2002

Flood Insurance Study, Salt Lake County, Utah, and Incorporated Areas, Volume 1 of 3

Federal Emergency Management Agency

FLOOD INSURANCE STUDY

SALT LAKE COUNTY, UTAH

AND INCORPORATED AREAS

VOLUME 1 OF 3

49035CV001

COMMUNITY NAME	COMMUNITY NUMBER
*ALTA, TOWN OF	490251
BLUFFDALE, CITY OF	490247
DRAPER, CITY OF	490244
HERRIMAN, TOWN OF	490252
HOLLADAY, CITY OR	490253
MIDVALE, CITY OF	490211
MURRAY, CITY OF	490103
RIVERTON, CITY OF	490104
SALT LAKE CITY, CITY OF	490105
SANDY CITY, CITY OF	490106
SOUTH JORDAN, CITY OF	490107
SOUTH SALT LAKE, CITY OF	490219
TAYLORSVILLE, CITY OF	490248
WEST JORDAN, CITY OF	490108
WEST VALLEY CITY, CITY OF	490245
SALT LAKE COUNTY, UNINCORPORATED AREAS	490102

*NON-FLOODPRONE COMMUNITIES

REVISED: MAY 15, 2002

Federal Emergency Management Agency

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this Flood Insurance Study may be revised and republished at any time. In addition, part of this Flood Insurance Study may be revised by the Letter of Map Revision process, which does not involve republication or redistribution of the Flood Insurance Study. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current Flood Insurance Study components.

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PUBLISHED SEPARATELY:

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Flood Insurance Rate Map

FLOOD INSURANCE STUDY
SALT LAKE COUNTY, UTAH AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study revises and updates information on the existence and severity of flood hazards in the geographic area of Salt Lake County, including the Cities of Bluffdale, Draper, Holladay, Midvale, Murray, Riverton, Salt Lake City, Sandy City, South Jordan, South Salt Lake, Taylorsville, West Jordan, and West Valley City; the Towns of Alta and Herriman; and the unincorporated areas of Salt Lake County (referred to collectively herein as Salt Lake County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood-risk data for various areas of the community that will be used to establish actuarial flood insurance rates and to assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3. Please note that the Town of Alta is non-floodprone.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for the original study were performed by Rollins, Brown and Gunnell, Inc., for the Federal Emergency Management Agency (FEMA), under Contract No. H-4593. The redelineation of flood boundaries on Big Cottonwood Creek (downstream of Millrace Lane) was performed by Dames & Moore under Contract No. C-0542.

This study covered all significant flooding sources, with the exception of an approximate hydraulic analysis of the Great Salt Lake, affecting the unincorporated areas of Salt Lake County and the incorporated areas of Draper, Murray, Salt Lake City, Sandy City, South Jordan, and South Salt Lake. The work for Salt Lake County and the Cities of Murray, South Jordan, and South Salt Lake was completed in May 1982; for the Cities of Draper and Sandy City in May 1983; and for the City of Salt Lake City in July 1981.

The original study for the unincorporated areas of Salt Lake County was revised on June 19, 1989, to incorporate the effects of a revised hydraulic analysis for a reach of Little Cottonwood Creek from Willow Creek Drive to a point approximately 5,000 feet upstream. This revised hydraulic analysis was based on more detailed topographic information for this reach and was prepared by Bush and Gudgell, Inc., Salt Lake City, Utah. The result of this analysis was a decrease in the width of the floodway along Little Cottonwood Creek.

information for this reach and was prepared by Bush and Gudgell, Inc., Salt Lake City, Utah. The result of this analysis was a decrease in the width of the floodway along Little Cottonwood Creek.

This study was revised again on September 30, 1994, to include the restudy of the Jordan River conducted by CH2M Hill, for FEMA, under Contract No. EMW-90-C-3104. This work was completed in November 1992, and affected the Cities of Bluffdale, Midvale, Murray, Riverton, West Jordan, and West Valley City.

The hydrologic and hydraulic analyses for a restudy affecting the unincorporated areas of Salt Lake County and the Cities of Murray and South Salt Lake was performed by CH2M Hill, for FEMA under Contract No. EMW-93-C-4125. The work was completed on September 30, 1997.

The restudy provided detailed flood-hazard information for Big Cottonwood Creek from its confluence with the Jordan River for approximately 18,540 feet upstream, to 900 East Street, for Little Cottonwood Creek from its confluence with the Jordan River to 900 East Street and for Mill Creek from its confluence with the Jordan River to 3300 South Street, approximately 15,990 feet upstream of the confluence.

1.3 Coordination

The community base map selection and the identification of streams requiring detailed study for the original studies were performed in Consultation Coordination Officer (CCO) meetings within each community. The results of the studies were reviewed at the final CCO meetings. All problems raised during the final meeting have been addressed in this study.

The dates of the initial, intermediate, and final CCO meetings held for Salt Lake County and the incorporated communities are shown in Table 1, "Historic Consultation Coordination Officer Meeting Dates".

Salt Lake County, unincorporated areas; the Cities of Draper, Murray, Sandy City, South Jordan, and South Salt Lake:

Streams to be designated for detailed and approximate studies were identified at an initial meeting attended by representatives of FEMA, the study contractor, Salt Lake County, and the incorporated communities listed above. Results of the hydrologic and hydraulic analyses were coordinated with representatives of the Salt Lake County Public Works Department, Flood Control and Water Quality Division, the U.S. Army Corps of Engineers (USACE), and the incorporated communities.

Intermediate coordination meetings were held to allow community representatives to review the draft study. In attendance were representatives of FEMA, the study contractor, the USACE, Salt Lake County, and the incorporated communities, with the exception of the City of Salt Lake City and the Town of Alta. Several communities west of the Jordan River were concerned because only approximate studies had been performed on the ephemeral streams that drain the Oquirrh Mountains. It was explained that this was done because of the limited development on that side of the valley.

Table 1. Historic Consultation Coordination Officer Meeting Dates

Community Name	Initial CCO Date	Intermediate CCO Date	Final CCO Date
Salt Lake County	September 1977	February 18, 1982	December 14, 1983
Alta	--[1]	--[1]	--[1]
Bluffdale	July 7, 1989	August 30, 1991	November 18, 1993
		September 16, 1991	
		November 7, 1991	
		February 5, 1992	
		September 21, 1992	
Draper	September 1977	February 18, 1982	December 14, 1983
Midvale	July 7, 1989	August 30, 1991	November 18, 1993
		September 16, 1991	
		November 7, 1991	
		February 5, 1992	
		September 21, 1992	
Murray	September 1977	February 18, 1982	December 14, 1983
Riverton	July 7, 1989	August 30, 1991	November 18, 1993
		September 16, 1991	
		November 7, 1991	
		February 5, 1992	
		September 21, 1992	
Salt Lake City	September 1977	--[2]	August 12, 1982
Sandy City	September 1977	February 18, 1982	December 14, 1983
South Jordan	September 1977	February 18, 1982	December 14, 1983
South Salt Lake	September 1977	February 18, 1982	December 14, 1983
Taylorsville	--[1]	--[1]	--[1]
West Jordan	July 7, 1989	August 30, 1991	November 18, 1993
		September 16, 1991	
		November 7, 1991	
		February 5, 1992	
		September 21, 1992	
West Valley City	July 7, 1989	August 30, 1991	November 18, 1993
		September 16, 1991	
		November 7, 1991	
		February 5, 1992	
		September 21, 1992	

[1]No meeting [2]No date available

Concerns were also expressed by representatives of the City of South Salt Lake over the depth and width of the Mill Creek floodplain. These concerns resulted in a hydraulic reanalysis of Mill Creek between Main Street and 700 East Street. Representatives of the City of Murray pointed out several locations on Big Cottonwood and Little Cottonwood Creeks where USACE field data did not reflect recent channel changes. These changes were incorporated into the study.

Final coordination meetings were attended by representatives of FEMA, the study contractor, the county, and the incorporated communities listed above. Two major concerns raised at these meetings were that the studies did not reflect flows from the 1983 flood and the conversion of the detailed study reaches of the Jordan River between 2100 South Street and the North Jordan Canal Diversion Dam to approximate study. It was agreed that these problems would be addressed during the appeal period along with other minor concerns raised by the individual communities and the county. All requests were considered and, where appropriate, were acted upon in the preparation of the studies.

Cities of Bluffdale, Midvale, Riverton, West Jordan, and West Valley City:

The initial coordination meeting was held with representatives of FEMA, Salt Lake County, Utah County, the study contractor, and the Cities of Murray and South Salt Lake. FEMA specified the study area to be the Jordan River from the Utah County line to 2100 South Street.

Another community meeting was held in August 1991 with representatives from FEMA, Salt Lake County, and the study contractor. During this meeting, the scope of work was reviewed and the methodology to be used in the hydrologic analysis and the acquisition of orthophoto topographic maps of the study area were discussed.

After completing the hydrologic analysis, a draft hydrology report was prepared to summarize the study methodology and present the revised hydrology results for the study reach of the Jordan River. Copies of this report were sent to FEMA, Salt Lake County, and the eleven cities that border the Jordan River (the Cities of Bluffdale, Draper, Midvale, Murray, Riverton, Salt Lake City, Sandy City, South Salt Lake, South Jordan, West Jordan, and West Valley City). Copies were also sent to the Utah State Engineer, the Utah Department of Transportation, the Utah Division of Comprehensive Emergency Management, the USACE, the U.S. Geological Survey (USGS), and the Natural Resources Conservation Service (NRCS), formerly known as the Soil Conservation Service. An intermediate meeting was held in September 1991 where the study contractor summarized the hydrologic analysis study methodologies and results, and representatives from each of the agencies listed above were given the opportunity to comment on the draft hydrology report. During this meeting, the revised hydrology results for the study area were discussed and adopted (Reference 1).

The November 1991 and February 1992 meetings were held during the hydraulic analysis process, and were attended by representatives of FEMA, Salt Lake County, and the study contractor. The representatives discussed how to evaluate the effectiveness of levees in certain reaches of the study area. After these issues were resolved, the hydraulic analysis was completed and the provisional flood elevation, floodplain, and floodway data were sent to FEMA, Salt Lake County, the Utah Division of Comprehensive Emergency Management, and the eleven cities that border the Jordan River for review. At the

September 1992 meeting the study contractor presented the provisional information and representatives from each of the agencies were given the opportunity to comment or identify any problems. During this meeting, the provisional flood elevations, floodplains, and floodways were adopted.

The final coordination meeting was attended by representatives of the Cities of Bluffdale, Midvale, Riverton, West Jordan, West Valley City, Salt Lake County, and FEMA.

City of Salt Lake City:

Streams to be designated for detailed and approximate study were identified at an initial meeting attended by representatives of the study contractor, FEMA, Salt Lake City, and Salt Lake County. Results of the hydrologic and hydraulic analyses were coordinated with the Salt Lake City Engineering Department, Salt Lake County Public Works Department, and the USACE.

The final coordination meeting was attended by representatives of FEMA, the study contractor, and the city. No problems were raised at the meeting.

Restudy of Big Cottonwood, Little Cottonwood and Mill Creeks affecting the unincorporated area of Salt Lake County, and the Cities of Murray and South Salt Lake

For the restudy affecting the unincorporated areas of Salt Lake County and the Cities of Murray and South Salt Lake, a preliminary CCO meeting was held on May 29, 1996, to discuss the hydrologic analyses, revised HEC-2 models and draft work maps of the streams under study. The meeting was attended by representatives of FEMA, the study contractor, and the communities. Detention areas were added and the HEC-1 models were modified. The discharge limits at undersized bridges and culverts on Mill Creek were added to modify the HEC-1 model within the City of South Salt Lake.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the geographic area of Salt Lake County, Utah, including the incorporated communities listed in Section 1.1.

The areas studied by detailed methods were selected with priority given to all known flood hazards and areas of projected development.

Streams studied by detailed methods were chosen based on the extent and validity of available hydrologic and hydraulic data.

The detailed study of the Jordan River within Salt Lake County (upstream of 2100 South Street) and the Cities of Draper, Murray, Sandy, South Jordan, and South Salt Lake was converted to approximate study. This change resulted from uncertainties in frequency analysis of the hydrologic data and from uncertainties in hydraulic modeling caused by completed and ongoing modifications to the river channel initiated after the completion date of this study. In addition, problems were encountered with elevation data on the orthophoto topographic maps used for the detailed flood boundary delineations; there were also discrepancies between the results of the step-backwater analysis and the detailed flood boundary delineations.

In the unincorporated areas of Salt Lake County, the hydrologic and hydraulic analyses for Emigration Creek and Burr Fork were performed together as one stream.

An area of shallow ponding in the northern part of the City of South Salt Lake was added to the study from the Flood Insurance Study for Salt Lake City (Reference 2).

The Jordan River was studied in detail from the Utah County/Salt Lake County line to the Surplus Canal diversion near 2100 South Street. The study area included unincorporated portions of Salt Lake County as well as portions of the Cities of Bluffdale, Draper, Midvale, Murray, Riverton, Sandy City, South Salt Lake, South Jordan, West Jordan, and West Valley City.

Riverine flooding for the study reach was restudied by detailed methods to replace the previous study, which was completed using approximate methods (Reference 3).

The scope and methods of study were proposed to and agreed upon by FEMA and the cities listed above.

For other streams studied by detailed methods, see Table 2, "Streams Studied by Detailed Methods".

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon, by FEMA and the communities.

Downstream of the diversion dam, approximate flood boundaries were taken from the Flood Hazard Boundary Map (Reference 4) and were supplemented by flood boundaries taken from USACE Floodplain Information reports (References 5 and 6) where Flood Hazard Boundary Map coverage was incomplete. Upstream of the diversion dam, approximate flood boundaries were adopted from the study contractor's detailed 100-year flood boundary delineations.

Downstream of the diversion dam, approximate flood boundaries were taken from the Flood Hazard Boundary Map. Preliminary hydrologic and hydraulic analyses for the tributaries west of the Jordan River (Rose, Butterfield, Copper, Midas, Bingham, and Coons Canyon Creeks) revealed that the approximate 100-year boundaries shown on the Flood Hazard Boundary Map (Reference 4) for these streams were accurate. Therefore the Flood Hazard Boundary Map was chosen as the source of approximate flood boundaries for these streams.

Flooding from the Great Salt Lake was also studied by approximate methods.

Table 2. Streams Studied by Detailed Methods

Stream Name	Description of Study Reaches
Big Cottonwood Creek	At City of Murray
	From 300 West Street to upstream of Wasatch Boulevard
Burr Fork	From confluence with Emigration Creek to a point approximately 2,100 feet upstream
Corner Canyon Creek	From confluence with Jordan River to Union Pacific Railroad
Dry Creek	At City of Sandy City (entire length within community)
	At City of South Jordan
	From City of South Jordan/Salt Lake County boundary to upstream of Dimple Dell Road
Emigration Creek	At City of Salt Lake City
	From Salt Lake City to confluence with Burr Fork
Jordan River	At City of Draper (entire length within community)
	At City of Murray
	At City of Salt Lake City
	At City of Sandy City(entire length within community)
	At City of South Jordan
	At City of South Salt Lake
	From Utah/Salt Lake County line to Surplus Canal diversion near 2100 South Street
	Unincorporated Areas of Salt Lake County
	(From upstream of a point just downstream of Cudahy Lane)
Little Cottonwood Creek	At City of Murray
	From City of Murray/Salt Lake County boundary to upstream of Wasatch Boulevard
Mill Creek	At City of South Salt Lake
	From approximately 470 feet downstream of 300 West Street
	to approximately 3,100 feet upstream of Wasatch Boulevard
Parleys Creek	At City of Salt Lake City
	From City of Salt Lake City/Salt Lake County boundary to downstream of Interstate Highway 215
Red Butte Creek	At City of Salt Lake City
Willow Creek	At City of Sandy City(from southern corporate limits to a point approximately 1.1 miles upstream of Kathy Drive)
	At City of South Jordan
	From approximately 280 feet to 490 feet upstream of Hidden Valley Country Club
Willow Creek (East)	At City of Draper (east of 1300 East Street)
Willow Creek (West)	At City of Draper (west of 300 East Street)

The approximate 100-year floodplain of Rocky Mountain Creek in the City of Sandy City was found to be consistently less than 200 feet wide along its entire study reach; therefore it has been shown as an area of minimal flood hazard.

For other streams studied by approximate methods, see Table 3, "Streams Studied by Approximate Methods".

Flood Insurance Rate Map data, originally produced manually for Salt Lake County and Incorporated Areas, have been converted to vector digital data by a digitization process.

Digital road base and centerline data were provided by the Salt Lake County Government Center, the City of Salt Lake City, the City of Sandy City, and the City of Taylorsville. The City of Midvale agreed to use Sandy City's road base data. These data have been plotted with the digital floodplain data to produce this countywide Flood Insurance Rate Map. These vector data were fit to raster digital images of the USGS quadrangle maps of the County area to provide horizontal positioning.

This countywide update also incorporates the determinations of mappable Letters of Map Change, including Letters of Map Amendment and Letters of Map Revision (LOMRs) issued by FEMA for the projects listed in Table 4, "Letters of Map Change".

2.2 Community Description

For population estimates, see Table 5, "Population Estimates."

<u>**Unincorporated Areas of Salt Lake County:**</u>

Salt Lake County is located in north-central Utah. The counties adjoining Salt Lake County include Davis and Morgan Counties on the north, Summit and Wasatch Counties on the east, Utah County on the south, and Tooele County on the west. The City of North Salt Lake, in Davis County, also borders Salt Lake County to the north. The county is bounded on the east by the Wasatch Mountains, on the west by the Oquirrh Mountains, on the south by the Traverse Mountains, and on the north by the Great Salt Lake. It is divided longitudinally by the Jordan River, which flows north from Utah Lake to the Great Salt Lake, a distance approximately 40 miles. Salt Lake County covers approximately 287 square miles, 66 square miles of which are within the boundaries of Salt Lake City. The remaining 221 square miles consist of undeveloped mountain and valley lands, agricultural areas, and approximately 67 square miles of residential, commercial, and industrial development.

The majority of the residential development in the history of the Salt Lake Valley has occurred in the north and central bench areas east of the Jordan River. Substantial amounts of commercial and industrial development have taken place along U.S. Highway 89-91 and Interstate Highway 15 which traverse the valley north to south. However, development trends have shifted to also include the southern and western portions of the valley.

Residential, commercial, and industrial development has occurred extensively in the floodplains of Mill, Big Cottonwood, and Little Cottonwood Creeks. High value residential construction has taken place along the upper reaches of Mill Creek and on the

Table 3. Streams Studied by Approximate Methods

Stream Name	Description of Study Limits
Bear Canyon Creek	At City of Draper (Below canyon mouth)
Bells Canyon	At City of Sandy City
Bells Canyon	Salt Lake County (unincorporated areas) above Wasatch Boulevard
Big Cottonwood Creek	Salt Lake County (unincorporated areas) above Wasatch Boulevard
Big Willow Creek	Salt Lake County (unincorporated areas)
Bingham Creek	At City of South Jordan
Bingham Creek	Salt Lake County (unincorporated areas)
Butterfield Creek	Salt Lake County (unincorporated areas)
City Creek	At City of Salt Lake City
Coon Canyon Creek	Salt Lake County (unincorporated areas)
Copper Creek	Salt Lake County (unincorporated areas)
Corner Canyon Creek	At City of Draper (Upstream of Union Pacific Railroad)
Deaf Smith Canyon	Salt Lake County (unincorporated areas)
Dry Creek	At City of Salt Lake City
Dry Hollows	Salt Lake County (unincorporated areas)
Heughs Canyon	Salt Lake County (unincorporated areas)
Limekiln Gulch	At City of Salt Lake City
Little Cottonwood Creek	Salt Lake County (unincorporated areas) above Wasatch Boulevard
Little Willow Creek	At City of Sandy City
Midas Creek	At City of South Jordan
Midas Creek	Salt Lake County (unincorporated areas)
Middle Fork Dry Creek	At City of Sandy City
Middle Fork Dry Creek	Salt Lake County (unincorporated areas)
Mill Creek	Salt Lake County (unincorporated areas) 3,100 feet above Wasatch Boulevard
Mountain Dell Creek	Salt Lake County (unincorporated areas)
Neffs Canyon	Salt Lake County (unincorporated areas)
Parleys Creek	Salt Lake County (unincorporated areas) above I-215
Perrys Hollow	At City of Salt Lake City
Rocky Mouth Canyon	At City of Sandy City
Rose Creek	Salt Lake County (unincorporated areas), Bluffdale, Riverton
South Fork Dry Creek	At City of Sandy City

Table 3. Streams Studied by Approximate Methods (Cont'd)

Stream Name	Description of Study Limits
South Fork Dry Creek	Salt Lake County (unincorporated areas)
Spring Creek	At City of Salt Lake City
Tolcats Canyon	Salt Lake County (unincorporated areas)
Unnamed Canyon (between Deaf Smith Canyon and Little Cottonwood Creek)	Salt Lake County (unincorporated areas)
Unnamed Canyon (between Ferguson and Deaf Smith Canyons)	Salt Lake County (unincorporated areas)
Valley-view Canyon	At City of Salt Lake City
Willow Creek	At City of Draper (Segment located downstream of irrigation pond east of Interstate Highway 15)
Willow Creek	At City of Sandy City

Table 4. Letters of Map Change

Community	Case Number	Flooding Source	Letter Date
Salt Lake County	91-08-04P	Little Willow Creek	12/20/90
Salt Lake County	92-08-037P	Little Willow Creek	09/01/92
Salt Lake City	94-08-071P	Jordan River	04/05/94
Murray	94-08-162P	Jordan River	11/01/94
Salt Lake County	94-08-162P	Jordan River	11/01/94
Salt Lake County	95-08-001P	One Fork of Butterfield Creek	12/13/94
Murray	94-08-138P	Little Cottonwood Creek	01/26/95
Riverton	94-08-171P	Midas Creek	02/07/95
Salt Lake County	94-08-171P	Midas Creek	02/07/95
South Jordan	94-08-171P	Midas Creek	02/07/95
Riverton	95-08-250P	South Butterfield Creek	09/25/95
West Jordan	96-08-342P	Barney's Wash	03/17/97
West Jordan	97-08-019P	Barney's Wash	03/17/97
West Jordan	97-08-145P	Barney's Wash	03/17/97
Draper	96-08-114P	Corney Canyon Creek	11/06/97
Salt Lake County	98-08-040P	Big Cottonwood creek	12/17/97
Salt Lake County	97-08-430P	Deaf Smith Creek	01/06/98
Riverton	98-08-367P	Midas Creek	09/02/98
South Jordan	98-08-367P	Midas Creek	09/02/98
Riverton	98-08-199P	Midas Creek	09/03/98
Salt Lake County	98-08-199P	Midas Creek	09/03/98
South Jordan	98-08-199P	Midas Creek	09/03/98
Salt Lake County	98-08-220P	Bingham Creek	07/19/99
South Jordan	98-08-220P	Bingham Creek	07/19/99
West Jordan	98-08-220P	Bingham Creek	07/19/99
West Jordan	99-08-116P	Barney's Wash	12/22/99
Sandy City	99-08-422P	South Fork Dry Creek	05/04/00
South Jordan	00-08-004P	Midas Creek	05/09/00
Riverton	01-08-142P	Butterfield Creek	03/07/01
South Jordan	01-08-142P	Butterfield Creek	03/07/01
Salt Lake County	01-08-142P	Butterfield Creek	03/07/01

Table 5. Population Estimates

Community	Population Estimate[1]
Salt Lake County	827,818
Alta	411
Bluffdale	3,934
Draper	19,147
Midvale	11,628
Murray	33,167
Riverton	20,410
Salt Lake City	174,348
Sandy City	99,186
South Jordan	26,414
South Salt Lake	9,957
Taylorsville	56,753
West Jordan	60,804
West Valley City	99,372

[1]Data for Salt Lake County obtained from USACitiesOnline (Reference 10). All other data obtained from the U.S. Census Bureau, Population Estimates, July 1, 1998 (Reference 11)

outwash fan of Neffs Canyon. Substantial amounts of residential construction have also occurred along Emigration Creek above the canyon mouth. Development in the floodplains of Dry and Willow Creeks is sparse. The floodplains of the Jordan River are also largely undeveloped. They do, however, contain some agricultural developments, a few residences, and two sewage treatment facilities.

The principal stream in the Salt Lake Valley is the Jordan River. It originates in Utah Lake at an elevation of approximately 4,489 feet and flows northerly through the center of the valley to terminate in the Great Salt Lake. The east-side streams tributary to the Jordan River originate in the high elevations of the Wasatch Mountains. These streams emerge at the foothill line and flow westerly across terraces formed by the recession of prehistoric Lake Bonneville. Mill, Big Cottonwood, and Little Cottonwood Creeks are perennial tributary streams which drain the center portion of the Wasatch Mountains on the eastside of the valley. Dry, Willow and Corner Canyon Creeks are intermittent streams which drain the southeastern part of the valley. These east-side streams have fairly steep gradients as they cross terraces, but become quite flat as they reach the valley floor. Several dry washes and emphemeral streams drain the eastern slopes of the Oquirrh Mountains and join the Jordan River from the west. Drainage areas of the tributaries to the Jordan River range from the high areas of the Wasatch Mountains at an elevation in excess of 11,000 feet, to the valley floor at an elevation of 4,250 feet. The Jordan River gradient is approximately 5.2 feet per mile.

Soils typically found in the terraces are granular in nature, while the valley floor is primarily composed of clays or clayey gravels.

Vegetation ranges from conifer, aspen, and oaks in the higher mountain elevations, to scrub oak, sage, and underbrush in the lower mountain elevations. Residential valley areas are vegetated mainly with lawn grasses, ornamental shrubbery, and shade trees. Undeveloped valley areas are mostly covered by grasses and sagebrush. Aspen and cottonwood trees grow along the stream courses.

The Salt Lake Valley has a temperate, semi-arid climate with four distinguishable seasons. Temperatures generally range from -20 degrees Fahrenheit (°F) in winter to 105°F in summer. Precipitation tends to vary directly with elevation, from 16 inches annually on the valley floor to 40 inches annually in the high mountains (Reference 7).

Town of Alta:

Alta is located in the southeast part of Salt Lake County. It encompasses approximately 10.5 square kilometers of land and is served by State Highway 210. It was settled in 1865 as a silver mining town until devaluation of silver in 1873 ruined the booming business. It is well known as a ski resort town (Reference 8).

City of Bluffdale:

Bluffdale is located in south-central Salt Lake County. Communities adjoining Bluffdale include the City of Riverton on the north, unincorporated areas of Salt Lake County on the west, unincorporated areas of Salt Lake County and Utah County on the south, and the City of Draper on the east. The City of Bluffdale covers approximately 16.4 square miles.

City of Draper:

Draper is located in southern Salt Lake County. Communities adjoining Draper include the City of Sandy City on the north, unincorporated areas of Salt Lake County on the east, unincorporated areas of Utah County on the south, and the Cities of South Jordan, Riverton, and Bluffdale on the west.

City of Midvale:

Midvale is located in central Salt Lake County. Communities adjoining Midvale include the City of Murray on the north, the City of Sandy City on the south, the City of West Jordan and South Jordan on the west, and the unincorporated areas of Utah County on the east. The City of Midvale covers approximately 3.4 square miles.

City of Murray:

Murray is located in central Salt Lake in central Salt Lake County. Murray is bordered by the City of Midvale on the south and unincorporated areas of Salt Lake County on the west, north, and east.

Most of the residential development of Murray has occurred in the terrace area east of the Jordan River.

City of Riverton:

Riverton is located in south-central Salt Lake County. Communities adjoining Riverton include the City of South Jordan on the north, the City of Bluffdale on the south, unincorporated areas of Salt Lake County on the west, and the City of Draper and the City of Sandy City on the east. The City of Riverton covers approximately 8.1 square miles.

City of Salt Lake City:

Salt Lake City lies in the northeast corner of the Salt Lake Valley, in northern Salt Lake County. Communities adjoining Salt Lake City include South Salt Lake City and West Valley City on the south, unincorporated areas of Salt Lake County on the west and southeast, and the Cities of North Salt Lake and Bountiful City in Davis County to the north.

Salt Lake City covers a total area of 66 square miles, 22 miles of which are covered with residential, commercial, and industrial development. The remainder consists of undeveloped mountain and valley lands.

The major development in the Salt Lake Valley has occurred on the valley floor and along the eastside benches. Much of the residential area and a large portion of the Salt Lake City business district are on high ground and would not be significantly affected by flooding. A substantial amount of residential and commercial development has, however, occurred in the floodplains of Red Butte, Emigration and Parleys Creeks.

In 1885, local interests constructed the Surplus Canal from 21st South Street, the southern boundary of Salt Lake City, to the Great Salt Lake. The purpose of this structure was to divert flood flows from Jordan River around the city. Hence, flooding on the Jordan River from 21st South Street to the Great Salt Lake is due primarily to inflow from tributary streams from the east and storm drains from the urbanized areas of the city.

The eastside tributary streams, City, Red Butte, Emigration, and Parleys Creeks, emerge from their Wasatch Mountain canyons on high terraces formed by ancient Lake Bonneville. These streams have very steep gradients in the upper reaches as they cross the terraces, but become quite flat when they reach the valley floor.

City of Sandy City:

Sandy City is located in central Salt Lake County. Communities adjoining Sandy City include the City of Midvale to the north, the City of Draper to the south, the Cities of West Jordan and South Jordan on the west, and the unincorporated areas of Salt Lake County to the east, north, and west.

Sandy City covers approximately 18.6 square miles; 59 percent of the land is occupied by residential development and commercial and industrial facilities, 17 percent is devoted to agriculture, and the remainder is vacant.

City of South Jordan:

South Jordan is located along the west bank of the Jordan River in southwestern Salt Lake County. The city has an average elevation of 4,500 feet and is surrounded by several distinct terrain features. To the immediate west are the Oquirrh Mountains, whose peaks rise to 10,000 feet. Twenty-five miles to the north is the Great Salt Lake. To the east, approximately 15 miles across the valley floor, the Wasatch Mountains rise to heights of 11,000 feet. Finally, Utah Lake is located to the south in nearby Utah County. This lake is the source of the Jordan River and empties into the Great Salt Lake.

South Jordan is bordered by the City of West Jordan on the north, the Cities of Sandy City and Draper on the east, the City of Riverton on the south, and the unincorporated areas of Salt Lake County on the south and west. South Jordan covers an area of approximately 26 square miles, 16 square miles of which are used for agriculture (mostly in the western portion of the city). Another 9.4 square miles are used for residential areas. The remaining area is used for commercial purposes.

There are no major tributaries to the Jordan River in South Jordan; however, a series of diversions and irrigation canals act to deplete the river volume during the summer. South Jordan is located near the area where the Jordan River begins to flow smoothly. This point coincides with a gradual deterioration of river quality as it proceeds downstream.

The County masterplan uses the canals to carry storm runoff to the natural channels. The excess from the canal would be discharged to the natural channel. Many improvements to the canals and the channels are required before this system can fully function.

Two intermittent streams originate from the Oquirrh Mountains and traverse the terraces between the mountains and the valley floor. Bingham Creek cuts through the northwestern corner of the city, and Midas Creek nearly parallels the southern corporate limits. These streams usually flow during snowmelt and storm runoff. Irrigation company policy allows storm drainage from new subdivisions to be channeled into the canal systems. Consequently, during periods of heavy runoff, the intermittent streams will carry the volume that the canal systems are incapable of handling. This process has been adopted by Salt Lake County as a flood-control measure.

South Jordan has a network of five major canals or ditches flowing in the south-north direction. This network consists of Provo Reservoir Canal, Utah Lake Distributing Canal, Utah and Salt Lake Canal, South Jordan Canal, and Beckstead Ditch. These canals and ditches divert water directly from the Jordan River and end at various points in Salt Lake County. This water is used to fulfill water rights and agricultural needs. As more agricultural land in the valley is developed into urban land, less water will need to be diverted from the river for farming.

South Jordan is an area of mostly confined and shallow unconfined aquifers. Ground water occurs in the unconsolidated deposits of the Salt Lake Valley under natural water table and artesian conditions. In the mountain areas, some ground water seeps into stream channels and flows to the Jordan River, and the remaining ground water moves through openings in the bedrock, eventually reaching the Jordan River.

City of South Salt Lake:

South Salt Lake is located in north-central Salt Lake County. It is bordered by the City of Salt Lake City on the north and east, the City of West Valley City on the west, and the unincorporated areas of Salt Lake County on the east and south. Much of the commercial and industrial development in South Salt Lake has taken place along Interstate 15 and U.S. Highways 89 and 91, as well as in the Mill Creek floodplain, where there are also residential areas.

City of Taylorsville:

Taylorsville is located in central Salt Lake County southeast of West Valley City. It encompasses approximately 28.7 square kilometers of land. Taylorsville was founded as "Over Jordan" in 1848 when Joseph and Susanna Harker crossed the Jordan River. It was incorporated as a city in 1995. Taylorsville's central location has allowed its residents to enjoy rapid-growing business. It is served by Interstate Highways 215 and 15 and Salt Lake International Airport (Reference 9).

City of West Jordan:

West Jordan is located in south-central Salt Lake County. Communities adjoining West Jordan include the unincorporated areas of Salt Lake County to the north and west, the City of South Jordan on the south, and the City of Midvale on the east. The City of West Jordan covers approximately 26.8 square miles.

City of West Valley City:

West Valley City is located in west-central Salt Lake County. Communities adjoining West Valley City include the unincorporated areas of Salt Lake County on the south and west, the City of Salt Lake City on the north and the City of South Salt Lake and the City of Murray on the east. The City of West Valley City covers approximately 34 square miles.

2.3 Principal Flood Problems

Flooding in the Salt Lake Valley generally occurs due to three types of events: snowmelt runoff, cloudburst rainstorms, and general rainstorms. Snowmelt floods usually occur during the months of April, May, and June. Cloudburst rainstorms are high-intensity, short-duration storms which usually occur over a relatively small area. These storms are characterized by high-runoff peaks, but low volumes. They generally occur during summer, from June through October. General rainstorms are caused by low-intensity rainfall occurring over a longer period of time. These storms can have a higher peak than the snowmelt flood and many times can have a higher volume than the cloudburst events. General rainstorms can occur at any time during the year.

The history of Salt Lake County indicates that flooding can occur from any of these types of events. However, the most dramatic and extensive flooding has been due to snowmelt and cloudburst floods.

With the exception of streamflow gages on Emigration Creek, Mill Creek, Big Cottonwood Creek, Little Cottonwood Creek, and the Jordan River, information concerning past flooding in the study area is virtually non-existent. Newspaper descriptions of flooding have dealt primarily with stream reaches within Salt Lake City.

Streamflow gages on the eastside tributary streams are generally located at the canyon mouths. These gages, therefore, give an accurate measurement of snowmelt runoff, but do not include any indication of runoff associated with cloudburst rainfall on the urbanized area.

Significant snowmelt flows occurred in the study area in 1909, 1912, 1921, 1949, 1953, and 1975. A partial list of some of these floods, with their estimated recurrence intervals, is presented in Table 6, "Historic Flood Data". The flow values shown are the mean daily flows. Instantaneous peaks would be somewhat higher.

The most notable flood on record in the Salt Lake Valley occurred during the months of April and May 1952. This flood was caused by the rapid melting of an unusually large snowpack on the Wasatch Mountains east of the valley. Approximately 1,200 acres, including 75 city blocks, of residential, commercial, and industrial land were inundated. The mean daily flow of this flood was 1,410 cubic feet per second (cfs), recorded at the Jordan Narrows gage, with an estimated return internal of 50 years. Flood flows from the Jordan River and the study area were diverted around Salt Lake City to the Great Salt Lake through the Surplus Canal.

Table 6. Historic Flood Data

Year	Location	Station No.	Flow-(Cubic Feet Per Second)[1]	Estimate Return Interval (Years)
1862	Jordan Narrows	--[2]	3,800[3]	250
	2100 South Street	--[2]	5,900[3]	250
1884	Jordan Narrows	--[2]	2,600[3]	70
	2100 South Street	--[2]	4,050[3]	70
1909	Parleys Creek	--[4]	274	18
1909	Mill Creek[5]		112	13
	Big Cottonwood Creek[6]		835	67
1912	Mill Creek[5]		121	20
	Big Cottonwood Creek[6]		848	77
	Little Cottonwood Creek[7]		705	13
1917	City Creek		105	7
	Emigration Creek	--[4]	64	8
	Parleys Creek		242	11
1921	Mill Creek[5]		104	10
	Big Cottonwood Creek[6]		721	30
	Little Cottonwood Creek[7]		762	18
	Jordan River[8]		1,020	20
1922	City Creek		118	13
	Emigration Creek	--[4]	110	33
	Parleys Creek		317	40

[1]Flow values shown are mean daily. Instantaneous peaks would be somewhat higher. [2]Not applicable. Streamflow gage not yet established. [3]Estimated discharge [4]At Canyon Mouth – stream gage number not specified [5]At Canyon Mouth – Salt Lake City stream gage No. 10170000 [6]At Canyon Mouth – Salt Lake City stream gage No. 10168500 [7]At Canyon Mouth – Salt Lake City stream gage No. 10167500 [8]At Jordan Narrows – U.S. Geological Survey stream gage No. 10167000

Table 6. Historic Flood Data (Cont'd)

Year	Location	Station No.	Flow-(Cubic Feet Per Second)[1]	Estimate Return Interval (Years)
1922	Jordan Narrows	10167000	1,370[2]	13
1949	Mill Creek[3]		152	50
1952	City Creek		127	20
	Parleys Creek		365	100
1952	Emigration Creek[4]		156	100
	Mill Creek[3]		102	10
	Big Cottonwood Creek[5]		503	4
	Little Cottonwood Creek[6]		597	5
	Jordan River[7]		1,410	50
1952	Jordan Narrows	10167000	1,410	15
	2100 South Street	10170490	1,820	9
1953	Big Cottonwood Creek		503	4
	Little Cottonwood Creek		736	15
1978	2100 South Street	10170490	2,426	--
1982	2100 South Street	10170490	2,670	--
1983	Jordan Narrows	10167000	2,150	42
	9000 South Street	10167230	1,630	23
	5800 South Street	10167300	2,850	43
	2100 South Street	10170490	3,350	42

[1]Flow values shown are mean daily. Instantaneous peaks would be somewhat higher. [2]Approximate discharge [3]At Canyon Mouth – Salt Lake City stream gage No. 10170000 [4]At Canyon Mouth – Salt Lake City stream gage No. 10172000 [5]At Canyon Mouth – Salt Lake City stream gage No. 10168500 [6]At Canyon Mouth – Salt Lake City stream gage No. 10167500 [7]At Jordan Narrows – U.S. Geological Survey stream gage No. 10167000

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Table 6. Historic Flood Data (Cont'd)

Year	Location	Station No.	Flow-(Cubic Feet Per Second)[1]	Estimate Return Interval (Years)
1984	Jordan Narrows	10167000	3,030	100
	9000 South Street	10167230	2,790	100
	5800 South Street	10167300	2,850	97
	2100 South Street	10170490	4,510	93
1986	Jordan Narrows	10167000	2,660	75
	9000 South Street	10167230	2,510	80
	2100 South Street	10170490	3,980	65

[1]Flow values shown are mean daily. Instantaneous peaks would be somewhat higher.

Historical records indicate that flooding on the Jordan River is closely associated with the stage of Utah Lake (Reference 1). The lake stage varies from month to month, usually reaching its annual peak in May or June, and then falling steadily until the beginning of winter. These seasonal fluctuations are a result of heavy inflows in the spring, evaporation and releases for irrigation, municipal, and industrial uses during the summer. Over the period of record, there is also a wide variation of the peak annual lake stage. These variations are a result of varying climatic conditions. The annual maximum lake levels fluctuated between a low of 4,480.5 in 1935 to a high of 4,495.7 in 1862.

Historically, floods have occurred on the Jordan River during each year that the peak lake stage exceeded elevation 4,491.1 (1862, 1884, 1885, 1907, 1909, 1910, 1921, 1923, 1952, 1953, 1983, 1984, 1985, and 1986). Flooding during these years was most severe during the months of April, May, and June, the major annual snowmelt period. These floods were intensified in the lower portion of the study reach by inflow from the tributary streams. Some of the historic flood discharges on the Jordan River, with estimated recurrence intervals, are listed in Table 6, "Historic Flood Data".

Historic information indicates that high stages of Utah Lake and flooding on the Jordan River and its tributaries are most commonly associated with runoff from snowmelt. However, limited flooding on the Jordan River and flooding on the major tributaries has also resulted from cloudburst storms, general rainstorms, and from a combination of rainfall and snowmelt.

In the 1921 flood, the Jordan River had a mean daily flow of 1,020 cfs at Jordan Narrows U.S. Geological Survey (USGS) stream gage No. 10167000, located upstream of Draper, with an estimated return interval of 20 years.

Since the study for this area that was completed in 1982, the Jordan River has experienced the three largest flood events that occurred since the streamflow gage was established at the Narrows in August 1913. These events occurred in 1984, 1986, and 1983, respectively, and were associated with high stages at Utah Lake caused by runoff from the melting of heavy snowpack. Floods in 1985 and 1987 are also ranked among the ten largest floods that have occurred during this 76-year period of record.

The floods of 1983 and 1984 caused severe property damage along the Jordan River. The magnitude and duration of these flood flows caused the five irrigation diversion structures on the Jordan River to fail. During this high flow period, the river also experienced severe bank erosion and channel migration as the river responded to channelization, dredging, and channel straightening work that was completed after the 1952 flood. In some reaches of the study area, the river channel migrated laterally between 300 and 400 feet. To mitigate flood damage, the Utah Lake/Jordan River Flood Management Program was implemented by Salt Lake and Utah Counties (Reference 12). This program was completed between the summers of 1985 and 1987 and included the following:

- Constructing a new gated outlet structure at the head of the Jordan River to increase the Utah Lake outlet capacity;
- Dredging the channel reach between Utah Lake and Turner Dam, near the Utah/Salt Lake County line, to increase conveyance capacity;

- Replacing the five failed irrigation diversion structures between Turner Dam and 4500 South; and
- Stabilizing river banks in several critical channel reaches to prevent further channel migration.

To address the concerns with the channel instability of the Jordan River, Salt Lake County retained CH2M Hill to evaluate the stability of the Jordan River (Reference 13). The primary purpose of the stability study was to develop a stability management plan that would supplement information presented in the original Flood Insurance Study that could be used by Salt Lake County and the ten incorporated cities that bordered the Jordan River to manage and protect the river, as well as development along the river. This management plan stresses the importance of utilizing nonstructural management techniques, such as zoning restrictions and control of land use, within a defined channel meander/bend migration corridor. Some structural improvements were also recommended to enhance the natural, on-going fluvial processes that are reestablishing a more natural channel pattern, as well as to protect existing development from erosion hazards.

Other major flooding events include several large floods recorded in the Salt Lake City area newspapers. A partial list of some of these floods, with their estimated return intervals is presented in Table 6, "Historic Flood Data". Most of the extensive floods in Salt Lake City have been associated with snowmelt.

One such flood occurred in the spring of 1909. Flow from City, Emigration, and Parleys Creeks flooded many areas in, and adjacent to, Salt Lake City. Severe erosion and deposition occurred on many city streets. No flow records are available on City or Emigration Creeks for this flood.

The largest reported cloudburst flood in Salt Lake City occurred on August 19, 1945. The storm was centered over Perrys Hollow, a small watershed of approximately 0.5 square mile, situated in the northeast foothills above the city. No streamflow gage is located on this watershed; however, reports indicate that large amounts of water, sediment, and debris flooded and damaged approximately 500 acres of urban area, including the City Cemetery.

Other major floods occurred in Salt Lake City in 1862, 1917, and 1922. No records of runoff quantities are available for the 1862 event.

Flooding problems on Mill Creek occur nearly every year during the spring snowmelt. These problems are created by channel constrictions at Highland Drive, 300 East Street, State Street, and the Union Pacific and Denver and Rio Grande Western Railroad crossings (Reference 14). Flooding on Mill creek and the other eastside tributaries is aggravated during rainstorms by the inflow from storm sewers which drain the urbanized areas.

2.4 Flood Protection Measures

Efforts to control flooding in Salt Lake County extend back to 1885 when local interests constructed the Surplus Canal from 2100 South Street to the Great Salt Lake. The purpose of this flood-control structure was to divert upstream the Jordan River runoff around Salt Lake City. Enlargement of the canal was completed by the USACE in 1960. In order to supply downstream water rights, a gated structure was constructed at the head of the Surplus Canal and on the adjacent diversion to the Jordan River north of 2100 South. During periods of high runoff, the gates to the Jordan River north of 2100 South are closed, diverting all water in the Jordan River upstream of 2100 South into the Surplus Canal. This action reduces flood damage along the Jordan River in Salt Lake City by reserving channel capacity for inflow from the Salt Lake City streams.

As part of this same project, levees were also constructed on the Jordan River from the head of the Surplus Canal to the Mill Creek confluence. The levees were designed to convey 3,300 cfs with a minimum freeboard of 3 feet. The 3,300 cfs was previously the estimate of the 100-year discharge. As a result of the original Flood Insurance Study, 3,300 cfs is estimated to be the approximate 40-year discharge. Through this reach, the channel can convey the 100-year discharge with a minimum freeboard of approximately 2 feet on the west levee, but under FEMA criteria, levees with less than 3 feet of freeboard are considered ineffective. The east levee in this area was constructed approximately 2 feet higher than the west levee, so it is considered effective during the 100-year flood event. Other levees along the Jordan River in the County are not certified and are considered to have little or no effect during the 100-year flood flows.

In 1902, a gated outlet structure and pumping station were constructed at the head of the Jordan River on Utah Lake. Since that time, Utah Lake, a natural body of water, has operated as a reservoir. Releases from Utah Lake into the Jordan River are regulated by a legal agreement. This agreement, commonly known as the Compromise Agreement, was established in 1885 and modified in 1985. Highlights of the agreement are listed below.

- The gates of the Utah Lake outlet will be opened to release the lesser of the Utah Lake outlet capacity or the capacity at the Jordan River at 2100 South in Salt Lake County when the lake stage is above 4,489.045 feet (compromise elevation).

- Minimum flows are released or pumped into the Jordan River when the lake level falls below compromise elevation. These minimum flows are determined by the water rights of the canal and irrigation companies in Salt Lake County and their ability to distribute water for use.

- An agent of Salt Lake County is authorized to control releases into the Jordan River when emergency conditions develop that could cause damage to property or injury to persons. This would allow the gates at the Utah Lake outlet to be partially closed during tributary flood peaks that would be expected to cause flow in the lower reach of the Jordan River to exceed channel capacity.

- The gates at Turner Dam may also be regulated during flood flows by this agreement.

The effects of the human intervention associated with regulating releases at Utah Lake could be substantial in reducing flood damage between 2100 South and the confluence of Little Cottonwood Creek.

The operation of irrigation canals during floods may also reduce flood flows in the Jordan River. During normal years, the canal companies divert water from the river from about April 15 to October 15, which includes the normal annual peak snowmelt period. Canal

operation was responsible for reducing the peak flood flow between the Narrows and 9000 South by approximately 550 cfs, 420 cfs, and 780 cfs, respectively during the floods of 1983, 1984, and 1985. However, this operating alternative cannot be considered to be a reliable flood control feature because normal irrigation demands can fluctuate, depending on weather conditions.

Also under various stages of planning and development is the Jordan River Parkway, a flood control and recreational facility approximately 100 to 200 feet wide along either side of the Jordan River, north from Interstate Highway 80 (approximately Second South Street) to Interstate Highway 215, north of the city.

In areas where the parkway has been developed, nature and recreational trails and portions of golf courses have been constructed near the river. In these areas, efforts have been made to preserve old oxbows and wetland and riverine habitat in a 100- to 200-foot-wide corridor on both sides of the river. The preservation of natural corridor along the river can have substantial flood control benefits. The flood-control project, when completed, will effectively eliminate overbank flooding through this reach of the river. The Jordan River Parkway was not included in the Flood Insurance Study analysis for the original study.

A number of irrigation diversions along the Jordan River near the southern boundary of Salt Lake County, such as Turner Dam at Jordan Narrows, can substantially reduce flood flows. Most outflow from Utah Lake, except during periods of high flow such as the 100- and 500-year floods, can be diverted to those canals.

The USACE has constructed levees along the Jordan River up to the mouth of Mill Creek and along the north bank of Mill Creek up to just downstream of the Denver and Rio Grande Western Railroad. These levees contain 100-year flood flows with a minimum freeboard of 3 feet. 500-year flows can overtop the Mill Creek levee.

The Salt Lake County Public Works Department has also constructed levees along the west bank of Jordan River as part of the Flood Control Project. The levees extend north from North Temple Street to Redwood Road. The levees provide a minimum of 2 feet of freeboard above the 100-year flood under the initial phase of construction with plans to have 3 feet of freeboard by the completion of phase two of the project. The project also involves channel bank improvements, dredging, channelization, and relocation of the channel between North Temple Street and 500 North Street. These improvements were included in the analysis for the original study.

Utah Lake, at the head of the Jordan River, affords a reduction of flood flows along the Jordan River above 2100 South Street. This lake is a natural water body which has been artificially modified so that the water-surface elevation can be controlled through the use of several large radial gates and a pumping station. The ability to raise and lower the lake elevation caused conflicts between the water users and property owners adjacent to the lake. In order to resolve the conflicts, in 1885, a "compromise level" elevation of 4,489.34 feet was agreed upon. Whenever runoff forecasts indicate that the water surface will exceed the compromise level, the lake is drawn down to permit discharges comparable to natural conditions.

A detention basin has been constructed on Big Cottonwood Creek near Highland Drive, located upstream of Murray. Discharge from this basin is limited to approximately 650 cfs (Reference 15). This tends to reduce 100- and 500-year discharges in Murray.

Several roadway and railroad fills on Dry Creek, Willow Creek, and Corner Canyon Creek afford limited detention storage and reduced downstream discharge as conduit capacities are exceeded.

Conduits were installed in Salt Lake City to protect urbanizing areas from flood flow damage. City Creek is diverted into a conduit which carries its runoff from the canyon mouth along North Temple Street to Jordan River. Dry Creek runoff emerges from its canyon and enters a small detention pond. Flow from this pond enters the Salt Lake City storm drain system.

The Red Butte Creek conduit has the capacity to carry approximately 40 percent of the 100-year discharge and 25 percent of the 500-year discharge. The Emigration Creek conduit will contain 55 percent of the 100-year discharge and 50 percent of the 500-year discharge. The Parleys Creek conduit has the capacity to carry most of the 100- and 500-year discharges. Red Butte and Emigration Creeks both enter conduits at approximately 11th East Street. These conduits combine at Liberty Park where a newly enlarged detention basin is located. Flow from the combined conduits and pond is piped down 13th South Street to State Street. Runoff on Parleys Creek can be somewhat regulated by Mountain Dell Dam, located several miles up Parleys Canyon. This structure was not designed as a flood control project, but, if capacity is available, can help to reduce downstream flows due to cloudburst storms on the upper watershed. Parleys Creek also enters a conduit at approximately 600 feet east of 11th East Street. Runoff is piped to State Street at 13th South Street, where the conduit joins the combined conduit from Red Butte and Emigration Creeks. This combined flow is then piped to Jordan River. The conduit from State Street to the river was severely overtaxed during the 1952 snowmelt flood. To alleviate this problem, a parallel conduit has since been installed to help carry high flows. Several storm drains remove runoff from the residential and commercial areas of the city and transport it to Jordan River. The city has an ongoing program of storm drain construction to alleviate localized flooding problems.

A new detention pond is planned and under construction on Parleys Creek at Sugarhouse Park. This facility will substantially reduce flooding of downstream urbanized areas caused by cloudburst storms. The Parleys Creek structure was included in the original Flood Insurance Study analysis.

The Little Dell Lake Project is a USACE multi-purpose project planned for construction in the mountains east of Salt Lake City. The project includes diversion and conveyance facilities to divert flood flows from Emigration and Parleys Creeks to the proposed Little Dell Lake. Flood flows from snowmelt runoff could be substantially reduced by this project. The project was authorized for construction but funding had not been appropriated at the time of the original Flood Insurance Study. Therefore, the proposed project was not included in the analysis.

Since the original studies of Big Cottonwood Creek, Little Cottonwood Creek, and Mill Creek were completed, numerous flood-control projects have been constructed in these areas. These projects include detention facilities, new bridges, and miscellaneous channel improvements. These improvements significantly changed the flood characteristics that existed at the time of the original Flood Insurance Studies. In addition, in May 1984, the USACE revised the hydrologic analyses on which the 1983 study was based. The restudy also accounts for hydrologic changes that have resulted from extreme hydrologic events that occurred after the original hydrologic analyses were completed.

Officials of Salt Lake County have established, in their Public Works Department, a Flood Control and Water Quality Division. It is the responsibility of this office to manage and enforce the county development and flood-control ordinances in the unincorporated areas. Salt Lake County also has a countywide flood-control tax, which enables it to obtain tax funds for use in construction of new flood-control projects and maintenance of existing facilities.

Salt Lake County officials also encourage officials from the incorporated communities that border the Jordan River to restrict structural improvements in a channel meander/bend migration corridor that was delineated as part of the Jordan River Stability Study (Reference 13). It was recommended that this corridor be preserved to let the river naturally reestablish a more natural channel pattern. Preserving this natural corridor could also have substantial flood control benefits.

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in the community, standard hydrologic and hydraulic study methods were used to determine the flood-hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied by detailed methods affecting the community.

Several stream gages on Salt Lake County streams have been operated since the beginning of the 20th century by Salt Lake City and the USGS (References 16 and 17). A summary of the various gages, their locations, length of record, and operating agency is presented in Table 7, "Stream Gaging Stations".

The hydrologic analyses described below for Mill, Big Cottonwood, and Little Cottonwood Creeks were performed by the USACE as part of the Jordan River Investigation report (Reference 14). These analyses were performed using the same basic methodologies as those used by the study contractor although values for some parameters, such as rainfall and infiltration rates, differed slightly.

Floodflow frequency analyses of the snowmelt events were performed for Burr Fork, Emigration, Mill, Big Cottonwood, and Little Cottonwood Creeks. The peak flow values were computed based on the Water Resources Council guidelines for determining floodflow frequencies (Reference 18). This method uses existing streamflow data and a log-Pearson Type III distribution in conjunction with a regional skew to predict floodflows. Streamflow records dating to 1898 were used in the analysis.

Existing streamflow information is not adequate to predict cloudburst runoff values downstream of the canyon mouths or the Jordan River where flows are dependent upon inflow from the urban area. In order to obtain flow values in these areas, the HEC-1 computer-runoff model, developed at the USACE Hydrologic Engineering Center, was used (Reference 19). This model uses a kinematic wave calculation to produce run-off due to rainfall. The model computes and routes flows based on physical characteristics of the basin such as percent imperviousness, infiltration rates, basin area and slope, and storm characteristics such as precipitation depths and rainfall distribution and duration. Rainfall depths were obtained from the Precipitation-Frequency Atlas of the Western United States, Volume VI, prepared by the National Oceanic and Atmospheric Administration (Reference 20). Due to the lack of available rainfall-runoff data, it was not possible to calibrate the computer model.

The HEC-1 analyses were used for all detailed-study streams downstream of canyon mouths. For gaged streams, the results of the log-Pearson Type III analyses were combined with the results of the HEC-1 analyses. Snowmelt events, with long, sustained peak discharges, dominated upstream of canyon mouths and cloudburst events, with short, intense peak discharges, dominated downstream of canyon mouths. The ungaged streams, Parleys, Dry, and Willow Creeks were analyzed by HEC-1 analysis only.

Capacities of storm drains and conduits tributary to the Jordan River were used to obtain floodflows on this river. Once the capacities of the storm drains and conduits are exceeded, the excess overland flow from the eastern and downtown areas of Salt Lake City will congregate in a large pond created by the Denver and Rio Grande Western Railroad tracks at approximately 600 West Street. Unless the tracks are overtopped, which would occur only during an extreme event (greater than 500 years), all flows must exit through the available capacity of the conduits. Hydrographs for each pipe were computed and added together using kinematic wave routing procedures to produce flood hydrographs and peaks at various locations along the river.

Table 7. Stream Gaging Stations

Stream	Location	Gage Number	Drainage Area (Square Miles)	Data Source[1]	Period of Record[2]
Big Cottonwood Creek	Canyon Mouth	10168500		SLC	1898-Present[3]
	Canyon Mouth	10170000	50.0	SLC	1901-Present
	Canyon Mouth	10169999	50.0	SLCo	1981-Present
	Cottonwood Lane	10169000	57.3	USGS, SLCo	1964-1968; 1979-Present
	Cottonwood Lane	10168800	57.3	USGS	1964-1968; 1979-Present
	Near Jordan River (200 West Street)	10169500	--[4]	USGS, SLCo	1933-1935; 1979-Present
City Creek	Near Salt Lake City			SLC	1898-Present[3]
Emigration Creek	Canyon Mouth	10172000		SLC	1900-Present[3]
	Below Burr Fork			USGS	1963-1973
	Below 13th East Street			USGS	1963-1968
Jordan River	500 North Street			USGS	1961-Present[5]
	1700 South Street	10171000	3,183.0	USGS	1942-Present
	5800 South Street	10167300	2,985.0	USGS	1965-1968; 1980-1985
	9000 South Street	10167230	2,905.0	USGS, SLCo	1980-Present
	9400 South Street	10167000		USGS	1913-Present
	Below Cudahy Lane			USGS	1963-1968
	The Narrows (Near Lehi)	10167000	2,755.0	USGS	1904; 1913-Present

[1]USGS = U.S. Geological Survey; USACE = U.S. Army Corps of Engineers; SLCo = Salt Lake County Engineering; SLC = Salt Lake City Water Department [2]Portions of Salt Lake City's Daily Records, and monthly summaries of all records, have been published by the USGS. In addition, records are available for many of the diversions from the Jordan River in annual reports by the Utah Lake and Jordan River Commissioner. [3]Records intermittent from 1898-1913 [4]Value not published [5]Intermittent records

Table 7. Stream Gaging Stations (Cont'd)

Stream	Location	Gage Number	Drainage Area (Square Miles)	Data Source[1]	Period of Record[2]
Little Cottonwood Creek	2050 East Street	10167700	35.2	USGS	1963-Present[5]
	Canyon Mouth	10167500	27.4	SLC	1898-Present[3]
	Canyon Mouth	10167499	27.4	SLC	1981-Present
	Near Jordan River (200 West Street)	10168000	--[4]	USGS, SLCo	1933-1934; 1980-Present
Mill Creek	2200 East Street	10170200		USGS	1963-1968
	Above Elbow Fork	10169800		USGS	1963-1968
	Canyon Mouth	10170000	21.7	SLC	1898-Present[3]
	Canyon Mouth	10169999	21.7	SLCo	1981-Present
	Near Jordan River	10170250	--[4]	USGS, SLCo	1980-Present
Parleys Creek	Canyon Mouth			SLC	1898-Present[3]
Red Butte Creek	Fort Douglas			USACE	1942-1968[6]
	Fort Douglas			USGS	1963-Present
	1600 East Street			USGS	1963-1968
Surplus Canal	2100 South Street	10170500	--[4]	USGS	1942-Present

[1]USGS = U.S. Geological Survey; USACE = U.S. Army Corps of Engineers; SLCo = Salt Lake County Engineering; SLC = Salt Lake City Water Department [2]Portions of Salt Lake City's Daily Records, and monthly summaries of all records, have been published by the USGS. In addition, records are available for many of the diversions from the Jordan River in annual reports by the Utah Lake and Jordan River Commissioner. [3]Records intermittent from 1898-1913 [4]Value not published [5]Intermittent records [6]Monthly Data only

Hydrologic analyses were performed to establish discharge-frequency relationships at four locations in the study reach of the Jordan River. Historic streamflow data were analyzed in accordance with criteria outlined in Bulletin No. 17B, Guidelines for Determining Flood Flow Frequency (Reference 21).

Historic Utah Lake stage records beginning in 1884, and a high water reference of 1862, were used in conjunction with a stage-discharge curve to estimate historic natural discharges in the Jordan River. These data were used to supplement USGS streamflow data to develop the discharge-frequency curves. The locations, length of record, and operating agency, and type of record available for the streamflow gages used for the original study are summarized in Table 7, "Stream Gaging Stations".

The streamflow gaging records for the Jordan River consist of two data populations as a result of the operational effects of the Compromise Agreement: natural releases and pumped releases (Reference 1). The two data populations were analyzed independently to develop flood flow frequency curves for snowmelt events, as it was determined that floods caused by snowmelt events are generally more severe than those caused by rainfall events. Flood peaks caused by rainfall events were not evaluated with peaks caused by snowmelt events so that the data populations would be homogeneous. The most severe snowmelt floods on the Jordan River are associated with natural releases and high levels of Utah Lake.

Discharge contributions to the Jordan River from Mill Creek, Big Cottonwood Creek, and Little Cottonwood Creek were based on estimated 100-year tributary discharges at the canyon mouths developed by the USACE (Reference 22).

The Surplus Canal diverts water from the Jordan River at 21st South Street and conveys the flow to the Great Salt Lake. Some of the water is diverted into the lower portion of the Jordan River (downstream of 21st South Street) through five gated flumes. The maximum capacity of these flumes is approximately 500 cfs. During periods of high inflow from downstream tributaries, the gates are closed, and only 200 cfs is diverted into the lower portion of the Jordan River. It can be observed that the runoff gages with the best record are located at the canyon mouths. Stream gages at the mouths of Emigration Creek and Parleys Creek provide ample data to predict upstream flood flows for these streams. Runoff values for Emigration Creek, Parleys Creek, and Red Butte Creek were computed based on the Water Resources Council Guidelines for determining flood flow frequencies (Reference 18). This method uses a log-Pearson Type III distribution in conjunction with a regional skew to predict flood flows based on existing streamflow data.

Flow values for City Creek studied by approximate methods, were computed based on the Water Resources Council Guidelines for determining flood flow frequencies (Reference 18). Flow values for the remaining approximate study streams were computed based on the USGS Open File Report Floods of Utah, Magnitude and Frequency Characteristics through 1969 (Reference 23). This procedure uses regression equations based on drainage area and mean basin elevation to estimate the 10- and 25-year peak flows. These values were then extended to a return interval of 100 years using a statistical relationship developed by Powell, James and Jones (Reference 24).

For the revised studies of the unincorporated areas of Salt Lake County and the Cities of Murray South Salt Lake, the hydrologic analyses performed by the USACE (Reference 22), were used as a basis for establishing discharge-frequency relationships at key locations within the restudied areas. The USACE documents how snowmelt discharge-frequency analyses were performed using historic streamflow data at the respective canyon mouths in accordance with criteria outlined in Bulletin No. 17B, "Guidelines for Determining Flood Flow Frequency" (Reference 21).

Mountain rainfall discharge-frequency analyses were also performed using historic streamflow data at the respective canyon mouths. HEC-1 models were developed using parameters summarized in the USACE hydrology study (Reference 22) to compute approximate mountain rainfall-runoff hydrographs and simulate the effects of recently constructed detention basins.

Urban rainfall flood analyses were performed using the USACE HEC-1 computer program (Reference 25). The HEC-1 models developed by the USACE (Reference 22) were revised to simulate runoff from 50- and 100-year, three-hour thunderstorm events. Revisions included adding recently constructed detention facilities and changing the hydrograph routing routine from the Kinematic Wave method to the Muskingum-Cunge method.

Basic addition theorems of probability were used to develop all-events discharge-frequency curves using the results from the snowmelt, mountain rainfall flood, and urban rainfall flood analyses.

Peak discharge-drainage area relationships for streams studied by detailed methods for Salt Lake County are shown in Table 8, "Summary of Discharges."

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Users should be aware that flood elevations shown on the FIRM represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data tables in the FIS report. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS in conjunction with the data shown on the FIRM.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals (Exhibit 1). The locations of selected cross sections used in the hydraulic analyses are shown on these profiles as well. For stream segments for which a floodway was computed (Section 4.2), selected cross-section locations are also shown on the Flood Insurance Rate Map (Exhibit 2).

Water-surface elevations for floods of the selected recurrence intervals for the streams studied by detailed methods were computed using the USACE HEC-2 step-backwater computer program (Reference 26). The starting water-surface elevations were determined using normal-depth calculations.

Table 8. Summary of Discharges

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (Cubic Feet per Second)[1] 10-Year	50-Year	100-Year	500-Year
Big Cottonwood Creek					
At Canyon Mouth	50.0	625	880	1,230	3,800
At Fairview Drive (2200 East)	--[2]	660	880	1,100	3,000
At Highland Circle	--[2]	1,150	1,900	2,200	3,600
Below Creekside Detention Basin	--[2]	640	800	880	1,020
At 900 East Street	70.9	690	860	920	1,100
At 400 East Street	72.6	720	890	1,000	1,500
At Jordan River	78.2	760	920	1,030	1,110
Burr Fork					
At Mouth	--[2]	75	125	150	220
Corner Canyon Creek					
At Union Pacific Railroad	5.00	40	205	290	890
At 300 East Street	5.00	25	180	285	975
At Interstate Highway 15	6.00	25	175	315	1,040
At Denver and Rio Grande Western Railroad	7.00	25	120	240	700
Dry Creek					
At Dimple Dell Road	4.00	5	30	320	1,630
At 2300 East Street (extended)	5.00	50	90	420	1,845
At 1300 East Street	11.00	110	200	510	2,120
At 700 East Street	13.00	130	240	550	1,750
At 300 West Street (located in South Jordan)	14.00	125	195	420	750
Emigration Creek and Burr Fork					
At Canyon Mouth	19.00	75	125	150	220

[1]Reductions in flow are generally due to detention storage through roadway fills or loss of flow to shallow flooding in overbank areas
[2]Data not available

Table 8. Summary of Discharges (Cont'd)

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (Cubic Feet per Second)[1] 10-Year	50-Year	100-Year	500-Year
Emigration Creek					
At Foothill Drive (U.S. Highway 40 and State Highway 186)	20.10	88	150	180	265
At 13th South Street	23.00	135	360	1,010	2,740
At 19th East Street	23.00	130[3]	360	950[3]	2,840
At 17th South Street	23.00	125[3]	305[3]	360[3]	360[3]
At 15th East Street	23.00	125	260[3]	300[3]	300[3]
At 13th East Street (State Highway 181)	24.20	120[3]	240[3]	300	300
At Entrance to Conduit	24.20	220	280	315	330
Jordan River					
At Narrows	2,755.00	1,260	2,400	3,000	4,800
At 9000 South Street	2,905.00	1,170	2,230	2,790	4,465
At 5800 South Street	2,985.00	1,200	2,280	2,850	4,560
At Little Cottonwood Creek Confluence	--[3]	1,585	3,010	3,740	5,925
At Big Cottonwood Creek Confluence	--[3]	1,930	3,665	4,535	7,145
At Mill Creek Confluence	--[3]	2,000	3,800	4,700	7,400
At 2100 South Street	3,165.00[2]	2,000	3,800	4,700	7,400
At Redwood Road	140.00[4]	1,233	1,233	1,233	1,233
Downstream of Surplus Canal Diversion	4.34	235[5]	250[5]	250[5]	250[5]
At 13th South Street Extended	107.60[4]	825	920	1,010	1,145
At Union Pacific Railroad Bridge	110.20[4]	910	1,005	1,095	1,230
At Indiana Avenue	116.70[4]	1,220	1,315	1,405	1,540
At 5th South Street	116.70[4]	1,350	1,445	1,530	1,670
At 4th South Street	117.00[4]	1,370	1,485	1,585	1,785
At North Temple Street (U.S. Highway 40 and State Highway 186)	140.30[4]	1,460	1,615	1,790	2,095
At 500 North Street	140.30[4]	1,460	1,610	1,765	2,060
At 700 North Street	140.30[4]	1,285	1,325	1,370	1,475
At Rose Park Golf Course Bridge	140.30[4]	1,200	1,200	1,200	1,200

[1]Reductions in flow are generally due to detention storage through roadway fills or loss of flow to shallow flooding in overbank areas [2]Value estimated based on published drainage area for gage at 1700 South Street [3]Data not available [4]Drainage area does not include tributary area upstream of the Surplus Canal diversion [5]Includes a Base Flow of 200cfs diverted from the Upper Jordan River Basin through diversion structures located at Surplus Canal

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Table 8. Summary of Discharges

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (Cubic Feet per Second)[1] 10-Year	50-Year	100-Year	500-Year
Little Cottonwood Creek					
At Canyon Mouth	27.40	690	1,000	1,400	4,000
Near 1445 East Street	--[2]	760	1,100	1,380	2,800
At Interstate 215	--[2]	830	1,200	1,450	2,150
At 900 East Street	42.70	790	980	1,050	1,200
At 700 East Street	44.30	790	980	1,050	1,200
At State Street	45.50	770	955	1,035	1,200
At Jordan River	46.10	780	955	1,035	1,200
Midas Creek					
Confluence with Jordan River to upstream South Jordan Canal	15.41	372	907	1,139	1,600
To upstream of the Utah and South Lake Canal	14.83	270	740	937	1,300
To upstream of the Utah Lake Distributing Canal	14.38	236	681	873	1,250
To 3600 West Street	13.91	224	660	844	1,200
Mill Creek					
At Canyon Road	22.00	150	260	340	1,800
Downstream of 2700 East Street	27.00	520	620	710	1,900
At Canyon Way	28.00	790	900	1,030	2,600
Downstream of Highland Drive	31.00	370	450	540	600
At 700 East Street (upstream of South Salt Lake)	33.00	700	750	800	850
At 3300 South Street	32.00	370	380	400	460
At 400 East Street	35.40	380	650	660	670
At the Jordan River	40.80	380	580	660	900
Parleys Creek					
At Canyon Mouth	51.00	240	330	370	450

[1]Reductions in flow are generally due to detention storage through roadway fills or loss of flow to shallow flooding in overbank areas
[2]Data not available

Table 8. Summary of Discharges

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (Cubic Feet per Second)[1] 10-Year	50-Year	100-Year	500-Year
Red Butte Creek					
At Canyon Mouth	11.00	40	60	70	100
At Foothill Drive (U.S. Highway 40 and State Highway 186)	11.35	45	75	140	270
At Sunnyside Avenue	11.50	90	110	170	370
At 15th East Street	11.73	150	190	260	380
At 13th East Street	11.89	170	200	240	340
Willow Creek					
At Kathy Drive	4.00	10	25	230	1,100
At 11700 South Street	5.00	70	100	300	1,150
At 12300 South Street (west of Interstate Highway 15, upstream of South Jordan)	17.00	25	150	276	922
Willow Creek (East)					
At 11700 South Street (upstream of Draper)	5.00	70	100	300	1,150
At 12400 South Street (above Union Pacific Railroad)	10.00	10	25	330	1,400
Willow Creek (West)					
At Interstate Highway 15	13.00	15	42	60	60
At 11400 South Street	15.00	200	350	380	445

[1]Reductions in flow are generally due to detention storage through roadway fills or loss of flow to shallow flooding in overbank areas

Natural channel and overbank roughness factors (Manning's "n" values) were chosen by engineering judgment and based on field observations of the streams and floodplain areas. For a complete list of Manning's "n" factors used in this study, see Table 9, "Manning's "n" Values".

Jordan River:

Floodflows can overtop a small portion of the Jordan River channel downstream of Salt Lake City and pond in the left overbank in the area of the Jordan River Parkway. A volumetric analysis was performed, using hand calculations, to determine the depth of this ponding for the 100- and 500-year floods.

Five shallow flooding or ponding zones (Zone AH) were identified. One of these areas is located just downstream of the confluence with Big Cottonwood Creek. Another is located just upstream of the 4500 South Street bridge. The other three are located between the south side of the Sharon Steel tailings pile and the North Jordan Diversion structure.

The AH Zone located just downstream of the Big Cottonwood Creek confluence is located in a low area behind a short levee. This levee provides less than three feet of freeboard during the 100-year flood, and shallow flooding occasionally occurs in the area because of inadequate internal drainage facilities. The flood elevation in this area was assumed to be equal to the water-surface elevation in the Jordan River.

The other four AH Zones are shallow flooding areas in low overbank areas along the Jordan River. The flood elevations in those areas were estimated from the water surface in the river at the low point where water enters those areas.

In addition to these five zones, excess overland flows from the eastern and downstream areas of Salt Lake City come together in a large pond created by the Denver and Rio Grande Western Railroad embankment located at approximately 600 West Street (in Salt Lake City). The flood elevation of the ponding was determined using the HEC-1 flood hydrograph package (Reference 19).

The HEC-2 computer model developed by the study contractor as part of the Utah Lake/Jordan River Flood Management Program in 1984 was used as a basis for performing the hydraulic analyses of the Jordan River (Reference 12). The cross sections used to develop that model were field surveyed in June 1984 during the peak flow period. The model was calibrated to the 1984 event. To update the model, 78 additional cross sections were added. Cross section data for approximately 38 of these sections were obtained from a 1987 survey where monumented cross sections were established between 2100 South and 14600 South Streets to monitor erosion and deposition. The data for the remaining 40 cross sections were field surveyed in 1990 and 1991. Overbank and underwater data were obtained by field survey for all channel cross sections. In some areas (i.e. between 2100 South Street and the Mill Creek confluence) supplemental overbank cross section data were obtained from the 1990 orthophoto topographic maps provided by Salt Lake County (Reference 27). The portion of the HEC-2 model for the study reach upstream of Turner Dam was obtained from data developed by the USACE.

Table 9. Manning's "n" Values

Flooding Source	Roughness Coefficients	
	Channel	Overbanks
Big Cottonwood Creek	0.030	0.060
Burr Fork	0.025-0.200	0.030-0.240
Corner Canyon Creek	0.030-0.040	0.040-0.060
Dry Creek (Salt Lake County)	0.025-0.200	0.030-0.240
Dry Creek (Sandy City, South Jordan)	0.030-0.040	0.040-0.060
Emigration Creek (Salt Lake County)	0.025-0.200	0.030-0.240
Emigration Creek (Salt Lake City)	0.030-0.080	0.040-0.100
Jordan River (Salt Lake County, Murray)	0.025-0.200	0.030-0.240
Jordan River (Bluffdale, Midvale, Riverton, Salt Lake County Revision, West Jordan, West Valley City)	0.022-0.077[1]	0.075-0.225
Jordan River (Draper, Sandy City, South Jordan)	0.030-0.040	0.040-0.060
Jordan River (Salt Lake City)	0.030	0.070
Jordan River (South Salt Lake)	0.025-0.100	0.030-0.200
Little Cottonwood Creek	0.030	0.060
Mill Creek (Salt Lake County)	0.025-0.200	0.030-0.240
Mill Creek (South Salt Lake)	0.030	0.060
Parleys Creek (Salt Lake County)	0.025-0.200	0.030-0.240
Parleys Creek (Salt Lake City)	0.040-0.060	0.040-0.080
Red Butte Creek	0.050-0.070	0.040-0.100
Willow Creek (Salt Lake County)	0.025-0.200	0.030-0.240
Willow Creek (Draper, Sandy City, South Jordan)	0.030-0.040	0.040-0.060

[1]Main channel coefficients 0.012 and 0.013 were used to model flow through two of the concrete diversion structures on the Jordan River.

The majority of the cross sections for the Jordan River north of Interstate Highway 80 in Salt Lake City were surveyed by Bingham Engineering in 1980 (Reference 24). Several intermediate sections in this reach and all sections on the remainder of the Jordan River, Red Butte Creek, Emigration Creek, and Parleys Creek were surveyed as a part of this study.

Orthophoto topographic maps with a scale of 1:4,800 and a contour interval of four feet, with two-foot supplemental contours, were provided to the study contractor by Salt Lake County (Reference 27). The photography date of the study area was November 11, 1990.

Since the enlargement of the Surplus Canal, debris from upstream runoff does not contribute to the Jordan River through Salt Lake City. It was also determined that, due to the extremely flat gradient, obstructions do not significantly affect the backwater effects along the Jordan River.

Other Flooding Sources

Burr Fork, Emigration Creek, and Parleys Creek:

Cross section data used in the backwater analyses for Burr Fork, Emigration Creek, and Parleys Creek were taken from field surveys.

Corner Canyon Creek and Dry Creek:

Cross section data for Corner Canyon Creek and Dry Creek were developed by the USACE for the 1974 Flood Plain Information report (Reference 6). Cross sections were taken from topographic maps at a scale of 1:600, with a contour interval of four feet (Reference 29), and from additional survey data provided by the County.

Big Cottonwood Creek and Little Cottonwood Creek:

Cross section data for Big and Little Cottonwood Creeks were developed by the USACE as part of the Jordan River Investigation Report (Reference 14). Cross sections were taken from orthophoto topographic maps at a scale of 1:600, with a contour interval of two feet (Reference 30).

On Little Cottonwood Creek, the 500-year flooding leaves the channel at Fort Union Boulevard (7000 South Street) and flows northward, generally paralleling the stream channel. In the vicinity of 900 East Street, this flow is joined by 100-year and additional 500-year overflows from Little Cottonwood Creek. These overland flows move generally northwest until they flow into Big Cottonwood Creek in the vicinity of Shamrock Drive in the City of Murray. On the basis of field inspection, review of topographic data, and engineering judgment, the USACE determined these flows to average less than one foot in depth (Reference 14).

The CH2M Hill HEC-2 computer model was developed based on the original Flood Insurance Study for the hydraulic analyses of the restudied streams. To account for the addition of bridges, culverts, channel relocation and improvements, areas of recent fill, and development in or near the floodplain that has occurred since the original Flood

Insurance Study HEC-2 models were developed, cross sections were added to each model. Sixty new field-surveyed channel cross sections were added to the Little Cottonwood Creek model, twenty-six were added to the Big Cottonwood Creek model, and seventy-three were added to the Mill Creek model. Field surveying included collection of overbank and underwater data. All new hydraulic structures were surveyed to obtain elevation and structural geometry data.

Mill Creek:

Cross section data for Mill Creek were developed by the USACE as part of the Jordan River Investigation Report (Reference 14). Cross sections for Mill Creek were taken from topographic maps at a scale of 1:600, with a contour interval of 2 feet (Reference 31).

On Mill Creek, the 500-year flooding leaves the main channel upstream of 2000 East Street and flows to the north towards Highland Drive. This flow is largely confined to the streets. Constrictions at Highland Drive force 100- and 500-year flooding away from the main channel. These flows move overland south of Mill Creek until they rejoin the main flow at 700 East Street (State Highway 71). The USACE determined that the average depth of these overland flows is less than one foot on the basis of field reconnaissance, review of topographic information, and engineering judgment (Reference 14).

The area protected from the 100-year flood by the Mill Creek levee was determined by a modification of the HEC-2 backwater analysis of Mill Creek (Reference 26). This area lies approximately between 900 West Street and the Denver and Rio Grande Western Railroad, north of Mill Creek to 21st South Street (State Highway 201).

The study contractor revised the 100-year hydraulic analysis for Mill Creek between Main Street (in the City of South Salt Lake) and 700 East Street. New cross section data for this reach were field surveyed and extended by using orthophoto topographic maps at a scale of 1:2,400, with contour intervals of 2.5 and 5 feet (Reference 32).

Willow Creek:

Cross section data for Willow Creek were developed by the USACE for the 1974 Flood Plain Information report (Reference 6). Cross sections were taken from topographic maps at a scale of 1:600, with a contour interval of four feet (Reference 29) and additional survey data provided by the County.

Constrictions at 12500 and 12715 South Streets on Willow Creek force 100- and 500-year flows upstream away from the channel as overland shallow flooding. These flows move generally to the west until they encounter drainages east of Interstate Highway 15 (U.S. Highway 89, 91, and Alternate 50). This area of shallow flooding is the major flow path for this portion of Willow Creek. Downstream of 12715 South Street, the channel is little more than an irrigation ditch. The remaining flows following this channel pass beneath the Union Pacific Railroad and spread out as shallow overland flooding moving southwest towards Boulder Street. Both of these overland flows were determined to have an average depth of less than 1.0 foot based on field reconnaissance and engineering judgment.

Approximate Studies

An approximate 100-year elevation for the Great Salt Lake was determined from an elevation-frequency analysis of annual peak elevations from 1851 to the present.

The depth and extent of approximate flooding from Neffs Canyon was determined from field reconnaissance, review of topographic data, and engineering judgment.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All bridges, dams, and culverts were field checked to obtain information to describe their structural geometry.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation Reference Marks (ERMs) and their descriptions are shown on the maps. ERMs shown on the FIRM represent those used during the preparation of this and previous Flood Insurance Studies. The elevations associated with each ERM were obtained and/or developed during FIS production to establish vertical control for determination of flood elevations and floodplain boundaries shown on the FIRM. Users should be aware that these ERM elevations may have changed since the publication of this FIS. To obtain up-to-date elevation information on National Geodetic Survey (NGS) ERMs shown on this map, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their website at www.ngs.noaa.gov. Map users should seek verification of non-NGS ERM monument elevations when using these elevations for construction or floodplain management purposes.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. To assist in this endeavor, each FIS provides 100-year floodplain data, which may include a combination of the following: 10-, 50-, 100-, and 500-year flood elevations; delineations of the 100-year and 500-year floodplains; and 100-year floodway. This information is presented on the FIRM and in many components of the FIS, including Flood Profiles, Floodway Data tables and Summary of Stillwater Elevation tables. Users should reference the data presented in the FIS as well as additional information that may be available at the local community map repository before making flood elevation and/or floodplain boundary determinations.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied by detailed methods, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section.

Between cross sections, the boundaries were interpolated using topographic and orthophoto topographic maps. For information regarding the scales and sources of these maps, see Table 10, "Topographic Mapping of Streams Studied by Detailed Methods".

Flood boundaries for Mill Creek (with the exception of 100-year boundaries between Main Street and 700 East Street); Big Cottonwood Creek, upstream of Millrace Lane; and Little Cottonwood Creek were delineated by the USACE for the Jordan River Investigation Report (Reference 14).

Flood boundaries for the Jordan River in the City of Bluffdale were delineated using orthophoto topographic maps at a scale of 1:4,800 with a contour interval of four feet and supplemental two-foot contours, as noted in Table 10. The contours on these maps extend to a point that is either 1,000 feet from the channel or 10 feet above the top of the bank, whichever comes first. In areas where the floodplain exceeded contoured areas on the maps, USGS quadrangle maps were used to supplement the contours on the orthophoto topographic maps (Reference 33).

Approximate flood boundaries in the unincorporated areas of Salt Lake County were delineated on topographic maps at a scale of 1:24,000, with contour intervals of 5, 10, 20, and 40 feet (Reference 33).

The 100-year floodplain boundaries of streams studied by approximate methods in the City of Draper were developed using the elevations determined from the normal depth computations discussed in Section 3.2. These boundaries were mapped on the 1:24,000 scale topographic maps referenced in Table 10 (Reference 33).

The 100-year floodplain boundaries of streams studied by approximate methods in the City of Draper were developed using the elevations determined from the normal depth computations discussed in Section 3.2. These boundaries were mapped on topographic maps with a scale of 1:24,000 and a contour interval of 40 feet (Reference 33), and at a scale of 1:2,400, with a contour interval of 5 feet (Reference 34).

The 100-year floodplain boundaries of streams studied by approximate methods in the City of Sandy City, with the exception of the Jordan River downstream of the North Jordan Canal Diversion Dam, were developed using topographic maps at a scale of 1:24,000, with a contour interval of 40 feet (Reference 33).

Flood boundaries along the revised portions of Big Cottonwood Creek and Mill Creek were delineated using orthophoto topographic maps provided by Salt Lake County. The maps used for most of the restudy area (References 32, 33, 35) are the same maps used to develop work maps for the original Flood Insurance Study. The maps for Big Cottonwood Creek were prepared at a scale of 1:2,400, with a contour interval of 4 feet, with supplemental spot elevations. The maps for Mill Creek were prepared at a scale of 1:2,400, with contour intervals of 2.5 feet, with supplemental spot elevations. In the vicinity of the Jordan River, orthophoto topographic maps at a scale of 1:4,800, with a contour interval of 4 feet, were used to delineate flood boundaries (Reference 27). In areas where the floodplain areas exceeded contoured areas on the aerial mapping, USGS quadrangle maps were used to supplement the contours on the orthophoto topographic maps (Reference 27). Ground surface and building floor elevation data in the developed area between Interstate 15 and the Union Pacific Railroad were field surveyed to supplement mapping information.

Table 10. Topographic Mapping of Streams Studied by Detailed Methods

Stream Name	Location	Scale	Contour Interval (feet)	Ref. No.
Big Cottonwood Creek	Downstream from Millrace Lane	1:24,000	5, 10, 20, 40	33
Big Cottonwood Creek	Upstream from Millrace Lane	1:2,400	2.5, 5	32
Burr Fork	Salt Lake County	1:24,000	5, 10, 20, 40	33
Dry Creek	Upstream from approximately 800 feet above 11700 South Street	1:2,400	5	41
Emigration Creek	Salt Lake City	1:4,800[1]	5, 20, 40	33
Emigration Creek	Salt Lake County	1:24,000	5, 10, 20, 40	33
Jordan River	Between Cudahy Lane and Salt Lake City northern corporate limits	1:24,000	5, 10, 20, 40	33
Jordan River	City of Bluffdale	1:4,800	22[2], 4	33
Jordan River	North of Interstate Highway 80 (in Salt Lake City)	1:2,400	2	42
Jordan River	Ponding area created by Denver and Rio Grande Western Railroad embankment (in Salt Lake City)	1:24,000	5	33
Jordan River	Ponding on left overbank downstream of Salt Lake City	1:2,400	2	43
Jordan River	South of Interstate Highway 80 (in Salt Lake City)	1:4,800[1]	5, 20, 40	33
Jordan River	Upstream from North Jordan Canal Diversion Dam	1:24,000	5, 10, 40	33
Jordan River	West overbank between 2100 South Street and Decker Lake Drain	1:6,000	5	44
Little Cottonwood Creek	Downstream from 7000 South Street	1:2,400	2, 4	35
Little Cottonwood Creek	Overland Flows	1:1,200	2, 4	45
Little Cottonwood Creek	Upstream from 7000 South Street	1:2,400	1.5, 2.5, 3.5, 5	46
Mill Creek	Levee-protected area	1:24,000	5	33
Mill Creek	Upstream from Millrace Lane; overland flows	1:2,400	2.5, 5	32
Parleys Creek	Salt Lake City	1:4,800[1]	5, 20, 40	33
Parleys Creek	Salt Lake County	1:24,000	5, 10, 20, 40	33
Red Butte Creek	Salt Lake City	1:4,800[1]	5, 20, 40	33
Willow Creek	Downstream from approximately 800 feet above 11700 South Street	1:24,000	5, 10, 40	33
Willow Creek	Overland Flows; Approximate Study Area (City of Draper)	1:24,000	5, 10, 20, 40	33
Willow Creek	Upstream from approximately 800 feet above 11700 South Street	1:2,400	5	41

[1]Enlarged from 1:24,000 scale
[2]Supplemental data

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, and AH), and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundary is shown on the Flood Insurance Rate Map (Exhibit 2). Approximate 100-year floodplain boundaries in some portions of the study area were taken directly from the Flood Hazard Boundary Maps for Salt Lake County, unincorporated areas (Reference 4); the City of Bluffdale (Reference 1); the City of Murray (Reference 36); the City of Salt Lake City (Reference 37); the City of Sandy City (Reference 38); the City of South Jordan (Reference 39); and the City of South Salt Lake (Reference 40). These boundaries were supplemented by those taken from the 1974 USACE Floodplain Information Report (Reference 6).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed for certain stream segments on the basis of equal-conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (see Table 11, "Floodway Data"). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Big Cottonwood Creek								
A	135	110	418	3.1	4,243.0	4,241.9[2]	4,241.9[2]	0.0
B	1,080	57	320	4.0	4,243.0	4,242.9[2]	4,243.7[2]	0.8
C	1,670	53	373	3.5	4,243.7	4,243.7	4,244.7	1.0
D	2,373	93	547	2.4	4,244.4	4,244.4	4,245.3	0.9
E	2,478	19	192	7.0	4,246.0	4,246.0	4,246.0	0.0
F	3,260	68	519	2.6	4,246.8	4,246.8	4,247.3	0.5
G	3,520	50	286	4.7	4,246.9	4,246.9	4,247.5	0.6
H	3,560	172	1,122	1.2	4,247.4	4,247.4	4,247.9	0.5
I	3,975	90	593	2.3	4,247.5	4,247.5	4,248.0	0.5
J	4,160	32	255	5.6	4,247.5	4,247.5	4,248.1	0.6
K	4,523	50	406	3.5	4,248.4	4,248.4	4,248.9	0.5
L	4,693	17	180	8.0	4,249.0	4,249.0	4,249.6	0.6
M	4,753	81	458	3.1	4,251.9	4,251.9	4,252.2	0.3
N	5,080	95	737	1.9	4,252.1	4,252.1	4,252.5	0.4
O	5,260	128	761	1.9	4,252.3	4 252.3	4,252.7	0.4
P	6,100	36	271	5.4	4,252.5	4,252.5	4,253.1	0.6
Q	6,813	66	464	3.3	4,253.7	4,253.7	4,254.7	1.0
R	6,903	77	589	2.6	4,254.0	4,254.0	4,254.9	0.9
S	7,300	30	235	6.5	4,254.0	4,254.0	4,255.0	1.0
T	7,886	19	188	8.0	4,256.4	4,256.4	4,256.9	0.5
U	8,230	68	466	3.3	4,257.9	4,257.9	4,258.3	0.4
V	8,765	42	212	7.3	4,259.1	4,259.1	4,259.7	0.6
W	8,815	46	323	4.8	4,259.8	4,259.8	4,260.4	0.6
X	9,500	322	1,717	0.9	4,260.4	4,260.4	4,261.0	0.6
Y	10,100	152	821	1.9	4,260.5	4,260.5	4,261.1	0.6
Z	10,690	45	254	6.1	4,260.7	4,260.7	4,261.4	0.7

[1]Feet above mouth [2]Elevations computed without consideration of backwater effects from Jordan River

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT
AND INCORPORATED AREAS

FLOODWAY DATA

BIG COTTONWOOD CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Big Cottonwood Creek (Cont'd)								
AA	10,773	40	210	4.8	4,260.0	4,260.0	4,260.1	0.1
AB	10,989	40	184	5.4	4,260.0	4,260.0	4,260.1	0.1
AC	11,114	32	107	9.3	4,259.5	4,259.5	4,259.8	0.3
AD	11,494	30	140	7.1	4,264.0	4,264.0	4,264.0	0.0
AE	11,721	41	219	4.2	4,265.6	4,265.6	4,265.6	0.0
AF	12,235	54	255	3.6	4,266.6	4,266.6	4,266.8	0.2
AG	12,585	42	204	4.5	4,267.3	4,267.3	4,267.7	0.4
AH	13,015	54	228	4.0	4,268.7	4,268.7	4,269.0	0.3
AI	13,875	65	269	3.4	4,271.1	4,271.1	4,271.2	0.1
AJ	14,625	59	262	3.5	4,272.6	4,272.6	4,272.8	0.2
AK	15,375	39	157	5.9	4,275.0	4,275.0	4,275.3	0.3
AL	16,036	47	171	5.4	4,279.7	4,279.7	4,279.7	0.0
AM	16,775	46	203	4.5	4,283.8	4,283.8	4,283.9	0.1
AN	17,349	41	211	4.4	4,285.4	4,285.4	4,285.7	0.3
AO	17,629	57	240	3.8	4,286.6	4,286.6	4,286.9	0.3
AP	18,075	31	139	6.6	4,288.5	4,288.5	4,288.5	0.0
AQ	18,539	20	82	11.2	4,290.5	4,290.5	4,290.6	0.1
AR	19,750	36	125	7.3	4,293.7	4,293.7	4,294.7	1.0
AS	21,250	25	153	5.9	4,304.2	4,304.2	4,304.9	0.7
AT	22,260	26	136	6.7	4,309.0	4,309.0	4,309.5	0.5
AU	22,450	29	157	5.7	4,310.0	4,310.0	4,311.0	1.0
AV	22,480	52	201	4.4	4,310.6	4,310.6	4,311.4	0.8
AW	23,240	26	150	5.2	4,315.3	4,315.3	4,316.1	0.8
AX	23,420	27	181	4.2	4,315.7	4,315.7	4,316.7	1.0
AY	24,000	20	108	6.2	4,319.7	4,319.7	4,320.2	0.5
AZ	24,190	21	117	5.5	4,324.6	4,324.6	4,324.6	0.0

[1]Feet above mouth

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT AND INCORPORATED AREAS

FLOODWAY DATA

BIG COTTONWOOD CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Big Cottonwood Creek (Cont'd)								
BA	24,250	115	208	6.8	4,325.6	4,325.6	4,325.7	0.1
BB	24,750	73	179	7.9	4,329.3	4,329.3	4,329.3	0.0
BC	25,570	21	109	13.0	4,335.2	4,335.2	4,335.2	0.0
BD	25,690	312	814	1.7	4,339.8	4,339.8	4,340.1	0.3
BE	26,170	44	202	7.0	4,340.1	4,340.1	4,340.9	0.8
BF	27,152	23	177	8.0	4,348.8	4,348.8	4,349.7	0.9
BG	27,500	50	166	8.2	4,350.3	4,350.3	4,350.9	0.6
BH	27,800	103	462	2.9	4,356.1	4,356.1	4,356.1	0.0
BI	28,350	36	173	7.2	4,356.2	4,356.2	4,356.8	0.6
BJ	28,483	39	221	5.6	4,360.4	4,360.4	4,360.4	0.0
BK	28,635	38	164	7.4	4,360.6	4,360.6	4,360.7	0.1
BL	29,140	167	300	3.8	4,368.4	4,368.4	4,369.2	0.8
BM	29,400	162	577	1.9	4,371.8	4,371.8	4,372.3	0.5
BN	29,722	29	172	6.3	4,373.8	4,373.8	4,374.5	0.7
BO	29,850	24	130	8.2	4,374.9	4,374.9	4,375.2	0.3
BP	30,030	21	143	7.3	4,376.9	4,376.9	4,377.9	1.0
BQ	30,100	64	323	3.2	4,378.2	4,378.2	4,378.8	0.6
BR	30,600	23	87	11.2	4,381.1	4,381.1	4,381.1	0.0
BS	31,100	38	160	5.6	4,387.6	4,387.6	4,388.5	0.9
BT	31,843	21	113	7.2	4,394.0	4,394.0	4,394.0	0.0
BU	31,900	32	116	7.0	4,394.6	4,394.6	4,394.8	0.2
BV	32,200	31	150	5.4	4,396.8	4,396.8	4,397.4	0.6
BW	32,800	52	169	4.8	4,400.7	4,400.7	4,400.9	0.2
BX	33,540	25	143	5.7	4,406.2	4,406.2	4,406.8	0.6
BY	33,590	156	247	3.3	4,406.9	4,406.9	4,407.2	0.3
BZ	34,700	44	157	5.2	4,417.0	4,417.0	4,417.1	0.1

[1]Feet above mouth

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT
AND INCORPORATED AREAS

FLOODWAY DATA

BIG COTTONWOOD CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Big Cottonwood Creek (Cont'd)								
CA	35,750	84	178	4.6	4,427.4	4,427.4	4,427.4	0.0
CB	36,275	145	285	2.9	4,430.4	4,430.4	4,430.4	0.0
CC	37,500	34	135	6.0	4,444.0	4,444.0	4,444.8	0.8
CD	38,000	34	114	7.2	4,448.5	4,448.5	4,449.4	0.9
CE	38,500	116	174	4.7	4,457.0	4,457.0	4,457.0	0.0
CF	39,100	49	125	6.5	4,464.6	4,464.6	4,465.3	0.7
CG	39,600	54	131	6.2	4,472.6	4,472.6	4,472.6	0.0
CH	39,940	19	93	8.7	4,478.9	4,478.9	4,478.9	0.0
CI	40,550	100	127	6.4	4,492.0	4,492.0	4,492.0	0.0
CJ	40,700	188	274	3.0	4,493.4	4,493.4	4,494.2	0.8
CK	41,550	20	108	7.5	4,512.1	4,512.1	4,512.1	0.0
CL	41,850	55	117	6.9	4,515.8	4,515.8	4,516.0	0.2
CM	42,300	41	94	8.7	4,524.0	4,524.0	4,524.3	0.3
CN	42,450	51	101	8.1	4,526.9	4,526.9	4,526.9	0.0
CO	42,650	55	115	7.1	4,533.5	4,533.5	4,533.8	0.3
CP	43,100	56	151	5.4	4,544.4	4,544.4	4,545.0	0.6
CQ	43,450	53	215	3.8	4,555.8	4,555.8	4,556.7	0.9
CR	43,580	22	159	5.1	4,557.7	4,557.7	4,558.4	0.7
CS	43,950	38	130	6.3	4,566.6	4,566.6	4,567.0	0.4
CT	44,150	35	171	4.8	4,570.8	4,570.8	4,571.8	1.0
CU	44,800	21	96	8.5	4,583.3	4,583.3	4,584.1	0.8
CV	45,113	27	126	6.5	4,594.3	4,594.3	4,595.2	0.9
CW	45,850	35	121	6.7	4,612.2	4,612.2	4,612.5	0.3
CX	46,450	26	125	6.5	4,629.4	4,629.4	4,629.7	0.3
CY	46,730	17	122	6.7	4,639.2	4,639.2	4,639.2	0.0
CZ	46,800	59	275	3.0	4,640.5	4,640.5	4,640.5	0.0

[1]Feet above mouth

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT
AND INCORPORATED AREAS

FLOODWAY DATA

BIG COTTONWOOD CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Big Cottonwood Creek (Cont'd)								
DA	47,050	40	93	8.7	4,644.3	4,644.3	4,644.3	0.0
DB	47,300	49	179	4.5	4,654.3	4,654.3	4,654.7	0.4
DC	47,900	48	190	4.3	4,667.9	4,667.9	4,668.7	0.8
DD	48,300	40	177	4.6	4,678.7	4,678.7	4,679.1	0.4
DE	48,700	61	173	4.7	4,689.1	4,689.1	4,689.7	0.6
DF	49,100	38	126	6.4	4,699.8	4,699.8	4,700.4	0.6
DG	49,500	34	131	6.2	4,713.9	4,713.9	4,714.2	0.3
DH	49,600	19	129	6.3	4,717.9	4,717.9	4,717.9	0.0
DI	50,500	43	143	5.7	4,747.1	4,747.1	4,747.1	0.0
DJ	50,900	65	199	4.1	4,757.1	4,757.1	4,757.5	0.4
DK	51,500	49	211	3.9	4,768.8	4,768.8	4,769.5	0.7
DL	51,700	48	134	6.1	4,775.4	4,775.4	4,775.8	0.4
DM	52,350	122	227	3.6	4,801.5	4,801.5	4,802.4	0.9
DN	52,500	50	216	3.8	4,815.0	4,815.0	4,815.1	0.1
DO	52,900	112	237	3.4	4,836.1	4,836.1	4,836.1	0.0
DP	53,500	80	281	2.9	4,871.9	4,871.9	4,872.0	0.1
DQ	53,840	19	143	5.7	4,890.9	4,890.9	4,891.9	1.0
DR	53,900	60	291	2.8	4,894.6	4,894.6	4,894.9	0.3

[1]Feet above mouth

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT
AND INCORPORATED AREAS

FLOODWAY DATA

BIG COTTONWOOD CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Corner Canyon Creek								
A	200	70	119	2.0	4,346.2	4,344.7[2]	4,344.7[2]	0.0
B	670	70	97	2.5	4,346.2	4,345.7[2]	4,345.7[2]	0.0
C	1,190	71	50	4.8	4,353.4	4,353.4	4,353.4	0.0
D	1,950	30	59	4.1	4,361.3	4,361.3	4,361.5	0.2
E	2,560	47	44	5.5	4,369.9	4,369.9	4,369.9	0.0
F	2,860	36	74	3.2	4,372.2	4,372.2	4,372.2	0.0
G	3,031	40	376	0.8	4,383.6	4,383.6	4,383.6	0.0
H	3,380	40	199	1.6	4,383.6	4,383.6	4,383.6	0.0
I	4,080	40	180	1.7	4,383.6	4,383.6	4,383.6	0.0
J	5,100	30	45	7.0	4,389.9	4,389.9	4,390.0	0.1
K	5,790	30	74	4.3	4,395.9	4,395.9	4,396.7	0.8
L	5,970	4	23	13.7	4,403.3	4,403.3	4,403.3	0.0
M	6,000	20	244	1.3	4,410.5	4,410.5	4,410.5	0.0
N	6,300	30	259	1.2	4,410.5	4,410.5	4,410.5	0.0
O	7,030	25	105	3.0	4,410.6	4,410.6	4,410.7	0.1
P	7,450	5	25	12.7	4,416.0	4,416.0	4,416.0	0.0
Q	8,020	20	264	1.1	4,428.0	4,428.0	4,428.1	0.1
R	10,220	19	36	7.9	4,438.6	4,438.6	4,438.7	0.1
S	10,910	16	34	8.4	4,443.4	4,443.4	4,443.4	0.0
T	11,300	24	41	6.9	4,453.3	4,453.3	4,454.1	0.8
U	11,525	103	156	1.8	4,453.6	4,453.6	4,454.4	0.8
V	11,850	28	100	2.9	4,454.0	4,454.0	4,454.9	0.9
W	12,600	16	35	8.3	4,463.2	4,463.2	4,463.2	0.0
X	12,845	60	59	4.9	4,467.3	4,467.3	4,467.9	0.6
Y	13,280	56	90	3.2	4,472.8	4,472.8	4,472.8	0.0
Z	13,400	247	853	0.3	4,474.9	4,474.9	4,475.9	1.0

[1]Feet above mouth [2]Elevations computed without consideration of backwater effects from Jordan River

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT AND INCORPORATED AREAS

FLOODWAY DATA

CORNER CANYON CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Corner Canyon Creek (Cont'd)								
AA	13,650	247	853	0.3	4,474.9	4,474.9	4,475.9	1.0
AB	13,761	71	95	3.0	4,477.7	4,477.7	4,478.7	1.0
AC	14,562	31	79	3.7	4,480.9	4,480.9	4,481.6	0.7
AD	17,560	16	35	8.3	4,530.5	4,530.5	4,530.9	0.4
AE	18,330	33	45	6.5	4,547.1	4,547.1	4,547.1	0.0
AF	18,710	40	35	8.2	4,562.9	4,562.9	4,562.9	0.0
AG	18,860	40	299	1.0	4,562.9	4,562.9	4,563.1	0.2
AH	18,918	41	74	3.9	4,563.4	4,563.4	4,564.4	1.0
AI	19,070	18	36	8.1	4,567.4	4,567.4	4,567.4	0.0
AJ	19,860	5	24	8.9	4,598.7	4,598.7	4,598.7	0.0

[1]Feet above mouth

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT
AND INCORPORATED AREAS

FLOODWAY DATA

CORNER CANYON CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET NGVD)
Dry Creek								
A	905	19	58	7.3	4,305.7	4,305.7	4,305.7	0.0
B	1,600	20	49	8.6	4,313.6	4,313.6	4,313.7	0.1
C	1,750	39	102	4.1	4,315.3	4,315.3	4,315.4	0.1
D	2,265	19	66	6.4	4,318.8	4,318.8	4,319.1	0.3
E	2,750	15	61	6.8	4,321.3	4,321.3	4,322.1	0.8
F	3,550	19	58	7.2	4,327.5	4,327.5	4,328.1	0.6
G	4,040	59	83	5.1	4,329.7	4,329.7	4,330.6	0.9
H	5,325	48	151	2.8	4,340.6	4,340.6	4,341.3	0.7
I	5,830	35	126	3.3	4,344.6	4,344.6	4,344.8	0.2
J	6,290	60	166	2.5	4,346.2	4,346.2	4,346.7	0.5
K	6,700	36	91	4.6	4,346.7	4,346.7	4,347.5	0.8
L	7,330	36	96	4.4	4,351.4	4,351.4	4,352.2	0.8
M	7,818	160	939	0.4	4,358.9	4,358.9	4,359.8	0.9
N	7,920	57	256	1.6	4,358.9	4,358.9	4,359.8	0.9
O	8,760	92	201	2.1	4,360.5	4,360.5	4,361.2	0.7
P	10,130	38	107	3.9	4,369.3	4,369.3	4,370.1	0.8
Q	11,320	58	158	2.5	4,378.2	4,378.2	4,378.8	0.6
R	12,600	17	53	7.6	4,391.3	4,391.3	4,391.9	0.6
S	12,970	75	99	4.0	4,395.0	4,395.0	4,395.3	0.3
T	13,415	23	49	8.2	4,404.6	4,404.6	4,404.6	0.0
U	13,800	62	179	2.2	4,409.2	4,409.2	4,410.2	1.0
V	13,970	100	399	1.0	4,413.4	4,413.4	4,414.4	1.0
W	14,165	20	49	8.1	4,413.4	4,413.4	4,414.4	1.0
X	14,285	89	312	1.3	4,415.8	4,415.8	4,416.6	0.8
Y	14,720	41	84	4.8	4,421.3	4,421.3	4,422.2	0.9
Z	15,900	20	49	8.2	4,436.2	4,436.2	4,437.2	1.0

[1]Feet above mouth

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT AND INCORPORATED AREAS

FLOODWAY DATA

DRY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Dry Creek (Cont'd)								
AA	16,800	35	357	1.5	4,457.7	4,457.7	4,457.7	0.0
AB	17,705	40	101	5.5	4,459.8	4,459.8	4,460.8	1.0
AC	18,775	81	169	3.2	4,472.8	4,472.8	4,473.5	0.7
AD	19,349	25	61	8.9	4,480.6	4,480.6	4,481.6	1.0
AE	19,600	30	297	1.7	4,491.1	4,491.1	4,491.1	0.0
AF	20,610	33	113	4.5	4,495.7	4,495.7	4,496.7	1.0
AG	20,965	70	118	4.3	4,502.8	4,502.8	4,503.7	0.9
AH	21,740	42	98	5.2	4,511.7	4,511.7	4,512.2	0.5
AI	23,550	24	66	7.7	4,545.8	4,545.8	4,546.7	0.9
AJ	25,400	76	94	5.4	4,574.6	4,574.6	4,574.6	0.0
AK	26,031	98	701	0.6	4,595.2	4,595.2	4,595.2	0.0
AL	26,530	30	54	7.7	4,595.2	4,595.2	4,595.2	0.0
AM	28,580	25	51	8.2	4,630.1	4,630.1	4,631.1	1.0
AN	28,930	67	115	3.7	4,639.6	4,639.6	4,639.9	0.3
AO	29,810	30	62	6.8	4,653.7	4,653.7	4,654.1	0.4
AP	30,690	35	58	7.2	4,669.0	4,669.0	4,669.0	0.0
AQ	31,735	17	55	7.6	4,686.1	4,686.1	4,687.1	1.0
AR	33,430	30	55	7.7	4,714.6	4,714.6	4,715.3	0.7
AS	34,790	54	67	6.3	4,739.2	4,739.2	4,739.2	0.0
AT	35,750	20	62	6.8	4,755.8	4,755.8	4,756.6	0.8
AU	36,280	71	160	2.6	4,763.5	4,763.5	4,764.1	0.6
AV	36,750	24	51	8.3	4,769.7	4,769.7	4,769.9	0.2
AW	37,530	12	47	9.0	4,783.1	4,783.1	4,784.0	0.9
AX	38,950	29	61	7.0	4,817.2	4,817.2	4,817.4	0.2
AY	39,410	54	162	2.6	4,824.2	4,824.2	4,824.8	0.6
AZ	40,340	35	83	5.1	4,835.3	4,835.3	4,835.9	0.6

[1]Feet above mouth

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT AND INCORPORATED AREAS

FLOODWAY DATA

DRY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET NGVD)
Dry Creek (Cont'd)								
BA	41,200	16	45	9.5	4,852.4	4,852.4	4,852.5	0.1
BB	41,870	46	52	6.2	4,872.1	4,872.1	4,872.1	0.0
BC	42,760	21	40	7.9	4,921.8	4,921.8	4,921.9	0.1
BD	43,610	15	36	8.9	5,005.7	5,005.7	5,005.7	0.0
BE	43,730	22	41	7.8	5,020.9	5,020.9	5,020.9	0.0

[1]Feet above mouth

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT
AND INCORPORATED AREAS

FLOODWAY DATA

DRY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Jordan River								
A	2,120[1]	91	510	2.4	4,211.8	4,211.8	4,211.8	0.0
B	4,270[1]	93	554	2.2	4,212.3	4,212.3	4,212.3	0.0
C	4,370[1]	77	619	2.0	4,212.3	4,212.3	4,212.3	0.0
D	4,500[1]	77	619	2.0	4,212.3	4,212.3	4,212.3	0.0
E	4,550[1]	87	645	1.9	4,212.3	4,212.3	4,212.3	0.0
F	8,575[1]	73	391	3.2	4,213.1	4,213.1	4,213.1	0.0
G	14,050[1]	111	545	2.3	4,214.8	4,214.8	4,214.8	0.0
H	14,600[1]	87	568	2.3	4,214.9	4,214.9	4,214.9	0.0
I	15,330[1]	80	643	2.0	4,215.1	4,215.1	4,215.1	0.0
J	15,415[1]	86	662	1.9	4,215.1	4,215.1	4,215.1	0.0
K	15,485[1]	86	663	1.9	4,215.1	4,215.1	4,215.1	0.0
L	15,573[1]	77	604	2.1	4,215.1	4,215.1	4,215.1	0.0
M	17,023[2]	75	525	2.4	4,215.3	4,215.3	4,215.3	0.0
N	18,453[2]	70	502	2.5	4,215.6	4,215.6	4,215.6	0.0
O	19,628[2]	69	442	2.9	4,215.9	4,215.9	4,215.9	0.0
P	19,638[2]	69	416	3.1	4,215.9	4,215.9	4,215.9	0.0
Q	19,688[2]	72	452	3.1	4,215.9	4,215.9	4,215.9	0.0
R	22,005[2]	80	529	2.6	4,216.6	4,216.6	4,216.6	0.0
S	22,855[2]	92	542	2.6	4,216.8	4,216.8	4,216.8	0.0
T	22,905[2]	92	543	2.6	4,216.8	4,216.8	4,216.8	0.0
U	22,975[2]	92	465	3.0	4,216.8	4,216.8	4,216.8	0.0
V	23,050[2]	103	496	3.5	4,216.9	4,216.9	4,216.9	0.0
W	24,375[2]	107	542	3.3	4,217.3	4,217.3	4,217.3	0.0
X	24,525[2]	80	497	2.8	4,217.4	4,217.4	4,217.4	0.0
Y	25,495[2]	80	518	2.7	4,217.6	4,217.6	4,217.6	0.0
Z	25,695[2]	104	744	2.4	4,217.7	4,217.7	4,217.7	0.0

[1]Feet above a point sixty feet downstream of Cudahy Lane [2]Feet above Cudahy Lane

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT
AND INCORPORATED AREAS

FLOODWAY DATA

JORDAN RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Jordan River (Cont'd)								
AA	25,775	104	745	2.4	4,217.7	4,217.7	4,217.7	0.0
AB	25,825	67	509	3.5	4,217.7	4,217.7	4,217.7	0.0
AC	27,600	59	415	4.3	4,218.5	4,218.5	4,218.5	0.0
AD	27,650	79	512	3.5	4,218.6	4,218.6	4,218.6	0.0
AE	27,695	79	513	3.4	4,218.6	4,218.6	4,218.6	0.0
AF	27,745	60	425	4.2	4,218.6	4,218.6	4,218.6	0.0
AG	28,735	76	560	3.2	4,219.1	4,219.1	4,219.1	0.0
AH	28,765	74	552	3.2	4,219.1	4,219.1	4,219.1	0.0
AI	32,365	175	855	2.1	4,220.2	4,220.2	4,220.2	0.0
AJ	32,940	59	386	4.6	4,220.2	4,220.2	4,220.2	0.0
AK	32,950	59	386	4.6	4,220.2	4,220.2	4,220.2	0.0
AL	33,350	73	437	4.1	4,220.6	4,220.6	4,220.6	0.0
AM	33,400	85	425	4.2	4,220.6	4,220.6	4,220.6	0.0
AN	33,500	86	431	4.2	4,220.7	4,220.7	4,220.7	0.0
AO	33,554	75	459	3.5	4,220.9	4,220.9	4,220.9	0.0
AP	34,138	81	536	3.0	4,221.1	4,221.1	4,221.1	0.0
AQ	34,337	103	557	3.0	4,221.2	4,221.2	4,221.2	0.0
AR	34,403	104	563	3.0	4,221.3	4,221.3	4,221.3	0.0
AS	34,495	102	507	3.1	4,221.4	4,221.4	4,221.4	0.0
AT	34,777	103	608	2.6	4,221.5	4,221.5	4,221.5	0.0
AU	34,939	122	626	2.5	4,221.6	4,221.6	4,221.6	0.0
AV	35,007	130	695	2.3	4,221.7	4,221.7	4,221.7	0.0
AW	35,821	62	316	5.0	4,221.9	4,221.9	4,221.9	0.0
AX	35,881	63	322	4.9	4,222.0	4,222.0	4,222.0	0.0
AY	36,090	40	325	4.9	4,222.3	4,222.3	4,222.3	0.0
AZ	36,930	67	467	3.4	4,222.8	4,222.8	4,222.9	0.1

[1]Feet above Cudahy Lane

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT
AND INCORPORATED AREAS

FLOODWAY DATA

JORDAN RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET NGVD)
Jordan River (Cont'd)								
BA	37,021	60	345	4.6	4,222.8	4,222.8	4,222.9	0.1
BB	37,131	67	481	3.3	4,223.1	4,223.1	4,223.2	0.1
BC	37,751	92	643	2.5	4,223.3	4,223.3	4,223.4	0.1
BD	37,851	97	611	2.6	4,223.3	4,223.3	4,224.3	1.0
BE	37,951	93	734	2.1	4,223.4	4,223.4	4,224.4	1.0
BF	38,591	72	630	2.4	4,223.5	4,223.5	4,224.4	0.9
BG	38,700	86	570	2.7	4,223.7	4,223.7	4,224.7	1.0
BH	38,790	93	649	2.4	4,223.8	4,223.8	4,224.7	0.9
BI	40,190	54	475	3.0	4,224.1	4,224.1	4,225.0	0.9
BJ	40,298	81	631	2.2	4,224.2	4,224.2	4,225.2	1.0
BK	40,368	54	486	2.9	4,224.2	4,224.2	4,225.2	1.0
BL	41,408	68	510	2.8	4,224.5	4,224.5	4,225.4	0.9
BM	41,500	46	466	2.4	4,224.6	4,224.6	4,225.5	0.9
BN	41,600	105	560	2.0	4,224.6	4,224.6	4,225.6	1.0
BO	42,755	78	549	2.0	4,224.9	4,224.9	4,225.7	0.8
BP	42,815	77	563	1.9	4,224.9	4,224.9	4,225.9	1.0
BQ	42,915	79	564	1.8	4,224.9	4,224.9	4,225.9	1.0
BR	44,815	80	604	1.7	4,225.2	4,225.2	4,226.1	0.9
BS	44,899	88	600	1.7	4,225.2	4,225.2	4,226.2	1.0
BT	45,099	80	614	1.6	4,225.3	4,225.3	4,226.3	1.0
BU	48,499	59	434	2.3	4,225.8	4,225.8	4,226.6	0.8
BV	48,623	74	466	0.5	4,225.9	4,225.9	4,226.9	1.0
BW	48,663	60	388	0.6	4,225.9	4,225.9	4,226.9	1.0
BX	51,063	77	431	0.6	4,226.0	4,226.0	4,226.9	0.9
BY	52,273	48	346	0.7	4,226.0	4,226.0	4,227.0	1.0
BZ	53,197	48	310	0.8	4,226.0	4,226.0	4,227.0	1.0

[1]Feet above Cudahy Lane

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT
AND INCORPORATED AREAS

FLOODWAY DATA

JORDAN RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Jordan River (Cont'd)								
CA	53,257[1]	100	443	0.6	4,226.0	4,226.0	4,227.0	1.0
CB	53,357[1]	50	312	0.8	4,226.0	4,226.0	4,227.0	1.0
CC	56,157[1]	60	343	0.7	4,226.1	4,226.1	4,227.1	1.0
CD	56,400[1]	88	329	0.8	4,226.1	4,226.1	4,227.1	1.0
CE	56,475[1]	182	1,504	3.1	4,232.0	4,232.0	4,232.0	0.0
CF	1,353[2]	186	1,632	2.9	4,232.8	4,232.8	4,232.8	0.0
CG	2,003[2]	194	1,497	3.1	4,232.9	4,232.9	4,232.9	0.0
CH	2,393[2]	169	1,562	3.0	4,232.9	4,232.9	4,232.9	0.0
CI	3,818[2]	164	1,462	3.2	4,232.9	4,232.9	4,233.1	0.2
CJ	4,488[2]	165	1,623	2.9	4,233.0	4,233.0	4,233.3	0.3
CK	5,508[2]	197	1,416	3.3	4,233.0	4,233.0	4,233.4	0.4
CL	5,708[2]	200	1,649	2.9	4,233.1	4,233.1	4,233.5	0.4
CM	6,858[2]	166	1,391	3.4	4,233.2	4,233.2	4,233.7	0.5
CN	9,318[2]	138	1,309	3.5	4,233.6	4,233.6	4,234.5	0.9
CO	10,078[2]	183	1,423	3.2	4,233.9	4,233.9	4,234.8	0.9
CP	10,778[2]	124	1,081	4.2	4,234.3	4,234.3	4,235.1	0.8
CQ	12,368[2]	90	974	4.7	4,234.9	4,234.9	4,235.9	1.0
CR	13,168[2]	105	1,013	4.5	4,235.3	4,235.3	4,236.3	1.0
CS	13,628[2]	90	1,022	4.4	4,235.6	4,235.6	4,236.6	1.0
CT	14,063[2]	70	941	4.8	4,235.7	4,235.7	4,236.7	1.0
CU	15,333[2]	108	1,078	4.2	4,236.7	4,236.7	4,237.7	1.0
CV	15,573[2]	111	1,186	3.8	4,236.8	4,236.8	4,237.7	0.9
CW	16,423[2]	90	1,025	4.4	4,237.2	4,237.2	4,238.2	1.0
CX	18,063[2]	225	1,443	3.1	4,238.3	4,238.3	4,239.2	0.9
CY	19,353[2]	110	1,213	3.7	4,238.7	4,238.7	4,239.7	1.0
CZ	19,783[2]	126	1,133	4.0	4,239.1	4,239.1	4,240.1	1.0

[1]Feet above Cudahy Lane [2]Feet above Surplus Canal Diversion

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNT, UT
AND INCORPORATED AREAS

FLOODWAY DATA

JORDAN RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET NGVD)
Jordan River (Cont'd)								
DA	19,783	126	1,133	4.0	4,239.1	4,239.1	4,240.1	1.0
DB	20,219	82	1,067	4.2	4,239.7	4,239.7	4,240.6	0.9
DC	20,389	75	803	5.6	4,239.8	4,239.8	4,240.8	1.0
DD	21,449	164	1,370	3.3	4,240.9	4,240.9	4,241.9	1.0
DE	23,569	72	860	5.3	4,242.1	4,242.1	4,243.1	1.0
DF	23,884	127	1,412	3.2	4,242.6	4,242.6	4,243.5	0.9
DG	25,079	100	964	3.9	4,243.2	4,243.2	4,244.1	0.9
DH	25,609	117	1,054	3.6	4,243.6	4,243.6	4,244.6	1.0
DI	26,599	86	873	4.3	4,244.3	4,244.3	4,245.2	0.9
DJ	27,230	145	816	4.6	4,245.1	4,245.1	4,246.0	0.9
DK	27,830	76	832	4.5	4,245.7	4,245.7	4,246.7	1.0
DL	28,005	83	582	6.4	4,246.5	4,246.5	4,246.9	0.4
DM	28,475	81	592	6.3	4,247.1	4,247.1	4,247.4	0.3
DN	29,035	61	434	8.6	4,247.7	4,247.7	4,248.0	0.3
DO	29,595	44	614	6.1	4,249.1	4,249.1	4,249.5	0.4
DP	30,042	41	526	7.1	4,249.2	4,249.2	4,249.7	0.5
DQ	30,752	89	728	3.9	4,250.1	4,250.1	4,250.8	0.7
DR	31,112	142	844	3.4	4,250.1	4,250.1	4,250.8	0.7
DS	32,462	124	714	4.0	4,250.8	4,250.8	4,251.7	0.9
DT	32,797	54	402	7.1	4,250.9	4,250.9	4,251.7	0.8
DU	33,407	71	578	4.9	4,251.7	4,251.7	4,252.6	0.9
DV	34,447	90	623	4.6	4,252.5	4,252.5	4,253.4	0.9
DW	35,787	85	585	4.9	4,253.7	4,253.7	4,254.3	0.6
DX	36,277	95	550	5.2	4,254.3	4,254.3	4,254.8	0.5
DY	37,057	120	673	4.2	4,255.6	4,255.6	4,255.9	0.3
DZ	37,349	52	436	6.5	4,256.5	4,256.5	4,256.7	0.2

[1]Feet above Surplus Canal Diversion

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT
AND INCORPORATED AREAS

FLOODWAY DATA

JORDAN RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET NGVD)
Jordan River (Cont'd)								
EA	37,939	101	658	4.3	4,257.7	4,257.7	4,258.0	0.3
EB	38,449	51	467	6.1	4,258.1	4,258.1	4,258.4	0.3
EC	39,099	106	695	4.1	4,259.3	4,259.3	4,260.1	0.8
ED	39,549	57	454	6.3	4,260.1	4,260.1	4,260.8	0.7
EE	40,069	65	557	5.1	4,261.4	4,261.4	4,262.1	0.7
EF	40,439	88	773	3.7	4,262.0	4,262.0	4,262.7	0.7
EG	41,021	81	700	4.0	4,263.1	4,263.1	4,264.1	1.0
EH	41,791	86	593	4.7	4,263.9	4,263.9	4,264.7	0.8
EI	42,701	89	520	5.4	4,265.0	4,265.0	4,265.6	0.6
EJ	43,315	57	469	5.9	4,266.1	4,266.1	4,266.6	0.5
EK	43,465	93	549	5.1	4,266.4	4,266.4	4,266.9	0.5
EL	43,965	98	646	4.3	4,267.1	4,267.1	4,267.5	0.4
EM	44,445	107	594	4.7	4,267.3	4,267.3	4,267.7	0.4
EN	45,035	84	508	5.5	4,267.9	4,267.9	4,268.2	0.3
EO	45,835	61	445	6.3	4,269.5	4,269.5	4,269.9	0.4
EP	46,185	65	571	4.9	4,270.2	4,270.2	4,270.7	0.5
EQ	46,455	50	490	5.7	4,275.4	4,275.4	4,275.4	0.0
ER	47,205	80	514	5.4	4,275.6	4,275.6	4,275.6	0.0
ES	48,525	63	634	4.4	4,277.1	4,277.1	4,277.4	0.3
ET	49,745	80	593	4.7	4,278.6	4,278.6	4,279.0	0.4
EU	51,155	91	533	5.2	4,280.4	4,280.4	4,280.6	0.2
EV	52,055	72	608	4.6	4,282.0	4,282.0	4,282.1	0.1
EW	52,296	47	453	6.2	4,282.6	4,282.6	4,282.7	0.1
EX	53,011	66	650	4.3	4,283.6	4,283.6	4,283.9	0.3
EY	54,261	56	465	6.0	4,285.1	4,285.1	4,285.8	0.7
EZ	54,521	53	543	5.1	4,286.7	4,286.7	4,287.0	0.3

[1]Feet above Surplus Canal Diversion

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT AND INCORPORATED AREAS

FLOODWAY DATA

JORDAN RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Jordan River (Cont'd)								
FA	54,981	89	781	3.6	4,287.5	4,287.5	4,287.9	0.4
FB	55,481	58	575	4.8	4,287.9	4,287.9	4,288.3	0.4
FC	56,641	48	516	5.4	4,289.1	4,289.1	4,289.6	0.5
FD	57,641	46	607	4.6	4,290.5	4,290.5	4,291.4	0.9
FE	58,841	76	681	4.1	4,291.9	4,291.9	4,292.9	1.0
FF	59,901	61	559	5.0	4,292.9	4,292.9	4,293.8	0.9
FG	60,931	121	899	3.1	4,293.9	4,293.9	4,294.6	0.7
FH	61,361	86	659	4.2	4,294.2	4,294.2	4,294.9	0.7
FI	61,561	247	706	3.9	4,294.7	4,294.7	4,295.1	0.4
FJ	61,931	63	564	4.9	4,295.0	4,295.0	4,295.6	0.6
FK	62,821	74	563	5.0	4,295.7	4,295.7	4,296.7	1.0
FL	63,441	86	672	4.2	4,296.3	4,296.3	4,297.3	1.0
FM	63,991	89	585	4.8	4,296.8	4,296.8	4,297.5	0.7
FN	64,406	70	528	5.3	4,297.8	4,297.8	4,298.4	0.6
FO	64,796	67	645	4.3	4,298.7	4,298.7	4,299.3	0.6
FP	65,406	44	467	6.0	4,299.0	4,299.0	4,299.8	0.8
FQ	66,156	76	707	3.9	4,299.9	4,299.9	4,300.8	0.9
FR	66,496	93	664	4.2	4,300.0	4,300.0	4,300.9	0.9
FS	67,416	99	762	3.7	4,300.9	4,300.9	4,301.6	0.7
FT	67,856	79	569	5.3	4,303.0	4,303.0	4,303.0	0.0
FU	68,516	68	447	6.7	4,303.4	4,303.4	4,303.6	0.2
FV	69,226	83	785	3.8	4,304.1	4,304.1	4,304.5	0.4
FW	70,426	76	564	5.3	4,304.8	4,304.8	4,305.1	0.3
FX	70,726	89	533	5.6	4,305.1	4,305.1	4,305.4	0.3
FY	71,616	362	926	3.2	4,306.5	4,306.5	4,306.7	0.2
FZ	73,086	310	994	3.0	4,308.4	4,308.4	4,309.4	1.0

[1]Feet above Surplus Canal Diversion

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT
AND INCORPORATED AREAS

FLOODWAY DATA

JORDAN RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Jordan River (Cont'd)								
GA	74,396	367	1,272	2.4	4,310.6	4,310.6	4,311.5	0.9
GB	74,926	317	1,266	2.4	4,310.9	4,310.9	4,311.8	0.9
GC	75,706	92	736	4.1	4,311.2	4,311.2	4,312.1	0.9
GD	76,066	74	625	4.8	4,311.5	4,311.5	4,312.3	0.8
GE	77,342	96	537	5.6	4,313.3	4,313.3	4,313.9	0.6
GF	77,632	144	1,017	3.0	4,313.9	4,313.9	4,314.5	0.6
GG	78,542	108	517	5.8	4,314.8	4,314.8	4,315.3	0.5
GH	79,652	104	718	4.2	4,316.4	4,316.4	4,317.1	0.7
GI	80,902	105	763	3.9	4,317.5	4,317.5	4,318.4	0.9
GJ	82,032	128	913	3.3	4,318.5	4,318.5	4,319.5	1.0
GK	82,502	86	654	4.6	4,319.1	4,319.1	4,320.0	0.9
GL	82,892	87	559	5.4	4,320.0	4,320.0	4,320.7	0.7
GM	83,957	88	527	5.7	4,321.7	4,321.7	4,322.3	0.6
GN1	84,777	67	536	5.6	4,322.5	4,322.5	4,323.2	0.7
GN2	86,627	185	945	3.2	4,324.3	4,324.3	4,325.1	0.8
GO	87,787	205	843	3.6	4,325.6	4,325.6	4,326.0	0.4
GP	88,087	78	411	7.3	4,326.0	4,326.0	4,326.2	0.2
GQ	88,847	77	441	6.8	4,327.5	4,327.5	4,328.2	0.7
GR	89,907	109	658	4.6	4,329.4	4,329.4	4,329.9	0.5
GS	90,677	115	617	4.9	4,330.2	4,330.2	4,330.6	0.4
GT	91,752	69	503	6.0	4,331.9	4,331.9	4,332.1	0.2
GU	92,242	170	1,025	2.9	4,333.3	4,333.3	4,333.5	0.2
GV	92,862	60	432	6.9	4,334.6	4,334.6	4,334.6	0.0
GW	93,427	50	354	8.5	4,336.2	4,336.2	4,336.2	0.0
GX	94,027	194	989	3.0	4,337.3	4,337.3	4,338.0	0.7
GY	94,937	85	483	6.2	4,337.7	4,337.7	4,338.4	0.7
GZ	96,257	155	697	4.3	4,339.2	4,339.2	4,340.1	0.9

[1]Feet above Surplus Canal Diversion

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT AND INCORPORATED AREAS

FLOODWAY DATA

JORDAN RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET NGVD)
Jordan River (Cont'd)								
HA	96,717	114	612	4.9	4,339.7	4,339.7	4,340.4	0.7
HB	97,257	136	483	6.2	4,340.8	4,340.8	4,341.2	0.4
HC	98,257	81	471	6.4	4,342.9	4,342.9	4,343.0	0.1
HD	98,777	108	541	5.6	4,343.5	4,343.5	4,343.8	0.3
HE	99,407	62	430	7.0	4,344.3	4,344.3	4,344.6	0.3
HF	100,527	65	418	7.2	4,346.2	4,346.2	4,346.6	0.4
HG	101,387	100	428	7.0	4,348.8	4,348.8	4,349.2	0.4
HH	102,737	131	557	5.4	4,352.1	4,352.1	4,352.7	0.6
HI	104,287	104	603	5.0	4,354.4	4,354.4	4,354.7	0.3
HJ	105,337	102	433	6.9	4,356.4	4,356.4	4,356.7	0.3
HK	105,987	45	346	8.7	4,357.9	4,357.9	4,358.5	0.6
HL	107,467	116	559	5.4	4,361.2	4,361.2	4,362.0	0.8
HM	108,367	47	294	10.2	4,362.9	4,362.9	4,363.6	0.7
HN	108,877	98	524	5.7	4,365.4	4,365.4	4,366.1	0.7
HO	109,917	67	361	8.3	4,367.0	4,367.0	4,367.8	0.8
HP	111,177	79	369	8.1	4,372.3	4,372.3	4,372.7	0.4
HQ	112,607	76	387	7.7	4,377.6	4,377.6	4,378.6	1.0
HR	112,837	50	405	7.4	4,379.1	4,379.1	4,379.6	0.5
HS	113,497	84	489	6.1	4,382.8	4,382.8	4,383.4	0.6
HT	113,760	66	585	5.1	4,385.3	4,385.3	4,385.5	0.2
HU	113,830	56	453	6.6	4,385.4	4,385.4	4,385.6	0.2
HV	114,450	75	535	5.6	4,387.1	4,387.1	4,387.8	0.7
HW	114,840	75	614	4.9	4,388.2	4,388.2	4,388.9	0.7
HX	115,565	64	430	7.0	4,390.6	4,390.6	4,391.3	0.7
HY	116,545	60	400	7.5	4,394.4	4,394.4	4,395.0	0.6
HZ	117,230	95	600	5.0	4,398.2	4,398.2	4,398.5	0.3

[1]Feet above Surplus Canal Diversion

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT AND INCORPORATED AREAS

FLOODWAY DATA

JORDAN RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Jordan River (Cont'd)								
IA	117,530	190	664	4.5	4,399.5	4,399.5	4,399.7	0.2
IB	117,910	82	456	6.6	4,400.6	4,400.6	4,400.7	0.1
IC	118,510	89	587	5.1	4,402.7	4,402.7	4,403.2	0.5
ID	118,790	46	299	10.0	4,403.4	4,403.4	4,403.9	0.5
IE	119,110	63	451	6.7	4,405.5	4,405.5	4,406.1	0.6
IF	119,370	94	604	5.0	4,406.4	4,406.4	4,407.1	0.7
IG	119,760	62	479	6.3	4,407.0	4,407.0	4,407.6	0.6
IH	120,940	51	356	8.4	4,408.8	4,408.8	4,409.5	0.7
II	121,530	59	389	7.7	4,411.9	4,411.9	4,412.5	0.6
IJ	122,310	42	449	6.7	4,417.0	4,417.0	4,417.8	0.8
IK	123,350	60	489	6.1	4,423.6	4,423.6	4,424.4	0.8
IL	124,230	47	389	7.7	4,429.2	4,429.2	4,429.6	0.4
IM	124,420	36	382	7.8	4,433.8	4,433.8	4,433.8	0.0
IN	124,660	90	662	4.5	4,434.6	4,434.6	4,434.6	0.0
IO	125,190	97	720	4.2	4,435.1	4,435.1	4,435.2	0.1
IP	125,649	296	890	3.4	4,436.3	4,436.3	4,436.4	0.1
IQ	126,169	208	1,067	2.8	4,437.5	4,437.5	4,437.9	0.4
IR	126,569	104	465	6.4	4,438.3	4,438.3	4,438.9	0.6
IS	127,259	44	440	6.8	4,441.0	4,441.0	4,442.0	1.0
IT	128,149	192	758	4.0	4,446.0	4,446.0	4,447.0	1.0
IU	129,049	40	288	10.4	4,449.3	4,449.3	4,450.3	1.0
IV	130,189	394	1,547	1.9	4,454.3	4,454.3	4,454.5	0.2
IW	131,739	160	510	5.9	4,459.6	4,459.6	4,460.6	1.0
IX	133,329	175	786	3.8	4,471.8	4,471.8	4,472.4	0.6
IY	134,069	158	712	4.2	4,475.8	4,475.8	4,476.0	0.2
IZ	134,309	48	255	11.7	4,482.2	4,482.2	4,482.4	0.2

[1]Feet above Surplus Canal Diversion

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT
AND INCORPORATED AREAS

FLOODWAY DATA

JORDAN RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Jordan River (Cont'd)								
JA	134,378	39	263	11.4	4,483.2	4,483.2	4,483.8	0.6
JB	134,690	132	1,313	2.3	4,487.7	4,487.7	4,487.8	0.1
JC	135,020	116	1,188	2.5	4,487.8	4,487.8	4,487.9	0.1
JD	135,220	59	493	6.1	4,487.6	4,487.6	4,487.7	0.1
JE	135,385	78	654	4.6	4,488.0	4,488.0	4,488.1	0.1

[1]Feet above Surplus Canal Diversion

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT
AND INCORPORATED AREAS

FLOODWAY DATA

JORDAN RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Little Cottonwood Creek								
A	700	61	333	2.4	4,252.6	4,252.6	4,252.7	0.1
B	1,120	62	329	1.9	4,252.8	4,252.8	4,252.9	0.1
C	1,590	109	436	1.8	4,252.9	4,252.9	4,253.0	0.1
D	2,265	27	157	5.1	4,253.8	4,253.8	4,254.8	1.0
E	2,950	16	70	11.5	4,257.5	4,257.5	4,257.5	0.0
F	3,160	46	181	4.6	4,260.1	4,260.1	4,260.1	0.0
G	3,650	66	254	3.2	4,260.6	4,260.6	4,261.2	0.6
H	3,940	10	89	9.2	4,266.4	4,266.4	4,266.4	0.0
I	4,270	55	360	2.3	4,267.9	4,267.9	4,267.9	0.0
J	4,740	21	165	5.1	4,269.9	4,269.9	4,270.9	1.0
K	4,920	35	182	4.7	4,270.4	4,270.4	4,271.1	0.7
L	5,270	16	72	11.9	4,271.6	4,271.6	4,271.6	0.0
M	5,320	52	174	4.9	4,271.6	4,271.6	4,271.6	0.0
N	6,060	35	169	5.1	4,273.6	4,273.6	4,273.6	0.0
O	6,280	38	181	4.8	4,274.2	4,274.2	4,274.2	0.0
P	6,550	41	160	5.4	4,275.0	4,275.0	4,275.0	0.0
Q	6,750	16	129	6.7	4,277.3	4,277.3	4,277.3	0.0
R	6,880	105	478	1.8	4,278.1	4,278.1	4,278.1	0.0
S	7,400	29	157	5.6	4,278.3	4,278.3	4,278.3	0.0
T	7,800	28	148	5.9	4,278.7	4,278.7	4,279.6	0.9
U	8,460	72	253	3.7	4,280.6	4,280.6	4,281.6	1.0
V	8,770	20	106	8.2	4,282.3	4,282.3	4,283.2	0.9
W	8,900	29	152	5.8	4,284.2	4,284.2	4,284.4	0.2
X	9,600	48	199	4.4	4,287.0	4,287.0	4,287.1	0.1
Y	10,400	36	95	9.3	4,291.4	4,291.4	4,291.4	0.0
Z	10,560	19	105	8.4	4,294.4	4,294.4	4,294.4	0.0

[1]Feet above mouth

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT
AND INCORPORATED AREAS

FLOODWAY DATA

LITTLE COTTONWOOD CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Little Cottonwood Creek (Cont'd)								
AA	10,650	26	113	7.8	4,295.4	4,295.4	4,295.4	0.0
AB	10,940	77	298	3.0	4,296.8	4,296.8	4,297.0	0.2
AC	11,310	20	142	6.2	4,297.9	4,297.9	4,297.9	0.0
AD	11,730	22	139	6.5	4,298.7	4,298.7	4,299.0	0.3
AE	11,860	59	261	3.5	4,299.5	4,299.5	4,299.8	0.3
AF	12,050	22	122	7.4	4,299.8	4,299.8	4,300.1	0.3
AG	12,350	27	108	8.4	4,302.2	4,302.2	4,302.2	0.0
AH	12,480	21	132	6.8	4,303.5	4,303.5	4,303.5	0.0
AI	12,910	93	227	4.0	4,306.3	4,306.3	4,306.3	0.0
AJ	13,210	18	96	9.3	4,307.9	4,307.9	4,307.9	0.0
AK	13,720	51	166	5.4	4,310.7	4,310.7	4,310.9	0.2
AL	13,850	19	100	9.0	4,311.4	4,311.4	4,311.5	0.1
AM	14,140	49	269	3.4	4,314.7	4,314.7	4,314.7	0.0
AN	14,730	40	101	9.0	4,315.6	4,315.6	4,315.6	0.0
AO	15,310	61	36	3.9	4,321.7	4,321.7	4,321.8	0.1
AP	16,050	57	178	5.1	4,327.6	4,327.6	4,327.6	0.0
AQ	16,950	17	103	8.9	4,335.5	4,335.5	4,335.6	0.1
AR	17,285	43	295	3.1	4,337.8	4,337.8	4,337.9	0.1
AS	17,865	35	160	5.7	4,338.9	4,338.9	4,339.1	0.2
AT	18,295	41	191	4.8	4,341.5	4,341.5	4,341.6	0.1
AU	18,760	43	215	4.2	4,345.7	4,345.7	4,345.7	0.0
AV	19,120	16	128	7.1	4,352.7	4,352.7	4,352.7	0.0
AW	19,200	22	119	7.7	4,353.3	4,353.3	4,353.3	0.0
AX	19,510	47	94	9.9	4,358.1	4,358.1	4,358.1	0.0
AY	19,580	74	142	7.0	4,359.2	4,359.2	4,359.2	0.0
AZ	20,300	102	212	6.1	4,364.5	4,364.5	4,364.7	0.2

[1]Feet above mouth

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT
AND INCORPORATED AREAS

FLOODWAY DATA

LITTLE COTTONWOOD CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET NGVD)
Little Cottonwood Creek (Cont'd)								
BA	20,310	80	178	7.3	4,364.6	4,364.6	4,364.6	0.0
BB	21,130	57	159	8.2	4,370.7	4,370.7	4,370.9	0.2
BC	21,490	48	314	4.2	4,377.0	4,377.0	4,377.9	0.9
BD	22,100	106	153	8.5	4,380.5	4,380.5	4,380.7	0.2
BE	22,820	51	184	7.1	4,384.4	4,384.4	4,385.4	1.0
BF	23,220	51	319	4.1	4,391.3	4,391.3	4,391.9	0.6
BG	23,410	43	270	4.8	4,392.3	4,392.3	4,392.9	0.6
BH	23,520	23	178	7.3	4,397.7	4,397.7	4,397.7	0.0
BI	23,930	171	227	5.7	4,400.3	4,400.3	4,400.8	0.5
BJ	24,060	151	407	3.2	4,401.6	4,401.6	4,402.6	1.0
BK	25,000	46	180	7.3	4,412.6	4,412.6	4,413.2	0.6
BL	25,590	49	179	7.3	4,419.7	4,419.7	4,420.6	0.9
BM	25,730	82	315	4.1	4,422.2	4,422.2	4,422.6	0.4
BN	26,310	54	257	5.1	4,427.1	4,427.1	4,428.0	0.9
BO	26,670	22	194	6.6	4,432.9	4,432.9	4,433.5	0.6
BP	27,020	51	189	6.5	4,434.7	4,434.7	4,434.8	0.1
BQ	27,370	41	136	8.2	4,438.3	4,438.3	4,438.5	0.2
BR	27,690	47	186	6.3	4,441.9	4,441.9	4,442.6	0.7
BS	28,170	12	126	8.9	4,451.5	4,451.5	4,451.5	0.0
BT	28,240	62	310	3.6	4,452.8	4,452.8	4,452.8	0.0
BU	28,740	44	117	9.3	4,455.4	4,455.4	4,455.9	0.5
BV	29,080	20	142	7.4	4,461.0	4,461.0	4,461.6	0.6
BW	29,240	46	211	4.9	4,462.4	4,462.4	4,462.9	0.5
BX	29,990	41	112	9.2	4,468.1	4,468.1	4,468.2	0.1
BY	30,540	88	253	4.1	4,477.3	4,477.3	4,477.6	0.3
BZ	30,840	39	136	6.7	4,479.4	4,479.4	4,480.2	0.8

[1]Feet above mouth

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT AND INCORPORATED AREAS

FLOODWAY DATA

LITTLE COTTONWOOD CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET NGVD)
Little Cottonwood Creek (Cont'd)								
CA	31,170	175	410	2.5	4,483.5	4,483.5	4,483.9	0.4
CB	31,470	38	149	7.0	4,485.8	4,485.8	4,486.6	0.8
CC	31,850	79	254	4.1	4,491.7	4,491.7	4,491.9	0.2
CD	32,220	56	194	4.6	4,494.2	4,494.2	4,494.7	0.5
CE	32,440	39	117	8.9	4,498.1	4,498.1	4,498.1	0.0
CF	32,610	28	133	7.8	4,501.7	4,501.7	4,502.3	0.6
CG	33,150	135	393	2.6	4,506.4	4,506.4	4,507.3	0.9
CH	33,580	58	121	6.9	4,513.3	4,513.3	4,513.3	0.0
CI	34,280	47	166	6.2	4,522.4	4,522.4	4,522.6	0.2
CJ	34,360	44	131	7.9	4,523.4	4,523.4	4,523.8	0.4
CK	34,950	57	209	5.0	4,531.0	4,531.0	4,531.6	0.6
CL	35,470	89	193	5.4	4,538.5	4,538.5	4,538.5	0.0
CM	35,900	139	275	3.8	4,543.5	4,543.5	4,544.3	0.8
CN	36,430	64	177	5.9	4,552.0	4,552.0	4,552.4	0.4
CO	37,120	82	265	3.9	4,563.8	4,563.8	4,563.8	0.0
CP	38,490	42	221	4.7	4,584.2	4,584.2	4,584.5	0.3
CQ	38,680	20	135	7.7	4,585.3	4,585.3	4,586.1	0.8
CR	38,920	60	125	8.3	4,589.3	4,589.3	4,589.3	0.0
CS	39,850	37	138	6.5	4,603.0	4,603.0	4,603.2	0.2
CT	40,280	49	190	3.9	4,612.4	4,612.4	4,612.4	0.0
CU	41,170	53	205	3.7	4,627.4	4,627.4	4,628.1	0.7
CV	41,720	51	156	4.8	4,635.2	4,635.2	4,635.5	0.3
CW	42,190	44	113	9.1	4,643.1	4,643.1	4,643.3	0.2
CX	42,260	143	440	2.4	4,645.6	4,645.6	4,646.6	1.0
CY	42,410	79	342	3.0	4,646.7	4,646.7	4,647.4	0.7
CZ	42,820	51	173	6.0	4,653.7	4,653.7	4,653.8	0.1

[1]Feet above mouth

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT
AND INCORPORATED AREAS

FLOODWAY DATA

LITTLE COTTONWOOD CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET NGVD)
Little Cottonwood Creek (Cont'd)								
DA	43,070	22	148	7.0	4,657.3	4,657.3	4,657.6	0.3
DB	43,170	44	249	4.2	4,658.4	4,658.4	4,658.9	0.5
DC	43,450	51	172	6.0	4,660.0	4,660.0	4,660.6	0.6
DD	44,070	30	154	6.7	4,669.5	4,669.5	4,669.5	0.0
DE	44,320	50	164	6.1	4,673.8	4,673.8	4,673.8	0.0
DF	44,940	35	114	8.8	4,682.5	4,682.5	4,682.5	0.0
DG	46,340	46	138	7.3	4,706.3	4,706.3	4,706.3	0.0
DH	46,820	39	145	6.9	4,715.4	4,715.4	4,715.4	0.0
DI	47,780	42	175	5.7	4,739.5	4,739.5	4,739.5	0.0
DJ	48,200	40	161	6.2	4,749.2	4,749.2	4,749.2	0.0
DK	48,360	19	159	6.3	4,761.9	4,761.9	4,761.9	0.0
DL	48,400	100	225	4.5	4,763.4	4,763.4	4,763.4	0.0
DM	48,500	225	640	1.6	4,763.9	4,763.9	4,763.9	0.0
DN	49,070	51	149	6.6	4,774.2	4,774.2	4,774.2	0.0
DO	49,830	73	147	7.1	4,791.3	4,791.3	4,791.7	0.4
DP	50,060	50	135	7.4	4,801.4	4,801.4	4,801.4	0.0
DQ	50,640	43	160	6.3	4,816.0	4,816.0	4,816.2	0.2
DR	50,820	38	105	9.5	4,821.3	4,821.3	4,821.3	0.0
DS	51,230	40	111	9.0	4,836.9	4,836.9	4,836.9	0.0
DT	51,470	43	141	7.1	4,845.4	4,845.4	4,845.4	0.0
DU	51,830	47	220	4.5	4,860.0	4,860.0	4,860.2	0.2
DV	52,180	47	187	5.3	4,869.4	4,869.4	4,869.6	0.2
DW	52,430	62	264	3.8	4,881.8	4,881.8	4,881.8	0.0
DX	52,950	64	258	3.9	4,897.4	4,897.4	4,897.5	0.1
DY	53,170	38	106	9.5	4,907.2	4,907.2	4,907.2	0.0
DZ	53,460	54	209	4.8	4,922.7	4,922.7	4,923.3	0.6

[1]Feet above mouth

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT
AND INCORPORATED AREAS

FLOODWAY DATA

LITTLE COTTONWOOD CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Little Cottonwood Creek (Cont'd)								
EA	53,750	38	133	7.5	4,937.2	4,937.2	4,937.2	0.0
EB	54,050	33	116	8.7	4,956.5	4,956.5	4,956.7	0.2
EC	54,690	27	197	5.1	4,997.8	4,997.8	4,998.3	0.5
ED	55,340	31	114	8.8	5,030.1	5,030.1	5,030.3	0.2
EE	55,780	33	131	7.7	5,047.6	5,047.6	5,047.6	0.0
EF	55,860	29	97	10.3	5,054.6	5,054.6	5,054.6	0.0
EG	56,240	44	111	9.0	5,069.6	5,069.6	5,069.6	0.0
EH	56,340	46	125	8.0	5,077.5	5,077.5	5,077.6	0.1
EI	56,500	23	157	6.4	5,083.1	5,083.1	5,084.0	0.9
EJ	56,580	37	258	3.9	5,084.9	5,084.9	5,085.4	0.5

[1]Feet above mouth

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT AND INCORPORATED AREAS

FLOODWAY DATA

LITTLE COTTONWOOD CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Mill Creek								
A	2,020	18	81	7.9	4,232.8	4,232.8	4,233.8	1.0
B	3,160	66	318	2.0	4,234.7	4,234.7	4,235.0	0.3
C	3,870	18	118	5.4	4,235.6	4,235.6	4,235.7	0.1
D	4,290	98	297	2.5	4,239.1	4,239.1	4,239.1	0.0
E	5,960	18	156	4.8	4,241.3	4,241.3	4,242.3	1.0
F	7,025	17	142	5.6	4,241.9	4,241.9	4,242.8	0.9
G	7,905	39	277	2.9	4,245.6	4,245.6	4,245.6	0.0
H	8,615	12	122	4.9	4,246.6	4,246.6	4,246.8	0.2
I	9,435	44	387	1.4	4,249.5	4,249.5	4,249.8	0.3
J	6,194	34	213	3.1	4,241.6	4,241.6	4,242.5	0.9
K	6,763	39	281	2.3	4,241.8	4,241.8	4,242.8	1.0
L	7,529	39	212	3.1	4,242.8	4,242.8	4,243.6	0.8
M	8,079	43	255	2.6	4,245.2	4,245.2	4,245.4	0.2
N	8,916	31	279	2.4	4,247.4	4,247.4	4,248.4	1.0
O	9,692	13	94	7.0	4,250.1	4,250.1	4,250.9	0.8
P	10,597	20	111	5.9	4,252.9	4,252.9	4,253.3	0.4
Q	11,483	30	172	3.8	4,254.6	4,254.6	4,254.8	0.2
R	12,102	36	185	3.6	4,255.4	4,255.4	4,255.6	0.2
S	12,702	35	156	4.2	4,256.4	4,256.4	4,256.5	0.1
T	13,539	14	114	5.8	4,260.1	4,260.1	4,261.1	1.0
U	14,773	50	279	1.4	4,261.6	4,261.6	4,262.2	0.6
V	15,638	34	175	2.3	4,262.6	4,262.6	4,262.9	0.3
W	18,815	66	336	1.6	4,268.4	4,268.4	4,268.8	0.4
X	21,082	60	100	5.4	4,298.4	4,298.4	4,298.4	0.0
Y	22,765	64	113	4.8	4,322.1	4,322.1	4,322.6	0.5
Z	24,495	8	52	10.4	4,352.5	4,352.5	4,352.9	0.4
AA	26,266	82	526	2.6	4,409.2	4,409.2	4,409.2	0.0
AB	27,425	45	208	5.0	4,438.7	4,438.7	4,439.1	0.4

[1]Feet above mouth

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT
AND INCORPORATED AREAS

FLOODWAY DATA

MILL CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Mill Creek (Cont'd)								
AC	29,160	5	67	11.7	4,490.8	4,490.8	4,490.8	0.0
AD	30,660	4	62	11.4	4,533.1	4,533.1	4,533.1	0.0
AE	33,360	18	75	9.4	4,603.3	4,603.3	4,603.3	0.0
AF	36,420	21	73	4.8	4,697.9	4,697.9	4,697.9	0.0
AG	39,480	41	72	4.9	4,796.4	4,796.4	4,796.4	0.0
AH	42,070	7	123	2.8	4,878.3	4,878.3	4,879.3	1.0
AI	43,790	8	75	4.5	4,943.8	4,943.8	4,943.8	0.0

[1]Feet above mouth

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT AND INCORPORATED AREAS

FLOODWAY DATA

MILL CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET NGVD)
Parleys Creek								
A	13,910	5	28	13.1	4,592.0	4,592.0	4,592.0	0.0
B	13,960	49	164	2.3	4,595.0	4,595.0	4,595.0	0.0
C	17,640	38	54	6.8	4,675.7	4,675.7	4,675.7	0.0
D	17,740	8	32	11.5	4,680.4	4,680.4	4,680.4	0.0

[1]Feet above entrance to conduit

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT
AND INCORPORATED AREAS

FLOODWAY DATA

PARLEYS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Willow Creek (East)								
A	0	12	22	6.7	4,548.0	4,548.0	4,548.0	0.0
B	100	58	95	1.6	4,550.8	4,550.8	4,550.8	0.0
C	820	83	53	2.8	4,551.0	4,551.0	4,551.4	0.4
D	1,395	47	88	1.7	4,553.5	4,553.5	4,554.4	0.9
E	2,475	65	184	2.4	4,561.2	4,561.2	4,561.9	0.7
F	3,310	21	134	2.5	4,579.0	4,579.0	4,579.4	0.4
G	5,080	30	76	4.4	4,601.7	4,601.7	4,602.2	0.5
H	6,250	70	61	5.4	4,620.4	4,620.4	4,620.4	0.0
I	7,720	3	17	13.6	4,648.8	4,648.8	4,648.8	0.0
J	8,250	31	50	4.7	4,662.9	4,662.9	4,662.9	0.0
K	9,150	80	963	0.3	4,697.1	4,697.1	4,697.1	0.0
L	11,740	10	33	8.8	4,747.9	4,747.9	4,748.5	0.6
M	12,885	89	1,302	0.2	4,791.4	4,791.4	4,791.9	0.5
N	14,970	14	36	6.9	4,814.6	4,814.6	4,814.7	0.1
O	18,485	7	26	9.5	4,972.9	4,972.9	4,973.8	0.9

[1]Feet above a point seventy feet downstream of Union Pacific Railroad

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT
AND INCORPORATED AREAS

FLOODWAY DATA

WILLOW CREEK (EAST)

7K

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Willow Creek (West)								
A	1,000	16	35	7.8	4,317.9	4,317.9	4,318.2	0.3
B	2,260	5	26	10.7	4,339.1	4,339.1	4,340.1	1.0
C	2,560	30	67	4.1	4,344.4	4,344.4	4,345.2	0.8
D	3,360	60	190	1.5	4,351.3	4,351.3	4,352.2	0.9
E	4,040	6	30	12.7	4,357.0	4,357.0	4,357.0	0.0
F	4,560	24	175	2.2	4,363.2	4,363.2	4,363.5	0.3
G	5,161	22	110	3.5	4,363.4	4,363.4	4,363.8	0.4
H	5,908	35	102	3.7	4,364.6	4,364.6	4,365.0	0.4
I	6,907	19	67	5.6	4,367.2	4,367.2	4,367.4	0.2
J	7,411	25	66	5.7	4,373.4	4,373.4	4,371.0	0.6
K	7,490	18	45	8.5	4,377.5	4,377.5	4,377.9	0.4
L	8,125	38	101	3.8	4,380.0	4,380.0	4,380.5	0.5
M	8,910	19	44	8.7	4,384.9	4,384.9	4,384.9	0.0
N	9,479	14	50	7.7	4,394.8	4,394.8	4,394.8	0.0
O	10,280	27	152	2.5	4,398.6	4,398.6	4,398.9	0.3
P	11,107	29	132	2.9	4,401.8	4,401.8	4,402.2	0.4
Q	11,785	42	119	3.2	4,402.3	4,402.3	4,402.6	0.3
R	12,382	64	409	0.9	4,409.5	4,409.5	4,409.5	0.0
S	13,134	50	244	1.6	4,409.5	4,409.5	4,409.5	0.0
T	13,613	20	85	4.5	4,409.3	4,409.3	4,409.6	0.3
U	14,490	38	64	6.0	4,415.6	4,415.6	4,416.0	0.4
V	15,290	37	92	4.1	4,418.2	4,418.2	4,419.0	0.8
W	15,694	16	80	4.7	4,420.9	4,420.9	4,421.4	0.5
X	16,992	10	62	6.1	4,427.1	4,427.1	4,427.8	0.7
Y	17,854	18	71	5.4	4,430.0	4,430.0	4,430.7	0.7
Z	18,824	40	105	3.6	4,435.6	4,435.6	4,436.6	1.0
AA	19,554	29	89	4.3	4,441.9	4,441.9	4,442.1	0.2

[1]Stream distance in feet above confluence with Jordan River

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT AND INCORPORATED AREAS

FLOODWAY DATA

WILLOW CREEK (WEST)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET NGVD)
Midas Creek								
A	403	70	193	5.9	4,325.9	4,325.9	4,326.4	0.5
B	858	25	146	7.8	4,331.8	4,331.8	4,331.8	0.0
C	1,114	57	130	8.8	4,334.3	4,334.3	4,334.5	0.2
D	1,831	23	124	9.2	4,341.8	4,341.8	4,341.8	0.0
E	2,449	29	152	7.5	4,344.8	4,344.8	4,345.8	1.0
F	2,608	125	491	1.9	4,357.7	4,357.7	4,358.4	0.7
G	2,768	55	983	1.2	4,370.9	4,370.9	4,371.7	0.8
H	3,515	110	1,615	0.7	4,370.9	4,370.9	4,371.7	0.8
I	4,156	52	653	1.7	4,370.9	4,370.9	4,371.7	0.8
J	4,620	51	586	1.9	4,371.0	4,371.0	4,371.8	0.8
K	5,309	48	309	3.7	4,371.1	4,371.1	4,372.0	0.9
L	5,454	128	729	1.6	4,375.1	4,375.1	4,375.1	0.0
M	5,710	72	416	2.7	4,376.6	4,376.6	4,377.1	0.5
N	5,971	45	299	3.8	4,376.8	4,376.8	4,377.3	0.5
O	6,623	12	82	13.9	4,384.8	4,384.8	4,385.1	0.3
P	6,856	45	347	3.3	4,390.6	4,390.6	4,391.3	0.7
Q	7,411	45	356	3.2	4,391.8	4,391.8	4,392.1	0.3
R	7,639	35	159	7.2	4,391.5	4,391.5	4,391.9	0.4
S	8,160	24	116	9.8	4,396.3	4,396.3	4,396.9	0.6
T	8,709	40	192	5.9	4,404.4	4,404.4	4,405.1	0.7
U	9,062	50	710	1.3	4,422.9	4,422.9	4,422.9	0.0
V	9,412	70	130	7.2	4,425.2	4,425.2	4,425.7	0.5
W	10,079	52	179	5.2	4,433.3	4,433.3	4,433.6	0.3
X	10,306	87	353	2.7	4,438.2	4,438.2	4,439.1	0.9
Y	10,875	26	103	9.1	4,443.5	4,443.5	4,443.5	0.0
Z	11,559	43	148	6.3	4,450.1	4,450.1	4,450.2	0.1

[1]Stream distance in feet above confluence with Jordan River

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT AND INCORPORATED AREAS

FLOODWAY DATA

MIDAS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET NGVD)
Midas Creek								
AA	12,036	73	144	6.5	4,457.0	4,457.0	4,457.1	0.1
AB	12,507	46	109	8.6	4,461.7	4,461.7	4,462.3	0.6
AC	12,972	115	169	5.6	4,466.6	4,466.6	4,466.7	0.0
AD	13,847	22	146	6.4	4,471.3	4,471.3	4,471.7	0.4
AE	14,265	27	88	9.9	4,476.1	4,476.1	4,476.3	0.2
AF	14,615	29	91	9.6	4,485.1	4,485.1	4,485.1	1.0
AG	15,721	37	123	7.1	4,499.3	4,499.3	4,499.5	0.2
AH	15,979	156	207	4.2	4,509.1	4,509.1	4,509.1	0.0
AI	16,879	63	159	5.5	4,519.3	4,519.3	4,520.3	1.0
AJ	18,297	162	240	3.6	4,541.5	4,541.5	4,542.4	0.9
AK	19,045	25	88	9.9	4,553.4	4,553.4	4,554.0	0.6
AL	19,649	11	88	9.9	4,559.7	4,559.7	4,560.3	0.6
AM	20,130	33	93	9.3	4,566.4	4,566.4	4,566.8	0.4
AN	20,587	42	103	8.2	4,574.6	4,574.6	4,574.6	0.0
AO	21,616	28	134	6.3	4,590.9	4,590.9	4,591.7	0.8
AP	22,161	32	92	9.2	4,603.8	4,603.8	4,603.8	0.0

[1]Stream distance in feet above confluence with Jordan River

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT
AND INCORPORATED AREAS

FLOODWAY DATA

MIDAS CREEK

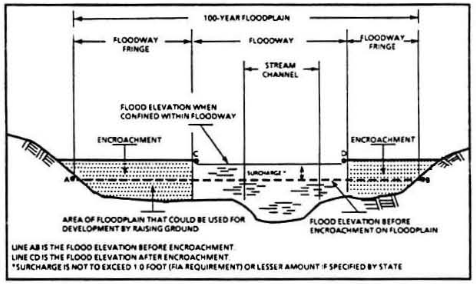

Figure 1. Floodway Schematic

No floodways were computed for Burr Fork, Emigration Creek, or Red Butte Creek. It was determined that floodflows corresponding to the 100-year event on these streams would be essentially confined to the channel. Due to this circumstance, the concept of a floodway was deemed to be inappropriate on these streams.

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base (100-year) flood elevations (BFEs) or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No BFEs or depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot BFEs or average depths. Insurance agents use the zones and BFEs in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year floodplains, floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

The countywide Flood Insurance Rate Map presents flooding information for the entire geographic area of Salt Lake County. Previously, Flood Insurance Rate Maps were prepared for each incorporated community and the unincorporated areas of the County identified as flood-prone. This countywide Flood Insurance Rate Map also includes flood-hazard information that was presented separately on Flood Boundary and Floodway Maps, where applicable. Historical data relating to the maps prepared for each community are presented in Table 12, "Community Map History."

7.0 OTHER STUDIES

Flood Insurance Rate Maps were previously published for the unincorporated areas of Salt Lake County, and for the Cities of Bluffdale, Draper, Midvale, Murray, Riverton, Salt Lake City, Sandy City, South Jordan, South Salt Lake, West Jordan, and West Valley City.

Flood Insurance Studies were prepared for Davis and Utah Counties, and a Flood Insurance Rate Map was prepared for the City of North Salt Lake (References 47, 48, and 49, respectively). The section of the Jordan River studied in detail downstream of Salt Lake City was studied by approximate methods in Davis County and North Salt Lake. In all other respects, the studies are in agreement.

Flood Hazard Boundary Maps were prepared for Morgan, Summit, and Wasatch Counties (References 50, 51, and 52, respectively).

A report prepared by the USACE (Reference 33) reevaluated the frequency of flood discharges along Mill, Big Cottonwood, and Little Cottonwood Creeks. This report considered the impacts of the extreme flood of September 1983 and of urban development. The USACE report indicated

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISION DATE(S)	FLOOD INSURANCE RATE MAP EFFECTIVE DATE	FLOOD INSURANCE RATE MAP REVISION DATE(S)
Salt Lake County (Unincorporated Areas)	August 30, 1977	--[1]	December 18, 1985	September 30, 1994
Bluffdale, City of	September 30, 1987	--[1]	September 30, 1987	June 19, 1989
Draper, City of	December 18, 1985	--[1]	December 18, 1985	September 30, 1994
Herriman, Town of	--[1]	--[1]	--[1]	--[1]
Holladay, City of	--[1]	--[1]	--[1]	--[1]
Midvale, City of	September 26, 1975	April 1, 1977	September 30, 1994	--[1]
Murray, City of	March 29, 1974	December 19, 1975	December 18, 1985	September 30, 1994
Riverton, City of	November 1, 1974	July 23, 1976	February 19, 1986	September 30, 1994
Salt Lake City, City of	December 27, 1974	--[1]	August 1, 1983	September 30, 1994
Sandy City, City of	July 26, 1974	January 16, 1976	December 18, 1985	September 30, 1994
South Jordan, City of	July 26, 1974	January 30, 1976	December 18, 1985	September 30, 1994
South Salt Lake, City of	September 19, 1975	--[1]	December 18, 1985	September 30, 1994
Taylorsville, City of	August 30, 1977 (Salt Lake County)	--[1]		
West Jordan, City of	July 19, 1974	March 5, 1976 March 1, 1984	September 1, 1987	September 30, 1994
West Valley City, City of	November 2, 1983	--[1]	May 1, 1986	September 30, 1994

[1]Not applicable

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

SALT LAKE COUNTY, UT AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

that discharges along these three streams, in general, are larger than those reported in the original study; however, they are not significantly larger statistically. Changes occurred along the stream channels following the September 1983 flood.

Following the disastrous flooding along Utah Lake and the Jordan River in 1983 and 1984, Salt Lake County and Utah County officials commissioned an investigation by CH2M Hill, Inc., of remedial measures to mitigate flood losses. The resulting report (Reference 12) proposed channel modifications on the Jordan River, a flow control structure for Utah Lake, and a plan for regulating Utah Lake outflows. These proposals were based on design discharge values established through an analysis of historical Jordan River and tributary floodflow records and a synthesis of impacts of controlled releases from Utah Lake. These design discharges are shown in Table 13, "Jordan River Proposed Design Discharges". The discharges were used in a hydraulic step-backwater model (Reference 26) of the Jordan River that assumed all proposed channel modifications to be in place.

It should also be noted that a Jordan River Stability Study was completed for Salt Lake County. The primary goals of this report were to delineate a river meander/bend (Reference 13) migration corridor along the river, to identify existing and potential stability problems, and to develop a management and maintenance plan for the Jordan River. The results of the stability study area intended to be used in conjunction with the results from this Flood Insurance Study to help control development in the floodplains of the river.

The USACE completed a Floodplain Information Report on the Jordan River and its tributaries in 1969 (Reference 5). This investigation included mapping of the floodplains along the various streams for the Intermediate Regional and Standard Project Floods.

The USACE defines the Intermediate Regional Project Flood as a flood having an average frequency of occurrence in the order of once every 100 years although the flood may occur in any year. It is based on statistical analyses of streamflow records available for the watershed and analyses of rainfall and runoff characteristics in the general region of the watershed.

The Standard Project Flood is the flood that may be expected from the most severe combination of meteorological and hydrological conditions that are considered reasonably characteristic of the geographical area in which the drainage basin is located, excluding extremely rare combinations. Peak discharges for these floods are generally about 40-60 percent of the Probable Maximum Floods for the same basins. As used by the USACE, Standard Project Floods are intended as practicable expressions of the degree of protection that should be sought in the design of flood control works, the failure of which might be disastrous.

Significant differences were found between the water-surface elevations and floodplain boundaries computed by the USACE for the Intermediate Regional flood and those computed in the Flood Insurance Study for Salt Lake City (Reference 2) for the 100-year flood on Jordan River and its tributary streams. The differences found on the tributary streams may be attributed to the different hydrologic and hydraulic methodologies used. The USACE used a synthetic unit hydrograph approach with low infiltration rates to obtain runoff from the mountain and valley areas. Relatively large flows were generated through this procedure. Flow values computed as part of this Flood Insurance Study were computed at the canyon mouths using a frequency analysis based on existing stream flow gage records. Discharges in other areas were computed as described in Section 3.1. The USACE hydraulic analysis of these streams consisted of hand calculations performed principally at the bridges and culverts. The Flood Insurance Study analysis used the step-backwater methods described in Section 3.2.

Table 13. Jordan River Proposed Design Discharges

Location	Design Discharges (cubic feet per second)[1]
2100 South Street to Mill Creek Confluence	4,500
Mill Creek Confluence to Big Cottonwood Creek Confluence	4,500
Big Cottonwood Creek Confluence to Little Cottonwood Creek Confluence	4,380
Little Cottonwood Creek Confluence to 5800 south Street (Bullion Street)	3,870
5800 South Street (Bullion Street) to 9400 South Street	3,330
9400 South Street to Jordan Narrows	3,260
Above Jordan Narrows	

[1]Source of Discharge Data: Utah Lake/Jordan River Flood Management Plan, Phase I Report (Reference 12)

Differences in the flood boundaries and water-surface elevations on the Jordan River may also be attributed to differing methodologies and assumptions. The USACE hydraulic calculations on Jordan River were based only on the peak discharge. The basics assumption was that a sufficient volume of water would be available to fill all areas below a computed surface elevation in the river. The Flood Insurance Study hydraulic analysis, however, was based on available volume as well as peak discharge. Flood hydrographs were computed, routed, and then used to produce water-surface elevations and delineate the flood boundaries.

The USACE completed a Flood Plain Information Report on the Jordan River and Dry and Willow Creeks in 1974 (Reference 6). Due to the different values used for parameters, such as infiltration rates and permeability, the discharges used in this study are generally lower than those presented in the Floodplain Information report. Additionally, there are differences between this study and the report due to revised hydraulic analyses and more recent and detailed topographic mapping.

This report either supersedes or is compatible with all previous studies published on streams studied in this report and should be considered authoritative for the purposes of the NFIP.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting FEMA, Mitigation Division, Denver Federal Center, Building 710, Box 25267, Denver, Colorado 80225-0267.

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10.0 Revision Descriptions

This section has been added to provide information regarding significant revisions made since the original Flood Insurance Study was printed. Future revisions may be made that do not result in the republishing of the Flood Insurance Study report. To assure that any user is aware of all revisions, it is advisable to contact the community repository of flood hazard data located at Salt Lake County Engineering Department, 2001 South State Street, Suite N3300, Salt Lake City, Utah 84109-4600.

10.1 First Revision

This study was revised on May 15, 2002, to incorporate new detailed flood hazard information for Midas and Willow Creeks, within the Cities of Draper, Riverton, and South Jordan.

The hydrologic and hydraulic analyses for this study were performed by Foothill Engineering Consultants, Inc. for the Federal Emergency Management Agency (FEMA), under Contract No. EMW-93-C-4150. The Willow Creek study was completed in February 2000 and the Midas Creek study was completed in December 1999.

The results of the restudy were reviewed at the final CCO meeting held on May 31, 2001. All problems raised at that meeting have been addressed in this restudy.

The downstream study portion of Midas Creek extends from 3600 West Street to its confluence with the Jordan River and has a drainage area of approximately 15 square miles. Funds were not allocated to conduct a new hydrologic study, so existing information was used to obtain information on discharges for the 10-, 50-, and 100-year flood recurrence intervals. Communities agreed to use the results of the Southwest Canal and Creek Study (SCCS) of 1985 for this purpose (Reference 53). This study was completed in 1985 with future land use conditions projected 20-years. Community growth has accelerated substantially in the last decade, so the future condition as outlined was expected to reflect current conditions better than the 1985 present day conditions. Future flow conditions included flows that are planned to be diverted from Butterfield Canyon that actually are diverted into north - south flowing canals and waterways. Although the diversion has not taken place, the flows were included in the FIS so that new development along the Midas Creek will be planned with future conditions in mind.

The studied portion of Willow Creek (West) extends from 300 East Street downstream to 11400 South Street, approximately 3330 feet upstream of its mouth and has a drainage area of approximately 15 square miles. Funds were not allocated to conduct a new hydrologic study because both the city and county have conducted effective hydrologic studies for stormwater master planning (References 54 and 55), so existing information was used to obtain discharges for 10-, 50-, and 100-year flood recurrence intervals.

In the Montgomery Watson study for the county (Reference 54) both cloudburst and snowmelt scenarios were examined to produce the most conservative discharge results. HEC-1 Flood Hydrograph Package was used for hydrologic modeling (Reference 25). Both existing and ultimate condition hydrology were developed and flows compared with previous studies to allow discrepancies to be resolved. Higher results for existing conditions were obtained by Horrocks Engineers who completed the City of Draper study (Reference 55). HEC-1 was also used for the hydrologic analysis of Midas and Willow Creeks. However, the city and county reprepresentitives agreed that the city study results were overly conservative for the 100-year flow, although the 10-year flows were in agreement, so the county flows were used throughout.

Only hydrology for the 10 and 100-year peak discharges was developed in the city and county studies, so the 500-year peak discharge was determined by extrapolating a best-fit line through peak discharges for Willow Creek on a log-probability plot. This plot was generated using the USACE FFA Log-Pearson III type model (Reference 56).

The SCCS used the Eviromental Protection Agency's Stormwater Management Model (SWMM) for runoff modeling due to a lack of stream flow measurements and complex flow patterns in the area. Results were calibrated using streams with similar characteristics, because no data for Midas Creek discharges were available. Of the four conditions for which runoff hydrographs were modeled in the SCCS, the future land use condition with existing channel conditions and no channel restrictions was adopted. This best reflects current conditions, in which culverts may overtop, and canal flow increments peak, during flooding.

Only hydrology for the 2-, 5-, 10-, 50-, and 100-year peak discharges was developed in the SCCS, so the 500-year peak discharge was determined by extrapolating a best-fit line through peak discharges for Midas Creek on a log-probability plot. This plot was generated using the USACE Flood Frequency Analysis Log-Pearson III type model (Reference 56).

Analyses of the hydraulic characteristics of Midas and Willow Creeks were carried out to provide estimates of the elevations of the 100- and 500-year floods and floodways. BOSS River Modeling System (RMS) was used to conduct the hydraulic analyses (Reference 57). BOSS RMS is an AutoCAD-based program designed to simplify the input and output processing of the water surface profiles model, HEC-2. HEC-2 is a step-backwater computer model developed by the Army Corps of Engineers (Reference 58).

Maps of 2-foot contours were acquired from an aerial survey conducted by Salt Lake County in September 1997. Aerial photography was orthorectified and used to generate contours using standard photogrammetric methods. Since elevations were originally in feet, but distance units in meters, Arc/Info GIS was required to reproject the data into consistent State Plane units of feet. Once all the contour sections needed for the study reach were imported into the working drawing, it became too large to use. Therefore, an AutoCAD utility called CurveFit was used to convert line segments into larger arcs to compress the drawing size.

A three-day field investigation was conducted to measure the elevation of inverts and diameter of all pipes and the geometry of all bridges for the Midas Creek study. A one-day field investigation was conducted to verify the elevation of inverts and diameter of all pipes listed in the county study (Reference 54) for Willow Creek. The entire length of the study reaches for Midas and Willow Creeks were examined, photographed and video-taped to help estimate Manning's "n" values. The roughness values for the main channel depended on channel conditions and obstructions; roughness values for the floodplain depended on vegetation, irregularity, obstructions, and meandering (Reference 57). The ranges of "n" values used for Willow Creek are listed in Table 14 "Range of Manning's "n" Values".

TABLE 14. Range of Manning's "n" Values

Flooding Source	Channel	Overbank
Midas Creek	0.022-0.080	0.028-0.090
Willow Creek	0.030-0.050	0.040-0.060

In order to establish a floodway at culvert sections where ineffective flow areas would conflict, cross sections in the HEC-2 model were altered to incorporate ineffective flow areas as part of the ground geometry. However, in redefining the cross sections, a fixed boundary was used at the sides of the cross section to contain the flow, where no solid boundary actually existed. This can cause the model to add wetted perimeter to the friction loss calculations, resulting in different results than obtained before the ineffective flow areas were remodeled as solid barriers. However, in this particular case, no measurable change in results occurred with the change in geometry, so no model adjustments were required to bring water surface elevation results to agree with the original model in which ineffective flow areas were modeled directly.

Using BOSS RMS, cross sections were cut to be perpendicular to contours along the reach to effectively represent changes in flow, conveyance, surface characteristics, and structures. Locations of cross sections used in the hydraulic analyses are shown in the Flood Profiles (Exhibit 1). Using this completely digital method of data entry, surveying errors were eliminated and cross sections were placed wherever appropriate rather than only where they could be fully surveyed.

The starting water-surface elevation for Willow Creek was calculated using normal depth at the first cross section located downstream of 11400 South Street. Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for the 100-year flood and floodway.

The starting water surface elevation for Midas Creek was calculated using normal depth at the first cross section located about 200 feet upstream of the confluence with the Jordan River. Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for the 100-year flood and floodway.

As part of this restudy, the corporate limits for the City of South Salt Lake and the City of Taylorsville were updated. These updated corporate limits also affected the unincorporated areas of Salt Lake County.

Table 8, "Summary of Discharges", Table 11, "Floodway Data" and Exhibit 1, "Flood Profiles" were revised to reflect the results of the restudy.