

WASHOE COUNTY  
FLOOD HAZARD MITIGATION PLAN

APRIL 15, 1986

## TABLE OF CONTENTS

	Page
1. INTRODUCTION	3
2. WASHOE COUNTY GOVERNMENT	4
3. INSTITUTIONAL PROBLEMS	4
4. FLOOD DAMAGE	6
5. WASHOE COUNTY FLOOD CONTROL PLAN	11
6. WASHOE COUNTY MITIGATION PROGRAM	14

## TABLES

1. FEBRUARY 1986 RAINFALL RENO NATIONAL WEATHER SERVICE	3
---	---

## REFERENCES

## APPENDICES

## FLOOD HAZARD MITIGATION PLAN

### INTRODUCTION

The flooding that occurred in unincorporated Washoe County in February 1986 was the result of precipitation over a nine day period from February 12th to February 20th, 1986. 4.62 inches of rainfall was recorded at the Reno National Weather Service office on the Truckee Meadows valley floor with the bulk of the rainfall (4.35 inches) occurring in a six day period from February 14th through February 19th (see Table 1). Precipitation in the Truckee Meadows increases with elevation and westerly direction from the Reno National Weather Service office. Figure 1 shows the spatial variation in precipitation recorded in the Truckee Meadows during the above mentioned six day period. Long duration rainfall intensity frequency curves (IDF curves) have been prepared for the Truckee Meadows area by the State of California, Division of Water Resources (Reference 1). Comparison with these IDF curves would indicate that the February 1986 storm would be equivalent to a fifty-sixty year storm event. The Truckee River at the Reno Gage recorded a peak flow of 14,500 cfs and 16,000 cfs at the Vista Gage. These flows would be equivalent to 75 and 60 year events, respectively (Reference 2). Since 1944 storms of similar magnitude and duration have occurred in the Truckee Meadows in December 1955 (4.08 inches in six days), in February 1962 (2.68 inches in six days), in February 1963 (2.77 inches in six days) and in January 1969 (2.75 inches in six days).

TABLE 1.

#### FEBRUARY 1986 RAINFALL RENO NATIONAL WEATHER SERVICE OFFICE

<u>DAY</u>	<u>INCHES/24 HOURS</u>
12th	0.02
13th	0.22
14th	0.53
15th	0.75
16th	0.22
17th	0.96
18th	0.83
19th	1.06
20th	0.03

The flooding that occurred in February 1986 caused an estimated \$655,000 (plus) of Federal Emergency Management Agency (FEMA) eligible costs in damage to public facilities in unincorporated Washoe County. Actual cost to the County could exceed \$1,000,000. A majority of this damage occurred in the Washoe Valley area, Steamboat Valley - Toll Road area, Spanish Springs area, Hidden Valley area, Verdi area and Lemmon Valley area in and around the Truckee Meadows; and in the area around Gerlach in northern Washoe County, and was due to flooding by normally small streams, backwater from the Truckee River or flow to playas.

The narrative that follows will explain why the damages occurred and what steps are being taken to prevent future reoccurrences.

### WASHOE COUNTY GOVERNMENT

Washoe County has a commission form of government with five elected commissioners. Day-to-day operations are coordinated by a County Manager assisted by an Assistant County Manager. County Agencies with responsibility for flood control/flood plain management related matters are Building and Safety, Comprehensive Planning, Emergency Management, Public Works, Sheriff's Office, and Truckee Meadows Fire Protection District. The Public Works Department (of which Building and Safety is a division) ensures that construction projects comply with the County's flood plain management ordinance. The Comprehensive Planning Department staffs the Washoe Council of Governments which is the local coordinator for the Corps of Engineers Flood Control Plan for the Truckee Meadows which is expected to be submitted to Congress for funding shortly. During emergency periods when major flooding is imminent or in progress, the Department of Emergency Management operates a command center that coordinates assistance from all three jurisdictions that function in Washoe County (Reno, Sparks, and Washoe County). Personnel from the Department of Comprehensive Planning, Department of Public Works, Sheriff's Office, and Truckee Meadows Fire Protection District are also assigned to assist the Department of Emergency Management during emergency periods.

### INSTITUTIONAL PROBLEMS

The institutional problems that contributed to flood related damages are as follows:

- 1) The first problem is the lack of a regional flood control/storm drain master plan that has been adopted by all three local jurisdictions and by which all jurisdictions (federal, state and local) are required to adhere.

A flood control plan for addressing flooding of the Truckee Meadows by the Truckee River and Steamboat Creek has been proposed by the Corps of Engineers (COE). This plan has received support from the local jurisdictions. The Soil Conservation Service (SCS) has prepared watershed

investigation reports for most of the small streams tributary to the Truckee River in the Truckee Meadows that are not included in the COE plan but only one has been constructed (Peavine). The County (and Cities) have storm drain master plans which have varying design criteria (5 to 10 year frequency events) but these master plans do not account for flows up to the 100 year frequency events. The Truckee Meadows flood control plan, the small watershed investigation reports, and the County/City storm drain master plans have not been integrated into a single master plan that demonstrates how major and minor flooding will be handled thereby protecting private and public property.

- 2) The second problem is the lack of a flood control district or other appropriate mechanism that would be responsible for implementing the previously mentioned flood control/storm drain master plan and providing the operation and maintenance of the appertenant facilities.
- 3) The third problem is the lack of funding to support either a coordinated effort through a flood control agency or individual jurisdiction effort consistent with a regional flood control/storm drain master plan that was adopted.

The 1983 Nevada legislature has constrained the ability of local governments to secure needed funds by placing a cap on the amount of money that can be generated from ad valorem taxation and sales taxes. Flood control districts are funded by ad valorem taxes which fall under the same cap as local general purpose of governments resulting in a very bleak funding picture.

- 4) The fourth problem is related to the flood insurance program. The initial detailed flood insurance study prepared by Tudor Engineering (FEMA contractor) for Washoe County (and Reno and Sparks) was completed in 1984. This study utilized a regional frequency analysis to predict flood flows on tributary streams. The flood flows predicted by the regional frequency analysis are substantially different from those developed using rainfall-runoff relationships and in some instances the flooding in February 1986 (60-75 year event) exceeded the 100 year flows used by FEMA contractor to develop the flood insurance rate maps and flood boundary and floodway maps resulting in more extensive flooding than was anticipated.
- 5) The fifth major problem is regional precipitation increases associated with possible climatic changes and its impact on closed basins. Lemmon Valley and Cold Springs Valley to the north of the Truckee Meadows are closed basins with playas. Housing developments and commercial/industrial projects have been allowed to encroach to the edge of the playas. When these projects were approved the playas were dry. Since 1980 mean annual precipitation has been substantially above

normal, three out of five years. "Normally" dry playas contain standing water year around and continue to rise inundating existing developments.

#### FLOOD DAMAGE

The following is a summary of the damages experienced during the events of February 1986. These are presented by FEMA project summary category:

A. Debris Clearance	\$ 89,245.00
B. Protective Measures	126,251.00
C. Road Systems	354,869.00*
D. Water Control Facilities	36,795.00
F. Public Utility Systems	7,640.00*
G. Facilities Under Construction	25,206.00
I. Others	14,380.00*
	\$ 654,386.00*

#### A. Debris Clearance

Cold Springs - Removal of silt and debris from ditches and culverts around North Avenue (\$584.00).

Lemmon Valley - Removal of debris from fairways of Sierra Sage Golf Course (\$944.00), Removal of heavy siltation of roadway ditches in Golden Valley (\$15,052.00), Removal of silt from ditches on Arkansas Street (\$2,000.00), Debris and silt removal from various locations in Lemmon Valley area (\$584.00), Removal of silt and debris in drainage easement in Lemmon Valley area (\$3,399.00).

Sun Valley - Removal of debris from roadside ditches (\$32,428.00), Flush culvert and manhole at 9th Avenue and Yukon Drive (\$2,573.00).

Spanish Springs Valley - Removal of silt and debris from ditch and culvert on Dolores Road (\$501.00), Removal of silt on Spanish Springs Road (\$2,936.00).

\*Five damage survey reports in these categories have been suspended pending development of further information which will add to the listed costs.

Truckee Meadows - Removal of debris from fairways, etc., at Washoe County Golf Course (\$1,324.00), Remove debris from culvert between Heather Ridge Lane and Plumb Lane (\$1,175.00), Clean ditch and flush culvert on Sagittarius (\$912.00), Clean ditch and flush culvert on Courtney Lane (\$271.00), Remove silt and flush culvert on Bellhaven Road (\$334.00), Remove debris from ditches on Kivett Lane (\$3,310.00).

Washoe Valley - Removal of debris from various locations in New Washoe City (\$19,995.00).

Gerlach - Removal of debris on Route 34 (\$276.00).

#### B. Protective Measures

Lemmon Valley - Place fill to protect levee on Sierra Sage Golf Course (\$760.00), Place fill to protect sanitary sewer along Lemmon Valley Drive (\$4,122.00), Replace culvert and asphalt surface on Remington Road (\$842.00), Repair washout on Lemmon Valley Drive (\$18,459.00), Construct berm on Lemmon Valley Drive near Arkansas Street and near Idaho Street (\$6,832.00), Construct berm on Pompe Way (\$962.00), Construct berm on Idaho Street (\$4,397.00), Sandbag placement and other protective work to Lemmon Valley sewage treatment plant (\$18,704.00).

Sun Valley - Place fill to protect sanitary sewer along El Rancho Drive at Clinton Street (\$1,267.00).

Spanish Springs Valley - Emergency protection of water line at Spring Creek Water Storage Facility (\$4,122.00).

Truckee Meadows - Extra labor requirements for operation and protection of the CDB sewage treatment facility (\$1,120.00), Sandbagging and pumping at the Washoe County Golf Course (\$973.00), Sandbagging and other protective operations at Court House, General Services Building, and Fairgrounds (\$4,678.00), Emergency channel cleanout on Toll Road (\$1,767.00).

Steamboat Valley - Temporary repairs to Andrews Lane and Rhodes Road at Steamboat Creek (\$3,291.00).

Pleasant Valley - Repair of watermain for Sunrise Estates water system (\$22,970.00), Emergency floodfighting on Blackwillow Way, Carriage Drive to end and East Laramie (\$2,495.00).

Galena Creek - Floodfighting on Galena Creek (\$1,977.00).

Countywide - Sandbagging and other emergency protective measures during incident (\$4,820.00), Sheriff Dept. personnel overtime, moving prison inmates to other sites, helicopter for search and rescue, and avalanche warning (\$23,479.00), Emergency repairs on water and sewer systems and inspection thereof (\$1,492.00).

### C. Road Systems

Honey Lake Valley - Replace culvert on Fish Springs Road (\$917.00), Replace culvert on Fish Springs Road (\$286.00), Repair roadway washout and ditch siltation on Fish Springs Road (\$908.00).

Red Rock Valley - Repair shoulder on Red Rock Road near Shetland Circle (\$437.00), Reinstall washed out culvert and 20' section of 30' ACMP on Red Rock Road (\$10,521.00).

Lemmon Valley - Repair of washout of Lemmon Valley Drive (\$27,311.00), Repace two culverts and restore embankment and asphalt surfacing in Golden Valley (\$3,213.00), Repair culvert on Tholl Drive (\$4,110.00), Repair culvert at Wise Avenue and Leather Lane (\$917.00), Removal of dike on Lemmon Valley Drive when floodwaters recede (\$7,965.00), Fill, grade, and reshape washed out and rutted access roads and cart paths on Sierra Sage Golf Course (\$13,088.00), Repair of shoulder and ditch erosion on Silver Lake Road (\$532.00).

Sun Valley - Repair of shoulder and ditch erosion at various locations in Sun Valley (\$4,269.00), Repair of washout on west 7th Avenue (\$7,658.00).

Spanish Springs Valley - Repair Spanish Springs Road at North Truckee Drain (\$3,276.00), Repair roadway and culvert on Robert Banks Blvd. (\$374.00), Repair shoulder erosion on Spanish Springs Road at HWY 33 (\$756.00), Repair shoulder erosion on Spanish Springs Road at Omni Drive (\$344.00), Restoration of shoulders and ditches on Spanish Springs Road (\$2,614.00).

Truckee Meadows - Repair washout of Bridge Street, Dog Valley Road, and South Verdi Road in Verdi (\$4,996.00), Repair washout of Bridge Street at Dog Creek (\$11,146.00), Repair drainage ditch washouts on Mae Ann Drive (\$3,078.00), Fill in, grade and shape roads and trail in Mayberry Park (\$12,827.00), Repair ditch washout on Comstock Drive (\$19,391.00), Repair of eroded shoulders on Wedekind Road at Clearacre Lane (\$2,434.00), Repair slope damage and parking lot washout in Hidden Valley Park (\$1,478.00), Fill and reshape service roads and cart paths in Washoe County



Golf Course (\$10,332.00), Replace culvert, etc., on Heather Ridge Lane (\$1,402.00), Repair washout on Sagittarius Drive (\$610.00), Repair washout on Bellhaven Road (\$450.00), Repair drainage structure on Sierra Manor Drive (\$481.00), Repair roadway on Edmonds Drive (\$5,349.00), Repair roadway and culvert on Thomas Creek Road (\$5,168.00), Repair roadway on Old Virginia Road at Whites Creek (\$1,084.00), Repair shoulders and ditches on Kivett Lane (\$3,377.00), Repair shoulders and ditches on Virginia Foothill Road (\$2,840.00), Repair shoulders and ditches on Toll Road (\$8,803.00).

Steamboat Valley - Complete emergency repairs on Andrews Lane and Rhodes Road at Steamboat Creek (\$6,248.00), Repair shoulders on Towne Road (\$621.00).

Pleasant Valley - Repair washouts on Blackwillow Road, Laramie Drive, Concho Drive and Conestoga Circle (\$23,072.00), Repair access road to Sunrise Estates water storage tank (\$1,312.00).

Washoe Valley - Repair access road and park trails in Davis Creek Park (\$669.00), Repair access road to Bowers Mansion Park (\$1,001.00), Repair washout of Bellevue Road (\$1,532.00), Repair washout of Lake Drive at Washoe Drive (\$1,438.00), Repair washout of Pershing Lane and Esmeralda to East Lake Blvd. (\$37,411.00), Fill washouts, etc., at various locations in New Washoe City area (\$43,218.00), Repair washout of Joy Lake Road (\$1,152.00).

Gerlach - Repair washout of RTE 34 at Rock Creek (\$3,966.00), Repair washout of RTE 34 at Cottonwood Creek (\$325.00), Repair washout of RTE 34 at Negro Creek (\$1,010.00), Repair washout of RTE 34 at Willow Creek (\$14,055.00), Repair washout/culvert on RTE 34, 40 mi. north of Gerlach (\$480.00), Repair of washout of RTE 34 at Swedes Field (\$2,574.00), Repair washout/culvert on RTE 33, 3.2 mi from HWY 81 (\$1,196.00), Repair of washout/culvert on RTE 33, 4 mi from HWY 81 (\$740.00), Repair of washout of RTE 33, 7 mi from HWY 81 (\$1,566.00), Repair of washout of RTE 33, 9.5 mi from HWY 81 (\$1,135.00), Repair of washout of RTE 33, 18.6 mi from HWY 81 (\$1,116.00), Repair of washout of RTE 33, 21.3 mi from HWY 81 (\$651.00), Repair of washout of RTE 33, 30mi from HWY 81 (\$659.00), Repair of washout of Smoke Creek Road, 5.4 mi from RTE 33 (\$3,413.00), Repair of washout of Smoke Creek Road, 5.8 mi from RTE 33 (\$15,015.00), Repair of washout of Smoke Creek Road, 7.3 mi from RTE 33 (\$3,413.00), Repair of washout/culvert on Buffalo Meadows Road, 2 mi from HWY 33 (\$387.00), Repair of washout/culvert on Tuledad Road at Duck Creek (\$752.00).

#### D. Water Control Facilities

Lemmon Valley - Remove silt deposit in Sierra Sage Golf Course irrigation reservoir (\$13,500.00), Place culvert and restore Number 2 fairway pond at Sierra Sage Golf Course (\$2,794.00).

Truckee Meadows - Repair levee and reservoir on Evans Creek at Rancho San Rafael Park (\$19,734.00).

Gerlach - Repair levee washout along Rock Creek on RTE 34 (\$767.00).

#### F. Public Utility Systems

Lemmon Valley - Placement of bedding and backfill on sewer main along Lemmon Valley Drive (\$2,940.00).

Sun Valley - Place bedding and backfill on sewer main along El Rancho Drive at Clinton Street (\$4,700.00).

Truckee Meadows - Repair of drainage channel at new Regional Jail Facility (\$25,206.00).

#### I. Other Damages

Lemmon Valley - Repair of washout of sand traps and fairway on Sierra Sage Golf Course (\$3,896.00), Repair of washout and erosion in Golden Valley Park (\$1,755.00), Repair of washout of ball diamond at Silver Knolls Park (\$1,821.00).

Truckee Meadows - Repair of washout of sand traps and fairway, reconstruct pedestrian bridge and replace perf pipe on french drain near Clubhouse (\$5,268.00), Repair parking lots at Washoe County Fairgrounds (\$889.00).

Washoe Valley - Replace fill and repair park bench at Bowers Mansion Park (\$751.00).

In addition to the above, five projects have suspended damage survey reports which will be submitted at a later date.

#### C. Road Systems

Washoe Valley - Washoe Lake Boat Landing access road (total damage not assessable because facility is underwater).

Gerlach - Repair of washout of Smoke Creek Road, 4.1 mi from RTE 33 (hazard mitigation work not yet complete).

#### F. Public Utility Systems

Lemmon Valley - Lemmon Valley sewage treatment plant is

being kept dry by sandbags. No damage to plant as yet. Lagoons are under water and damage cannot be determined until water recedes.

#### I. Other Damage

Washoe Valley - Washoe Lake Boat Landing and Picnic Grounds are underwater and a damage assessment will have to wait until the water recedes.

Galena Creek - Galena Creek Park is covered with 3' of snow and a damage assessment will have to wait until the snow melts.

#### WASHOE COUNTY FLOOD CONTROL PLANS

Washoe County (and the Cities of Reno and Sparks) has been cooperating with the Bureau of Reclamation, the Corps of Engineers, the Soil Conservation Service and the Federal Emergency Management Agency since the 1950's on flood control and flood plain management measures for the main stem of the Truckee River and its tributaries.

- 1) In cooperation with the Bureau of Reclamation and the Corps of Engineers, the channel of the Truckee River has been increased to carry 7,000 cfs from the Glendale Bridge to Vista and the Vista Reefs lowered; the channel through Reno was increased to carry 14,000 cfs; and Prosser and Martis Creek Reservoirs were built upstream for flood protection. These Reservoirs are operated in combination with Boca Reservoir and Stampede Reservoir to provide 65,000 acre-feet of flood control storage reserve upstream seasonally. These measures do not however prevent flooding in the Truckee Meadows during a 100 year storm event.
- 2) In cooperation with the Corps of Engineers, a flood control plan that will provide 100 year protection to the Truckee Meadows from Truckee River and Steamboat Creek flooding has been proposed for construction. Washoe County (along with the Cities of Reno and Sparks) has passed a resolution of intent (see appendices) to participate in the local share of the project. The project however has not been submitted for authorization to Congress and arrangements for the local share of the funding have not been made.
- 3) In cooperation with the Soil Conservation Service watershed investigation reports have been completed on all major tributaries to the Truckee River in the Truckee Meadows and detention facilities were completed in the Peavine watershed in northwest Reno in 1963. Funding for the remainder of the proposed facilities however has never been arranged, even though storm drains downstream have been in some instances sized assuming the small watershed detention facilities would be constructed.

- 4) In cooperation with the Federal Emergency Management Agency (FEMA) Washoe County entered into the emergency phase of the flood insurance program in the mid 1970's and entered the regular phase in 1984 with the adoption of a flood plain management ordinance (see appendices) that sets building standards, etc., consistent with national flood insurance program and implements the flood insurance rate and floodway maps prepared by FEMA. The ordinances and their application in each of the jurisdictions is not however consistent.

In some instances errors have been noted in the hydrology used to prepare the FEMA maps. Requests for restudies are made but do not always occur in a timely manner.

- 5) The Washoe County Department of Emergency Management is responsible for coordinating the response of government agencies to disasters.

A Washoe County Disaster Plan has been developed and copies of the annexes on Flood Control Operations and Warning are included in the appendices of this plan. The Disaster Plan was followed during the flooding in February 1986. Manpower was generally deployed successfully to place barriers, assist stranded motorists, and reduce property damage. A central command post was established at the Washoe County building complex at 9th and Wells Avenue. Field personnel were coordinated and positioned by use of local government radio networks and the amateur radio network.

On the converse side were the factors that reduced the effectiveness of existing structures and procedures during the February 1986 flooding.

- 1) As was noted earlier some of the hydrology used by the original FEMA contractor has been questioned by subsequent FEMA contractors during restudies of areas. The North Truckee Drain in Sparks for instance was designed to accommodate the flows that the original FEMA contractor estimated would occur. These flows were exceeded by a substantial amount during the February 1986 flood causing considerable property damage.

Another area that has caused problems is the date of the base maps used by the original FEMA contractor. The detailed study of the Truckee Meadows was started in 1977. Land use and topography used in the hydraulic studies were based upon 1977. Final products however were not presented for adoption to the local governments until 1983-84. Considerable development had occurred in the interim yet the maps were not revised to reflect current land use and topography. In some instances FEMA decided not to develop a floodway indicating that the floodway development should be done by the local governments yet did not impress upon the local jurisdictions the need to curtail development until

the floodway had been delineated.

- 2) Many areas were flooded because the small watershed detention facilities proposed by the Soil Conservation Service have not been constructed. Prime examples of this are flooding below the Sun Valley watershed in the City of Sparks and flooding below the Block "N" watershed in the City of Reno. The storm drain facilities through the urban areas were insufficient to carry what was a fifty-sixty year rainstorm let alone a 100 year rainstorm. Likewise the streets were not designed to carry the excess water resulting in considerable flooding. Similar problems occurred in the Paradise Park watershed, Alum Creek watershed, Evans Creek watershed, Dry Creek watershed, and Thomas Creek watershed.
- 3) A number of areas were flooded by breaks in the irrigation ditches. Irrigation ditches such as Highland, Orr, Glendale, Cochran, Last Chance, Lake, North Truckee, Pioneer, and Steamboat, divert water from the Truckee River and carry the water to irrigated properties in the Truckee Meadows. These ditches do not carry irrigation waters in the winter. They have however been used to carry waters from urban storm drains back to the Truckee River by the local jurisdictions. Most of these ditches have limited capacity (less than 100 cfs) and are not capable of handling the urban stormwater along with the overland flow that accumulates in them. When they are full they breakout sending water down into the urban community.
- 4) An extensive network of precipitation gages (snotel) that is operated by the Soil Conservation Service has been installed in the Sierra Nevada above the Truckee Meadows area. The information that this network provides to the National Weather Service is invaluable in making flood forecasts and assisting the Federal Water Master in operating the Reservoirs upstream for flood control purposes. This information does not however provide for predicting flooding from tributaries in the Truckee Meadows. If storm-event activated precipitation gages that telemetered precipitation information to the National Weather Service had been available in the Truckee Meadows then the flooding in Sparks from Spanish Springs Valley and Sun Valley and the flooding in the South Truckee Meadows could have been anticipated and flood fighting forces organized more efficiently.
- 5) Lastly the storm drain system below the Peavine watershed detention facility was either undersized such that it could not carry the controlled discharge from the outlet of the dam, or the storm drain system was plugged with debris and therefore would need more operation and maintenance which is a problem throughout the community (lack of funding).

## WASHOE COUNTY MITIGATION PROGRAM

To reduce the potential for damages from future flooding events, Washoe County has taken or will take a number of steps to enhance the unincorporated area's flood control plan.

The short range mitigation measures that Washoe County has taken are as follows.

### Lemmon Valley

Washoe County has contracted with a local construction firm to upgrade the crossing of a natural drain on Tholl Road by removing an existing corrugated metal arch pipe and replacing it with a larger aluminum box culvert. Bid price for the project is \$25,053 and is expected to be completed by June 1986.

The Washoe County Road Division has increased the culvert size at the natural drain crossing of Wise Avenue from a 36" diameter CMP to a 48" diameter CMP.

The Washoe County Road Division has increased the culvert size at the natural drain crossing of Remington Road from an 18" diameter CMP to a 36" diameter CMP.

The Washoe County Utility Division has contracted with a local consulting firm to perform a study for solving the flooding problems associated with the Lemmon Valley Sewage Treatment Plant. The cost for the study is \$7,600.

### Truckee Meadows

Washoe County has contracted with a local construction firm to upgrade the crossing of Bailey Canyon Creek at Toll Road by installing a double barrel reinforced concrete box. Bid price for the project is \$38,786 and is expected to be completed by June 1986.

### Steamboat Valley

The Washoe County Public Works Department is seeking funds in the amount of \$140,000 for fiscal year 1987-1988 to upgrade the existing bridge crossing of Steamboat Creek at Andrew Lane.

### Washoe Valley

Pershing Lane will be reconstructed using more suitable screened material and repair of the roadside drain is to include re-rip-rapping of the side slopes and flowline. The overall costs exceed the DSR estimate by \$20,638.

The long range mitigation measures that Washoe County proposes to implement are as follows.

Objective 1 - Coordinate flood control planning, design, construction, operation and maintenance, and funding in Washoe County.

Mitigation Measure - Washoe County in cooperation with the Cities of Reno and Sparks will pursue formation of a flood control district or other appropriate mechanism encompassing the urbanized portion of Washoe County.

Washoe County in cooperation with the Cities of Reno and Sparks will pursue legislative changes that would allow the Washoe County flood control agency funding mechanism to be the same as the Clark County flood control district funding mechanism.

Objective 2 - Develop a comprehensive flood control plan for Washoe County.

Mitigation Measure - The Washoe County flood control agency will pursue development of a master flood control plan that integrates the Corps of Engineers' Truckee Meadows flood control plan, the Soil Conservation Service's watershed investigation reports, and the City and County storm drain master plans. This flood control plan would be adopted and all new projects would be required to adhere to the plan. Current deficiencies would be identified and prioritized for implementation of corrective measures.

Objective 3 - Fund the comprehensive flood control plan for Washoe County.

Mitigation Measure - The Washoe County flood control agency upon completion of the comprehensive flood control plan for Washoe County would pursue appropriate funding of the design, construction, and operation and maintenance of the appurtenant facilities.

Objective 4 - Accurate flood insurance maps.

Mitigation Measure - A FEMA restudy effort is underway in the Spanish Springs area, in the Vista Lake/North Truckee Drain area, and in the Lemmon Valley area. Washoe County and the two Cities will be working closely with the FEMA contractor to ensure that the most accurate maps are developed defining floodplain and floodway boundaries. The preliminary maps should be available in late 1987.

Objective 5 - Develop a flood warning system that will enable Washoe County flood control agency personnel to anticipate impending flooding.

Mitigation Measure - The Washoe County flood control agency would work with the National Weather Service to develop and fund a flood warning system for the County.



## REFERENCES

1. State of California, Department of Water Resources, Division of Water Planning, Rainfall Depth-Duration-Frequency for California, February 1981
2. Federal Emergency Management Agency, Flood Insurance Study, Washoe County, Nevada, Unincorporated Areas, February 1, 1984

## APPENDICES

BOARD OF COUNTY COMMISSIONERS  
PROCLAMATION OF EXISTENCE OF A LOCAL EMERGENCY

WHEREAS, The County of Washoe through its County Board of Commissioners or its authorized designee may proclaim the existence of a local state of emergency when said County is affected by a public calamity; and

WHEREAS, The Board of Commissioners of Washoe County has been requested by the Director of Emergency Management of said County to proclaim the existence of a local state of emergency therein; and

WHEREAS, Said Board of Commissioners does hereby find:

That conditions of extreme peril to the safety of persons and property have arisen within said County, caused by rainstorms, flooding, mudslides, erosion and wind in the area of Washoe County, commencing on the 17th day of February, 1986;

That the aforesaid conditions of extreme peril warrant and necessitate the proclamation of the existence of a local emergency;

NOW, THEREFORE, IT IS HEREBY PROCLAIMED That a local state of emergency now exists throughout said County; and

IT IS FURTHER PROCLAIMED AND ORDERED that during the existence of said local state of emergency, the powers, functions and duties of the Director of Emergency Management and the Emergency Services System of this County shall be those prescribed by State Law, by Ordinances and Resolutions of the County and by County of Washoe Disaster Plans.

IT IS FURTHER PROCLAIMED AND ORDERED That said local state of emergency shall be deemed to continue to exist until its termination is proclaimed by the Board of Commissioners of the County of Washoe, State of Nevada, or its authorized designee.

IT IS FURTHER ORDERED That a copy of this declaration be forwarded to the State Director of the Division of Emergency Management.

DATED: Feb 17, 1986

ATTEST:

Judi Biele  
County Clerk

B. W. Miller  
Acting Chairman, Board of County  
Commissioners, Washoe County,  
Nevada

BOARD OF COUNTY COMMISSIONERS  
RESOLUTION REQUESTING GOVERNOR  
TO PROCLAIM A STATE OF EMERGENCY

WHEREAS, On February 17, 1986, the Board of Commissioners of the County of Washoe found that due to rainstorms, flooding, mudslides, erosion and wind, a condition of extreme peril to life and property did exist in Washoe County; and

WHEREAS, the Board of Commissioners declared an emergency did exist throughout said County; and


WHEREAS, It has now been found that local resources are unable to cope with the effects of said emergency.

NOW, THEREFORE, IT IS HEREBY DECLARED AND ORDERED That a copy of this declaration be forwarded to the Governor of Nevada with the request that he proclaim the County of Washoe to be in a state of emergency; and

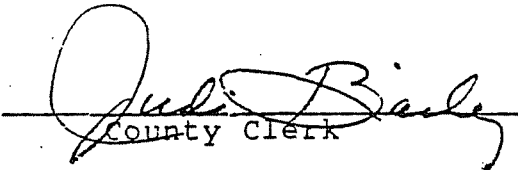
IT IS FURTHER ORDERED That a copy of this declaration be forwarded to the State Director of the Division of Emergency Management; and

IT IS FURTHER RESOLVED That Belie Williams, Acting Chairman, or the Director of Emergency Management of Washoe County, is hereby designated as the authorized representative of the County of Washoe for the purpose of receipt, processing and coordination of all inquiries and requirements necessary to obtain available state and federal assistance.

DATED: Feb. 17, 1986

  
Acting Chairman, Board of  
County Commissioners, Washoe  
County, Nevada

ATTEST:

  
County Clerk

May 6, 1982

## ANNEX V

### FLOOD CONTROL OPERATIONS

#### I. OBJECTIVE.

To define and coordinate the responsibilities and duties to combat flooding conditions.

#### II. OPERATIONS.

A. The Public Works Directors or other designated official for each separate jurisdiction in Washoe County has the chief authority over public works functions for flood control operations within their own jurisdiction.

B. Law enforcement personnel will be assigned duties related to traffic control; warning, rescue, and evacuation of people from flood or potential flood areas; road blocks; property protection; and provide communication links. Law enforcement is the lead agency in the warning, rescue, and evacuation of people during flood operations.

C. Fire departments have the primary responsibility for fire prevention and suppression. They might be able to provide additional manpower for warning, rescue, and evacuation of people from flood or potential flood areas, and assist in other support functions in flood control. Fire, law enforcement, and public works personnel must coordinate their efforts to insure a unified approach in combating the flood situation.

D. Each political jurisdiction will hire the extra personnel necessary for filling and stacking sandbags, and any other incidental work relative to their flood control operations.

E. When there is a need for large numbers of part-time workers, this information should be disseminated to the public over the local radio and television stations with instructions that persons desiring to become flood workers should report to the area designated in the announcement. For budgetary reasons, volunteers should be considered before hiring temporary flood workers.

F. The State of Nevada Employment Security Department, Reno, will work with each political jurisdiction in providing flood workers.

G. A rapid survey should be made of the extent of the flood to ascertain if the flood will be of sufficient magnitude to warrant assistance from the State, Federal, Red Cross, or Salvation Army. Requests for their support should be coordinated through the County Civil Defense and Disaster Agency, as more than one jurisdiction may need assistance. The Red Cross and Salvation Army can provide shelter and feeding for displaced persons, and limited feeding for flood workers.

H. Agencies will operate out of their normal administrative offices and maintenance yards. The County Civil Defense and Disaster Agency will work with

May 6, 1982

the political jurisdiction to establish an auxiliary radio net between agencies if and when the need becomes evident. It is of **UTMOST IMPORTANCE** that the Civil Defense Office be notified when each jurisdiction activates their command post so that pertinent information can be exchanged.

I. In the event of a major flooding condition, flood control operations will be coordinated at the Emergency Operations Center (E.O.C.) located at the Washoe County Complex at 9th and Wells Street (Management Information Services Building). Emergency radios for the three political jurisdictions are installed and operational at the E.O.C.

J. Each political jurisdiction is responsible for purchasing and stocking their sandbags. However, the County Civil Defense and Disaster Agency normally has a stock of sandbags prepositioned within the cities of Reno and Sparks. These sandbags will be issued as they are needed. Each political jurisdiction will order their own sand. Care must be exercised in the indiscriminate issue of sandbags for the protection of private property, as sandbags might not be available for essential flood control operations.

K. The County Civil Defense and Disaster Agency will establish contact with the Federal Watermaster and the National Weather Station, Reno, for information concerning severe weather or weather conditions which may cause flooding. This information will be forwarded to all interested agencies on a regular schedule. This does not restrict the jurisdictions from checking with these two agencies on weather conditions.

L. To provide for proper control for the release of information concerning flood control operations, all such information will be released by competent authority from each jurisdiction on the conditions within their jurisdiction. In the case of major flooding, a public information center will be established at the E.O.C. for the release of flood related news items.

M. During flood control operations, care must be taken to properly identify expenditures of funds, services, equipment, supplies, and facilities utilized. Work records and vehicle dispatch forms used during operations should be prominently identified with the words "FLOOD WORK" and dated. The specific area of application should be shown on the record, i.e., debris removal, sandbagging, etc. The proper identification of flood operation records will facilitate processing applications for disaster funds. Appendixes I and II are sample forms that could be used for flood work if the jurisdiction concerned does not have forms that would be applicable.

N. Businesses are responsible for developing their own plans for flood protection; with their political jurisdiction's concurrence.

### III. FEDERAL ASSISTANCE.

A. Federal disaster assistance is available for individuals and to local government when the disaster is of sufficient magnitude. When the Governor believes that such assistance is necessary to supplement the efforts and available resources of the local governments and State, he may request that the President declare the area a major disaster area.

May 6, 1982

B. The following are some of the Do's and Don'ts that may be helpful during and subsequent to flood control operations.

1. DO submit claims pertaining to federal reimbursement for debris removal to cover only debris caused by the flood.

2. DO understand that reimbursement for applicant's stock used during disaster work will only cover the actual cost which was paid to the supplier for the stocks. Nothing may be added for the cost of handling or overhead. The cost of hand tools, personal equipment, and protective clothing used is not eligible for reimbursement.

3. DO specify that the hourly rental rate for equipment was with or without an operator, when applicable, in the submission of claims for reimbursement for the cost of rental equipment.

4. DO consider using competitive bids for any work which may be eligible for federal reimbursement.

5. DO consider that emergency work not a part of permanent repairs of roads, bridges, or other facilities should be the minimum required for the immediate protection of life and property and to provide for essential public activities.

6. DO use the most economical methods of repair and materials to accomplish emergency repair or replacement to road systems if the repairs or replacements are not to be included as permanent work.

7. DO call the County Civil Defense and Disaster Agency to clarify any questions pertaining to federal reimbursement for flood control operations.

8. DO NOT make emergency repairs or emergency replacements in the road system unless such repairs or replacements will be incorporated within permanent repair or replacement work, or unless the traffic requirements can not be handled on the existing road network by rerouting or other methods.

9. DO NOT make extensive permanent repairs to roads, bridges, or other facilities until the Federal Emergency Management Agency has determined the eligibility for funding for such public facilities.

10. DO NOT expect federal reimbursement for the restoration of flood damaged streets, roads, bridges, or other facilities to a degree beyond pre-disaster status.

11. DO NOT request National Guard assistance during flood control operations unless it is determined that the National Guard is essential for traffic control, public safety, or security measures. Expenses for such utilization of the National Guard are not reimbursable by the federal government.

12. DO NOT enter into contracts for disaster work based on a cost plus percentage of costs, except when approved by the Federal Emergency Management Agency Regional Director to avoid unacceptable delays to emergency work.



May 6, 1982

POLITICAL JURISDICTION

DEPARTMENT

DISASTER

Location(s) where work performed: \_\_\_\_\_

Kind of work: \_\_\_\_\_

May 6, 1982

[illegible]

February 1, 1983

## ANNEX B

### WARNING

#### I. Objective.

To define a system which will insure adequate warning, with appropriate emergency instructions to key officials and Washoe County inhabitants, in the event of a large scale disaster, accident, or impending disaster situation.

#### II. Situation and Assumptions.

##### A. Nuclear Disaster.

1. A nuclear attack on the United States would likely be preceded by a period of international tension and crisis. Sufficient time may be available to warn key officials and the public, and to take protective action.

2. The Reno-Sparks metropolitan area of Washoe County could be subjected to an intentional attack and would be affected by radiological fallout from nuclear weapons landing in adjoining states.

3. The State of Nevada and Washoe County could be the victim of an accidental nuclear strike.

##### B. Natural and Man-made Disasters.

1. Natural Disasters. Washoe County encompassing an area of 6,375 square miles, is delineated by two physiographic provinces: the Basin and Range Province, characteristic of the southern two-thirds of the County and the Columbia Plateau Province, characteristic of the north. River flooding, flash floods, earthquakes, avalanches, land and mudslides, winter storms, windstorms, forest and grassland fires, and the effects of volcanic eruptions are examples of some natural disaster hazards that may occur in these provinces. Generally, the damaging effects of natural disasters can be predicted, planned for and mitigated.

2. Man-made or technological disasters. This group of disaster emergencies are difficult, if not impossible, to predict, plan for and to mitigate. Some examples of these are: hazardous materials and oil spills, upriver reservoir dam failures, resource shortages, major domestic disturbances, major structural fires and explosions, disease epidemics, transportation emergencies and failures, water system failure and contamination, multiple casualties, and major communication system failures.

#### III. Organization.

A. The Communications Supervisor, Washoe County Civil Defense, is designated as the County Warning Officer and is responsible to the Director for warning planning and operations.

B. The Warning Officer and, in his absence, the Director or Deputy

February 1, 1983

Director will coordinate the required information and activities of agencies, private business or volunteer organizations who have, or could have, a warning and notification function in either a nuclear disaster or a natural and man-made emergency. Note Appendix I for listing.

#### IV. Operations Concepts.

A. General. Basic operational concepts for warning will be essentially the same whether dealing with war caused, natural, or man-made disasters. Variations in the extent of warnings and associated emergency information provided to key officials and the public will be determined by the specific situation.

1. Increased readiness. Any period of increased readiness or lead time prior to an impending disaster will be used to continue warning operations to achieve maximum effectiveness. Readiness conditions are specified in Annex A of the Disaster Plan.

2. No Lead Time. It should be recognized and understood that lead time for planning, preparation implementation and warning could be considerably shortened or non-existent under conditions of natural or man-made disasters and nuclear attack conditions.

B. Warning Announcement. Any and all warning announcements of an actual or impending disaster or emergency situation should be disseminated to all emergency first response agencies and shared with appropriate support agencies and organizations in Washoe County. Adjacent Nevada counties that could be affected by an emergency event will be notified and provided all available current information and status condition.

1. Close communication ties exist between Washoe County Civil Defense and the State Division of Civil Defense. There may be occasions when the State may inform the County or when the County may inform the State of an impending or actual disaster or emergency event.

2. The State of Nevada cooperates with all adjacent states through mutual aid agreements. Warning announcements and status conditions should be shared with the appropriate adjacent California county(ies).

3. Adjacent Nevada counties can be notified using the telephone and the NAWAS located in the Sheriff's dispatch console and the Emergency Operations Center (EOC) located in the Management Information Services Building at the County Complex.

a. Carson, Lyon, Storey, Churchill, Pershing.

4. Adjacent California counties can be contacted by a direct telephone link and the NAWAS after requesting the Nevada Highway Patrol in Carson City to switch from state mode to national mode.

a. Lassen, Sierra, Nevada, Placer.

C. Sirens. Five radio activated, 125 db, Civil Defense fixed sirens are

February 1, 1983

installed and operational in the Reno-Sparks area.

1. The encoder and decoder control unit is located in the EOC.
2. All sirens are set to the attack warning mode - a wavering tone. Each unit, individually, may be adapted at their site to sound the steady blast for attention of alert warning.
3. The sirens are area non-selective, that is individual sirens cannot be individually selected. To choose any single or multiple of sirens, the remaining units must be disconnected at their site.
4. There is a recognized deficiency in the number of fixed sirens to adequately cover the Reno/Sparks metropolitan area. No sirens are currently available for communities outside the Reno/Sparks area. Some fire stations in the County may have non-civil defense type fixed sirens but they are small in size, manually operated and provide limited coverage.

D. National Weather Service (NWS). The primary mission is to deliver meteorological and hydrological information to the public in a timely fashion to help minimize the loss of life and property. Their varied systems also permit a rapid dissemination of warning messages from national, state or local sources to include natural, man-made or technological disasters and war-related emergencies. The NWS systems fan announcements through their National Weather Radio (NWR), National Weather Wire Service (NWWS), National Warning System (NAWAS) and Automated Field Operation System (AFOS).

E. Coast Guard. The U. S. Coast Guard Station at Lake Tahoe has two power boats, equipped with public address systems, and one four-wheel drive truck. Immediate assistance is available upon receipt of request.

F. Law Enforcement Teletype Systems (LETS). The Sheriff owns and operates a Data Speed 40 computer that is directly linked to the Law Enforcement Teletype System (LETS) that operates nationwide. The computer system is located at the Sheriff's Dispatch Center. Warning messages could be received and transmitted through this system as a backup to the NAWAS.

G. Paging. Paging facilities are available to both the Nevada Division of Forestry and the Truckee Meadows Fire Protection District, which, when notified of an attack warning or disaster emergency, in turn, via pagers, alert the respective Volunteer Fire Departments under their control.

H. Civil Disturbances. Normally Civil Disturbances will be handled exclusively by County and City Law Enforcement Agencies. There is always the possibility that assistance of the various emergency services could be required. Therefore, the Warning Officer should make every effort to keep the Civil Defense Director aware of the situations as they arise.

I. Direction and Control. The Warning Officer will act in concert with the direction and control elements of the Emergency Operations Center in providing factual information and instructions to the general public. Extreme close coordination between the Warning Section and the Emergency Public Information Section is of prime necessity. These sections have a responsibility to

February 1, 1983

disseminate accurate and timely information to help save lives, reduce injuries and property damage, and to prevent undesirable panic by the general public.

J. Methods of Warning Dissemination to the Public. The general public would receive warning announcements and emergency instructions through several methods. It is known that Nevada and Washoe County has a population that is active 24 hours a day, 7 days a week. There is a large portion of the population that may not receive any warning message or notification. Particular attention must be paid to this concern when disseminating any warning and emergency information message. It may be necessary to use one, a combination or all the following methods of warning dissemination.

1. Emergency vehicles, equipped with sirens, flashing lights and public address system(s).
2. Fixed Sirens, five each, 125 db.
3. Emergency Broadcast System (EBS) which uses radio and television stations.
4. National Weather Service Systems.
5. Door-to-door communication.
6. Word of mouth.
7. Notification of specific businesses, institutions, or organizations having large number of employees and patrons.
  - a. Washoe County School District Administration Offices having 59 schools and 25 ancillary service centers.
  - b. University of Nevada, Reno; having ten separate colleges or schools with 50 separate departments, and 78 separate ancillary support services.
  - c. Truckee Meadows Community College.
  - d. Nevada Mental Health Institute.
  - e. Hotels, motels, gaming facilities, shopping centers, and department stores.
  - f. Airports.
  - g. Hospitals.
  - h. Care Centers.

ANNEX B

APPENDIX I

AGENCIES WITH WARNING FUNCTION

A. The following government and private businesses may have a warning and notification function before, during or after a natural, man-made or nuclear disaster.

1. National Warning System (NAWAS).
2. Emergency Broadcast System (EBS).
3. Local Radio and TV Stations, Reno, Sparks, Carson City and Lake Tahoe.
4. National Weather Service - Severe Weather, River Flood and Flash Flood Warnings.
5. Washoe County Sheriff's Department.
6. Reno and Sparks Police Departments.
7. Reno and Sparks Fire Departments.
8. Truckee Meadows Fire Protection District and VFD's within their jurisdiction.
9. Hospitals and special care facilities.
10. Nevada Highway Patrol.
11. North Lake Tahoe Fire Protection District.
12. Reno Cannon International Airport.
13. Stead Airport.
14. Washoe County Government and Departments.
15. City of Reno, Sparks Governments and Departments.
16. Washoe County School District.
17. Nevada State Civil Defense.
18. Nevada Division of Forestry, Fire Dispatcher, and VFD's within their jurisdiction.
19. Federal Watermaster - Flood Information.
20. U. S. Bureau of Reclamation - Dam Spillage, Leakage or Breakage.
21. U. S. Department of Agriculture, Forest Service.
22. U. S. Department of Interior, Bureau of Land Management.
23. U. S. Coast Guard.
24. Pyramid Lake Indian Tribal Council.
25. California Highway Patrol.
26. Public Utilities.
  - a. Water
  - b. Electric
  - c. Natural and manufactured gas
  - d. Cable television
  - e. Telephone
  - f. Telegraph
27. Southern Pacific Pipeline Co.
28. Southern Pacific Transportation Co.
29. Western Pacific Railroad Co.
30. Volunteer Agencies and Organizations:
  - a. Amateur Radio, ARRL/ARES, RACES, REACT.
  - b. Search and Rescue
  - c. American National Red Cross

February 1, 1983

- d. Salvation Army
  - e. Religious groups: Mennonites, Mormons, Catholic Relief Services.
31. Pyramid Lake Indian Tribal Council.



PART 2

ANNEX B

WARNING

NATURAL AND MAN-MADE OR TECHNOLOGICAL DISASTERS

I. Objective.

The purpose of the following Standard Operating Procedures (SOPs) is to establish guidelines for warning Washoe County inhabitants, visitors and key officials of an impending or actual natural, man-made or technological disaster.

II. Scope.

A. Natural Disasters, Types and Brief Description.

1. River flooding may be caused by rain/snow melt or up-river reservoir dam failure.

2. Flash flooding may be caused by intense short lived summer convective storms in watershed areas having little or no vegetation and when surface soil cannot absorb the moisture.

3. Earthquakes in the form of regional events or local fault movement may register a Richter magnitude of 7 or above.

4. Avalanches in high elevation are caused by excessively heavy snowfall over short periods of time. Hard or icy snow packs add to increased avalanche risk.

5. Landslides are usually due to the massive erosion of soft soils that have been weakened by moisture during any time of the year.

6. Winter storms may bring the occurrence of the following weather conditions, either separately or in combination: blizzard conditions, heavy snow loads, or the accumulation of freezing rain and/or sleet. These conditions may slow or stop normal activities of life in and around the Truckee Meadows. Response activities of emergency services such as: law enforcement, fire services, medical services, utilities, etc., may be slowed or stopped also.

7. Windstorms with winds in excess of 110 miles per hour have been recorded in the cities and county. Winds with speeds as slow as 55 miles per hour have damaged roofs, mobile homes, and exposed structures. Blowing dust and sand will be common.

8. Severe thunderstorms and tornados may occur on the east side of the Sierra's, mainly during the summer. These storms generate winds in excess of 60-80 miles per hour and may produce hail and tornados. Water spouts (funnels of water similar to tornados in open bodies of water) may also be generated as a result of a severe thunderstorm weather condition.

9. Forest and grassland fires are seasonal threats to property and life. Most vulnerable are forested lands and areas of large accumulations of brush and vegetation.

10. Ash from volcanic eruptions may affect the county and will cause problems for large population centers, people with respiratory problems, all unprotected motor vehicles and specialized mechanical and electrical equipment.

B. Man-made or Technological Disasters, Types and Brief Description.

1. Hazardous materials and oil spills on land, water or in the air may cause harm to people and property and natural resources.

2. Upriver reservoir dam failures will cause increased river flow causing flooding problems throughout the Truckee Meadows.

3. Resource shortages in the form of food, medical supplies, consumer goods or essential supplies for long periods of time may necessitate emergency actions.

4. Major domestic disturbances could involve riots, people held as hostages, looting, bombings, attempted government overthrow, jail or prison breaks, etc.

5. Major structural fires and explosions may involve businesses, residential areas, warehousing, public buildings, utilities which could affect the flow of essential goods, services and supplies.

6. Disease epidemics of major proportions of almost any type and source could affect the flow of normal and essential goods, services and supplies.

7. Water system failure or contamination in almost any magnitude would cause an imminent threat to life.

8. Transportation system emergencies or failures may involve the limited highway and road network, the through-town railroad and the two air transport centers.

9. Multiple casualty incidents of major proportions would involve and possibly stress Emergency Medical Services (EMS), hospitals, and first response capabilities and ancillary support services.

10. Communication system failures on a major scale could strand and stress an affected community and emergency response agencies.

11. Major disruption of utility service on a major scale during any specific season would stress and adversely affect the specific community area, possibly the entire population, the response agencies and their ability to manage effective control of the situation.

### III. Operational Concepts.

A. Warning. Any warning of disasters or emergency conditions affecting the county or localized areas in the county or cities would be announced by the Civil Defense Director, the Deputy Director, the Warning Officer or any other appropriate official of the County, the cities or recognized government entity.

B. Method. The method of disseminating any warning or emergency message would be determined at the time of emergency and may vary from event to event or the stage of the emergency condition. The following are recognized methods of warning dissemination:

1. Emergency vehicles, equipped with sirens, flashing lights and public address system(s).
2. Fixed sirens, five each, 125 db.
3. Emergency Broadcast System (EBS) which uses radio and television stations.
4. National Weather Service (NWS) systems.
5. Door-to-door communication.
6. Word of mouth.
7. Notification of specific businesses, institutions, or organizations having large number of employees and patrons.
  - a. Washoe County School District Administration Offices having 59 schools and 25 ancillary service centers.
  - b. University of Nevada, Reno; having ten separate colleges or schools with 50 separate departments, and 78 separate ancillary support services.
  - c. Truckee Meadows Community College.
  - d. Nevada Mental Health Institute.
  - e. Hotels, motels, gaming facilities, shopping centers, and department stores.
  - f. Airports.
  - g. Hospitals.
  - h. Care Centers.

C. Emergency Operating Center (E.O.C.). The E.O.C. may be activated and staffed in whole or in part depending on the nature of the emergency, the need for immediate, combined and coordinated communications and the extent and depth of coordinated response activities.

D. Emergency Public Information. Emergency Public Information (EPI) will be provided through the Washoe County Civil Defense & Disaster Agency by the Coordinator of Public Information and Education Services after consultation with appropriate officials in the E.O.C. or the Emergency Government.

E. Warning Operations. Warning operations information should be maintained and accessible to the senior dispatcher or dispatch supervisor in the dispatch center for the primary and immediate county and city response agencies: Washoe County Sheriff, Truckee Meadows Fire Protection District, Reno Police, Reno Fire, Sparks Police, Sparks Fire, and North Lake Tahoe Fire Protection District. Warning operations information should contain the following information to be used in determining notification priorities.

February 1, 1983

1. County and city maps showing highways, streets, roads, river crossing bridges.

2. County and city maps showing all law enforcement and fire service buildings, siren locations, schools and government offices.

3. The Emergency Telephone Directory.

4. County Warning Plan.

5. County map showing the Truckee River Flood Plain Areas.

F. Volunteers. Recognized volunteer organizations and agencies may be of assistance in notifying the public located in outlying areas of disasters or emergency conditions.

G. Coordination. First response emergency service agencies will manage disaster warning and response activities and may request additional help from support agencies and organizations. In some cases the Civil Defense Director, Deputy Director or Warning Officer will coordinate or assist in the coordination of a warning notification and emergency information. Cooperation and coordination between agencies of political jurisdictions in warning dissemination is necessary in order for all the public to receive and benefit from a warning announcement.

H. Sirens. Five radio activated, 125 db, Civil Defense fixed sirens are installed and operational in the Reno-Sparks area.

1. The encoder and decoder control unit is located in the EOC.

2. All sirens are set to the attack warning mode - a wavering tone. Each unit, individually, may be adapted at their site to sound the steady blast for attention or alert warning.

3. The sirens are area non-selective, that is individual sirens cannot be individually selected. To choose any single or multiple of sirens, the remaining units must be disconnected at their site.

4. There is a recognized deficiency in the number of fixed sirens to adequately cover the Reno/Sparks metropolitan area. No sirens are currently available for communities outside the Reno/Sparks area. Some fire stations in the County may have non-civil defense type fixed sirens but they are small in size, manually operated and provide limited coverage.

I. Mutual Aid. Mutual aid agreements between the cities, the County, and the State could provide an effective level of coordination and supplemental support for response activities.

J. National Warning System (NAWAS). The NAWAS is a special purpose national telephone system that forms a major portion of the National Civil Defense Warning System. The system provides the capability for selective message dissemination nationwide, region-wide (western states, for example)

February 1, 1983

and statewide. Four NAWAS telephones are located in Washoe County.

1. Reno Public Safety Building, Combined Dispatch Center, Sheriff's Dispatch Console. (Primary Warning Point)
2. Washoe E.O.C. (Alternate Warning Point)
3. Nevada Highway Patrol
4. National Weather Service.

The NAWAS may be used inter and intra-county to disseminate warnings and emergency information.

K. National Weather Service (NWS). The NWS warning system is composed of several separate elements: the National Oceanic and Atmospheric Administration (NOAA) Weather Radio (NWR), NOAA Weather Wire Service (NWWS), and the Automated Field Operations System (AFOS). NAWAS communication equipment is also available for emergency message dissemination. The primary mission of both NWR and NWWS is to deliver meteorological and hydrological information to the public with the intent of helping to minimize loss of life and property. The State of Nevada Civil Defense and Disaster Agency has secured an agreement with the NWS to establish procedures whereby the State Civil Defense could relay warning messages over the NWR and NWWS. The agreement allows the state to use these systems when other means of warning dissemination are not adequate to ensure rapid delivery of urgent information. The NWS issues TRAVELERS ADVISORIES, WATCHES and WARNINGS for a series of weather related potential emergencies over their NWR, NWWS, NAWAS and telephone recording.

L. Appendixes. To assist with warning, the following appendixes have been included. These appendixes describe specific systems that are already established.

Appendix I	Civil Defense Office
Appendix II	Public Safety Services
Appendix III	Natural Disasters - Truckee River Flooding
Appendix IV	Natural Disasters - Flash Floods, Severe Thunderstorms, and Urban and Small Stream Flooding
Appendix V	Natural Disasters - Winter Storms, High Winds, Dust Storms and Travelers Advisories
Appendix XI	Man-made Or Technological Disasters - Hazardous Materials and Oil Spills
Appendix XII	Man-made Or Technological Disasters - Up River Reservoir Dam Failure

PART 2

ANNEX B APPENDIX I

CIVIL DEFENSE OFFICE

After determination of the nature and extent of the disaster, the County Warning Officer, at the direction of the Director or Deputy Director, may be required to accomplish the following:

1. Notify KROW Radio Station to activate the Emergency Broadcast System and to provide it with the appropriate warning message and emergency instructions. It may be necessary to contact all radio and television stations to insure that they have received the warning message, emergency instructions and to request they frequently transmit it to their audiences during the warning period.

2. Alert the Dispatcher, County Sheriff's Office, of the emergency and provide appropriate instructions and direct the implementation of Appendix II.

3. Contact volunteer agencies, if time permits, requesting that they stand by to aid in warning activities, or if warning assignments are known, request they assist in the warning operation.

4. Notify the County Manager's Office of the emergency and the current status of operations. The Manager's Office may contact the Board of County Commissioners if conditions warrant.

5. Notify the Reno and Sparks City Managers Offices of the emergency and the current status of operations if appropriate. The City Managers' may contact their respective mayors' and City Councils' if conditions warrant.

6. Notify all General Improvement District Managers Offices of the emergency and the current status of operations if appropriate. Those managers may contact their Board of Directors if conditions warrant.

7. Notify all other response and appropriate support agencies not affected by the disaster emergency, that a disaster emergency is imminent or in progress and that assistance may be requested at a later time.

8. Establish a telephone warning system (time permitting) using available personnel to alert as many affected people as possible. The following general categories may serve as a guide to possible locations of large groups of people.

- a. Government and public agencies.
  - City of Reno and Sparks.
  - Washoe County government.
  - Washoe County School District.
  - University of Nevada-Reno.
  - Schools - parochial and private.

- b. Medical and Care Facilities
  - Hospitals

February 1, 1983

Senior citizen care facilities  
Child care facilities  
Clinics  
Doctors offices

c. Utilities.

Electric.  
Gas, natural and manufactured  
Water  
Cable television  
Telephone  
Sewer and storm drain service

d. Private Business.

Financial, Banks, Savings and Loans  
Shopping Centers  
Hotels and Motels  
Apartment and Condominium Complexes  
Casinos  
Transportation systems  
Retail, department and grocery stores  
Restaurants

e. Recreational areas, events.

Parks, camps  
Ski areas  
Fitness centers  
Theaters, galleries  
Convention centers  
Reno Championship Air Races  
Reno Rodeo  
Nevada State Fair  
Sports performance sites

PART 2

ANNEX B APPENDIX II

PUBLIC SAFETY SERVICES

- A. The Washoe County Sheriff, Coordinator of Public Safety Services, may direct and control the operations of law enforcement and fire services as specified in the Basic Plan.
  - B. Initial and primary authority for an emergency lies with the city, County or other political jurisdiction in which the emergency occurs. The Incident Command System has been adopted by several primary response agencies and is used to orient activities.
  - C. As required by the disaster emergency, other agencies within the cities or County may be called on to assist with the warning function.
  - D. The following should be accomplished by dispatcher of the affected political jurisdiction or the Sheriff's Office:
    1. Notify the Senior Staff Deputy Sheriff present or on duty, relay the pertinent emergency instructions and direct him to implement their emergency response plan to the extent required by the event.
    2. Notify the Civil Defense Director or Deputy Director. If contacted and if the emergency warrants it, the Civil Defense Office will contact the following:
      - a. County Manager or Assistant County Manager
      - b. Chairman, Board of County Commissioners
      - c. Reno/Sparks City Manager
      - d. Reno/Sparks Mayor and City Council
- NOTE: In the event the City Managers cannot be reached, contact the City Police to notify their Manager, Mayor and City Council.
3. Notify the appropriate Police and Fire Departments of the emergency, relay the pertinent emergency instructions and direct them to implement their emergency response plan to the extent required by the event.
  4. Notify the appropriate Sheriff's Substations and direct them to implement their emergency response plans.
  5. Coordinate the use of volunteer agencies under the Sheriff's jurisdiction to the extent that they can perform a warning function.



PART 2

ANNEX B APPENDIX III

NATURAL DISASTERS

TRUCKEE RIVER FLOODING

A. River flooding is likely to be preceded by an unknown period of lead time. The National Weather Service (NWS) and the U. S. Federal Court Watermaster (Watermaster) receive river flow information through a specialized monitoring and telemetry system. The U. S. Geological Survey (USGS) operates the river monitoring stations and the NWS operates the telemetry system.

B. The Watermaster's primary mission is to regulate up-river water reservoir storage, monitor river flows, forecast river flow rates, and monitor the snow pack performance in terms of water content, amount of snow and it's temperature. The Watermaster will notify the following agencies when river flows and weather conditions indicate possible flooding conditions.

1. National Weather Service
2. U. S. Geological Survey
3. Washoe County Civil Defense and Disaster Agency
4. Sierra Pacific Power Company
5. Truckee Carson Irrigation District
6. Bureau of Reclamation
7. Army Corps of Engineers, Sacramento, California
8. Flood Control Center, Sacramento, California

C. The NWS mission is to deliver meteorological data and hydrological information to the public with the intent of helping to minimize loss of life and property damage. The NWS, upon receiving and analyzing river flow and meteorological data will issue an INFORMATION STATEMENT or WARNING with emergency instructions. An INFORMATION STATEMENT is designed to alert and inform agencies and the public that potential emergency conditions may or may not exist. A WARNING is an emergency message designed to alert agencies and the public of an imminent threat to life and property is present. The following will be notified by the NWS in the event of a WARNING condition.

1. Washoe County Civil Defense and Disaster Agency
2. Watermaster
3. Law Enforcement
4. State Civil Defense Agency
5. United Press International and Associated Press International
6. Local Media
7. Nevada Highway Patrol (NHP)
8. U. S. Geologic Survey (USGS)

The following agencies will be notified by the U.S. Federal Court Watermaster.

1. Public Works of Washoe County, City of Reno and City of Sparks
2. Reno-Sparks Joint Waste Water Treatment Plant

February 1, 1983

3. Sierra Pacific Power Company
4. Tahoe City and Boca Reservoir Gate Tender
5. Department of Interior, Bureau of Reclamation
6. Nevada Department of Transportation
7. Reno Downtown Merchants

D. Any agency or organization not listed in Sections B or C that have a warning or notification function should be contacted immediately to ensure a coordinated emergency response. For example, the District Health Department may be advised in the event of water contamination or overflowing sewage problems.

E. The following UNOFFICIAL and generalized river flow data is to be used as GUIDELINES for potential river flooding.

1. Lockwood - 6,000 cubic feet per second (CFS) suggest updating reports and gather more data, initial minor flooding.

2. Reno: Idlewild Park, Wingfield Park, Arlington, Sierra, Virginia, Center and Lake Street bridges - 8,000 CFS suggests updating reports and gather more data, continue to monitor flow reports.

3. Reno gauging station near Kietzke - 10-12,000 CFS concerned, beginning stages of flooding, active preparations to be made, water may leave channel.

4. Reno gauging station near Kietzke - 14,000 CFS initial flood stages, river overflowing banks, streets receiving water, active control, prepare for emergency. Flows in excess of 14,000 CFS will require emergency response activities - flooding will take place. Protect businesses and residences, prohibit pedestrian and vehicle traffic in affected areas.

F. Refer to the Basic Plan, Annex V of the Washoe County Disaster Plan for Flood Control Operations.

PART 2

ANNEX B APPENDIX IV

NATURAL DISASTERS

TORNADOS, FLASH FLOODS, SEVERE THUNDERSTORMS AND URBAN AND SMALL STREAM FLOODING

A. National Weather Service (NWS). The NWS lists flash floods, tornados, severe thunderstorms, and urban and small stream flooding as hazards having a "Short Fused Warning" notification period.

B. Flash floods may occur in almost any sparsely vegetated drainage area of Washoe County. Heavy summer convective thunderstorm precipitation may cause intensive surface runoff for short periods of time. Storm water runoff from a single storm may create an emergency condition for anyone or anything located in its path.

C. Urban small stream flooding may be caused by the collection of rain water from large areas of impervious material, i.e., cement, asphalt and structures, the backing up of storm drain systems or heavier than normal flows in intermittent creeks and watersheds. Both urban flooding and small stream flooding are normally less of a threat to life and property than a flash flood but they can cause temporary and localized emergencies. An urban and small stream flood INFORMATION STATEMENT is issued for local flood situations.

D. It is difficult to determine exactly where a flash flood, thunderstorm, or urban and small stream flooding will occur, even with the aid of sophisticated equipment, such as NWS weather radar. A storm cell may not pose a problem if it is steadily moving. On the other hand, if a storm builds, and remains somewhat stationary, the NWS will issue a FLASH FLOOD WATCH. People are then alerted and preparations are made for a flood emergency.

E. The NWS will issue a FLASH FLOOD WARNING for an area where a flood is imminent or is in progress. Because of the rapid rise and fall of the water and the short period for warning, an immediate move to high ground is imperative. The following agencies and the public will be notified by NWS.

1. Law Enforcement, N.H.P. and Washoe County Sheriff.
2. Washoe County Civil Defense and Disaster Agency

F. In addition to the NWS notification list, the Washoe County Civil Defense and Disaster Agency should contact the following to provide a coordinated emergency response, if applicable.

1. State Civil Defense
2. Public Works, Washoe County and Cities of Reno and Sparks
3. Washoe County District Health Department
4. Other responsible city, county, and private sector organizations.

SUMMARY: Amends Chapter 100 of the Washoe County Code by adding requirement for development of property within areas subject to flood damage.

BILL NO. \_\_\_\_\_

ORDINANCE NO. \_\_\_\_\_

AN ORDINANCE AMENDING CHAPTER 100 OF THE WASHOE COUNTY CODE BY ADDING TO THE BUILDING CODE REQUIREMENTS FOR THE CONSTRUCTION, ENLARGEMENT, CONVERSION, ALTERATION OR MOVING OF A STRUCTURE OR THE ALTERATION OF LAND WITHIN AREAS SUBJECT TO FLOOD DAMAGE.

THE BOARD OF COUNTY COMMISSIONERS OF THE COUNTY OF WASHOE DO ORDAIN:

SECTION 1. Section 100 of the Washoe County Code is hereby amended by adding thereto the provisions set forth as sections 2 to 24, inclusive, of this ordinance:

SECTION 2.

100.600. Title and Purpose. The purpose of the sections 100.600 through 100.700 is to safeguard the public health, safety and welfare by establishing guidelines and requirements for development of property within areas determined to be subject to flood damage. These sections may be cited as the Flood Hazard Reduction Ordinance.

SECTION 3.

100.605. Definitions. Unless specifically defined below, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this ordinance its most reasonable application. The following words and phrases when used in this ordinance shall have the meanings respectively ascribed to them:

1. Alluvial Fan is an area subject to flooding when the floodplain is comprised of a series of low flow channels where sediment accompanies the shallow flooding and the unstable soils scour and erode during a flooding event.

2. Area of Shallow Flooding is a designated AO Zone on the Flood Insurance Rate Map (FIRM). The base flood depths range from one to three feet; a clearly defined channel does not exist; the path of flooding is unpredictable and indeterminate; and, velocity flow may be evident.

3. Base Flood is the flood having a one percent (1%) chance of being equalled or exceeded in any given year.

4. Development is any man-made change to improved or unimproved real estate, including but not limited to buildings or other

structures, mining, dredging, filling, grading, paving, excavation or drilling operations.

5. Engineer is a registered professional engineer in the State of Nevada.

6. Existing Mobile Home Park or Mobile Home Subdivision is a parcel (or contiguous parcels) of land divided into two or more mobile home lots for rent or sale for which the construction of facilities for servicing the lots on which the mobile home is to be affixed (including, at a minimum, the installation of utilities, either final site grading or the pouring of concrete pads, and the construction of streets) is completed before the effective date of this ordinance.

7. Expansion to an Existing Mobile Home Park or Mobile Home Subdivision is the preparation of additional sites by the construction of facilities for servicing the lots on which the mobile homes are to be affixed (including the installation of utilities, either final site grading or pouring of concrete pads, or the construction of streets).

8. Flood or Flooding is a general and temporary condition of partial or complete inundation of normally dry land areas from:

- a. the overflow of inland waters and/or
- b. the unusual and rapid accumulation of runoff of surface waters from any source.

9. Flood Boundary Floodway Map (Floodway) is the official map on which the Federal Insurance Administration has delineated both the areas of flood hazard and the floodway.

10. Flood Hazard Area is the area designated as being flooded by the Base Flood, and is designated as any "Zone A" on the Flood Insurance Rate Map (FIRM).

11. Flood Insurance Rate Map (FIRM) is the official map on which the Federal Insurance Administration has delineated the Flood Hazard Area, the Limited Flooding Area, and the risk premium zones applicable to the community.

12. Flood Insurance Study (FIS) is the official report provided by the Federal Emergency Management Agency that includes flood profiles, the Flood Insurance Rate Map (FIRM), the Flood Boundary Floodway Map (Floodway), and the water surface elevation of the base flood.

13. Floodproofing means any combination of structural and nonstructural additions, changes or adjustments to non-residential structures which reduce or eliminate flood damage to real estate or improved property.

14. Floodway means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one (1) foot. The floodway is delineated on the Flood Boundary Floodway Map.

15. Habitable Floor means any floor usable for living purpose, which includes working, sleeping, eating or recreation, or a combination thereof. For flood insurance purposes lowest habitable floor and lowest finished floor will share the same definition.

16. Highest Existing Grade means the highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

17. Limited Flooding Area is the area between the limits of the Base Flood (100 year flood) and the 500 year flood; or certain areas subject to 100 year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one (1) square mile; or areas protected by levees from the base flood. This area is designated as "Zone B" on the Flood Insurance Rate Map (FIRM).

18. Manufactured Unit is a prefabricated structure in one or more sections that is assembled on-site with a permanent foundation.

19. Mobile Home is a structure that is transportable in one or more sections, built on a permanent chassis, and designed to be used with or without a permanent foundation when connected to the required utilities. It does not include recreational vehicles or travel trailers, or manufactured unit housing on permanent slab foundations.

20. New Construction means structures for which the "start of construction" commenced on or after the effective date of this ordinance.

21. New Mobile Home Park or Mobile Home Subdivision is a parcel (or contiguous parcels) of land divided into two or more mobile home lots for rent or sale for which the construction of facilities or servicing the lot (including, at the minimum, the installation of utilities, either final site grading or the pouring of concrete pads, and the construction of streets) is completed on or after the effective date of this ordinance.

22. Start of Construction means any form of site preparation or the construction or erection of permanent improvements whichever occurs first.

23. Structure is a walled and roofed building or mobile home that is principally above ground.

24. Substantial Improvement means any repair, reconstruction, or improvement to a structure, the cost of which equals or exceeds fifty percent (50%) of the market value of the structure either:

- a. before the improvement or repair is started, or
- b. if the structure has been damaged and is being restored, before the damage occurred. For the purposes of this definition, "substantial improvement" is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure.

This term does not, however, include either:

- a. any project for improvement of a structure to comply with existing state or local health, sanitary or safety code specifications which are solely necessary to assure safe living conditions, or
- b. any alteration of a structure listed on the National Register of Historic Places or a State Inventory of Historic Places.

25. Surveyor is a registered land surveyor in the State of Nevada.

26. Variance means a grant of relief from the requirements of this ordinance which permits construction in a manner that would otherwise be prohibited by this ordinance.

#### SECTION 4.

100.610. Lands to which this ordinance applies. This ordinance shall apply to all flood hazard areas (Zone A) and limited flooding areas (Zone B) within the jurisdiction of Washoe County.

#### SECTION 5.

100.615. Basis for establishing flood hazard areas and limited flooding areas. The flood hazard areas (Zone A) and limited flooding areas (Zone B) identified by the Federal Insurance Administration, through the Federal Emergency Management Agency in a scientific and engineering report entitled "The Flood Insurance Study for Washoe County, Nevada, Unincorporated Areas" dated February 1, 1984, with the accompanying Flood Insurance Rate Map, which is hereby adopted by reference and declared to be a part of this ordinance. The Flood Insurance Study is on file at the Washoe County Public Works Department, 1205 Mill Street, Reno, Nevada, 89502.

## SECTION 6.

100.620. Compliance. No structure or land shall, after the effective date of this ordinance, be constructed, located, extended, converted, or altered without full compliance with the terms of this ordinance and other applicable regulations.

## SECTION 7.

100.625. Abrogation and greater requirements. This ordinance is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this ordinance and another chapter, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent requirement shall prevail.

## SECTION 8.

100.630. Interpretation. In the interpretation and application of this ordinance, all provisions shall be considered as minimum requirements, shall be liberally construed in favor of the County, and shall be deemed to neither limit nor repeal any other powers granted under State statutes.

## SECTION 9.

100.635. Warning and disclaimer of liability. The degree of flood protection required by this ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur on rare occasions. This ordinance does not imply that land outside flood hazard areas or limited flooding areas or uses permitted within such areas will be free from flooding or flood damages. This ordinance shall not create liability on the part of Washoe County, any officer or employee thereof, or the Federal Insurance Administration, for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made thereunder.

## SECTION 10.

100.640. Letter of map amendment.

1. If an owner or developer of property believes the property to be inappropriately designated as being in a flood hazard area (Zone A), or an area of limited flooding (Zone B) on the Flood Insurance Rate Map, appeal may be made to the Federal Emergency Management Agency (FEMA). If the appellant shows either that the property is higher in elevation than the base flood, that the elevation of the base flood is incorrect, or that the boundaries of the base flood are incorrect, the Federal Emergency Management Agency will provide the owner or developer with a Letter of Map Amendment (LOMA) which will exempt the property from the requirements of this ordinance and which may



exempt the owner from the mandatory purchase of flood insurance.

2. All appeals must be submitted to the Public Works Director for review. The Public Works Director will transmit the appeals to the Federal Emergency Management Agency for its consideration. Appeals must include the following:

- a. An actual stamped copy of the recorded plat of the property showing official recordation and proper citation, or a photocopy of the property's legal description as shown on the recorded deed (e.g., lot, block, and plot number, etc.), together with a photocopy of the appropriate page of the County Assessor's parcel map.
- b. A copy of the Flood Insurance Rate Map (FIRM) with the location of the property identified.
- c. Certification by an engineer or surveyor stating:
  - (1) the type of structure,
  - (2) the elevation of the lowest finished grade adjacent to the structure, which must be above the base flood elevation,
  - (3) the elevation of the top of the lowest finished floor.
- d. When appealing the elevation or boundaries of the base flood, a thorough technical hydrological study of the contributing area which will substantiate the appeal must be submitted and must be certified by an engineer.
- e. A signed copy of the statement asserting the accuracy of the information, submitted on the form entitled "Request for Letter of Map Amendment".

#### SECTION 11.

100.645. Building and/or grading permit required. Any person desiring to construct, locate, extend, convert, or alter a structure or alter any land within any flood hazard area (Zone A) or limited flooding area (Zone B) must obtain a building and/or grading permit. The County Department of Public Works shall determine whether the proposed development is within any flood hazard area (Zone A) or limited flooding area (Zone B). If so, the procedures and requirements set forth hereinafter must be satisfied before a building and/or grading permit is issued.

#### SECTION 12.

100.650. Responsibilities of the owner or developer:

1. The owner or developer shall submit the following information for review by the County:

- a. The elevation of the base flood at the site(s) proposed for development;
- b. In a numbered Zone A (i.e. A2, A4, A6, etc.), proposed elevation in relation to mean sea level of the top of the lowest habitable floor of all structures, certified by an engineer or surveyor; in an un-numbered Zone A, Zone A0 and Zone B, elevation of highest existing grade and proposed elevation of the top of the lowest habitable floor of all structures, certified by an engineer or surveyor.
- c. Proposed elevation in relation to mean sea level to which any structure will be floodproofed, certified by an engineer or surveyor.
- d. Certification by an engineer that the floodproofing methods used for any non-residential structure meet the floodproofing criteria in Section 14.
- e. Plans for any watercourse proposed to be altered or relocated, which must be designed by an engineer in conformance with the requirements of Washoe County. The flood carrying capacity of the unaltered watercourse shall be maintained in the altered watercourse.
- f. An operation and maintenance plan for any and all acceptable flood protection measures, such as levees, dams, dikes, reservoirs, etc.

2. The owner or developer shall obtain a permit from the State of Nevada Division of State Lands and any other applicable agency before altering or relocating any waterway under the jurisdiction of such agency. This permit will be provided to the County.

3. The owner or developer shall be responsible for compliance with all provisions of this ordinance. Additionally, the owner or developer shall provide the County with "as-built" certification by an engineer or surveyor as to the elevation requirements of this ordinance or if floodproofing is a permissible means of compliance, shall provide the County with "as-built" certification by an engineer as to the floodproofing requirements of this ordinance for any applicable non-residential structure. Said certification shall be required at such time as the lowest finished floor has been constructed. Failure to submit said certification shall be cause to issue a stop-work for the project.

## SECTION 13.

### 100.655. Responsibilities of the County.

1. The County will review all permit applications to determine:
  - a. That the requirements of this ordinance have been satisfied;
  - b. That the cumulative effect of the proposed development when combined with all other existing and anticipated development will not increase the water surface elevation of the base flood more than one (1) foot at any point.
2. The County will maintain for public inspection and make available as needed for flood insurance policies all certifications required in this ordinance.
3. The County will insure that adjacent affected communities and the State of Nevada Division of Emergency Management are notified prior to any alteration or relocation of a watercourse and submit evidence of such notification to FEMA.
4. The County will provide interpretations, where needed, as to the location of the boundaries of the flood hazard areas and limited flooding areas, and the elevation of the base flood, if known.
5. When base flood elevation data has not been provided in accordance with Section 100.615, the County shall utilize the best available data in order to assist the developer in determining an estimated base flood elevation. If deemed necessary by the County, the owner or developer may be required to provide an engineered hydrological study to determine the base flood flow and elevations.
6. The County will maintain on file in the County Public Works Office all operation and maintenance plans submitted by the developer for any and all acceptable flood protection measures.

## SECTION 14.

100.660. Standards of construction. In all flood hazard areas (Zone A), and limited flooding areas (Zone B), the following standards are required:

1. Anchoring:
  - a. All new construction and substantial improvement shall be anchored to prevent flotation, collapse or lateral movement of

the structure.

- b. All mobile home units shall meet the anchoring standards of Sec. 100.680 (1).

2. Construction materials and methods:

- a. All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage.
- b. All new construction and substantial improvements shall use methods and practices that minimize flood damage.
- c. All elements that function as a part of the structure, such as furnace, hot water heater, air conditioner, etc., shall be elevated to one foot or more above the base flood elevation or depth number specified on the Flood Insurance Rate Map (FIRM).

3. Elevation and floodproofing:

- a. In a numbered Zone A (i.e., A2, A4, A6, etc.), new construction and substantial improvement of any structure shall have the top of the lowest floor (including basement floor) elevated to one (1) foot or more above the base flood elevation. Non-residential structures will meet the standards in subsection (e) below.
- b. In a Zone A0, new construction and substantial improvement to any structure shall have the top of the lowest floor (including basement floor) elevated to at least one (1) foot above the depth number specified on the Flood Insurance Rate Map (FIRM). Non-residential structures will meet the standards in subsection (e) below.
- c. In an un-numbered Zone A, new construction and substantial improvement to any structure shall have the top of the lowest floor (including basement) elevated to either:
  - (1) A height of at least two (2) feet above the highest adjacent undisturbed ground elevation if no base flood elevation has been determined, or
  - (2) A height of at least one (1) foot above

the base flood elevation as determined by an engineered hydrological study provided by the owner or developer, if deemed necessary by the County.

Non-residential structures will meet the standards in subsection (e) below.

- d. In Zone B, new construction and substantial improvement to any structure shall have the top of the lowest floor (including basement floor) elevated to at least two (2) feet above the highest adjacent undisturbed ground elevation. Non-residential structures will meet the standards of subsection (e) below.
- e. Non-residential construction shall either be elevated in conformance with subsections (a), (b), (c), or (d) above, or together with attendant utility and sanitary facilities, be floodproofed to the same appropriate elevations as the top of the lowest floor elevations as indicated in subsections (a), (b), (c) or (d) above. Examples of floodproofing include, but are not limited to:
  - (1) Installation of watertight doors, bulkheads, and shutters.
  - (2) Reinforcement of walls to resist water pressure.
  - (3) Use of paints, membranes, or mortars to reduce seepage through walls.
  - (4) Addition of mass or weight to the structure to resist flotation.
  - (5) Armor protection of all fill materials from scour and erosion.
- f. Mobile homes shall meet the above standards and also the standards in Section 100.680.

#### SECTION 16.

100.665. Standards for alluvial fans. Areas subject to alluvial fan flooding have irregular flow paths that result in erosion of existing channels and the undermining of fill material. Those areas are identified on the Flood Insurance Rate Map (FIRM) as A0 Zones with velocities.

- 1. All structures must be securely anchored to

minimize the impact of the flood and sediment damage.

2. All new construction and substantial improvements must be elevated on pilings, columns, or armored fill so that the top of the lowest floor is elevated at least one (1) foot above the depth number. It should be noted that a Letter of Map Amendment will not be granted by FEMA to structures elevated on pilings or columns.

3. Use of all fill materials must be armored to protect the material from the velocity of the flood flow.

4. All proposals for subdivision development must provide a mitigation plan that identifies the engineering methods used to:

- a. Protect structures from erosion and scour caused by the velocity of the flood flow.
- b. Capture or transport flood and sediment flow through the subdivision to a point of deposition that will not create a health or safety hazard.

#### SECTION 17.

##### 100.670. Standards for utilities.

1. All new and replacement water supply and sanitary sewerage systems shall be designed to minimize or eliminate infiltration of flood waters into the system and discharge from systems into flood waters.

2. On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding.

#### SECTION 19.

##### 100.675. Standards for subdivisions.

1. All tentative subdivision maps shall identify the flood hazard area, the limited flooding area, and the elevation of the base flood.

2. All subdivision improvement plans shall identify the flood hazard area, the limited flooding area, the elevation of the base flood, the elevation of proposed structure(s), pads, and adjacent grade. If the site is filled above the base flood, the final pad elevation shall be certified by an engineer or surveyor and provided to the County.

3. All subdivision proposals shall be consistent with the need to minimize flood damage.

4. All subdivision proposals shall have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize flood damage.

5. All subdivision proposals shall have adequate drainage provided to reduce exposure to flood damage as set forth in this ordinance.

#### SECTION 20.

##### 100.680. Standards for mobile homes, mobile home parks and mobile home subdivisions.

1. All new mobile homes and additions to mobile homes shall be set on permanent foundation by anchoring the unit to resist flotation, collapse, or lateral movement by one of the following methods:

- a. By providing an anchoring system designed to withstand horizontal forces of fifteen (15) pounds per square foot and uplift forces of nine (9) pounds per square foot, and vertical (down) loading as required by NRS 489.251.
- b. By the anchoring of the unit's system, designed to be in compliance to the Department of Housing and Urban Development Mobile Home Construction and Safety Standards; or
- c. By bolting the frame or undercarriage to a reinforced, permanent foundation such as a retaining wall or storm wall used to set the unit.

2. The following standards are required for mobile homes not placed in mobile home parks or subdivisions, new mobile home parks or subdivisions, expansions to existing mobile home parks or subdivisions, and repair, reconstruction, or improvements to existing mobile home parks or subdivisions that equals or exceeds fifty percent (50%) of the value of the streets, utilities, and pads before the repair, reconstruction, or improvement commenced.

- a. Adequate surface drainage and access for a hauler shall be provided.
- b. All mobile homes shall be placed on pads or lots elevated on compacted fill and protected against erosion or on pilings so that the lowest floor of the mobile home is at least one (1) foot above the base flood level. If elevated on pilings:

- (1) The lots shall be large enough to permit steps;
- (2) The pilings shall be placed in stable soil no more than ten (10) feet apart; and
- (3) A lateral reinforcement shall be provided for pilings taller than six (6) feet above ground level.
- (4) It should be noted that a Letter of Map Amendment will not be granted by FEMA to structures elevated on pilings or columns.

3. No mobile home shall be placed in a floodway, except in an existing mobile home park or existing mobile home subdivision.

4. No expansion to an existing mobile home park or mobile home subdivision shall be allowed in a floodway.

#### SECTION 21.

100.685. Floodways. Located within flood hazard areas are areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of flood waters which carry debris, potential projectiles, and erosion potential, all new encroachments, including fill, new construction, substantial improvements, and other developments is prohibited in the floodway.

#### SECTION 22.

##### 100.690. Appeal Board; Variance Procedures.

1. The Board of Washoe County Commissioners shall hear and decide appeals and requests for variances from the requirements of the ordinance.

2. The Board of Washoe County Commissioners shall hear and decide appeals when it is alleged there is an error in any requirement, decision or determination.

3. In passing upon such applications, the Board of Washoe County Commissioners shall consider all technical evaluations, all relevant factors, standards, etc., specified in other Sections of this ordinance, and:

- a. The danger that materials may be swept onto other lands to the injury of others.



- b. The danger to life and property due to flooding or erosion damage.
- c. The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner.
- d. The importance of the services provided by the proposed facility to the community.
- e. The necessity to the facility of a waterfront location, where applicable.
- f. The availability of alternative locations; for the proposed uses that are not subject to flooding or erosion damage.
- g. The compatibility of the proposed use with existing and anticipated development.
- h. The relationship of the proposed use to the comprehensive plan and floodplain management program for that area.
- i. The safety of access to the property in times of flood for ordinary and emergency vehicles.
- j. The expected heights, velocity, duration, rate of rise, and sediment transport of the flood waters expected at the site.
- k. The costs of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical, and water system, and streets and bridges.

4. Upon consideration of the factors of Section 100.690(3) and the purpose of this ordinance, the Board of Washoe County Commissioners may attach such conditions to the granting of variances as it deems necessary to further the purpose of this ordinance.

5. The Washoe County Public Works Department shall maintain the records of all appeal actions and report any variances to the Federal Emergency Management Agency upon request.

#### SECTION 23.

100.695. Conditions for variances.

1. Variances may be issued for the reconstruction, rehabilitation or restoration of structures listed on the National Register of Historic Places or the State Inventory of Historic Places without regard to the procedures set forth in the remainder of this Section.

2. Variances shall not be issued within any designated floodway if any increase in flood levels during the base flood discharge would result.

3. Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.

4. Variances shall only be issued upon:

- a. A showing of good and sufficient cause such as renovation, rehabilitation, or reconstruction. Variances issued for economic considerations, aesthetics, or because variances have been used in the past, are not good and sufficient cause.
- b. A determination that failure to grant the variance would result in exceptional hardship to the applicant.
- c. A determination that the granting of a variance will not result in additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization to the public, or conflict with existing local laws or ordinances.

5. Any applicant to whom a variance is granted shall be given written notice that the structure will be permitted to be built with a lowest floor elevation below the base flood elevation and that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced lowest floor elevation.

#### SECTION 24.

100.700. Penalties for violations. Any person who violates the provisions of sections 100.600 to 100.700 is guilty of a misdemeanor and shall be punished as provided in section 125.050.

Proposed on the \_\_\_\_\_ day of \_\_\_\_\_, 1984.

Proposed by Commissioners \_\_\_\_\_.

Passed on the \_\_\_\_\_ day of \_\_\_\_\_, 1984.

Vote:

Ayes: Commissioners:

Nays: Commissioners:

Absent: Commissioners:

\_\_\_\_\_  
Chairman of the Board

ATTEST:

\_\_\_\_\_  
County Clerk

This ordinance shall be in force and effect from and after the  
\_\_\_\_ day of \_\_\_\_\_, 1984.

SUMMARY: Amends Washoe County Code by revising provisions of Flood Hazard Reduction Ordinance.

BILL NO. 157

ORDINANCE NO. 683

AN ORDINANCE AMENDING THE WASHOE COUNTY CODE BY ADDING THERETO PROVISIONS ALLOWING SUBSTANTIAL IMPROVEMENTS TO BE MADE TO EXISTING STRUCTURES WITHIN FLOODWAYS.

THE BOARD OF COUNTY COMMISSIONERS OF THE COUNTY OF WASHOE DO ORDAIN:

SECTION 1. Section 100.685 of the Washoe County Code is amended to read as follows:

100.685 Development in floodways prohibited. Each and every new encroachment, including fill, new construction, substantial improvement, and other development, is prohibited in a designated floodway, unless, in the case of substantial improvements, certification by a registered professional engineer is provided demonstrating that the substantial improvements shall not result in any increase in flood levels during the occurrence of the base flood discharge.

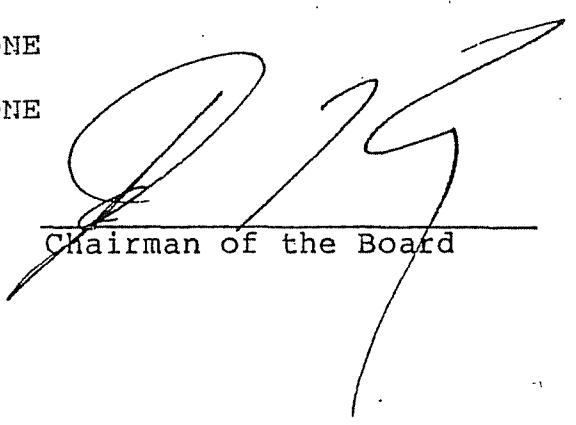
Proposed on the 11TH day of MARCH, 1986.  
Proposed by Commissioners LILLARD, MCDOWELL, KING, RITTER & WILLIAMS  
Passed on the 11TH day of MARCH, 1986.

Vote:

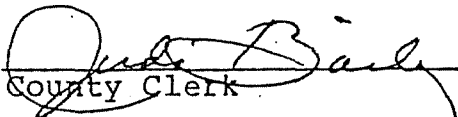
Ayes: Commissioners: LILLARD, MCDOWELL, KING, RITTER & WILLIAMS

Nays: Commissioners: NONE

Absent: Commissioners: NONE

  
Chairman of the Board

ATTEST:

  
County Clerk

This ordinance shall be in force and effect from and after the 24TH day of MARCH, 1986.