



LAND-TECH CONSULTANTS, INC.

ENVIRONMENTAL SCIENTISTS AND ENGINEERS

July 11, 2002

Mr. Gary Struve
Truesdale Lake Association
15 Gilbert Street
South Salem, New York 10590

Re: Truesdale Lake Dam Safety

Dear Mr. Struve:

At your request, Land-Tech Consultants, Inc. has completed a preliminary evaluation of the safety of the dam forming the Truesdale Lake impoundment, hereinafter "the Dam."

The Dam is a 300-foot-long earth embankment with a maximum height of 15 feet that was reportedly constructed in the 1920s. The Dam impounds an 83-acre lake that receives runoff from approximately 2,380 acres. The dam is reportedly owned by the Truesdale Lake Association, and the Town has possibly been granted a right of way for the road over the dam. The Dam is registered, # 231-5160, with New York Department of Environmental Conservation (NYDEC). Figure 1 shows the lake and its watershed.

The remainder of this letter present the results of this evaluation, which included a visual inspection of the dam and downstream area performed on April 20, 2002, and a preliminary hydrologic analysis to compare the spillway capacity to the 100-year flood.

CREST:

A 16-foot-wide, bituminous-surfaced, town road traverses the crest of the dam. At approximately 115 feet from the right (eastern) abutment there is a 19.75-foot-wide concrete spillway whose abutments support a timber bridge. Concrete blocks cast into the spillway to allow for insertion of weir boards have reduced the effective spillway width to 17.75 feet. The left (western) two-thirds of the dam is a vertical sag curve that appears to act as the emergency spillway. The lowest point of the sag is approximately 3.5 feet below the top of the bridge deck. The horizontal alignment of the dam appears to be acceptable with no noticeable misalignment.

A downstream portion of the emergency spillway was reportedly washed out and repaired within the last three to four years (photo 12). Based on a depressed pavement area and longitudinal cracks (photos 7 & 13), the repaired area appears to be experiencing ongoing settlement of the fill material.

UPSTREAM SLOPE:

The upstream area of the dam has an average slope of 2.5H:1V above the water line. The slope is covered by sparse riprap that has been displaced by wave action and pedestrian traffic. At several locations there is a six to twelve-inch nearly vertical drop at normal lake level, due to wave action. No animal borrows were observed. At several locations

concentrated road runoff has created minor erosion channels. The remains of several tree stumps were observed (photo 14). At approximately 210 feet from the right abutment, a four-foot-long by one-foot-thick concrete wall was observed.

DOWNSTREAM SLOPE:

The downstream slope of the Dam varies considerably. In the vicinity of the washout area, there is a three-to-four-foot-high, almost vertical, masonry face (photo 12). In the areas adjacent to the spillway, the slope is about 2H:1V. At approximately 215 feet from the right abutment, there is a three-foot by three-foot concrete box. Immediately adjacent to the box, there is a two-to-three-foot-deep erosion gully. At both abutment contact areas, there are erosion paths caused by discharge from storm (road) drainage pipes.

PRIMARY SPILLWAY:

The primary spillway is a 19.75-foot wide concrete chute with concrete blocks cast into the spillway to allow for insertion of weir boards to control the upper 1.5 feet of the lake level. The concrete blocks reduce the spillway width to 17.75. At the time of inspection (April 20, 2002) one six-inch weir board was in place.

A laminated timber bridge set on top of the spillway walls carries the road over the chute. There appears to have been some minor displacement between the walls and floor of the spillway in the past. Attempts have been made to parge or seal the crack, but loss of mortar has allowed vegetation to begin growing in a few locations.

The downstream face of the spillway chute is unmortared masonry with voids that are up to three feet deep (photo 5). Immediately downstream of the spillway chute is an unlined plunge pool.

Preliminary hydrologic analysis shows that the spillway is not capable of passing the discharge from a 100-year storm. A 100-year storm is a very heavy rainfall (more than seven inches of rain falling within a 24-hour period) expected to occur an average of once per one hundred years over the long run. In other words, there is a one-percent chance of such a rainfall occurring in any 12-month period.

When the spillway capacity is exceeded, the lake can be expected to overflow at the low point in the road, which acts as an emergency spillway. The capacity of the spillway is about 250 cubic feet per second (cfs) before the flood overtops the road. The preliminary hydrologic analysis showed that the 100-year peak discharge is about 980 cfs. During a 100-year storm, the water passing over the road was determined to be on the order of 15 inches deep.

EMERGENCY SPILLWAY:

The existing emergency spillway is not considered acceptable by NYDEC. Auxiliary/emergency spillways should not be located in a filled area. Given the development in the vicinity of the dam it may be very hard to find a suitable location. It might be possible to get NYDEC to approve continued use of the emergency spillway if a suitably designed and constructed armoring system is installed.

OUTLET WORKS:

No apparent outlet appurtenances were observed. The three-foot by three-foot concrete box on the downstream slope and the corresponding concrete wall on the upstream slope may be parts of an outlet works. A 1993 inspection report by NYDEC indicated that a low level outlet had not been operated for at least eight years. At the time of the inspection (April 20, 2002) a metal plate on top of the concrete box was locked and the area lakeside of the wall was filled with debris and silt.

HAZARD CLASSIFICATION:

NYDEC has classified the Dam as a Class "A," indicating a low downstream hazard. This hazard rating relates to the amount of damage to be expected in the event that the Dam were to fail. The hazard rating is not an indication of the likelihood of a dam failure.

Failure of the Dam would wash out the road along the crest of the Dam and cause damage to Main Street, quite probably removing the bridge. Some stillwater flooding around the house immediately downstream of the dam would occur. Most of the flood flow resulting from a dam failure would be attenuated in the wetland areas below the dam prior to reaching an area where extensive damage would occur.

CONCLUSION AND RECOMMENDATIONS:

The Dam is in fair to poor condition, and an active maintenance and repair program should be undertaken. The following items should be addressed at a minimum:

1. Protect the road from erosion so that it can continue to be used as the emergency spillway. This will involve armoring the slopes, especially the downstream slope.
2. Cut trees and brush off the downstream slope to a distance of 10 feet beyond toe.
3. Flatten the downstream slope to a 3H:1V slope and replant with grass to allow for future maintenance and inspection. A good vegetated cover also reduces the possibility of erosion.
4. During work on the downstream slope, excavate and recompact the fill material in the vicinity of the previously repaired washout.
5. Remove stumps and any roots over one inch in diameter from the upstream slope of the dam. The resulting void should be backfilled with a well-compacted silty gravel, and the area should be planted with grass.
6. Smooth and regrade the upstream slope, and then replace riprap on the reconstructed slope of the dam. The riprap should extend a minimum of two feet below the normal lake level.
7. Line the existing plunge pool at the primary spillway outlet with "standard" size riprap (typically 18-24 inch stone). This will serve to buttress the existing dry

- masonry wall and reduce the probability of undermining when large discharges occur. It will also protect the erodible banks of the existing pool
8. Investigate the three-foot by three-foot concrete box on the downstream side of the road. If it is a gate it should either be repaired or grouted shut. It is not advisable to have a gate located downstream of the centerline of a dam, because such a condition allows a pressurized pipe to extend through the dam. Leakage from deterioration or a break in the pipe would cause failure of the dam.
 9. Develop and put into practice a routine operation and maintenance plan including an annual visual inspection.

Some of the above maintenance items can be addressed by the Lake Association, however prior to undertaking major repairs to the dam, NYDEC will require a review of proposed plans. Regrading of the upstream and downstream faces of the dam will require preparation of a detailed topographic map and delineation of existing wetlands. Placement of fill and armoring material on the downstream face may require obtaining permits from the Town, the State of New York and the Army Corps of Engineers.

If you have any questions concerning the observations or recommendations presented, please contact us to discuss them

Sincerely,
LAND-TECH CONSULTANTS, INC.

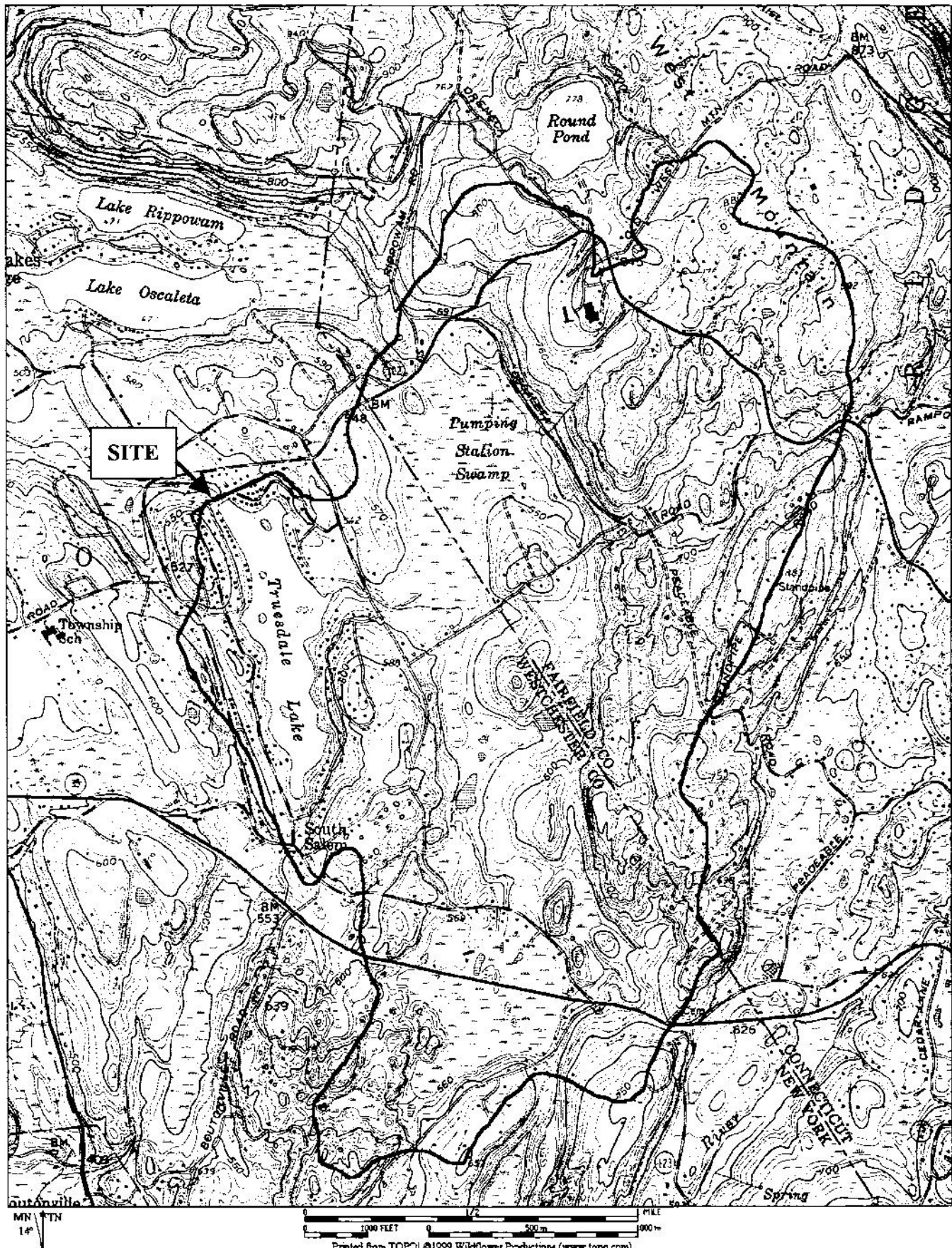
Robert B. Oley, P.E.

APPENDIX A:

REFERENCES

1. *Dam Safety Regulations*, 6 NYCRR 673, State of New York, Department of Environmental Conservation. Statutory authority: Environmental Conservation Law Article 15
2. *An Owners Guidance Manual For the Inspection and Maintenance of Dams in New York State*, New York State/Department of Environmental Conservation, June 1987.
3. *Guidelines For Design of Dams*, New York State/Department of Environmental Conservation, January 1985, Revised January 1988.

APPENDIX B:
FIGURES AND SKETCHES

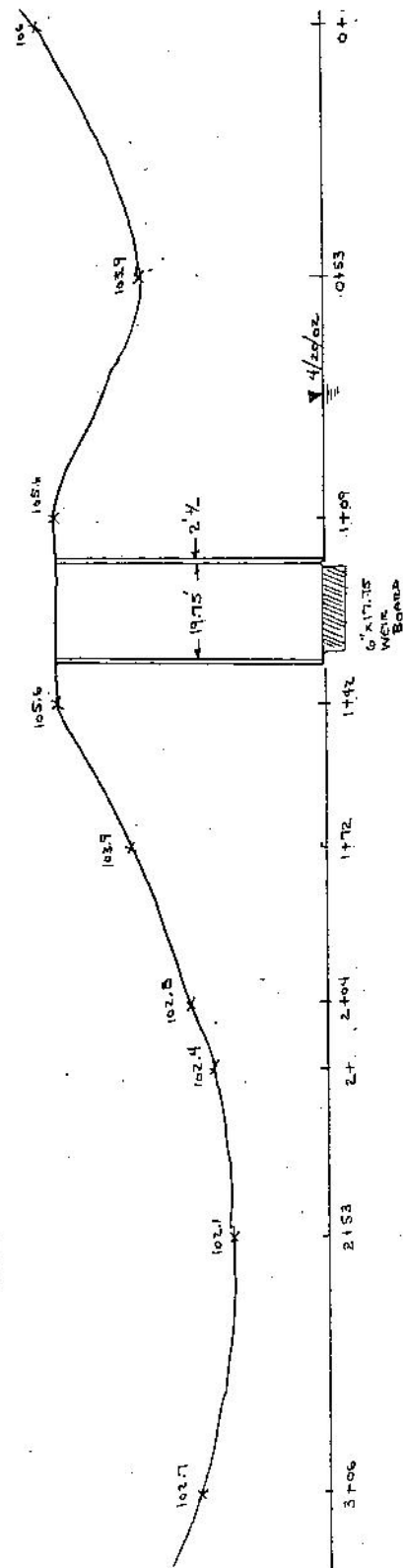


LAND-TECH CONSULTANTS, INC.
205 PLAYHOUSE CORNER
SOUTHBURY, CT 06488

FIGURE 1 SITE LOCATION

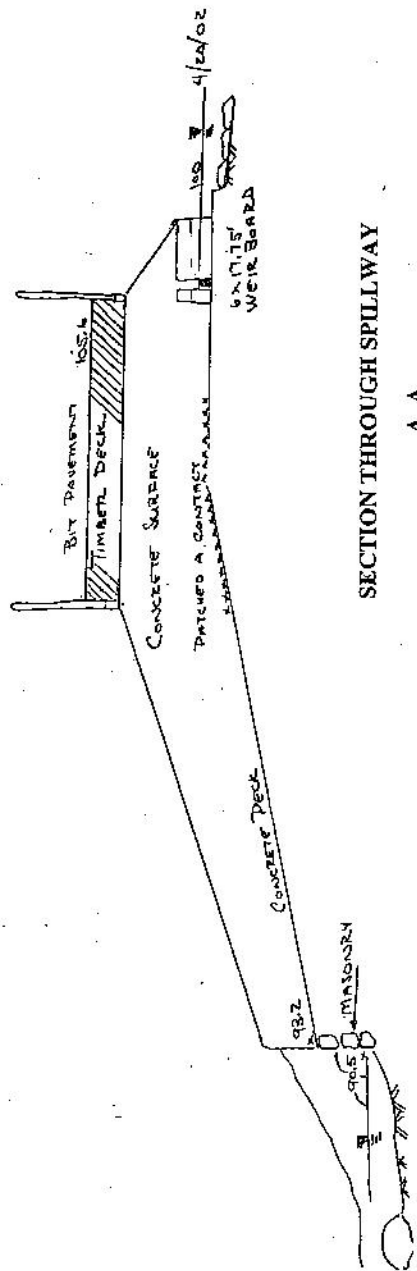
TRUESDALE LAKE
LEWISBORO, NY
MAP SOURCE: USGS PEACH LAKE,
NY QUAD

4



SCALE
 HOR 1" = 20'
 VERT 1" = 2'

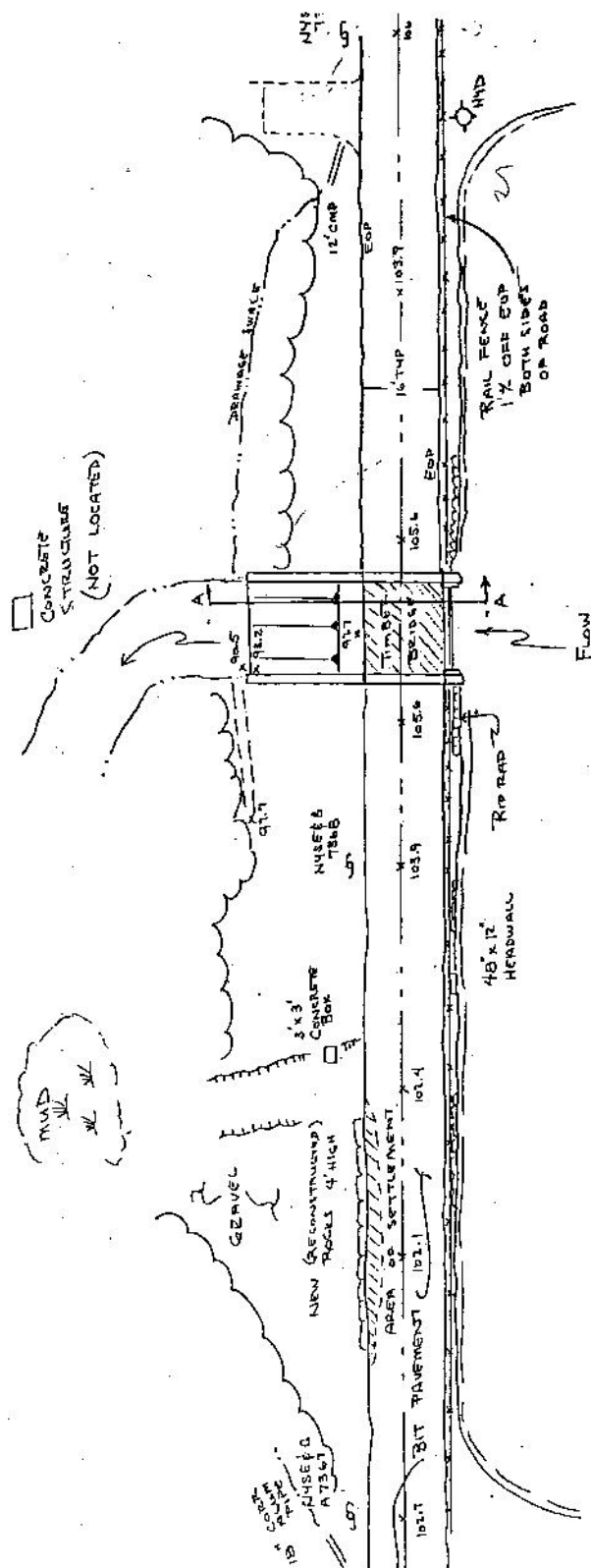
PROFILE TRUESDALE LAKE Lewisboro New York



SECTION THROUGH SPILLWAY

A A

Scale 1" = 5'



APPENDIX C:
PHOTOGRAPHS



Photo 1: Looking West From Right (East) Abutment.



Photo 2: Looking East From Left Abutment.



Photo 3: Spillway & Underside Of Bridge Deck, Looking Downstream.



Photo 4: Spillway & Underside Of Bridge Deck, Looking Upstream (Note- Single Weir Board In Place).



Photo 5: Downstream Face Of Spillway.



Photo 6: Looking South From Bridge.



Photo 7: Looking West To Area Of Washout.



Photo 8: Riprap Along Shore.



Photo 9: Looking East At Upstream Face Of Dam.



Photo 10: Right (East) Abutment (Note- Hydrant).



Photo 11: Concrete Box (Possible Gate Chamber ?).



Photo 12: Downstream Face Of Dam In Area Of Washout.



Photo 13: Road In Vicinity Of Washout.



Photo 14: Tree Stumps On Upstream Face.

APPENDIX D:
INSPECTION FORMS

NAME OF DAM: IRUESDALE LAKE DAM

INSPECTION DATE: 4-2-00

27 DEC # 231-5100

EMBANKMENT

1 of 2

ROGER HUBBUT

CHECK ()
ACTION
NEEDEDAREA
INSPECTED

CREST

UPSTREAM SLOPE

ITEM NO.	CONDITION	OBSERVATIONS	CHECK () ACTION NEEDED		
			MONITOR	INVESTI- GATE	REPAIR
1	SURFACE CRACKING	Some cracking of Bituminous Pavement	X		
2	CAVE IN, ANIMAL BURROW	None Observed			
3	LOW AREA(S)	Western 2/3 of Dam appears to be emergency spillway			
4	HORIZONTAL ALIGNMENT	No problems observed			
5	RUTS AND/OR PUDDLES	Paved Town Road			
6	VEGETATION CONDITION	Paved Paved Town Road			
7					
8					
9	SLIDE, SLOUGH, SCARP	None Observed			
10	SLOPE PROTECTION	spotty - several areas of displaced riprap			X
11	SINKHOLE, ANIMAL BURROW	None Observed			
12	EMB. ABUT. CONTACT	No problems observed			X
13	EROSION	Minor - resulting from head runoff			X
14	VEGETATION CONDITION	Poor - clumps of grasses & weeds some			
15		small woody vegetation remains of tree stumps			
16		Visible			

ADDITIONAL COMMENTS: REFER TO ITEM NO. IF APPLICABLE.

NAME OF DAM: TRUESDALE LAKE DAM

N4 DEC # 231-5160

INSPECTION DATE: 4/20/02

EMBANKMENT

2 of 2

Project: Huribut

AREA INSPECTED	ITEM NO.	CONDITION	OBSERVATION	CHECK () ACTION NEEDED		
				MONITOR	INVESTIGATE	REPAIR
DOWNSTREAM SLOPE	17	WET AREA(S) (NO FLOW)				
	18	SEEPAGE				
	19	SLIDE, SLOUGH, SCARP		X		
	20	EMB. ABUT. CONTACT		X		
	21	CAVE IN, ANIMAL BURROW				
	22	EROSION				
	23	UNUSUAL MOVEMENT				X
	24	VEGETATION CONTROL				
	25					X
	26					
INSTRUMENTATION	27	PIEZOMETERS/OBSERV. WELLS				
	28	STAFF GAUGE AND RECORDER				
	29	WEIRS				
	30	SURVEY MONUMENTS				
	31	DRAINS				
	32	FREQUENCY OF READINGS				
	33	LOCATION OF RECORDS				
	34					
	35					

ADDITIONAL COMMENTS: REFER TO ITEM NO. IF APPLICABLE.

NAME OF DAM: TRUESDALE LAKE DAM

INSPECTION DATE: 4-2-68

NY DEC # 231-5160

Roger Huntbut

SPILLWAYS

1 of 1

AREA INSPECTED	ITEM NO	CONDITION	OBSERVATIONS	CHECK () ACTION NEEDED		
				MONITOR	INVESTIGATE	REPAIR
ERODIBLE CHANNEL	51	SLIDE, SLOUGH, SCARP	None observed			
	52	EROSION				
	53	VEGETATION CONDITION	Overgrown			
	54	DEBRIS	minor brush			
	55					
	56					
NON-ERODIBLE CHANNEL	57	SIDEWALLS	Concrete			
	58	CHANNEL FLOOR	Concrete	X		
	59	UNUSUAL MOVEMENT	minor separation between floor & walls			
	60	APPROACH AREA	Clear & Clean			
	61	WEIR OR CONTROL				
	62	DISCHARGE AREA	Erodible Channel - riprap protection should be installed at end of concrete chute			X
DROP INLET	63					
	64					
	65	INTAKE STRUCTURE				
	66	TRASHRACK	N/A			
	67	STILLING BASIN				
	68					
	69					

ADDITIONAL COMMENTS: REFER TO ITEM NO. IF APPLICABLE.
 walls of spillway appear to be concrete faced masonry - the contact between the walls and the floor has been patched in the past

NAME OF DAM: Truesdale Lake Dam

INSPECTION DATE: 4/20/02

NY DEC # 231-5160

**DOWNSTREAM AREA
AND MISC.**

1 of 1

AREA INSPECTED	ITEM NO.	CONDITION	OBSERVATIONS	CHECK () ACTION NEEDED		
				MONITOR	INVESTI- GATE	REPAIR
DOWNSTREAM AREA	36	ABUTMENT LEAKAGE	None observed			
	37	FOUNDATION SEEPAGE	Have to determine close to proximity of discharge	X		
	38	SLIDE, SLOUGH, SCARP	None observed			
	39	DRAINAGE SYSTEM	Unknown			
	40					
MISCELLANEOUS	41					
	42	DOWNSTREAM HAZARD DESCRIPTION	Low - Class "A" Dam			
	43	DATE OF LAST UPDATE OF EMERGENCY ACTION PLAN	Unknown			
	44	RESERVOIR SLOPES				
	45	ACCESS ROADS				
	46	SECURITY DEVICES	None			
	47					
	48					
	49					
	50					

ADDITIONAL COMMENTS: REFER TO ITEM NO. IF APPLICABLE.