which of the District dams have valves, the wheel sizes, locks on the riser structure, and low ports. This table will be updated to include more information as it is gathered (for any blank cells).

Table 2: Presence of Valves for District Dams
(*Updated as of May 2024)*

DAM NO.	LOCK PRESENT	VALVE PRESENT	WHEEL SIZE	LOW PORTS
2	NO	YES		
3	NO	YES		
4A	NO	YES*		
6	NO	YES		
7	NO	YES		
8	NO	YES		
9	NO	YES		
10	NO	YES		
12	NO	YES*		
13	NO	YES		
17	NO	YES		
18	Y - 0245	YES*		
20	NO	YES*		
21	NO	YES		
22	NO	YES*		
23	NO	YES		
24	NO	YES		
25	NO	YES		
29	NO	YES		
30	NO	YES		
31	NO	YES		
32	NO	YES*		
33	NO	YES		
*	These valves are inspected and operated annually. The rest are the original construction valves, and these are not inspected or operated. These will be added to the maintenance list once repair projects are performed at each site.			

Section 6: USGS Operations Activities

Types of Activities:

USGS is contracted by the District and performs the following activities:

- Daily visual inspection of gage hydrographs and automated reports
- Short notice checks if a stage gage is determined to be offline
- Frequent rain gage inspections
- Operations and maintenance inspection every 8 weeks:
    - Download data
    - Instrumentation verification
    - General upkeep of site
    - Discharge measurements at discharge sites
- On an as needed basis:
    - Discharge measurements to ensure stage-discharge rating curve is accurate
    - Rain-gage visits prior to forecasted large precipitation to ensure operability during storm events
    - Post rainfall checks are done to gather additional data
- 1- , 3-, and 5-yr Intervals:
    - Differential levels to reference marks and reference gage to ensure stability. The time interval is dictated by historic stability of the site.

There is USGS equipment on sites 18, 20, 25, 29, and 32.

The contact information for the USGS Personnel is provided in **Appendix A**.

Section 7: Instrumentation and Monitoring

At this time, there are no active piezometers at any District dam. If in the future, piezometers are installed, they are not regularly monitored as part of the inspection programs. If an issue is noted on a dam, the existing piezometers may be utilized as needed. If lids are ever observed to be missing due to a site visit, the District must be notified immediately so that temporary cover or crest road closure can be implemented.

Section 8: References

TCEQ *Guidelines for Operation and Maintenance of Dams in Texas*, GI-357, November 2006.

UBCWCID *Manual for Operations and Maintenance of Dams,* November 2022.

Appendix D

Dam Inspection Calendar

Dam No.	Hazard Classification	Last Inspection (USDA records)	Inspection Date	Inspection Date	Inspection Date	Inspection Date	Inspection Date	Inspection Date	Inspection Date
			2024	2025	2026	2027	2028	2029	2030
2	Significant	Jan 2021	M	M	X	M		M	
3	Significant	Jan 2022		M		X, M		M	
4A	Significant	Jan 2022		M		X, M		M	
6	Significant	Jan 2021	M	M	X	M		M	
7	Significant	Jan 2021	M	M	X	M		M	
8	Low	-		X, M		M		M	X
9	High	Jan 2021	M	M	X	M		M	
10	Low	Mar 2022	M	M		X, M		M	
12	Low	-	4/15/2024	M		M		X, M	
13	Low	-	4/15/2024	M		M		X, M	
17	Significant	Jan 2021	M	M	X	M		M	
18	High	Nov 2018*	X, M	M		M		X, M	
20	High	Mar 2020		X, M		M		M	X
21	Low	-	4/16/2024	M		M		X, M	
22	Low	-	4/16/2024	M		M		X, M	
23	Low	Mar 2022		M		X, M		M	
24	Significant	Mar 2022		M		X, M		M	
25	High	Jan 2022		M		X, M		M	
29	High	Jan 2021		M	X	M		M	
30	High	Jan 2022		M		X, M		M	
31	Low	-		X, M		M		M	X
32	High	Jan 2021		M	X	M		M	
33	Low	-		X, M		M		M	X
# of technical dam inspections per year			6	4	7	7	0	5	4

X = Planned technical Inspection (every 5 years), M = Planned maintenance inspection (every other year).

* Inspection by TCEQ

Appendix E

Guidelines for Access to District's Easements

GUIDELINES FOR ACCESS TO DISTRICT'S EASEMENTS

Background

1. Previously, the Brushy Creek Water Control and Improvement District No. 1 of Williamson and Milam Counties (the "Original District") entered into a series of Easements for the design, installation, operation, maintenance, and inspection, repair, and rehabilitation of series of Floodwater Retarding Structures in the Brushy Creek watershed. These Easements were subsequently filed with the Williamson and Milam County Clerks and are available in the Official Public Records of the county.

2. The Easements included property for (1) a Floodwater Retarding Structure including the dam, the emergency spillway and a plunge pool and for (2) the temporary storage of floodwaters upstream of the dam.

3. The Easements also included the right of ingress and egress at any time over and upon Property owned by the original grantor of the Easement.

4. The Lower Brushy Creek Water Control and Improvement District (the "District") is the successor to the original District and holds the Easements.

Guidelines for Access to District's Easements

1. The District shall make all reasonable efforts to give current Landowner of the Easement at least 48-hour notice before any District employee, contractor, subcontractor, or representatives shall have the right to enter onto the Property of the Landowner. In the event of an emergency as determined by the District or a force majeure event, the District, its employees, contractors, subcontractors, or representatives shall have the right to enter onto the Easement without prior notice.

2. The District shall access the Easement through reasonable ingress and egress points designated by Landowner, but the Easement allows the District to have the right to use Landowner's adjacent and adjoining land If the designated ingress or egress points are impassable. The District shall be responsible for incurring the cost and installation of any new gates at the access points designated by the Landowner.

3. All gates along the Easement boundary shall be closed immediately upon entering and exiting the Property. Interior gates shall be closed immediately upon entering and exiting if such gates were closed when crossing. Interior gates which are open when crossing shall remain open.

4. The District shall not remove or alter existing fences along the boundary of the Property.

5. In the event an employee, representative, contractor, or subcontractor of District causes any damage or loss to the Property, District shall, as soon as reasonably practicable, restore any affected areas on the Easement to their prior conditions or otherwise pay any actual and proven damages caused by District in the exercise of its easements rights under the original Easement or any amendment thereto, including but not limited to, actual and proven damage to roads, fences, ditches, culverts, terraces, growing crops, livestock, buildings and other structural improvements. The District shall notify Landowner, as soon as reasonably practical of any damages to the Property, including damages affecting livestock.

6. In the event of an emergency involving the Property, the District shall notify Landowner as soon as reasonably practical, Emergency situations shall include but are not limited to, fire, personal injury, death, flooding and any situation requiring the presence of law enforcement any governmental agency, emergency medical personnel and/or rescue.

7. These Guidelines shall not pertain or apply to those areas that are outside of the Property.