Settlement Canyon Irrigation Company

Tooele, UT

Approved for use by:

_____

President

Settlement Canyon Irrigation Company

_____

Date

Revised Dates:

Settlement Canyon Dam

EMERGENCY ACTION PLAN

This copy includes the following revisions:

Revision No.	Date	Action

CONTENTS

Part IV - Preventative Actions

PART I. INTRODUCTION

EAP SUMMARY SHEET

A. FOREWORD

This Emergency Action Plan defines responsibilities and provides procedures designed to identify unusual and unlikely conditions, which may endanger Settlement Canyon Dam in time to take remedial actions and to notify appropriate public officials of possible, impending, or actual failure of the dam. The plan also provides for notification when flood releases may create major flooding.

The term "dam tender" referenced in this document is the individual having on-site supervisory control of the dam and reservoir. In the absence of the dam tender, the next highest ranking official associated with the entity owning the dam is designated as the dam tender.

The term "engineer" referenced in this document is an individual or corporation, generally having a continuing relationship with the dam owner, who provides technical advice and assistance pertaining to the dam. The engineer may be an employee of the owner, an officer in the organization, or may be a consultant retained to provide advice and support. The engineer should possess qualifications, training, and experience with the specific type of facility involved and be a licensed professional engineer in the state of Utah.

The dam tender and staff must be knowledgeable in recognizing an emergency situation or unusual condition and must act immediately to minimize danger to the structure and to all persons within the immediate area - especially those in the downstream channel.

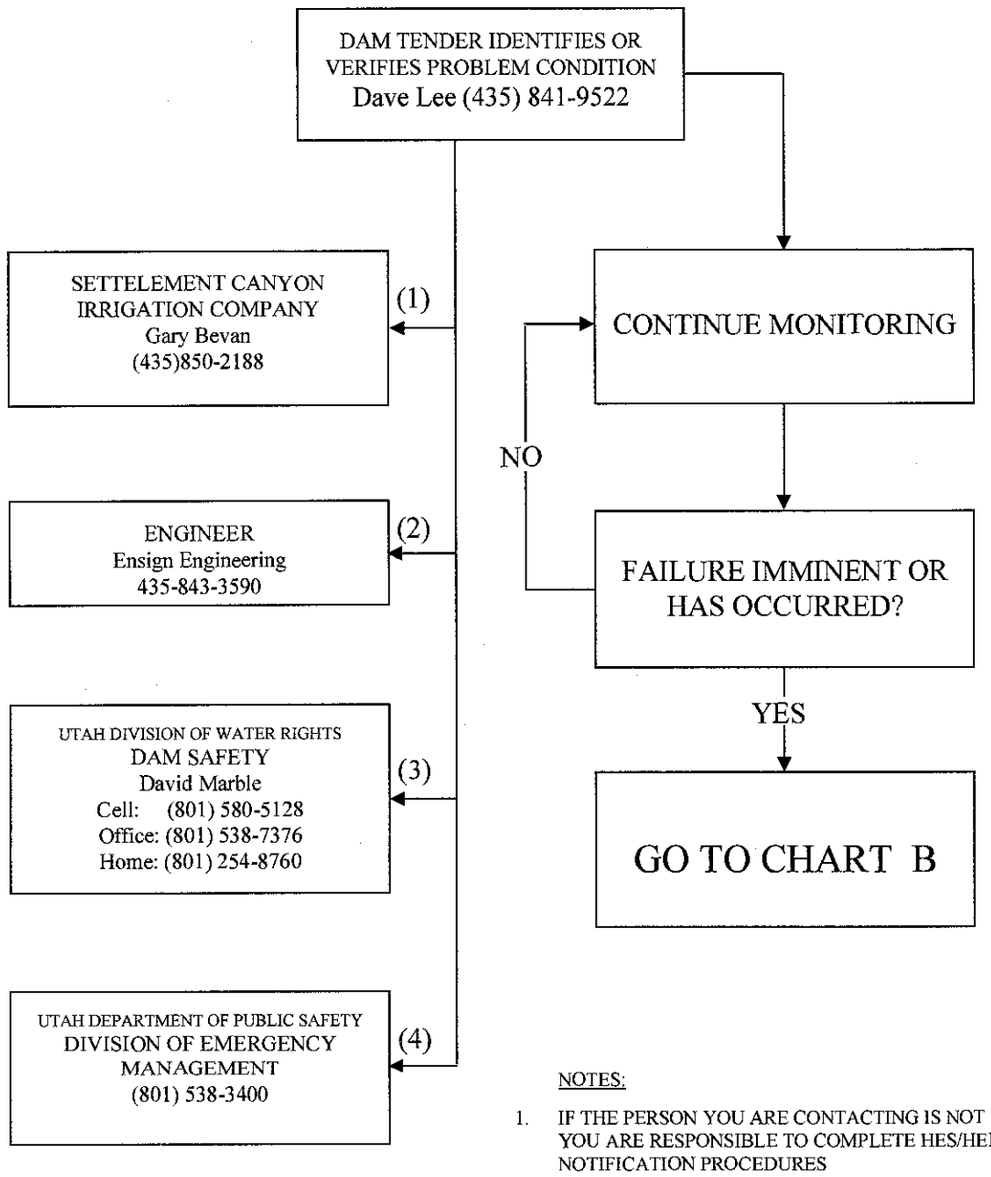
As a minimum procedure the Settlement Canyon Dam dam tender shall immediately:

- Identify the emergency situation
- Contact Tooele County Sheriff
- With assistance from the State Office of Comprehensive Emergency Management, as needed, determine necessary actions
- Carry out the above actions
- Maintain contact with State Office of Comprehensive Emergency Management (if necessary, enlist help to remain at communications source or to relay information)

SETTLEMENT CANYON DAM

NOTIFICATION FLOW CHART A

POTENTIALLY DANGEROUS SITUTATION



NOTES:

1. IF THE PERSON YOU ARE CONTACTING IS NOT AVAILABLE, YOU ARE RESPONSIBLE TO COMPLETE HES/HER NOTIFICATION PROCEDURES
2. SEE DETAILED NOTIFICATION PROCEDURES ON PAGES EAP-7 THROUGH -19 OF THIS EMERGENCY ACTION PLAN

REVISION DATE: 15 JUNE 2013

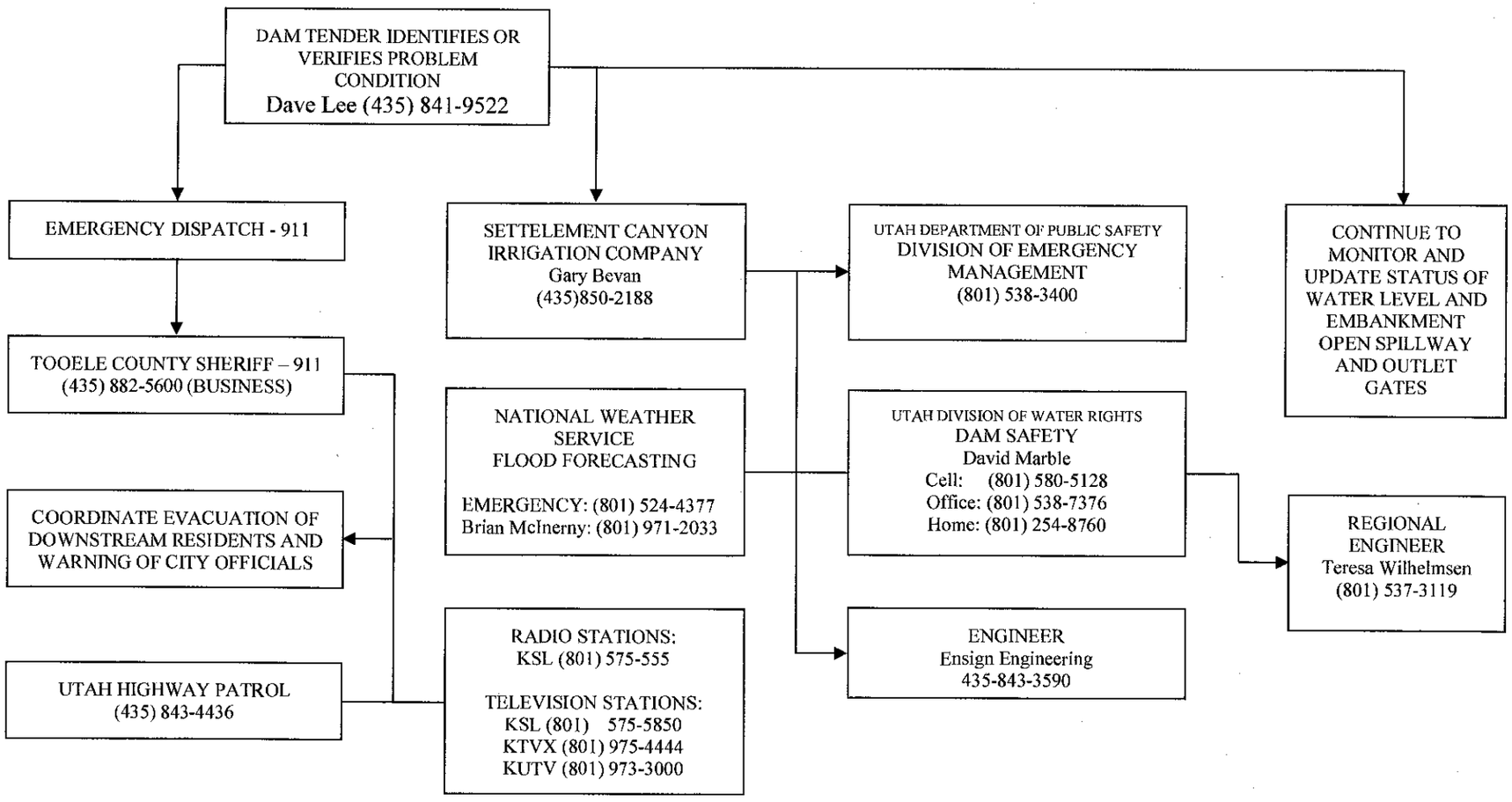
SETTLEMENT CANYON DAM

NOTIFICATION FLOW CHART B

FAILURE IS IMMINENT OR HAS OCCURRED

NOTES:

1. IF THE PERSON YOU ARE CONTACTING IS NOT AVAILABLE, YOU ARE RESPONSIBLE TO COMPLETE HES/HER NOTIFICATION PROCEDURES
2. SEE DETAILED NOTIFICATION PROCEDURES ON PAGES EAP-7 THROUGH -19 OF THIS EMERGENCY ACTION PLAN



REVISION DATE: 15 JUNE 2013

PART II. RESPONSIBILITIES

A. GENERAL RESPONSIBILITIES UNDER THE PLAN

1. Owner Responsibility

Settlement Canyon Dam is owned by Settlement Canyon Irrigation Company. The owner has the responsibility to operate, maintain, and repair Settlement Canyon Dam. The responsible official of Settlement Canyon Irrigation Company is Don Talmadge. Daily operations of the dam are delegated to Dean Maloney, who also serves as the dam tender.

The owner

- insures safe operation of the dam
- maintains and repairs the dam as needed to insure safe operation
- directs the dam tender in operating the dam
- insures the dam complies with applicable local, state and federal law
- secures and appoints a dam tender
- provides or arranges training for the dam tender
- prepares and distributes the Emergency Action Plan and Standard Operating Procedures for Settlement Canyon Dam.
- Communicates with local public safety officials, Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section, and State Division of Comprehensive Emergency Management, as needed

The dam tender

- operates and maintains the dam according to approved Standard Operating Procedures
- Determines and identifies conditions or triggering events that initiate or require emergency actions
- Initiates actions to be taken
- Clearly communicates the emergency situation to those who need to be contacted
- Issues warning messages if dam failure is impending or has occurred
- Maintains records as required by law and by the owner
- Cooperates with local public safety officials in exercising the Emergency Action Plan

2. Sample Warning Messages

DAM HAS FAILED

"This is Dean Maloney, Dam Tender of Settlement Canyon Dam, located two miles upstream from Tooele. Settlement Canyon Dam has failed. Flooding can be expected. The flood plain below must be evacuated immediately."

DAM FAILURE IS POSSIBLE

"This is Dean Maloney, Dam Tender of Settlement Canyon Dam, located two miles upstream from Tooele. Failure of Settlement Canyon Dam is possible. Flooding in the flood plain may be expected at any time. The flood plain below may require evacuation."

A POTENTIAL EMERGENCY SITUATION AT THE DAM HAS DEVELOPED OR IS DEVELOPING

"This is Dean Maloney, Dam Tender of Settlement Canyon Dam, located two miles upstream from Tooele. A potential emergency situation at the dam has developed, which, if it continues may result in failure or uncontrolled releases from Settlement Canyon Dam. Flooding in the flood plain may be expected. Further information will be provided as it develops."

3. Emergency Declaration

Don Talmadge, President, Settlement Canyon Irrigation Company, is responsible for declaring the existence of an emergency at Settlement Canyon Dam.
Don Talmadge, President, Settlement Canyon Irrigation Company, is responsible for declaring the termination of an emergency at Settlement Canyon Dam, after consultation the Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section.

The State Engineer, State Dam Safety Officer, County Sheriff, or other responsible public safety official, may also, upon cause, declare an emergency condition at Settlement Canyon Dam.

Consultation among the parties concerned with the dam should take place prior to declaring an emergency, if time permits.

4. Responsibility For Notification

The President, Settlement Canyon Irrigation Company is responsible to notify local officials. If time allows in an emergency situation, on-site personnel should seek advice and assistance. However, if failure is impending or has occurred, the responsibility and authority for notification is delegated to the dam tender if the owner cannot be quickly contacted.

The President, Settlement Canyon Irrigation Company is responsible to notify the National Weather Service (NWS), which has general responsibility for issuing flood warnings. The National Weather Service must be notified of any impending or actual dam break flooding, so that flood warnings can be issued via the Emergency Broadcast System.

The President, Settlement Canyon Irrigation Company is responsible to notify the Utah State Office of Comprehensive Emergency Management (CEM) (Public Safety) for emergency management assistance. CEM will in turn contact all the appropriate governmental entities such as the Governor's Office, FEMA, the State Geologist, Water Resources, the State Engineer, Area Office, and Dam Safety Section personnel.

5. Responsibility For Evacuation

The Tooele County Sheriff is responsible for warning and evacuation planning. The Settlement Canyon Irrigation Company is responsible for notifying the Tooele County Sheriff when flooding is anticipated or a failure is impending or has occurred.

The Settlement Canyon Irrigation Company cannot assume the responsibility of governmental entities for evacuation of people.

6. EAP Coordinator Responsibility

The President, Settlement Canyon Irrigation Company, is designated as the Emergency Action Plan coordinator. The EAP Coordinator is responsible for EAP-related activities, including (but not limited to) preparing revisions to the EAP, establishing training seminars, coordinating EAP exercises with Tooele County Sheriff and Tooele County Emergency Preparedness Director., etc. Persons having questions or concerns should address their interest to President, Settlement Canyon Irrigation Company.

7. EAP Revisions

This EAP should be reviewed every year for applicability and accuracy. Phone numbers listed in the Communications Directory should be verified annually by the EAP Coordinator and revised communications directory pages should be prepared. The EAP Coordinator should issue revisions to all copy holders. When conditions or personnel change revisions should be made prior to the review cycles listed above.

PART III. EMERGENCY PROCEDURES

A. EMERGENCY SITUATIONS

Whenever possible videos and/or still photos of the problem site should be taken. Such pictures are useful in evaluating and alleviating emergency situations.

1. Failure or Impending Failure of the Dam

DOWNSTREAM HAZARD POTENTIAL: Settlement Canyon Dam could present a high hazard potential to the downstream area as a result of failure or unsound operation. Should it fail, loss of life and potential economic loss may occur.

The dam's location in the watershed above Tooele and recreational use downstream should alert the reader of an urgency in event of a failure.

WARNING MESSAGES: The initial warning message to the 24-hour warning point would be one of three possible emergency conditions.

1. Advise that a **POTENTIAL** emergency situation exists or is developing and expressing concern for the safety of the dam.

2. A **WATCH** of the strong possibility of failure and calling for the evacuation of the flood plain.

3. A **WARNING** of failure and calling for immediate evacuation of the flood plain.

Notification Flow Charts A and B located in the front of this EAP graphically define the notification and warning process.

a. *Failure*

If the dam is failing, the dam tender (or other operating personnel at the dam) must immediately initiate downstream evacuation using the following procedures:

(1) Inform the following by phone, radio, or by driving to the nearest phone (refer to the *Communications Directory* for phone numbers, radio, or backup systems):

Tooele County Sheriff, Tooele, UT

(2) Contact the Public Communication Officer. The Public Communication Officer will contact the Utah Division of Comprehensive Emergency Management; they will inform other appropriate federal, state and county government offices.

(3) Coordinate efforts with Tooele County Sheriff's Office and Tooele County Emergency Preparedness Director in alerting all downstream areas.

(4) The Public Communication Officer will contact downstream dam operators and major water users if possible.

(5) Maintain contact with Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section.

b. *Impending failure*

If the dam tender suspects *impending failure*, the following procedures should begin *immediately*:

(1) Contact the Utah Division of Comprehensive Emergency Management and your engineer:

a) determine if and what downstream entities should be notified

(2) Initiate corrective measures and other actions as recommended by your engineer.

(3) Maintain contact with Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section.

NOTE: Notify the Tooele County Sheriff's Office of *possible flooding* downstream as early as possible; *make certain* all officials understand the situation.

2. Flooding

a. *With normal communications* - If the reservoir water surface is projected to rise above the top of the dam, immediately contact the Utah State Division of Comprehensive Emergency Management. In the event of flooding due to severe weather conditions, contact with the National Weather Service is recommended. Information reported should include:

(1) Current reservoir water surface elevation

(2) Observed water surface rise rate

(3) Weather conditions in the vicinity--past, present, and predicted

(4) The discharge condition of the stream above and below the reservoir

(5) Known conditions at locations upstream or downstream from Settlement Canyon Dam.

b. The Utah Division of Comprehensive Emergency Management will contact the Utah State Department of Natural Resources, State Engineer's Office, Dam Safety Section.

3. Earthquake

LATITUDE: 40° 30' North LONGITUDE: 112° 17' West

ZONE: Settlement Canyon Dam is located in an area subject to earthquakes of major damaging intensity. The dam lies in seismic risk zone 3.

Seismic Evaluation: A seismic evaluation has not been performed.

a. *Normal communications* - If an earthquake is felt or one is reported to have occurred in the area, use the following procedures:

(1) Immediately conduct an overall visual dam inspection.

(2) IF THE DAM IS DAMAGED TO THE EXTENT THERE IS INCREASED FLOW PASSING DOWNSTREAM, IMMEDIATELY IMPLEMENT *FAILURE OR IMPENDING FAILURE* PROCEDURES.

(3) If visible damage occurred but is not serious enough to cause dam failure, immediately:

(a) Observe nature, location, and extent of damage. The description of slides, sloughs, and sudden subsidence should include:

Location
Extent (severity)
Rate of subsidence
Effects on adjoining structures
Springs or seeps
Reservoir and tailwater elevations
Prevailing weather conditions
Other facts believed pertinent

Evaluate *impending failure* hazard.

(b) Report all information to the Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section; if key personnel are unavailable, report directly to the Tooele County Sheriff.

It is *extremely important* that the person receiving your report understands your evaluation and description of the potential hazard at the dam. A decision on further actions required *should be made promptly*.

(c) Reinspect the damage site and maintain communications with key personnel previously receiving the report.

(d) If dam failure is not impending, continue to the following step (4).

(4) Thoroughly inspect for damage

(a) Both dam faces for cracks, settlement, or seepage

(b) Abutments for possible displacement

(c) Drains and seeps

(d) Spillway structure

(e) Outlet works control house, shaft, and gate chamber

(f) Power supply and standby power unit

(g) Visible reservoir and downstream areas for landslides

(h) Other appurtenant structures

(i) Read critical instruments and note any abnormal or changed readings.

(5) Report inspection findings to the Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section during the earthquake incident.

(6) If apparent damage has not occurred to the dam, embankments, or appurtenant structures, a "No Damage" report should be made to the Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section.

(7) Continue to inspect and monitor the facilities for at least 48 hours or as instructed by your engineer and the Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section - in the event unobservable or delayed damage should occur.

(8) Some damage to structures may not be apparent during the inspection immediately following an earthquake. It is

possible that the settlement of structures, the reactivation of old slides, or the development of new slides may not occur with ground shaking and would manifest itself after the initial inspection. A secondary inspection 2 weeks to a month after the initial inspection should be made.

(9) Survey settlement and alignment measurement points if requested by your engineer and the Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section.

b. *Communication outage* - IF ALL COMMUNICATIONS FROM THE DAM ARE LOST and there is potential for *impending failure* of the dam, use the following checklist as a guide during an earthquake event:

(1) Quickly inspect the dam and evaluate potential failure hazard.

(2) Check for sloughs, slides, slumps, and other signs of distress near dam abutments.

(3) If failure is impending, use all measures that can reduce reservoir storage. Warning downstream residents is imperative. If possible, enlist aid of Tooele County Emergency Preparedness Director and the Tooele County Sheriff's Office. Personally warning downstream residents will be performed by the Tooele County Sheriff.

NOTE: Caution should be used when increasing discharge through the outlet works because the conduit may be sheared and increased flow may cause piping in the dam. It may be necessary to shut off the outlet works flow (if possible) to avoid piping.

(4) Continue trying to contact or send word to the Tooele County Sheriff, your engineer, and the Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section.

B. UNUSUAL OCCURRENCES

1. Slumping or Cracking of the Dam or Abutments

a. *Determine* -

(1) Location

(2) Size of affected area(s) in height, width, and depth

(3) Extent (severity)

(4) Estimated discharge (whether clear or cloudy water)

(5) Reservoir and tailwater elevations

b. Contact your engineer and the Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section.

2. Failure of Appurtenances or Operating Equipment

a. *Determine* -

(1) Probable cause of failure, duration, and effects on reservoir operation

(2) Immediate assistance required from your engineer and contact the Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section to remedy the problem, including:

(a) Replacement parts

(b) Type of labor available

(c) Repair equipment

(3) Available temporary replacements or temporary alternatives

(4) Any other facts believed pertinent

b. Contact your engineer and the Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section.

3. New Springs, Seeps, or Boggy Areas

If new springs, seeps, and boggy areas develop, use the following procedures:

a. *Determine* -

(1) Location

(2) Size of affected area(s)

(3) Estimated discharge

(4) Nature of the discharge (whether clear or cloudy water)

(5) Reservoir and tailwater elevation

b. Read data from all pertinent instrumentation

c. *Map data* - If necessary to further analyze conditions, a map should be prepared showing the extent of all seep areas, springs, and any other pertinent data, including the dates of recording reservoir levels.

d. Contact your engineer.

e. Contact the Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section and continue to monitor situation.

f. Initiate corrective measures as directed by your engineer.

4. Rapid Increase or Cloudy Appearance in Seepage

If existing or new springs, seeps, and boggy areas develop rapid increases in cloudy water, use the following procedures:

a. *Determinations* -

(1) Location

(2) Size of affected area(s)

(3) Estimated discharge

(4) Nature of the discharge (whether clear or cloudy water)

(5) Reservoir and tailwater elevation

b. Contact your engineer or the Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section for assistance.

(1) Read and report other instrumentation readings

(2) Monitor continuously until instructed otherwise

c. *Map data* - If necessary to further analyze conditions, a map should be prepared showing the extent of all seep areas, springs, and any other pertinent data, including the dates of recording reservoir levels.

d. *Settlement points* - If surface measurement (reading for settlement points) readings will help clarify abnormal conditions, such observations should be made, reported, and recorded.

5. Abnormal Instrumentation Readings

During instrument recording, the Settlement Canyon Dam Tender will compare the current readings with the previous readings and, if necessary, with readings at the same reservoir elevation. If the readings appear abnormal, the Settlement Canyon Dam Tender shall:

A. Determine –
   (1) Possible reading, computation or instrumentation failure
   (2) Calculate reading from normal
   (3) Reservoir level
   (4) Weather conditions
   (5) Any other facts believed to be pertinent

B. Contact your engineer and the Utah Department of Natural Resources, State Engineers office, Dam Safety Section for assistance

6. Landslide

Any landslide that could move into the spillway area, outlet works, or into the reservoir – rapidly displacing large volumes of water – would be dangerous to the dam. Landslides or potential landslides into the downstream channel which may impound water should be reported.

Any landslide which may affect either abutment should be reported to the Utah Department of Natural Resources, State Engineers office, Dam Safety Section immediately.

All landslides or potential landslides that may affect the dam, abutments, outlet works or reservoir basin should be reported to the Utah Department of Natural Resources, State Engineers office, Dam Safety Section immediately. Indentify landslide areas by name and location.

A. Determine size
B. Possible cause
C. Degree of effect on operation.

(4) Probability of additional movement of disturbed area or of other slide areas

(5) Development of new slides

(6) Any other facts believed pertinent

b. Contact your engineer and the Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section for assistance.

For a landslide that occurs in the downstream channel:

a. *Determine*

(1) Size (including depth and percent across river channel)

(2) Capability of immediately closing outlet works

(3) Other inflows

(4) Location in relation to the toe of the dam and other appurtenant structures

(5) Availability or need for heavy equipment

b. Contact your engineer and the Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section for assistance.

7. Severe Storms

Contact the National Weather Service and the Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section and report local news reports and personal observations of severe storms, including heavy rainstorms, unusual snowfall, high winds, tornadoes, etc. Data should include pertinent information to aid in evaluating the impact of the event upon the Settlement Canyon Dam.

8. Fires

a. For forest or range fires -

(1) Determine

(a) Location and extent

(b) Possibility of fire spreading to or damaging dam facilities

(c) Prevailing weather conditions

(d) Communications outage

(e) Any other facts believed pertinent

(2) Contact the Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section.

b. For fire within or about the structure -

(1) Determine location and severity

(2) Contact Tooele County fire department.

(3) Initiate use of available fire equipment

(4) Contact Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section and report

(a) Extent (severity)

(b) Possibility of additional damage

(c) Damage to operating equipment

(d) Loss of records or communications equipment
(e) Any other pertinent facts

9. Demonstrations, Sabotage, or Nuclear Attack

For a *demonstration* at the dam use this checklist as a minimum procedure:

a. Show restraint.

b. Lock all gates and doors.

c. Notify Tooele County Sheriff's Office.

d. Notify the Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section.

If a *bomb threat* call is received, use the following checklist during and after the incident:

a. Keep the caller on the line as long as possible. Ask the caller to repeat the message. Record every word spoken by the caller.

b. If the caller does not indicate the location of the bomb nor the time of detonation, the person receiving the call should ask the caller to provide this information.

c. It may be advisable to inform the caller that detonation of a bomb would result in death or serious injury to many innocent people.

d. Pay particular attention for any strange or peculiar background noises such as: motors running, background music (type), and any other noises that might give a remote clue as to the caller's location.

e. Listen closely to the voice (male or female), voice quality, accent, or speech impediment.

f. Immediately after the caller hangs up, the person receiving the call should report to -

(1) Tooele County Sheriff's Office

g. Evacuate all unnecessary personnel and visitors from the facility.

h. Immediately suspend **ALL** radio transmissions in the vicinity until directed to resume radio use by the public safety official directing the bomb search. *CAUTION*: The use of radios during a bomb search could be dangerous. The radio transmissions could cause premature detonation of an electric initiator (blasting cap).

i. If a suspicious package or object is found, *DO NOT TOUCH*. It should be left for trained personnel to remove or disarm.

j. The dam tender, after consultation with on-site public safety or fire authorities, shall be responsible for giving the "all clear" for normal duty to be resumed.

In the event of a *nuclear attack* or *an act of war*, and assuming communications are lost, the following procedures will be used as a checklist:

a. Evacuate dam area and downstream vicinity if failure is impending.

b. As soon as possible, check for any damage to the dam.

c. If there are any injuries, assist with first aid treatment.

d. Protect essential records.

e. Maintain a complete blackout.

f. Maintain 24-hour watch over all facilities to prevent sabotage

g. Notify Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section as soon as communications are restored.

If *impending failure* is possible due to an act of sabotage, use the following checklist as a guide:

a. Immediately perform an overall visual dam inspection to determine location and extent of damage.

b. IF THE DAM IS FAILING, use procedures outlined above.

c. If damage to the embankment is substantial, reservoir evacuation should be initiated.

d. Check to see whether the saboteur has left the area.

e. When it is determined that the saboteur has left, check area for further sabotage potential and any evidence that might aid in apprehending the saboteur.

f. As soon as possible, notify the Tooele County Sheriff.

g. Continue trying to contact the Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section.

10. Fish and Wildlife Losses

a. Describe loss, species, numbers, location, possible further losses, probable cause, and other pertinent information.

b. Contact Utah State Division of Wildlife Resources Area Office.

C. ATTENDANCE AND COMMUNICATIONS PROCEDURES

The dam tender may be contacted at his home telephone number listed in the *Communications Directory*. The dam will be monitored by regular visits to the site by the dam tender as necessary for safe operation of the dam.

The dam will be attended continuously when threatened by physical harm such as bomb threat or extreme runoff condition.

Refer to the *Communications Directory* for normal and emergency phone numbers and methods of communications.

PART IV. PREVENTATIVE ACTIONS

A. SURVEILLANCE

Settlement Canyon Dam is not continuously manned and a remote surveillance system has not been installed. Failure would endanger human life or cause significant property damage. It is imperative that procedures be developed to identify conditions requiring emergency actions, and to promptly alert public safety officials responsible for evacuating residents who would be affected in the event of an emergency at the dam. In order to be able to promptly notify responsible officials of emergency conditions, a dam owner or owner's representative must receive a timely warning that an emergency has developed or is developing.

The information received must be clear and concise, so that the responsible officials may react with confidence and activate the EAP, if necessary, without requiring personnel to visit the site to verify conditions.

Reaction time must be minimized due to the fact that inhabited structures are located immediately downstream of the dam. Special procedures will be necessary to notify the occupants. Local public safety officials should be fully involved in the development of these procedures.

Settlement Canyon Dam will be monitored round-the-clock by the dam tender or other qualified person for periods of actual or forecasted high flows. An observer must be at the dam when flood conditions or signs of serious structural distress have been identified.

B. ACCESS TO THE SITE--TRANSPORTATION

Settlement Canyon Dam is located approximately two miles south of Tooele, Utah.

1. <u>From Tooele, Utah</u> - Access to the dam is via a one half-mile paved road which intersects with State Route 36 approximately fifteen miles south of the junction of State Route 36 and Interstate 80. The access road is locally called "Settlement Canyon Road". There is good road access to the dam crest from the left abutment. The dam could be reached cross country on foot or horseback from State Route 36. Vehicle access to the dam crest is good.

State Route 36 and Settlement Canyon Road are paved all-weather roads. They are maintained by State and City crews and are passable at all times.

2. From Salt Lake City, Utah - Follow I-15 south to the Junction of I-15 and I-80, thence west on I-80 for eighteen miles to the junction of I-80 and State Route 36, thence south on State Route 36 for fifteen miles to the junction with "Settlement Canyon Road." Then follow the directions from Tooele, Utah, listed above.

During severe storms four-wheel drive vehicles, snowmobiles, cross-country skis, or snowshoes may be required to travel the route. Operation of the Settlement Canyon Dam spillway will not flood the access road from State Route 36 to the dam.

The nearest airport is the Tooele Municipal Airport located two miles west of Tooele, approximately two and one-half miles northwest of the dam. Small planes may land at Tooele Municipal airport and helicopters may land at Tooele Municipal Airport or on Settlement Canyon Road near the dam.

C. RESPONSE DURING PERIODS OF DARKNESS

Response to potential or actual emergency conditions during periods of darkness is complicated by poor visibility. If 24-hour surveillance is required at the dam, portable light plants, located on the abutments, will be used to illuminate the operating deck, crest, groins and toe.

D. POWER FAILURE

During power failure, releases may be made from the outlet works by hand.

E. RESPONSE TIME

Since Settlement Canyon Dam is located in a semi-remote area, response time to verify an emergency depends in large part on weather conditions. Anticipated response times for various weather scenarios are listed below:

Weather Conditions	Estimated Time to Access Dam from Tooele	Estimated Time to Assess Emergency	Estimated Time to Notify Sheriff
Sunny Day	3 minutes	5 minutes	1 minute
Rainy Day	3 minutes	5 minutes	1 minute
Winter	5 minutes	5 minutes	1 minute
Night	5 minutes	10 minutes	1 minute

F. RESPONSE DURING PERIODS OF ADVERSE WEATHER AND FLOODING

ALTERNATIVE SYSTEMS OF COMMUNICATION

In the event of power or communications failure, the Tooele County Sheriff would be contacted by dispatching a courier with a written message to the nearest public safety official's office and having them contact the sheriff via their radio system. If time permits, the Tooele County Sheriff may dispatch emergency radio communications technicians to the dam to establish direct communications with the sheriff's office. The sheriff is responsible for recruiting, training, and supervising volunteer communications staff as appropriate.

G. COORDINATING INFORMATION ON FLOWS

Information on flows based on weather and runoff forecasts, failure and other emergency conditions will be coordinated with downstream water users and the National Weather Service, when possible. Coordination with the National Weather Service and state Dam Safety Section is recommended to monitor storms, river stages, and flood waves resulting from a dam break. The NWS or Dam Safety Section may also supplement warnings being issued by using its own communication system.

H. EMERGENCY RESERVOIR EVACUATION

Emergency evacuation of the reservoir should only be undertaken under extreme emergencies. The dam owner, in consultation with your engineer and the Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section, decides if emergency evacuation is appropriate. Notification should be given to the Tooele County Sheriff and National Weather Service in advance. Releases should be ramped so that downstream users receive visual confirmation of increased streamflows in addition to public warnings.

I. EMERGENCY INFLOW REDUCTION

If time permits, actions should be taken to reduce inflow to the reservoir. Coordination with the Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section is required prior to modifying any streamflow. Actions should be taken to reduce downstream flows on the waterway on which the dam is located.

PART V. INUNDATION MAPS

Inundation maps for Settlement Canyon Dam are located on the following pages.

Below is a summary list of major structures and populated areas downstream from the dam which may be affected. This list serves only as a guide for evacuation purposes

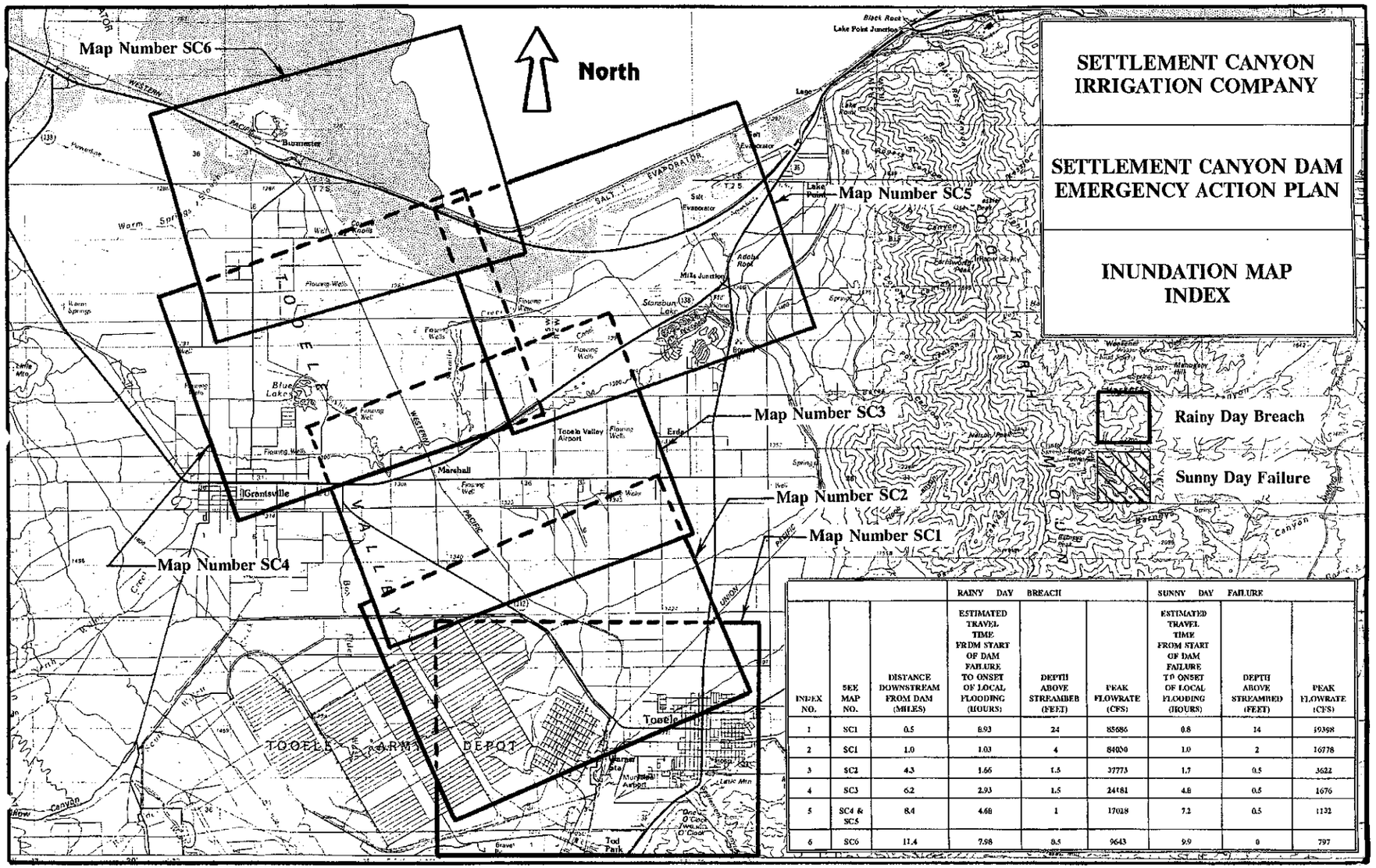
1. Tooele
2. West Erda
3. Tooele Army Depot
4. Tooele Municipal Airport
5. Interstate 80
6. State Routes 36, 112, and 138
7. Union Pacific Railroad

WARNING SYSTEM

There is no warning system at the dam. The nearest telephone is located in the homes immediately downstream from the dam or within the city of Tooele. Warning of *failure* or notification of *impending failure* would be telephoned to the Tooele County Sheriff's office. That office will implement appropriate procedures to warn or evacuate the downstream population.

Part IV

Appendices

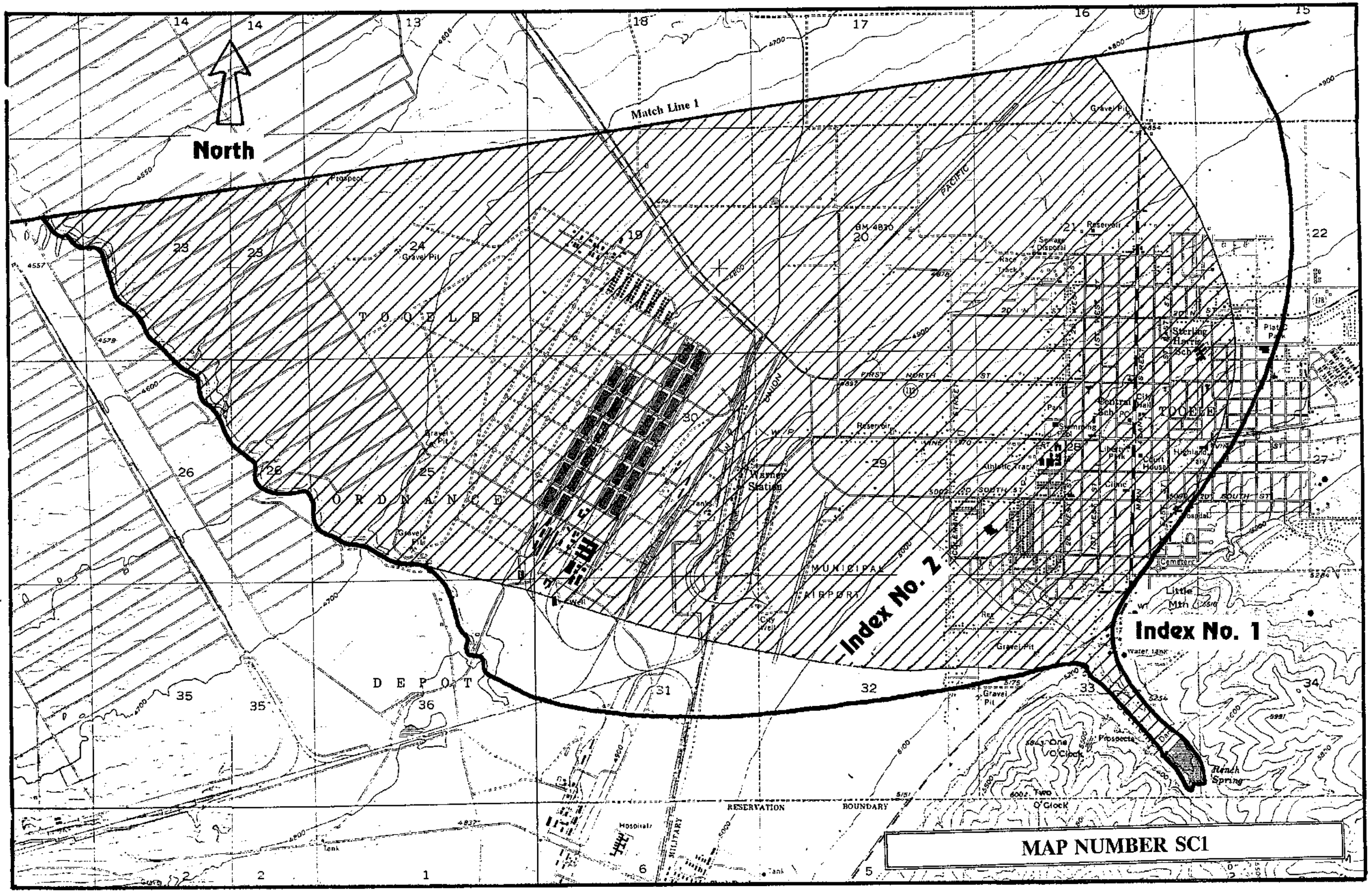


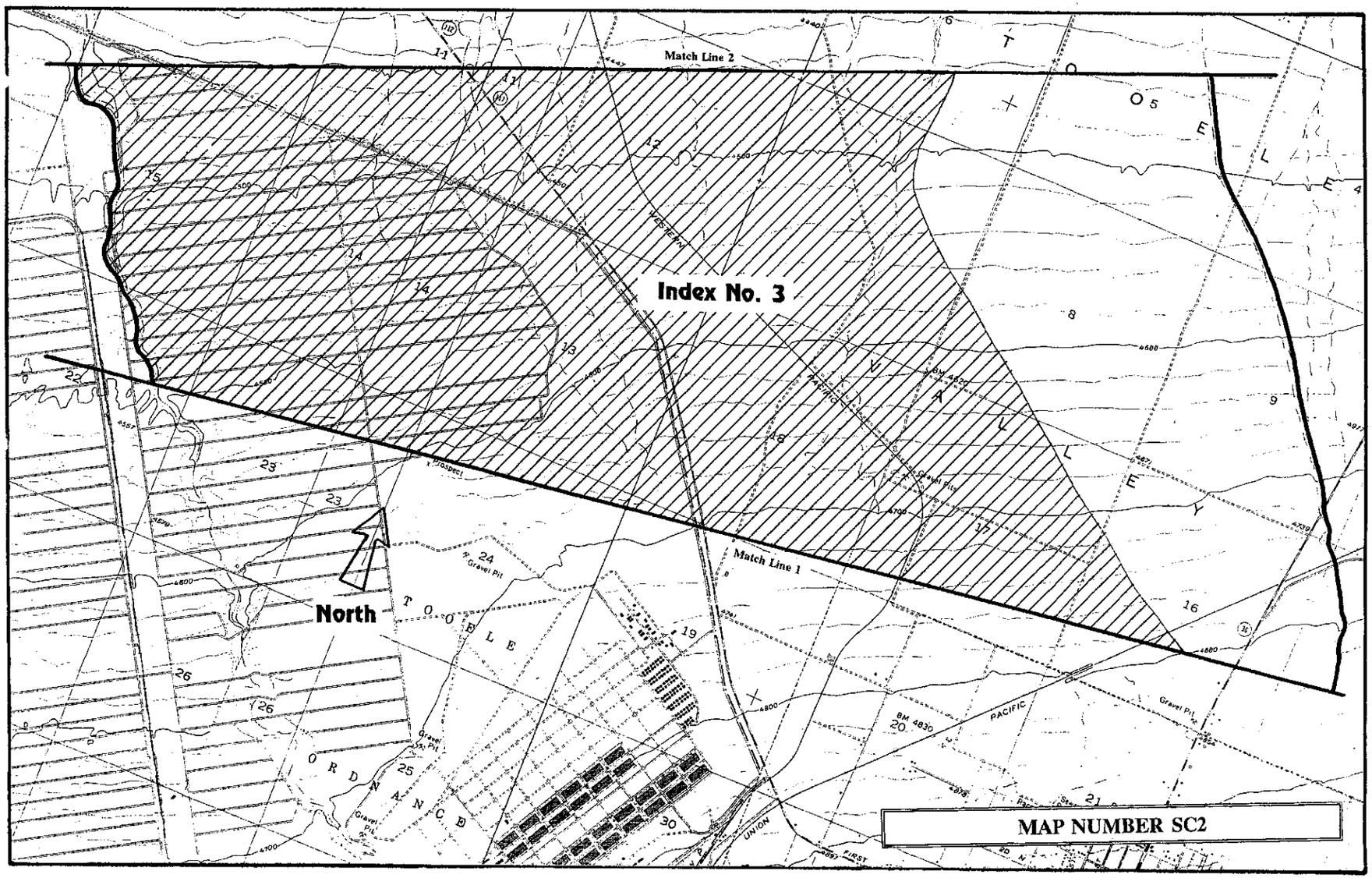
SETTLEMENT CANYON IRRIGATION COMPANY

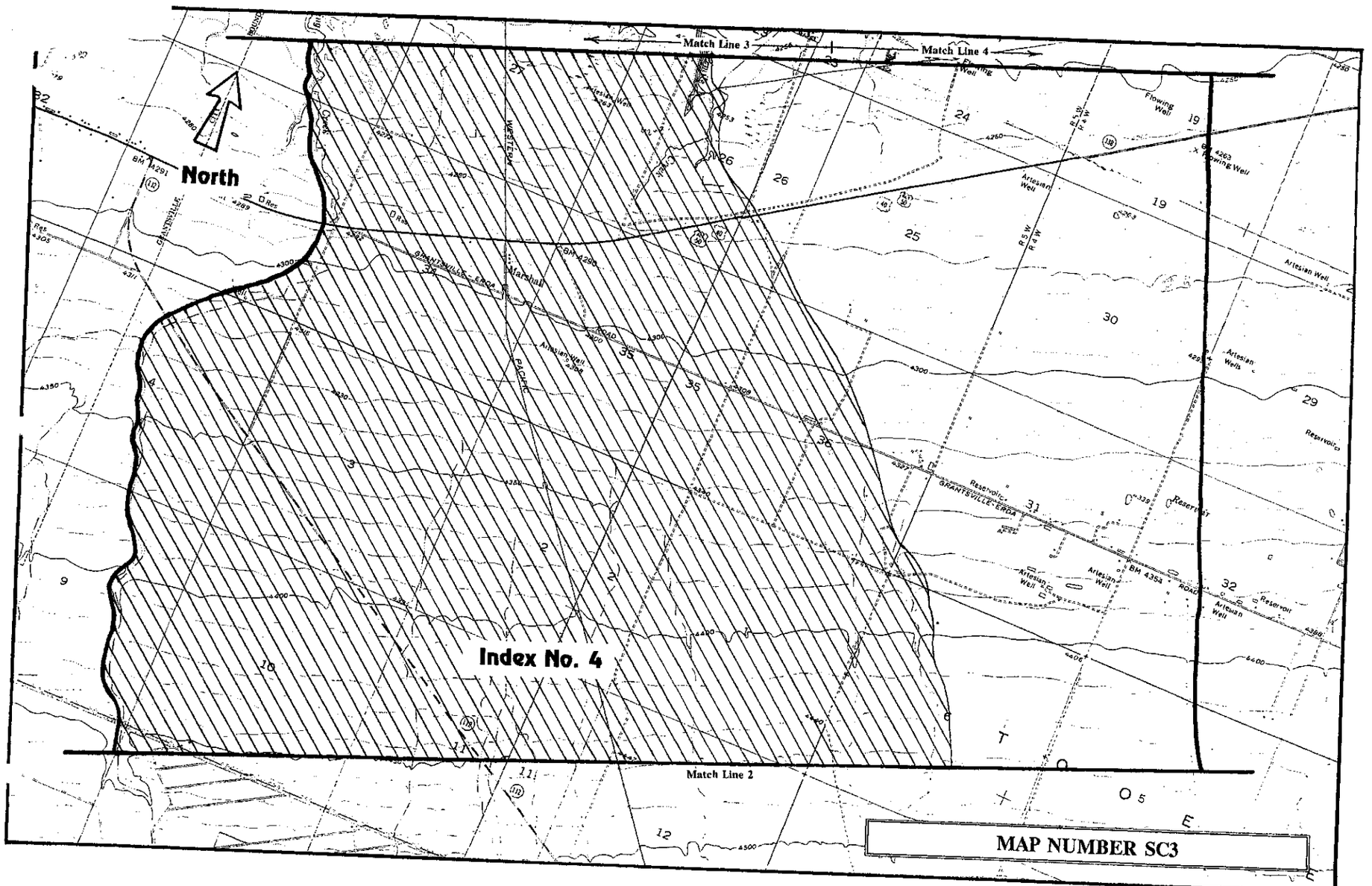
SETTLEMENT CANYON DAM EMERGENCY ACTION PLAN

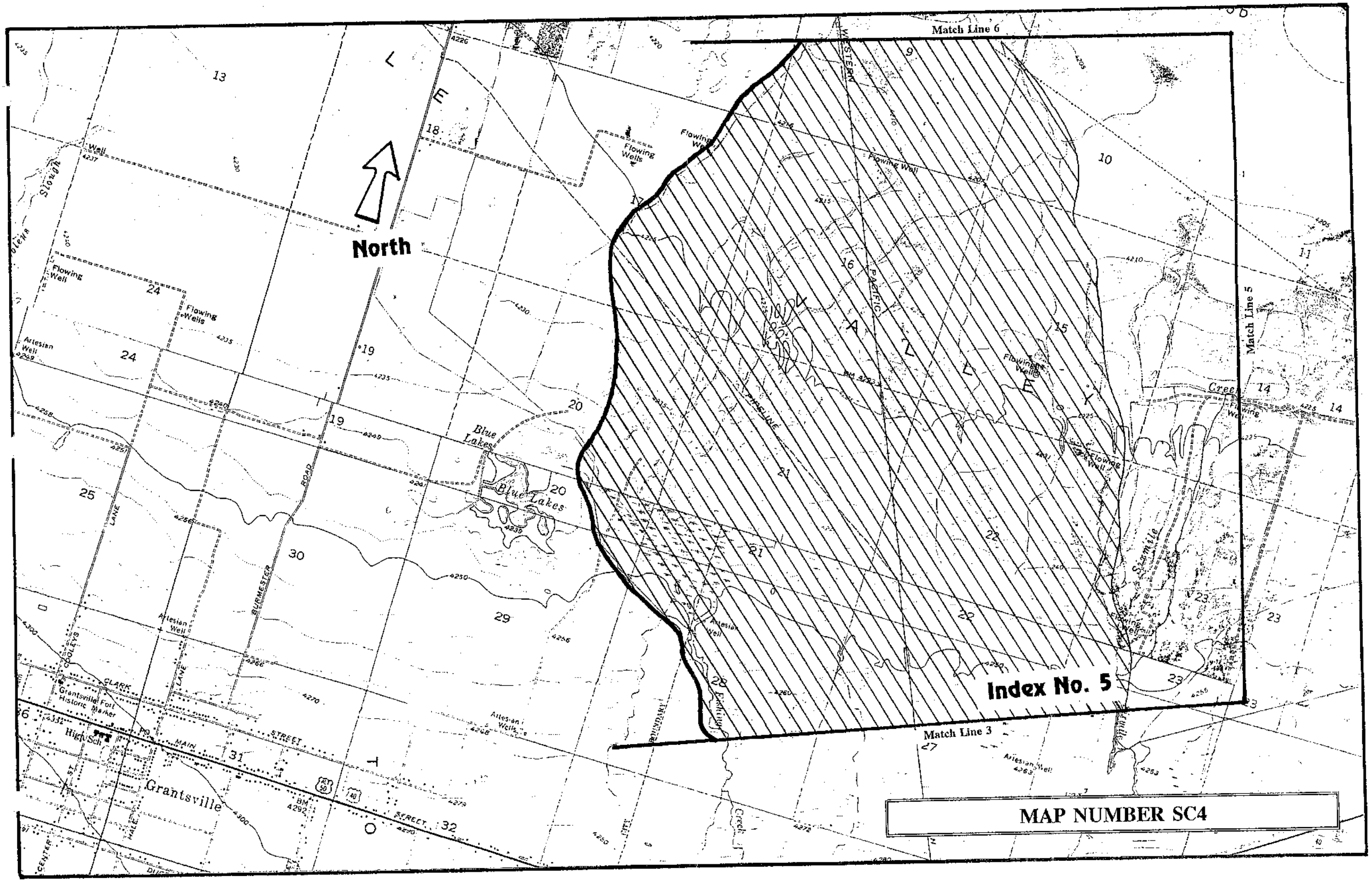
INUNDATION MAP INDEX

			RAINY DAY BREACH			SUNNY DAY FAILURE		
INDEX NO.	SEE MAP NO.	DISTANCE DOWNSTREAM FROM DAM (MILES)	ESTIMATED TRAVEL TIME FROM START OF DAM FAILURE TO ONSET OF LOCAL FLOODING (HOURS)	DEPTH ABOVE STREAMBED (FEET)	PEAK FLOWRATE (CFS)	ESTIMATED TRAVEL TIME FROM START OF DAM FAILURE TO ONSET OF LOCAL FLOODING (HOURS)	DEPTH ABOVE STREAMBED (FEET)	PEAK FLOWRATE (CFS)
1	SC1	0.5	0.93	24	85686	0.8	14	59398
2	SC1	1.0	1.03	4	84090	1.0	2	16778
3	SC2	4.3	1.66	1.5	37773	1.7	0.5	3622
4	SC3	6.2	2.93	1.5	24161	4.8	0.5	1676
5	SC4 & SC5	8.4	4.68	1	17028	7.2	0.5	1132
6	SC6	11.4	7.98	0.5	9643	9.9	0	797

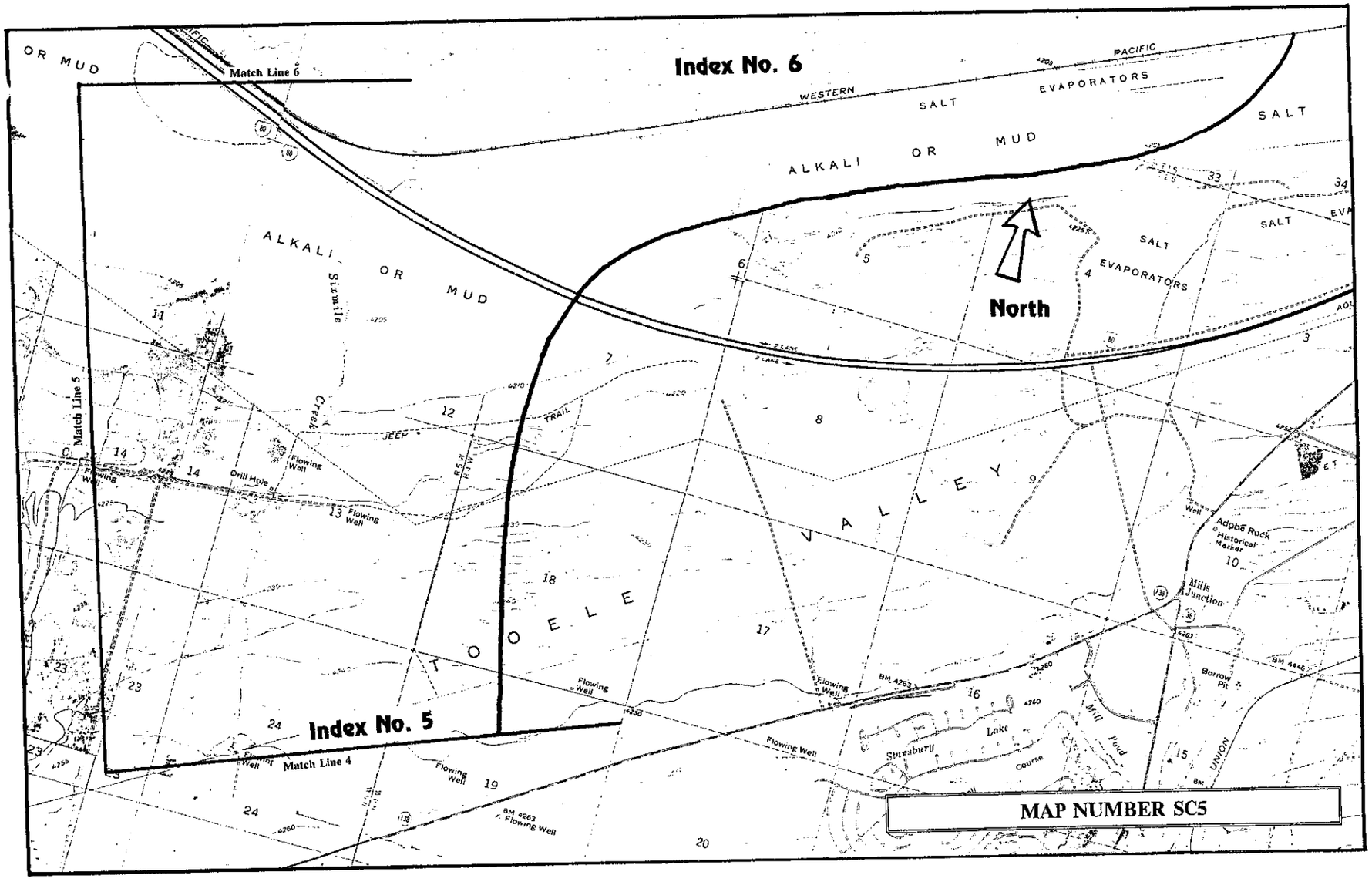

North
Match Line 1
Index No. 1
Index No. 2
TOOELE
ORDNANCE
DEPOT
MUNICIPAL AIRPORT
Warner Station
PACIFIC
UNION
MILITARY
RESERVATION
BOUNDARY
Hospital
Gravel Pit
Reservoir
Sewage Disposal
Race Track
FIRST NORTH ST
Central Sch
City Hall
Court House
Liberty Park
Highland Park
Sterling Harris Sch
Athletic Track
Swimming Pool
Clinic
Cemetery
Little Mtn
Water Tank
One O'Clock
Two O'Clock
Prospects
Hench Spring
Plat C Park
TOOELE
MAP NUMBER SC1

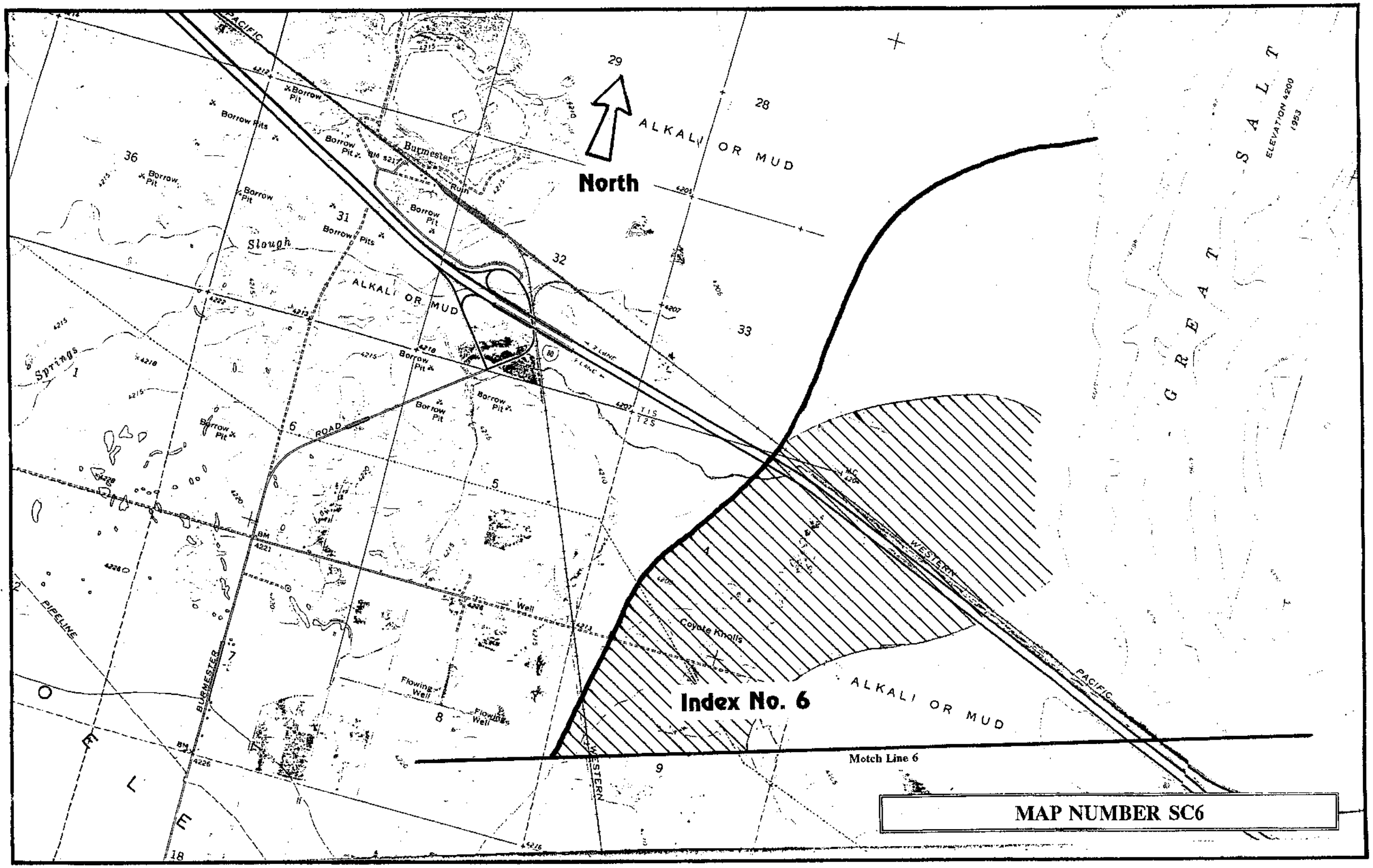

Match Line 2
Index No. 3
Match Line 1
North
MAP NUMBER SC2


Match Line 3
Match Line 4
North
Index No. 4
Match Line 2
MAP NUMBER SC3



MAP NUMBER SC4


Index No. 6
Match Line 6
Index No. 5
Match Line 5
Match Line 4
North
PACIFIC
WESTERN
SALT
EVAPORATORS
ALKALI OR MUD
TOOELE VALLEY
Simmie Creek
JEEP TRAIL
Flowing Well
Drill Hole
Adobe Rock
Historical Marker
Mills Junction
Borrow Pit
Lake
Mill Pond
Shrubury
Course
UNION
BM 4263
MAP NUMBER SC5



MAP NUMBER SC6

Appendix 1 **COMMUNCATIONS DIRECTORY**

COMMUNICATIONS DIRECTORY

Settlement Canyon Dam

Tooele County, Utah

A. DAM OWNER

Settlement Canyon Irrigation Company

PO Box 962

Tooele, UT 84074

Phone: 435-833-9606

B. OPERATING AGENCY

Settlement Canyon Irrigation Company
PO Box 962
Tooele, UT 84074
Phone: 435-833-9606

C. FACILITIES OPERATOR AND DAM TENDER

All maintenance and local operations during construction are performed by David Lee, the Dam Tender. David lives about three miles from the dam.

NORMAL COMMUNICATIONS

Phone: 435-833-9606

EMERGENCY COMMUNICATIONS

Name	Position	Address	Phone Number
Gary Bevan	Board President	853 W. Vine Street Tooele, UT 84074	435-850-2188
David Lee	Dam Tender	833 W. Vine Street Tooele, UT 84074	435-841-9522

D. NOTES

Settlement Canyon Dam is located approximately two miles south of Tooele, Utah. Access is via Settlement Canyon Road from State Highway 36 to the crest of the left abutment. The road is paved up to the dam crest. Access to the dam crest is good. There are two outlet gates on the outlet pipe: One of the outlet gates is submerged near the base of the upstream face of the embankment. The controls for this outlet (which is normally left open) are located on the dam crest inside of a chain link fence enclosure approximately two hundred feet from the left abutment.

The other outlet gate is accessible from a small frame building near the base of the downstream embankment. The controls for this outlet are located inside the core of the dam and are accessible via a tunnel which daylights at the frame building mentioned above. This outlet is normally used to regulate flows through the dam and can be accessed on foot from the dam crest. There is a dirt road from State Route 36 to the outlet.

APPENDIX 2

APPENDIX 2

A. DESCRIPTION OF THE DAM

Settlement Canyon Dam is an earthen dam, constructed by Lawrence Engineering during 1962. The reservoir impounded by Settlement Canyon Dam is known as Settlement Canyon Reservoir. It's primary purpose is to store flows of runoff for irrigation use in Tooele City and Tooele County, Utah. Additional reservoir uses include recreation. The dam is located in Section 33, T3S, R4W, Salt Lake Base and Meridian.

Construction of Settlement Canyon Dam began in about 1961. The embankment was completed in 1962 and initial filling began in 1962.

B. DIRECTIONS AND ACCESS TO DAM

Settlement Canyon Dam is located approximately two miles south of Tooele, Utah.

1. From Tooele, Utah - Access to the dam is via a one half-mile paved road which intersects with State Route 36 approximately fifteen miles south of the junction of State Route 36 and Interstate 80. The access road is locally called "Settlement Canyon Road". There is road access to the dam crest from the left abutment. The dam could be reached cross country on foot or horseback from State Route 36. Vehicle access to the dam crest is good.

State Route 36 is a paved all-weather road. "Settlement Canyon Road" may not be passable during the winter or during periods of heavy rainfall or snowmelt runoff.

2. From Salt Lake City, Utah - Follow I-15 south to the Junction of I-15 and I-80, thence west on I-80 for eighteen miles to the junction of I-80 and State Route 36, thence south on State Route 36 for fifteen miles to the junction with "Settlement Canyon Road." Then follow the directions from Tooele, Utah, listed above.

During severe storms four-wheel drive vehicles, snowmobiles, cross-country skis, or snowshoes may be required to travel the route. Operation of the Settlement Canyon Dam spillway will not flood the access road from State Route 36 to the dam.

The nearest airport is the Tooele Municipal Airport located two miles west of Tooele, approximately two and one-half miles northwest of the dam. Small planes may land at Tooele Municipal airport and helicopters may land at Tooele Municipal Airport or on Settlement Canyon Road near the dam.

APPENDIX 3

POTENTIAL PROBLEMS AND IMMEDIATE RESPONSE ACTIONS

The information listed below is provided for general information. In the event one or more of these conditions exist at Settlement Canyon Dam, the Settlement Canyon Irrigation Company should contact your engineer immediately for specific advice based on field observation.

The Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section should be contacted as soon as possible and details of the problem and emergency action taken.

OVERTOPPING BY FLOOD WATERS

Open outlet to maximum safe capacity

Place sandbags along the crest to increase freeboard and force more water through the spillway.

Provide erosion-resistant protection to the downstream slope by placing plastic sheets or other material over eroding areas.

Divert flood water around the reservoir basin if possible. Restrict reservoir inflow if possible.

Create additional spillway capacity by making a controlled breach in a low embankment section or dike section where the foundation materials are erosion resistant.

LOSS OF FREEBOARD OR DAM CROSS SECTION DUE TO STORM WAVE EROSION

Place additional riprap or sandbags in damaged areas to prevent further embankment erosion.

Lower the water level to an elevation below the damaged area Restore freeboard with sandbags or earth and rockfill. Continue close inspection of the damaged area until the storm is over.

SLIDES ON THE UPSTREAM OR DOWNSTREAM SLOPE OF THE EMBANKMENT

Lower the water level at a rate and to an elevation considered safe given the slide condition. If the outlet is damaged or blocked, pumping, siphoning, or a controlled breach may be required. Restore lost freeboard if required by placing sandbags or filling in the top of the slide. Stabilize slides on the downstream slope by weighing the toe area with additional oil, rock, or gravel.

EROSIONAL FLOWS THROUGH THE EMBANKMENT, FOUNDATION, OR ABUTMENTS

Plug the reservoir side of the flow with whatever material is available (hay bales, bentonite, or plastic sheeting if the entrance to the leak is in the reservoir basin).

Lower the water level until the flow decreases to a non-erosive velocity or until it stops.

Place a protective sand and gravel filter over the exit area to hold materials in place.

Continue lowering the water level until a safe elevation is reached.

Continue operating at a reduced level until repairs can be made.

FAILURE OF APPURTENANT STRUCTURES SUCH AS OUTLETS OR SPILLWAYS

Implement temporary measures to protect the damaged structure, such as closing an outlet or providing temporary protection for a damaged spillway.

Employ experienced professional divers if necessary to assess the problem and possibly implement repair.

Lower the water level to a safe elevation. If the outlet is inoperable, pumping, siphoning, or controlled breach may be required.

MASS MOVEMENT OF THE DAM ON ITS FOUNDATION (SPREADING OR MASS SLIDING FAILURE)

Immediately lower the water level until excessive movement stops.

Continue lowering the water until a safe level is reached.

Continue operation at a reduced level until repairs can be made.

EXCESSIVE SEEPAGE AND HIGH LEVEL SATURATION OF THE EMBANKMENT

Lower the water to a safe level.

Continue frequent monitoring for signs of slides, cracking or concentrated seepage.

Continue operation at a reduced level until repairs can be made.

SPILLWAY BACKCUTTING THREATENING RESERVIOR EVACUATION

Reduce the flow over the spillway by fully opening the main outlet.

Provide temporary protection at the point of erosion by placing sandbags, riprap materials, or plastic sheets weighted with sandbags.

When inflow subsides, lower the water to safe level.

Continue operating at a low water level in order to minimize spillway flow.

EXCESSIVE SETTLEMENT OF THE EMBANKMENT

Lower the water by releasing it through the outlet or by pumping, siphoning, or a controlled breech.

If necessary, restore freeboard, preferably by placing sandbags.

Lower water to a safe level.

Continue operating at a reduced level until repairs can be made.

LOSS OF ABUTMENT SUPPORT OR EXTENSIVE CRACKIN IN CONCRETE DAMS

Lower the water level by releasing it through the outlet.

Attempt to block water movement through the dam by placing plastic sheets on the upstream face.

Lowering water to a safe level.

MATERIAL AND HEAVY EQUIPMENT

Listed below are possible sources of material (sand and gravel fill) and construction equipment which may be used in an emergency.

Supplier	Address	Phone Number
Western Excavation	820 West Vine Street	435-882-5337
Adobe Rock Products	5500 Highway 36	435-830-6500
Broken Arrow	8960 Clinton Landing	435-882-3942
Christensen & Griffith	30 South Tooele Blvd	435-882-1529

Settlement Canyon Irrigation Company

Settlement Canyon Dam

EMERGENCY ACTION PLAN

Distribution List

- Emergency Action Plan Coordinator, Gary Bevan
  853 W. Vine Street
  Tooele, UT 84074
- Dam Tender, David Lee
  833 W. Vine Street
  Tooele, UT 84074
- Tooele County Sheriff
  47 S. Main
  Tooele, UT 84074
- Tooele County Emergency Management Director
  47 S. Main
  Tooele, UT 84074
- National Weather Service

- Utah State Department of Natural Resources, State Engineers Office, Dam Safety Section
  PO Box 145610
  1564 W. North Temple
  Salt Lake City, UT 84114-5610

Settlement Canyon Dam

EMERGENCY ACTION PLAN

Participant Concurrence

We, the undersigned, representing our respective organizations, have read the Emergency Action Plan for Settlement Canyon Dam, and understand our responsibilities in the execution of this plan should an emergency occur:

Tooele County Sheriff	Date
Tooele County Emergency Management Director	Date
President, Settlement Canyon Irrigation Company	Date
Dam Tender, Settlement Canyon Dam	Date
Settlement Canyon Dam Engineer	Date
Division of Comprehensive Emergency Management	Date
National Weather Service	Date

Settlement Canyon Irrigation Company
Settlement Canyon Dam

RECORD OF PHONE CONVERSATIONS

DATE_____ TIME_____

PERSON CALLING_____

PERSON CALLED_____

_____

NATURE OF PROBLEM_____

_____

LOCATION OF PROBLEM (looking downstream)_____

_____

APPARENT CAUSE OF PROBLEM_____

_____

EXTENT OF PROBLEM AREA (Measure, pace or estimate)_____

_____

ESTIMATED QUANTITY OR UNUSUAL FLOW _____

COLOR OR TURBIDITY OF FLOW_____

WATER LEVEL IN RESERVOIR_____

NAME OF PERSON(S) WHO OBSERVED PROBLEM_____

_____

PHONE NUMBER OF OBSERVER_____

IS SITUATION WORSENING? _____

WHAT REMEDIAL ACTIONS HAVE BEEN TAKEN_____

_____

WHAT ARE THE CURRENT WEATHER CONDITIONS AT THE DAM? _____

_____

REMARKS _____

_____

_____

REFERENCES

How to Develop and Implement an Emergency Action Plan, Cavenaugh, J.P., Chagnon, P.H., Collins, M.J., Gotzmer, J.W., Lee, R. G., 1989, , Training Aids for Dam Safety, U. S. Bureau of Reclamation, United States Government Printing Office, Denver, Colorado.

Emergency Action Planning Guidelines for Dams, Interagency Committee of Dam Safety, Sub Committee on Emergency Action Planning, 1985, Federal Emergency Management Agency, United States Government Printing Office, Washington, D.C.

Guide for Development of State and Local Emergency Operation Plans, Interagency Committee on Dam Safety, Sub Committee on Emergency Action Planning, 1985, Federal Emergency Management Agency, United States Government Printing Office, Washington, D.C.