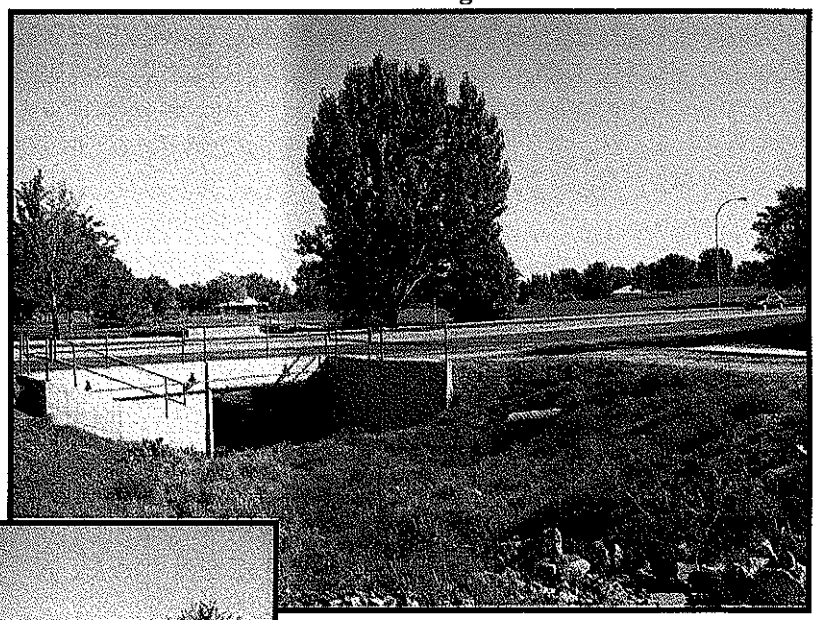
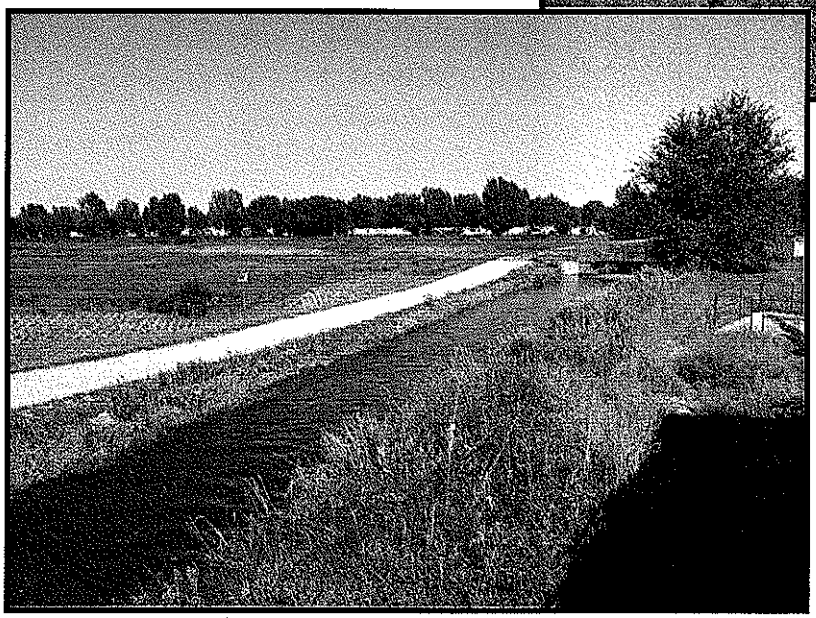
CITY OF GREELEY
COMPREHENSIVE DRAINAGE PLAN

GRAPEVINE BASIN
FINAL REPORT

16th Street Culvert Crossing at Bittersweet Park





Northview Spill Structure and Underchute on the Greeley No. 3 Ditch

MARCH 8, 2006

ANDERSON CONSULTING ENGINEERS, INC.

Civil • Water Resources • Environmental

City of Greeley

ANDERSON CONSULTING ENGINEERS, INC.
Civil • Water Resources • Environmental

March 8, 2006

Mr. Bert Leautaud
City of Greeley
Public Works Department
1001 Ninth Avenue
Greeley, CO 80631

RE: City of Greeley Comprehensive Drainage Plan – Grapevine Basin
(ACE Project No. COCOG05)

Dear Bert:

Anderson Consulting Engineers, Inc. (ACE) is pleased to inform you that we have completed the analyses, design, plan preparation and documentation associated with the update of the comprehensive drainage plan for the Grapevine Basin. In addition we have completed all revisions to the report and project notebook pursuant to City review comments and our final in-house review. Please find enclosed two copies of the Final Report and one copy of the Project Notebook for the Grapevine Basin Comprehensive Drainage Plan.

It has been our pleasure working with you in the completion of this study. If you have any questions or comments concerning any aspect of this project, please do not hesitate to contact us.

Sincerely,
ANDERSON CONSULTING ENGINEERS, INC.

Gregory J. Koch, P.E.
Vice President

Brian L. Van Zanten

Brian L. Van Zanten, P.E.
Project Engineer II

GJK/BLV/vla

Enclosures

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CITY OF GREELEY
COMPREHENSIVE DRAINAGE PLAN

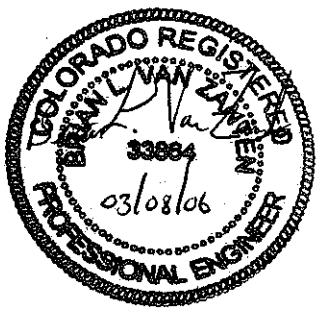
GRAPEVINE BASIN
FINAL REPORT

Prepared for:

City of Greeley
Public Works Department
1001 Ninth Avenue
Greeley, CO 80631

Prepared by:

Anderson Consulting Engineers, Inc.
772 Whalers Way, Suite 200
Fort Collins, CO 80525
(ACE Project No. COCOG05)



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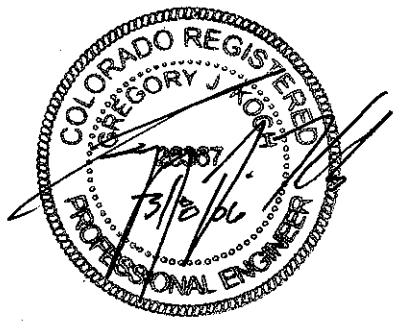

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I. INTRODUCTION

The City of Greeley is a rapidly growing community that previously recognized the need for adequate storm drainage facilities, as exemplified by the completion of the Comprehensive Drainage Plan in 1974. With the development that occurred in and around Greeley in the 23 years following completion of the 1974 Comprehensive Drainage Plan, the Comp Plan was updated in 1997 for five of the City's major drainage basins, including the Grapevine Basin (Comprehensive Drainage Plan, City of Greeley, Grapevine Basin, Lidstone and Anderson, Inc., November 1996). The City of Greeley has continued to experience significant growth over the past eight years since completion of the 1997 Comp Plan.

It has become increasingly important that the 1997 Comp Plan be updated, including the following three primary factors: (a) moderate development has occurred within the Grapevine Basin both north and south of the Greeley No. 3 Ditch in the vicinity of 35th Avenue since completing the 1997 Comp Plan, thereby necessitating an update of the hydrologic model for the basin; (b) recent improvements to the Highland Hills Golf Course Irrigation Pond, the construction of the Monfort Park Regional Detention Pond, proposed improvements to the Franklin Park Detention Pond, proposed construction of the regional detention pond at 4th Street and 35th Avenue, and construction of the Northview Regional Detention Pond (including the Northview Side Channel Weir, in-line ditch control structure, and the Greeley No. 3 Ditch Underchute) have also warranted a change to the hydrologic model; and (c) in relation to the first two items, proposed improvements as outlined in the 1997 Comp Plan were re-evaluated and updated.

In support of these needs, the City contracted with Anderson Consulting Engineers, Inc. (ACE) to update the Comp Plan for the Grapevine Basin, as well as the other basins that were the subject of the 1997 study. This report specifically identifies the results of the Comp Plan efforts associated with the Grapevine Basin.

1.1 Project Goals and Objectives

The goal of the 1997 Comprehensive Drainage Plan was to update the 1974 Comp Plan and develop a planning document to be utilized as a tool for making decisions related to stormwater management within the City of Greeley. Completion of the 1997 Comp Plan for the Grapevine Basin involved the development of a planning document that met the following objectives:

(a) identify long-term capital improvements and rehabilitation measures for the existing drainage system;

(b) provide a tool for implementation of future improvements associated with new developments within the urban growth boundary;

(c) provide a basis for prioritizing and scheduling required improvements (implementation plan);

(d) provide the flexibility to implement improvements that afford flood protection while being cost effective; and

(e) address environmental and recreational and other open space and drainage corridor planning issues.

Sensitivity to these objectives was an important consideration during the preparation of the 1997 Comp Plan; however, the primary focus of the planning efforts was the reduction of both existing and potential future flood hazards within the City of Greeley.

The objectives of the current study are commensurate with those identified for the 1997 Comp Plan. The goals of the current study are to update the previous Comp Plan to reflect existing conditions based on recent improvements, to re-evaluate the proposed improvements outlined in the 1997 Comp Plan that have not been built in context of the most recent hydrologic analyses, and update them if necessary, and identify new improvements. All objectives were important in the current Comp Plan update; however, the primary focus of the Comprehensive Drainage Plan remains the reduction of existing and potential future flood damages and hazards within the City of Greeley in the most economical manner.

1.2 Scope of Work

The scope of work associated with the current Comp Plan update included the following tasks:

1. Review of Existing Information and Field Reconnaissance. Existing information pertinent to the current study was reviewed and evaluated with respect to identifying data and parameters that were needed for completing the current analyses and modeling effort. This information included the following: (a) the 1997 Comp Plan for the Grapevine Basin, including all background data and modeling information; (b) all development that has occurred within the Grapevine Basin since the completion of the previous Comp Plan, including final 100-year discharge release rates for all pertinent on-site detention facilities; (c) design and as-built information regarding the improvements prepared for the Highland Hills Golf Course Irrigation Pond, the Monfort Park Irrigation Pond, and the Monfort Park Regional Detention Pond by the City of Greeley; (d) design information regarding the improvements prepared for the Franklin Park Detention Pond; (e) design and as-built information regarding the

improvements prepared for the Northview Regional Detention Pond; (f) design information regarding improvements associated with the Best-Way Park drainage facilities; and (g) available GIS data within the basin including existing structures, topography, roads, railroads, water features, soils, zoning, storm sewers, and sanitary sewers.

Field reconnaissance efforts included the following: (a) verification and determination of existing drainage facilities; and (b) site visits to locations of recent improvements.

2. Update of Existing, Future, and Proposed Condition Hydrologic Models. The hydrologic models associated with the existing development/existing facilities, future development/existing facilities, and future development/Comp Plan facilities condition developed as part of the 1997 Comp Plan were updated to include drainage improvements in the basin that have been implemented since 1997. This included the following three items: (a) incorporation of all new detention facilities with a single pond volume of approximately seven acre-feet or greater, as well as the re-delineation of subbasins as they relate to the detention facilities; (b) incorporation of improvements related to the Highland Hills Golf Course Irrigation Pond; and (c) incorporation of improvements related to the Northview Side Channel Weir located on the Greeley No. 3 Ditch. A comparison of current existing condition discharges to those estimated from the 1997 Comp Plan was completed in order to evaluate discharge changes along the two Grapevine Basin major drainageways.

3. Revisions to Drainage Improvement Plan. The drainage improvement plan considered potential revisions to the 1997 Comp Plan, based on revised discharges obtained from the updated hydrologic models.

4. Engineering Analyses of the Drainage Improvement Plan. Based on the selected level of protection determined from the 1997 Comp Plan, hydrologic and hydraulic design parameters for all proposed improvements were evaluated, with all components associated with all the previously proposed improvements modified to accommodate current hydraulic conditions.

5. Preparation of the Plan of Storm Drainage Improvements. Hydraulic design parameters were finalized and final hydrologic modeling of the drainage improvement plan was completed. The revised plan of improvements for the Grapevine Basin was completed, including facilities and revised estimates of capital improvement costs.

6. Final Report Documenting the Updated Grapevine Basin Comp Plan. The results of the Plan efforts are summarized in this report as well as in the accompanying Project Notebook.

1.3 Mapping and Surveying

The primary mapping utilized for this Comp Plan update was obtained from the City of Greeley GIS department. It is the same 2-foot contour mapping utilized for the 1997 Comp Plan. This mapping was previously digitized from 1987 and 1992 aerial flight line data. A triangulated irregular network (TIN) was generated from a 50-foot point grid and break lines provided by Arnold Analytical Services. The North American Datum of 1927 (NAD27) was used for horizontal control, while the National Geodetic Vertical Datum of 1929 (NGVD29) was used for vertical control in preparing the mapping. A 2-foot contour map was specifically generated to facilitate completion of the Comp Plan for the Grapevine Basin. It should be noted that the contour mapping has recently been converted by the City of Greeley in an effort to keep up with the most current and accurate datum standards. The NAD27 horizontal datum has been converted to the North American Datum 1983 (NAD83) High Accuracy Reference Network (HARN) under the State Plane Coordination System Projection and the Colorado North Zone. The NGVD29 vertical datum has been converted to the geodetic North American Vertical Datum of 1988 (NAVD88). However, as this Comp Plan had largely been completed prior to the datum conversion, no datum adjustments were made and the original NAD27 and NGVD29 datums were maintained for this study.

No additional survey information was collected for the current Comp Plan. Field survey data collected by King Surveyors, Inc. of Windsor, Colorado for the 1997 Comp Plan is included in Section 1.1 of the Project Notebook.

1.4 Previous Studies

Many previous studies related to drainage within the Grapevine Basin were collected and reviewed during the completion of the 1997 Comp Plan project. The Grapevine Basin was initially analyzed as part of the 1974 Comprehensive Drainage Plan (CDP). The CDP identified alternative drainage improvements and cost estimates for the major drainageway within the basin. Improvements to the 35th Avenue Storm Sewer and Outfall Channel have been constructed in the northern half of the basin as a result of recommendations from the 1974 CDP. Three design reports (considered preliminary at the time of their submittal) related to the 16th Street Storm Sewer and Roadway Improvements were submitted by Burnett Consulting Engineers, Inc. (BCE) to the City of Greeley during the time period extending from 1985 to 1991.

In addition to the 1997 Comp Plan and the documents referenced in that report, the current study utilized numerous drainage reports associated with previous and on-going

developments, as well as specific design information related to the improvements recently implemented to the Highland Hills Golf Course Irrigation Pond, the Monfort Park Irrigation Pond and Regional Detention Pond, and the Northview Side Channel Weir. All drainage report information as it relates to the current study is provided in Section 3.2 of the accompanying Project Notebook.

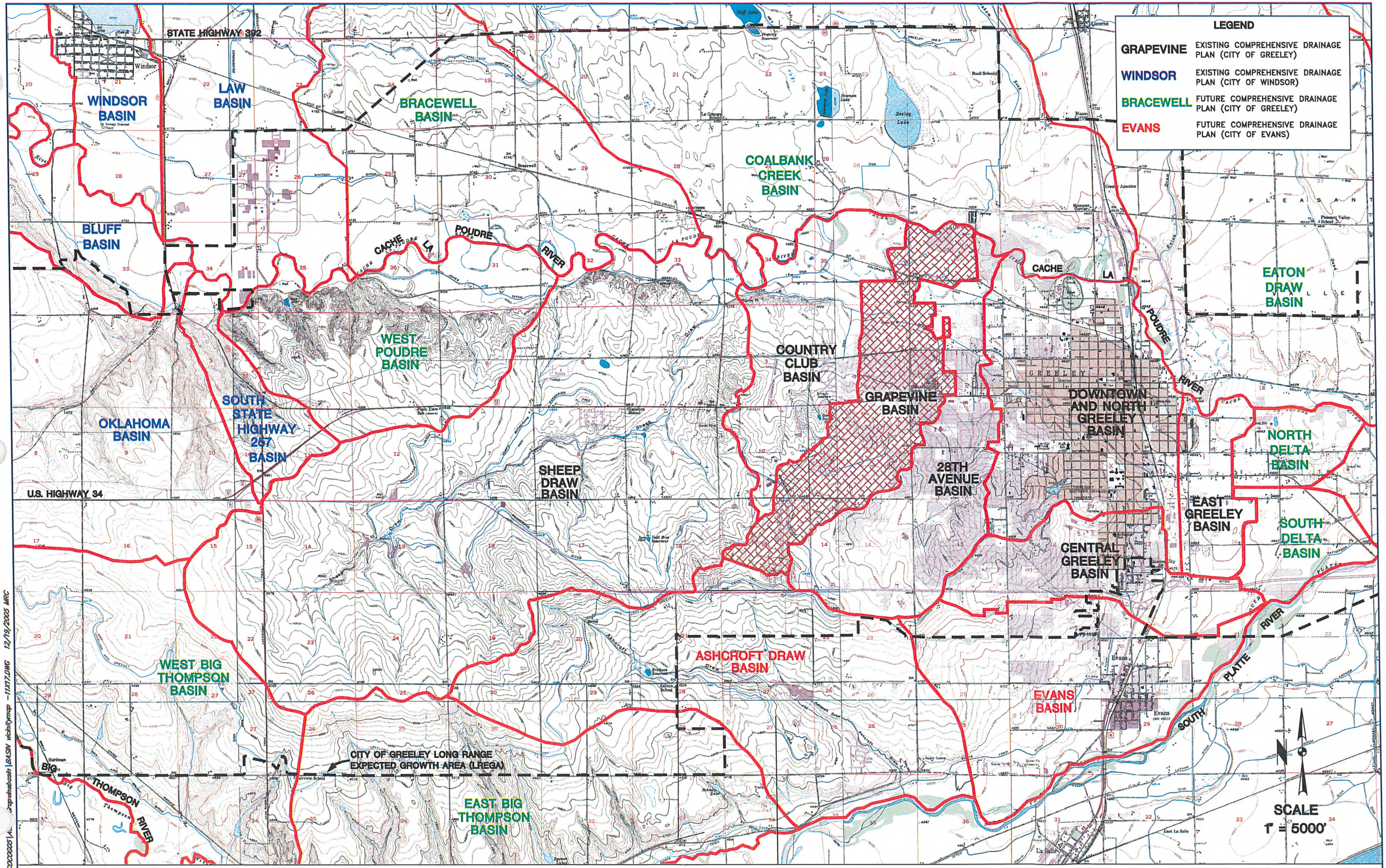

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Figure 2.1. Basin Vicinity Map

II. BASIN CHARACTERISTICS

2.1 Location and Description

The Grapevine Basin is located in the central portion of the existing urbanized area within the City of Greeley. The basin limits are approximately defined by the Cache La Poudre River on the north, 25th Avenue on the east, 27th Street on the south and 58th Avenue (at the extreme southwest corner of the basin) on the west. The drainage basin boundaries are delineated on the vicinity map in Figure 2.1.

The Grapevine Basin drainage area is estimated to be approximately 2,230 acres. The Greeley No. 3 Ditch divides the basin between 4th Street and C Street, with 1,699 acres located south of the ditch and 531 acres situated between the ditch and the Cache La Poudre River. Ninety-two percent of the basin area south of the ditch has been developed, while approximately 23 percent of the land north of the ditch is developed. As a point of reference, 83 percent of the area south of the ditch was developed upon completion of the 1997 Comp Plan; only 9 percent of the land north of the ditch was developed at that time. Approximately 126 acres south of the ditch and 354 acres north of the ditch are under Weld County jurisdiction, and have not been annexed by the City of Greeley. The entire Grapevine Basin, however, lies within the City of Greeley's Long Range Expected Growth Area (LREGA) limits, which represents the expected twenty-year growth area boundary.

The majority of the development in the basin consists of low to medium-density single- and multi-family residential housing. Land use in the basin also includes commercial development along West 10th Street, development associated with the Highland Hills Golf Course, and a portion of the Aims Community College campus near West 20th Street. The majority of the undeveloped land within the basin is presently zoned for low to medium residential housing, or is presently owned by Weld County.

2.2 Drainage Features

In the southern half of the Grapevine Basin (specifically south of 10th Street), three detention facilities serve as major drainage features that are utilized to significantly reduce the peak discharges occurring along the major drainageway. Specifically, these facilities include: (1) the Highland Hills Golf Course Irrigation Pond; (2) the Monfort Park Regional Detention Pond; and (3) the Bittersweet Park Detention Pond. The major drainageway in the northern portion of the Grapevine Basin, unlike portions of the southern basin that have developed more recently, contains no major detention facilities for attenuation of the storm runoff that is conveyed downstream. Major detention facilities north of 10th Street, but not located along the major drainageway, include the Franklin Park Detention Pond and the Northview Regional Detention Pond.

In addition to the major drainageway and outfall system, two irrigation ditches traverse the Grapevine Basin. These include the Grapevine Ditch and the Greeley No. 3 Ditch. The Grapevine Ditch traverses the southwestern portion of the basin along 50th Avenue roughly between 18th Street and 24th Street. The ditch conveys minor irrigation and stormwater flows within the basin, but offers limited value as a drainage feature that will convey major stormwater runoff out of the basin. The Greeley No. 3 Ditch conveys flow (irrigation and captured stormwater) in a southeasterly direction between C Street and 4th Street in the northern half of the basin. Presently, the Greeley No. 3 Ditch intercepts the majority of the stormwater emanating from the southern portion of the basin. Stormwater runoff captured by the Greeley No. 3 Ditch is conveyed eastward to the Northview Side Channel Weir near 30th Avenue. At this location, stormwater is diverted over the side channel weir via an in-line ditch control structure into the Northview Regional Detention Pond. During a majority of the flood events (up to and including a 50-year return period), the Greeley No. 3 Ditch serves as a significant drainage boundary within the basin. Even during the 100-year event, the No. 3 Ditch collects a substantial portion of the storm runoff generated within the basin and conveys those flows east to the Northview Side Channel Weir.

The Cache La Poudre River represents the northern boundary of the Grapevine Basin. The river receives all the stormwater runoff that is generated within the basin. The 100-year floodplain associated with the Cache La Poudre River (updated by the U.S. Army Corps of Engineers in 2003) encompasses nearly 70 percent (369 acres) of the basin drainage area between the Greeley No. 3 Ditch and the river.

The drainage features along with the 100-year floodplain are presented on the basin boundary map shown on Sheet B-1.

2.3 Description of Existing Drainage Paths

In general, stormwater runoff generated within the Grapevine Basin flows in a northerly direction toward the Cache La Poudre River. Runoff originates in the southwestern portion of the basin, specifically south and west of the Highland Hills Golf Course. Stormwater runoff is routed toward the northeast, in particular toward the intersection of 47th Avenue and 20th Street. At this intersection, stormwater is conveyed in an easterly direction along 20th Street to 46th Avenue; from this location, runoff is directed north to 16th Street. The 16th Street Storm Sewer and Outfall Channel collect and convey stormwater runoff generated within the upper basin into the Bittersweet Park Detention Pond, illustrated in Figure 2.2. Releases from the Bittersweet Park Detention Pond are directed into the 35th Avenue Storm Sewer; runoff in excess of the storm sewer capacity is conveyed northward within the street section of 35th Avenue, where the Greeley No. 3 Ditch intercepts a majority of the flow. Immediately north of C Street, the runoff

conveyed within the storm sewer is directed to an outfall channel, located east of and parallel to 35th Avenue. The 35th Avenue Outfall Channel ultimately conveys the runoff in a northerly direction to the Cache La Poudre River.

Figure 2.2 Bittersweet Park Detention Pond.

The Grapevine Basin is also served by a secondary drainage path that is worth noting. Flows exceeding the capacity of the 35th Avenue Storm Sewer at 10th Street are conveyed eastward along 10th Street to a sump area located in the vicinity of 32nd Avenue. At this location, the stormwater commingles with runoff generated from the residential subdivision located south of 10th Street. During major storm events, the runoff overtops 10th Street and is conveyed northward via a storm sewer and overland to an open channel adjacent to Franklin Middle School. This runoff is then directed into a storm sewer at 7th Street and 30th Avenue Place, which in turn is routed into the Franklin Park Detention Pond. Releases from the Franklin Park Detention Pond are conveyed northward via storm sewer and street flow (specifically 31st Avenue, 5th Street, and 30th Avenue Court) across 4th Street. A small detention pond northwest of the intersection of 4th Street and 30th Avenue receives the stormwater and directs it east into an open channel. This open channel routes flows north to an underchute, where they are directed beneath the Greeley No. 3 Ditch into the Northview Regional Detention Pond (depicted in Figure 2.3). Releases from the Northview Regional Detention Pond are directed northward via storm sewer and overland, combining with detained releases from Subbasin 30 in the 28th Avenue Basin. The commingled flows are then directed to the east (immediately north of C Street) beneath the Colorado and Southern Railroad, where they combine with flows from the Greeley

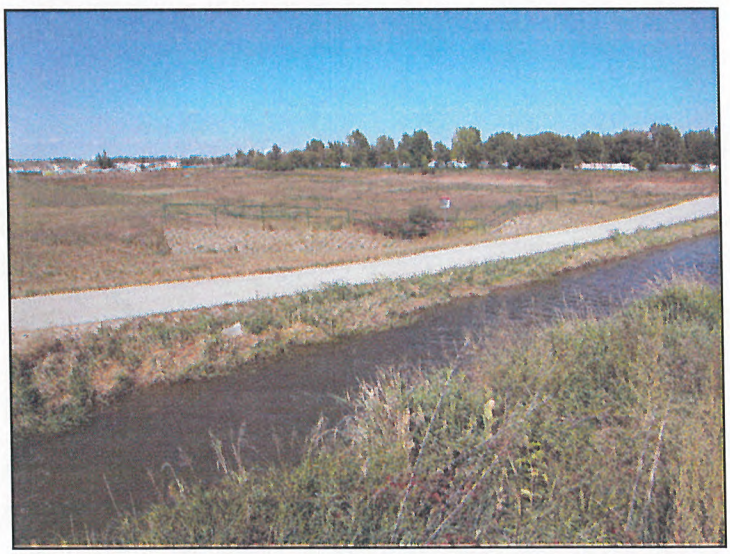

Figure 2.3 Northview Regional Detention Pond.

No. 3 Ditch Wasteway Channel located in the 28th Avenue Basin. All stormwater flows are then routed to the north to the Cache la Poudre River. The major drainageway and pertinent hydraulic structures are graphically portrayed on Sheet B-1.

III. INVENTORY OF EXISTING FACILITIES

Substantial improvements had been made to the drainage facilities within the Grapevine Basin along the major drainageway at the time the 1997 Comp Plan was completed. Much of this work had been accomplished in response to development within the basin. Detention ponds, storm sewers, conveyance channels, and overflow weirs comprise the network of drainage facilities that provide flood relief during the major storm events. As part of the 1997 Comp Plan, an inventory of the existing facilities along the major drainageway was conducted. The inventory and evaluation of each facility involved: (a) field reconnaissance to document location, condition and additional data requirements; (b) review of available design and as-built drawings; (c) collection of site-specific survey data; and (d) evaluation of the hydraulic capacity. Table 3.1 summarizes the results of the inventory and evaluation of existing facilities completed for the 1997 Comp Plan. New information included in the table, prepared as part of the current study includes the Highland Hills Golf Course Irrigation Pond, the Monfort Park Irrigation Pond, the Monfort Park Regional Detention Pond, the 40th Avenue Crossing, the 30th Avenue Crossing, the Northview Subdivision Bypass Channel, the Greeley No. 3 Ditch Underchute, and the Northview Regional Detention Pond. Specific information related to these facilities is provided in the following paragraphs. More detailed data and photographic documentation associated with each facility are provided in Sections 1.2 and 6, respectively, of the Project Notebook.

The current study included a comprehensive inventory of storm drainage facilities constructed in conjunction with recent development (since completion of the 1997 Comp Plan). Improvements constructed as part of the Northview Regional Detention Pond and the Northview Side Channel Weir (located on the Greeley No. 3 Ditch) were also evaluated.

3.1 Detention Facilities

The following documentation of existing detention facilities was provided in the 1997 Comp Plan, with discharge, storage volume, and overtopping depth values updated for the current Comp Plan. The main detention facilities along the major and secondary drainageways are located in the following areas: (a) Highland Park West Subdivision; (b) Highland Hills Golf Course; (c) Monfort Park; (d) Bittersweet Park; (e) Franklin Park; and (f) Northview Subdivision. Several minor detention facilities also exist within the Grapevine Basin. These minor detention ponds provide for a reduction in peak flows locally, but offer no significant reduction of peak flows along the major drainageway; consequently, they were not specifically evaluated during this master planning effort. A summary of the location, condition, and capacity of each major detention facility is included in Table 3.1.

Table 3.1 Inventory of Existing Drainage Facilities.

Facility Name and/or Type	Location [EPA SWMM ID]	Condition	Maximum Storage Volume (acre-feet)	Maximum Discharge Capacity[1] (cfs)
MAJOR DRAINAGEWAY				
Highland Park West Pond	NE corner of 25th Street and 53rd Avenue Court [301]	Poor-outlet is inadequate	4.5	5[1]
Highland Hills Golf Course Irrigation Pond	East side of Highland Hills Golf Course near 23rd Street and 51st Avenue [302]	Good-outlet improvements made in 2000	18.5	166[1]
Monfort Park Irrigation Pond	East of 22nd Street and 50th Avenue [304]	Good-outlet improvements made in 2000	7.0[2]	167[1]
Monfort Park Regional Detention Pond	South of Monfort Elementary School along 47th Avenue at 21st Street Road [331]	Good - constructed in 2000	15.7	92[1]
47th Avenue Storm Sewer	From Monfort Park Regional Detention Pond to 46th Avenue [231]	Good	N/A	73[3]
16th Street Storm Sewer and Channel	Between 20th and 16th Streets [205]	Good	N/A	155[3]
	Between 47th and 46th Avenues for storm sewer; between 46th Avenue and 44th Avenue Court for channel [207] [507]	Good	N/A	84[3] 172[4]
	Between 46th and 40th Avenues for storm sewer; between 44th Avenue Court and 42nd Avenue Court for channel [208] [508]	Good	N/A	134[3] 1,340[4]
	Between 40th Avenue and Bittersweet Park for storm sewer; between 42nd Avenue Court and Bittersweet Park for channel [209] [509]	Good	N/A	118[3] 1,500[4]
44th Avenue Court Culvert	Crossing under 44th Avenue Court at intersection with 16th Street [N/A]	Good	N/A	83[5]
42nd Avenue Court Box Culverts	Crossing under 42nd Avenue Court at intersection with 16th Street [N/A]	Good	N/A	515[5]
40th Avenue Box Culverts	Crossing under 40th Avenue at intersection with 16th Street [N/A]	Good	N/A	725[5]
16th Street Box Culvert	Crossing under 16th Street at upstream end of Bittersweet Park [N/A]	Good	N/A	566[5]
Bittersweet Park Detention Pond	Bittersweet Park near the intersection of 13th Street and 35th Avenue [314]	Good	151[6] 180[7]	149[6] 236[7]
10th Street Detention Ponds	Several minor detention ponds in the vicinity of 10th Street and 43rd Avenue [316]	Fair	3	25
10th Street Storm Sewer	Between 43rd Avenue and 35th Avenue [218]	Good	N/A	29[3]
4th Street Storm Sewer	Between 40th Avenue and 35th Avenue [N/A]	Good	N/A	165[3]

[1] Maximum discharge of outlet pipe prior to overtopping.
[2] Volume above normal operating water surface.
[3] Pipe full flow capacity.
[4] Maximum capacity of stormwater channel.
[5] Prior to flooding or overtopping.
[6] At invert of spillway.
[7] Including spillway discharge and surcharged storage capacity.

Table 3.1 Inventory of Existing Drainage Facilities (Continued).

Facility Name and/or Type	Location [EPA SWMM ID]	Condition	Maximum Storage Volume (acre-feet)	Maximum Discharge Capacity[1] (cfs)
35th Avenue Storm Sewer	Between Bittersweet Park and 10th Street [215]	Good	N/A	120[3]
	Between 10th and 8th Streets [N/A]	Good	N/A	165[3]
	Between 8th and 4th Streets [220]	Good	N/A	233[3]
	Between 4th Street and Greeley No. 3 Ditch [224]	Good	N/A	498[3]
	Between Greeley No. 3 Ditch and Village Drive (entrance to trailer park on east side of 35th Avenue) [N/A]	Good	N/A	483[3]
	Between Village Drive and C Street [235]	Good	N/A	452[3]
35th Avenue Outfall Channel	Between C and F Streets [228]	Fair	N/A	470[4]
	Between F Street and Cache La Poudre River [229]	Fair	N/A	300[4]
F Street Box Culverts	Crossing under F Street at intersection with 35th Avenue Outfall Channel [N/A]	Good	N/A	499[5]
Colorado and Southern Railroad Box Culverts	Crossing under the Colorado and Southern Railroad at intersection with 35th Avenue Outfall Channel [N/A]	Good	N/A	772[5]
County Access Road Box Culverts	880 feet downstream of Colorado and Southern Railroad Crossing [N/A]	Fair	N/A	600[5]
SECONDARY DRAINAGEWAY				
32nd Avenue Storm Sewer	Crossing under 10th Street near intersection with 32nd Avenue [N/A]	Good	N/A	66[3]
Franklin Middle School Channel	From 32nd Avenue Storm Sewer outfall to the Franklin Park Storm Sewer [219]	Good	N/A	147[4]
Franklin Park Storm Sewer	From 30th Avenue Place to Franklin Park [N/A]	Good	N/A	170[3]
Franklin Park Detention Pond	Northeast corner of 6th Street and 31st Avenue [321]	Good	10.8[6] 13.4[7]	24[6] 667[7]
30th Avenue Culverts	Crossing under 30th Avenue near intersection with 4th Street [N/A]	Good	N/A	299[5]
Northview Subdivision Bypass Channel	East of Northview Subdivision [N/A]	Good	N/A	1,360[4]
Greeley No. 3 Ditch Underchute	Crossing under Greeley No. 3 Ditch near Northview Regional Detention Pond [N/A]	Good - constructed in 2001	N/A	780[5]
Northview Regional Detention Pond	Northeast of Greeley No. 3 Ditch and 30th Avenue [332]	Good - constructed in 2001	46.4[6] 57.8[7]	12[6] 383[7]
Northview Side Channel Weir	Along left bank of Greeley No. 3 Ditch above underchute [36]	Good - constructed in 2001	N/A	753[5]

[1] Maximum discharge of outlet pipe prior to overtopping.
[2] Volume above normal operating water surface.
[3] Pipe full flow capacity.
[4] Maximum capacity of stormwater channel.
[5] Prior to flooding or overtopping.
[6] At invert of spillway.
[7] Including spillway discharge and surcharged storage capacity.

Highland Park West Pond. The Highland Park West Pond is a dry detention pond located in the northeast corner of the Highland Park West Subdivision, south of the Highland Hills Golf Course. The maximum storage volume is estimated to be approximately 4.5 acre-feet prior to overtopping. The pond collects runoff from the Highland Park West Subdivision and releases stormwater runoff at a maximum rate of 5 cfs (also prior to overtopping) through a 15-inch CMP. Releases from the pond are ultimately conveyed into the Highland Hills Golf Course Irrigation Pond, located adjacent to 23rd Street within the southern portion of the Highland Hills Golf Course. The Highland Park West Pond is not currently equipped with an emergency spillway. Flows that cannot be contained within the pond overtop the embankment and flow in an easterly direction toward the residences located along 52nd Avenue Court. The existing condition analysis of the 100-year storm event predicts the maximum release from the pond to be 109 cfs.

Highland Hills Golf Course Irrigation Pond. The Highland Hills Golf Course Irrigation Pond lies immediately to the northeast of the Highland Park West Pond, within the limits of the Highland Hills Golf Course. This pond was previously modeled in the 1997 Comp Plan; however, a new outlet has since been constructed as a result of proposed improvements from that plan. Prior to overtopping, the pond volume is estimated to be 18.5 acre-feet with a maximum pipe capacity of approximately 166 cfs. The outlet of the pond consists of a 54-inch RCP (along with two segments of 43"H x 68"W HERCP), with flows routed east along 23rd Street, north along 50th Avenue to 22nd Street Road, and then east beneath the Grapevine Ditch where the pipe daylights into an open channel. Releases are ultimately conveyed into the Monfort Park Irrigation Pond, located immediately east of 22nd Street and 50th Avenue. Approximately 161 cfs will be released from the pond during the 100-year existing condition storm event.

Monfort Park Irrigation Pond. The Monfort Park Irrigation Pond is a wet pond located immediately east of 22nd Street and 50th Avenue. The pond is used to irrigate soccer fields associated with Monfort Elementary School, and receives all stormwater runoff from the Highland Hills Golf Course Irrigation Pond. Due to the fact that the pond maintains a permanent pool elevation, the pond has limited value in terms of stormwater detention volume. The maximum storage volume above the permanent pool elevation prior to overtopping the embankment to the east is approximately 7.0 acre-feet. The pond outlet consists of a large concrete box structure with an overtopping weir set to the pond permanent pool elevation. Stormwater overtops the weir and is directed into a 48-inch RCP, with a maximum discharge capacity prior to overtopping the embankment of 167 cfs. Flows are routed to the east into the Monfort Park Regional Detention Pond, west of 21st Street Road and 47th Avenue. The maximum 100-year existing condition release from the irrigation pond will be approximately 142 cfs.

Monfort Park Regional Detention Pond. The Monfort Park Regional Detention Pond is a dry detention pond located immediately south of the Monfort Elementary School and west of 47th Avenue. This pond was constructed in conjunction with recommendations made from the 1997 Comp Plan. The pond receives all stormwater runoff from the Monfort Park Irrigation Pond. The pond volume is estimated to be 15.7 acre-feet with a maximum pipe outlet capacity of 92 cfs, prior to overtopping the embankment. The 36-inch RCP outlet ties into the 47th Avenue Storm Sewer, located immediately east of Monfort Elementary School along 47th Avenue. The pond was not designed with an emergency spillway; however, higher flows will overtop the embankment to the north, be routed to the northeast, and ultimately be captured by the 47th Avenue Storm Sewer. The existing condition analysis of the 100-year event estimates the maximum release from the pond to be 92 cfs.

Bittersweet Park Detention Pond. Bittersweet Park Detention Pond is a wet pond located at the northern end of Bittersweet Park, west of 35th Avenue at 13th Street. This pond serves as a regional detention facility for the southern portion of the Grapevine Basin. The maximum stormwater detention volume of the pond prior to overtopping the emergency spillway is estimated to be 151 acre-feet. A 48-inch RCP serves as the primary outlet from the pond; the outlet pipe has a capacity of 149 cfs (also referenced to the crest of the emergency spillway) and releases stormwater directly into the 35th Avenue Storm Sewer. The Bittersweet Park Detention Pond incorporates a concrete emergency spillway that releases flows onto 35th Avenue. During a 100-year storm event for existing conditions, the maximum release from the pond is estimated to be 123 cfs.

Franklin Park Detention Pond. Franklin Park Detention Pond is located northeast of the intersection of 31st Avenue and 6th Street along the secondary drainageway. This detention facility was originally designed to detain runoff from the 25-year storm. Prior to overtopping, the pond volume is estimated to be 10.8 acre-feet. The outlet from the pond consists of a 24-inch RCP with a maximum capacity of approximately 24 cfs; pond releases via the outlet pipe are conveyed to the north under 4th Street. A depressed section of the west embankment serves as the emergency spillway for the pond. Flows that overtop the emergency spillway are released onto 31st Avenue. During the existing condition 100-year storm event, the capacity of the emergency spillway will be exceeded and the north and east pond embankments overtopped. Approximately 603 cfs will be released from the Franklin Park Detention Pond during the existing condition 100-year storm event.

Northview Regional Detention Pond. The Northview Regional Detention Pond is located northeast of the Northview Subdivision and the Greeley No. 3 Ditch, near 30th Avenue and 4th Street. This pond, constructed in conjunction with recommendations made from the 1997 Comp Plan, is located along the secondary drainageway. The maximum detention volume of the pond prior to overtopping the emergency spillway is 46.4 acre-feet. A 30-inch RCP with a 12-inch

orifice plate serves as the primary pond outlet, and has a maximum discharge capacity of 12 cfs (also referenced to the crest of the emergency spillway). Stormwater flows are combined with detained releases from Subbasin 30 in the 28th Avenue Basin near C Street. An emergency spillway located at the northeastern corner of the pond allows overflows to spill toward an access street along the east side of the Northview Mini-Storage Complex. The existing condition analysis of the 100-year event estimates the maximum pond release to be 146 cfs.

3.2 Road/Ditch Crossings

There are four road crossings over the 16th Street Channel, two road crossings and one railroad crossing over the 35th Avenue Outfall Channel, one road crossing over the Northview Subdivision Bypass Channel, and one underchute on the Northview Subdivision Bypass Channel beneath the Greeley No. 3 Ditch. Descriptions of each of these channels may be found in Section 3.4. All of the crossings along each channel are culverts. The capacity of each crossing was calculated using the Federal Highway Administration's (FHWA) culvert analysis program HY-8. Table 3.1 includes a summary of the location, condition, and hydraulic capacity of each crossing structure. A brief description of each crossing is provided in the following paragraphs.

44th Avenue Court Culvert. This culvert is a 36-inch diameter RCP beneath the 16th Street Channel that crosses 44th Avenue Court alone the south side of 16th Street. The crossing incorporates a drop inlet both upstream and downstream of 44th Avenue Court; the culvert then ties into the 16th Street Storm Sewer (described in Section 3.3) downstream of 44th Avenue Court. The depth of flow in the channel at which roadway overtopping occurs is approximately 4.0 feet. The capacity of the culvert prior to overtopping the roadway was determined to be 83 cfs. The 100-year existing condition discharge in the channel at 16th Street and 44th Avenue Court is estimated to be 921 cfs.

42nd Avenue Court Culverts. This twin culvert opening is 20 feet wide and 3 feet high (double 10'W x 3'H RCBs), and is located along the 16th Street Channel at 42nd Avenue Court along the south side of 16th Street. The depth of flow in the channel at which roadway overtopping occurs is approximately 4.8 feet. The capacity of the culverts prior to overtopping the roadway was determined to be 515 cfs. The 100-year existing condition discharge in the channel at 16th Street and 42nd Avenue Court is estimated to be 921 cfs.

40th Avenue Culverts. This twin culvert crossing incorporates an opening that is 20 feet wide and 4 feet high (double 10'W x 4'H RCBs), and is located along the 16th Street Channel at 40th Avenue along the south side of 16th Street. The depth of flow in the channel at which roadway overtopping occurs is approximately 5.8 feet. The capacity of the culverts prior to

overtopping the roadway was determined to be 725 cfs. The 100-year existing condition discharge in the channel at 40th Avenue and 16th Street is approximately 1,215 cfs.

16th Street Culvert. This crossing incorporates an opening that is 12 feet wide and 6 feet high (single 12'W x 6"H RCB), and is located along the 16th Street Channel at 16th Street immediately south of Bittersweet Park. The depth of flow in the channel at which 16th Street overtops is approximately 7.8 feet. The capacity of the culvert prior to overtopping 16th Street was calculated to be 566 cfs. The 100-year existing condition discharge in the channel at 16th Street is estimated to be 1,690 cfs.

F Street Culverts. This twin culvert crossing incorporates an opening that is 14 feet wide and 5 feet high (double 7'W x 5'H RCBs), and is located on the 35th Avenue Outfall Channel at F Street. The depth of flow in the outfall channel at which road overtopping occurs is approximately 6.2 feet. The capacity of the culverts prior to overtopping the roadway was calculated to be 499 cfs. The 100-year existing condition discharge in the outfall channel at F Street is estimated to be 867 cfs.

Colorado and Southern Railroad Culverts. This triple culvert opening is 21 feet wide and 4 feet high (triple 7'W x 4'H RCBs), and is located along the 35th Avenue Outfall Channel at the Colorado and Southern Railroad. The depth of flow in the outfall channel at which overtopping of the railroad embankment occurs is approximately 7.7 feet. The capacity of the culverts prior to overtopping the railroad embankment was determined to be 772 cfs. The 100-year existing condition discharge in the outfall channel at the Colorado and Southern Railroad is estimated to be 867 cfs.

County Access Road Culverts. This twin culvert opening is 14 feet wide and 5 feet high (double 7'W x 5'H RCBs), and is located along the 35th Avenue Outfall Channel approximately 880 feet north of the Colorado and Southern Railroad crossing. The depth of flow in the channel at which roadway overtopping occurs is approximately 6.4 feet. The capacity of the culverts prior to overtopping the roadway was calculated to be 600 cfs. The 100-year existing condition discharge in the channel at the farm access road is estimated to be 785 cfs.

30th Avenue Culverts. This twin culvert crossing has two 54-inch RCPs along the Northview Subdivision Bypass Channel at 30th Avenue just north of 4th Street. The depth of flow in the bypass channel at which roadway overtopping occurs is approximately 6.5 feet. The capacity of the culverts prior to overtopping the roadway is approximately 299 cfs. The 100-year existing condition discharge in the channel at 30th Avenue is estimated to be 724 cfs.

Greeley No. 3 Ditch Underchute. This crossing incorporates an opening that is 16 feet wide and 3 feet high (single 16'W x 3'H RCB), and is located along the Northview Subdivision Bypass Channel beneath the Greeley No. 3 Ditch. The depth of flow in the channel at which overtopping of the right bank of the Greeley No. 3 Ditch would occur is approximately 11.0 feet. The capacity of the culvert prior to overtopping the Greeley No. 3 Ditch is estimated to be 780

cfs. The 100-year existing condition discharge in the channel at the Greeley No. 3 Ditch is approximately 724 cfs.

3.3 Storm Sewers

The principal storm sewers as inventoried in the 1997 Grapevine Basin Comp Plan included the following: (a) 47th Avenue Storm Sewer; (b) 16th Street Storm Sewer; (c) 35th Avenue Storm Sewer; (d) 10th Street Storm Sewer; (e) 4th Street Storm Sewer; and (f) Franklin Park Storm Sewer. Table 3.1 summarizes the location, condition, and hydraulic capacity of each storm sewer.

47th Avenue Storm Sewer. This storm sewer originates in the vicinity of Monfort Elementary School and extends north along 47th Avenue to 20th Street. Recent improvements associated with the Monfort Park Regional Detention Pond have extended the storm sewer farther south along 47th Avenue to the pond outlet. At the intersection of 47th Avenue and 20th Street, the storm sewer crosses 47th Avenue and continues east along 20th Street to 46th Avenue. With the exception of two small sections of 42-inch reinforced concrete pipe and 42-inch ductile iron pipe, the storm sewer consists of a 36-inch RCP with a maximum capacity estimated to be 73 cfs.

16th Street Storm Sewer. The intersection of 46th Avenue and 20th Street marks the beginning of the 16th Street Storm Sewer. At this point, the 42-inch ductile iron pipe (47th Avenue Storm Sewer) transitions to a 60-inch CMP that continues north along 46th Avenue to 16th Street. The maximum capacity of the 60-inch CMP in this section of storm sewer is approximately 155 cfs. At the intersection of 16th Street and 46th Avenue, stormwater runoff conveyed in the 60-inch CMP is commingled with flows collected by a 42-inch CMP adjacent to 16th Street and extending west to 47th Avenue. The 42-inch CMP has a maximum capacity estimated to be 84 cfs. From the 16th Street intersection with 46th Avenue to 40th Avenue, the 60-inch CMP continues east along the south side of 16th Street with a maximum capacity of 134 cfs; from 40th Avenue to the upstream end of 16th Street, the culvert has a maximum capacity of approximately 118 cfs. The 60-inch CMP ultimately conveys stormwater runoff to the grass-lined channel within Bittersweet Park.

35th Avenue Storm Sewer. The 35th Avenue Storm Sewer extends from 16th Street to C Street, ranging in size from an 18-inch RCP to a 68"H x 106"W HERCP. The 18-inch RCP, which increases in size to a 30-inch RCP, extends from 16th Street to the outlet pipe from the Bittersweet Park Detention Pond, and has a maximum capacity of approximately 16 cfs. Downstream of Bittersweet Park Detention Pond, the storm sewer transitions to a 48-inch RCP with a maximum capacity estimated to be 120 cfs. Between 10th Street and 8th Street, the storm

sewer is a 54-inch RCP with a maximum capacity of 165 cfs; between 8th Street and 4th Street, the storm sewer increases in size to a 60-inch RCP with a maximum capacity of 233 cfs. The storm sewer from 4th Street to the Greeley No. 3 Ditch transitions to a 66-inch RCP with a maximum capacity of 498 cfs. Downstream of the Greeley No. 3 Ditch to Village Drive, the storm sewer increases in size to a 72-inch RCP with a capacity of 483 cfs; from Village Drive to C Street, the storm sewer transitions to a 68"H x 106"W HERCP with a capacity of approximately 452 cfs. The 35th Avenue Storm Sewer terminates immediately downstream of C Street where stormwater runoff is conveyed from the HERCP to the 35th Avenue Outfall Channel.

10th Street Storm Sewer. The 10th Street Storm Sewer originates near 43rd Avenue and Ward Drive south of 10th Street, and extends eastward along 10th Street ultimately connecting with the 35th Avenue Storm Sewer. The storm sewer consists of a 15-inch RCP that increases to a 24-inch RCP, with a maximum capacity of approximately 29 cfs.

4th Street Storm Sewer. The 4th Street Storm Sewer originates near 40th Avenue and extends eastward along 4th Street, also connecting with the 35th Avenue Storm Sewer. The storm sewer ranges in diameter from an 18-inch RCP to a 54-inch RCP, with a maximum capacity of 165 cfs.

32nd Avenue Storm Sewer. The 32nd Avenue Storm Sewer crosses 10th Street at 32nd Avenue, with several laterals that route runoff from the south to this intersection. The storm sewer extends to the north between two storage buildings and daylights into the Franklin Middle School Channel (described in Section 3.4). The storm sewer is a 36-inch RCP as it crosses 10th Street and has a maximum capacity of approximately 66 cfs.

Franklin Park Storm Sewer. This storm sewer consists of a 48-inch RCP located along the secondary drainageway immediately south of Franklin Park, with the inlet at the upstream face of 30th Avenue Place. The storm sewer receives flow from the Franklin Middle School Channel. The maximum capacity of the storm sewer is estimated to be 170 cfs.

3.4 Open Channels

Three open channels are found in the Grapevine Basin as inventoried for the 1997 Comp Plan; one additional channel has been constructed since the completion of that plan. A description of each is presented below. In addition, the location, condition, and hydraulic capacity of each channel are summarized in Table 3.1.

16th Street Channel. This channel is located along the south side of 16th Street and extends from 46th Avenue to Bittersweet Park. Near 46th Avenue, the channel has a trapezoidal shape with an 8-foot bottom width, average depth of 1.8 feet, sideslopes of 7H:1V and an

average longitudinal slope of 1.4 percent. In the vicinity of Bittersweet Park, the channel transitions to a 20-foot bottom width, average depth of 4.2 feet, sideslopes of 4H:1V, and a longitudinal slope of 1.5 percent. The bankfull capacity of the 16th Street Channel ranges from approximately 170 cfs near 46th Avenue to 1,500 cfs in the vicinity of Bittersweet Park.

35th Avenue Outfall Channel. Stormwater runoff captured along the major drainageway and conveyed by the 35th Avenue Storm Sewer is ultimately released into the 35th Avenue Outfall Channel. This channel originates immediately downstream of C Street and extends northward to the Cache La Poudre River. The typical configuration of the outfall channel includes a bottom width of 15 feet, sideslopes ranging from 1H:1V to 2H:1V, and an average depth of 5.4 feet. The channel slope varies from 0.2 percent in the reach from C Street to F Street to 0.12 percent from F Street to the river. The bankfull capacity of the outfall channel ranges from 470 cfs upstream (south) of F Street to approximately 300 cfs downstream (north) of F Street.

Franklin Middle School Channel. This channel is located along the secondary drainageway immediately east of Franklin Middle School. The channel is trapezoidal in shape with an average bottom width of 9 feet, sideslopes between 1H:1V and 2H:1V, average depth of 2.3 feet, and a longitudinal slope of 1.8 percent. The bankfull capacity of the Franklin Middle School Channel was estimated to be 147 cfs.

Northview Subdivision Bypass Channel. This channel was built in conjunction with the Northview Subdivision, located at the northeast corner of 35th Avenue and 4th Street. The channel is located along the secondary drainageway, immediately east of 30th Avenue and extending north from 4th Street to the Greeley No. 3 Ditch, where flows are directed beneath the ditch via the Greeley No. 3 Ditch Underchute. The channel is trapezoidal in shape with a bottom width of approximately 15 feet, average depth of 5.8 feet, side slopes of 3H:1V, and a longitudinal slope of 0.5 percent. The bankfull capacity of the Northview Subdivision Bypass Channel is estimated to be 1,360 cfs.

3.5 Overflow Weirs

One overflow (side channel) weir is found in the Grapevine Basin; it has been constructed along the left bank of the Greeley No. 3 Ditch as recommended from the 1997 Comp Plan. A description is provided below. In addition, the location, condition, and hydraulic capacity of the overflow weir is summarized in Table 3.1.

Northview Side Channel Weir. This overflow weir was constructed in conjunction with the Northview Regional Detention Pond improvements. It is located along the left bank of the Greeley No. 3 Ditch directly above the Greeley No. 3 Ditch Underchute Culvert. The weir is

intended to spill excess stormwater flows from the ditch along the left bank into the Northview Regional Detention Pond. An in-line ditch control structure located immediately downstream of the weir forces excess flow over the weir and into the pond. The weir is trapezoidal in shape with a width of approximately 60 feet, average available depth of 2.0 feet, side slopes of 20H:1V, and a downstream slope of 3H:1V. The maximum capacity of the weir is approximately 753 cfs.

IV. HYDROLOGIC ANALYSES AND MODELING

4.1 Formulation of the Hydrologic Model

The primary objectives of the current hydrologic analyses and modeling efforts were to: (a) update the hydrologic model for the Grapevine Basin to include development and drainage improvements that have been implemented since the completion of the 1997 Comp Plan; and (b) revise peak discharge and hydrograph data from the 1997 Comp Plan at various locations throughout the Grapevine Basin. This information, combined with the capacity of the existing drainage facilities, provides insight to existing and future flooding problems, allows comparison with discharges estimated as part of the 1997 Comp Plan, and assists in the identification of potential revisions to previously proposed improvements. Hydrologic analyses were conducted for the 2-, 5-, 10-, 50-, and 100-year return periods, as well as the simulation of three modeling scenarios: (a) Existing Condition – existing development with existing facilities; (b) Future Condition – future development with existing facilities; and (c) Proposed Condition – future development with proposed improvements.

4.1.1 Model Description

The modeling approach chosen to simulate the runoff generated within and routed through the Grapevine Basin was similar to that used by the 1997 Comp Plan. This approach involves the application of two computer models: the Colorado Urban Hydrograph Procedure (CUHP) and the EPA Stormwater Management Model (SWMM). The CUHP model is a hydrologic simulation program developed in 1982 (updated in May 2002) for the Urban Drainage and Flood Control District (UDFCD); it is used to generate storm runoff hydrographs for basin subcatchments. The program requires input of physical subbasin parameters such as area, slope, percent of impervious surface, etc., as well as the 1-hour depth for the design storm associated with each return period, from which a 2-hour design storm distribution is computed for each storm event. The methodology used in developing the design storm is outlined in the Urban Storm Drainage Criteria Manual (USDCM, Volume I, 1978, updated 2001) and in the Storm Drainage Design Criteria (SDDC) and Construction Specifications Manual (City of Greeley, Colorado, Volume II, May 2002). Storm hydrographs were generated by the CUHP model for the 2-, 5-, 10-, 50-, and 100-year return periods; these hydrographs were in turn entered into the transport block of the EPA SWMM model. A description of the program written to convert the CUHP hydrographs into EPA SWMM inflow hydrographs as well as a copy of the

program itself is provided in Section 3.4 of the Project Notebook. Documentation describing the CUHP input parameters is provided in Section 2.2 of the Project Notebook.

The EPA SWMM model, originally developed in 1969 (updated in June 2003) by the Environmental Protection Agency, is a hydrologic model consisting of four computational blocks: the runoff block, transport block, extended transport block, and storage/treatment block. Each block can be used to route both stormwater flows and pollutants through a drainage basin to evaluate both quantity and quality issues. For purposes of this study, hydrologic analyses and modeling for the Grapevine Basin utilized the storm water quantity aspects of the transport block to develop routed flood hydrographs at various locations throughout the basin. The hydrographs generated from CUHP were routed through the drainage network simulated by the EPA SWMM model transport block, which in turn depicts the actual network of storm sewers, detention ponds, and open channels existing within the basin. Documentation describing the EPA SWMM input parameters are provided in Section 3.5 of the Project Notebook.

4.1.2 Network Development

The stormflow routing network incorporated into the EPA SWMM transport block is a numerical model of the basin drainage network, representing each of the drainage subbasins and facilities along the major drainageway. The first step in forming the network was to conceptualize and develop a schematic linking the drainage subbasins to the drainage facilities along the major drainageway. Identification of each drainage facility is based on information compiled from the following: (a) previous field reconnaissance and surveying efforts; (b) design and as-built plan sets; and (c) drainage reports from previously built or recently approved developments implemented since the 1997 Comp Plan. EPA SWMM refers to facilities incorporated into the modeling network as: conveyance elements (conduits and open channels), subcatchments (or subbasins), storage units (detention ponds, or features that provide significant flow attenuation), flow dividers (diversions), and manholes (nodes or design points). Subbasin delineations were accomplished through the use of the City's 2-foot contour topographic mapping and from drainage reports obtained from the City of Greeley (identified in Section 3.2 of the Project Notebook). Drainage network schematics were developed for the three identified scenarios: (a) Existing Condition; (b) Future Condition; and (c) Proposed Condition.

A numbering scheme was developed for integration into the modeling network to facilitate identification of each type of drainage element; this numbering convention is presented below.

1 – 99	Subbasin runoff hydrographs (from CUHP) and inflow hydrographs (from HEC-RAS unsteady flow analyses)
200 – 299	Conveyance elements (storm sewers and open channels)
300 – 399	Existing detention facilities
400 – 499	Nodes (flow combination or design points)
500 – 599	Overflow conveyance elements (used in conjunction with capacity-limited storm sewer conveyance elements; typically streets or swales)
600 – 699	Flow diversions (typically used to separate surface and sub-surface flows)
700 – 799	Nodes (used in conjunction with flow diversions)
800 – 899	Future/Proposed detention facilities
900 – 999	Nodes (collection points at the Greeley No. 3 Ditch; used to create a hydrologic disconnect at the ditch due to HEC-RAS unsteady flow analyses)

It should be noted that the numbering scheme for existing detention facilities (300 – 399) releasing flows from fully-developed sites did not change when the Future or Proposed Conditions models were created; however, if a pond existed in the Existing Condition model and was reconfigured to a different release rate or did not exist in the Existing Condition model, a new numbering scheme (800 – 899) was utilized. This was applied to Pond 301 (which became Pond 801 in the Proposed Condition model due to a modified release rate), Pond 321 (which became Pond 821 in the Proposed Condition model due to a modified release rate), Pond 325 (which became Pond 825 in the Future and Proposed Condition models, due to a reduced release rate), Pond 331 (which became Pond 831 in the Proposed Condition model due to a modified release rate), Pond 332 (which became Pond 832 in the Proposed Condition model due to a modified release rate), and Ponds 806, 824, 828, 833, 834, and 835 (which did not exist in the Existing Condition model).

4.2 Rainfall Design Storms

The rainfall design storms used in the hydrologic analysis of the Grapevine Basin were prepared as part of the 1997 Comp Plan, based on information presented in the Precipitation

Frequency Atlas of the Western United States, NOAA Atlas 2, Volume III, Colorado (1973). The one-hour rainfall values for the City of Greeley were obtained from the NOAA Atlas and used to develop a two-hour design storm. The two-hour storms developed for each return period are presented in the SDDC Manual. Further documentation and details regarding the development of the design storms can also be found in the SDDC Manual and in Section 2.2 of the Project Notebook.

4.3 Hydrologic Subbasin Modeling Parameters

Hydrologic modeling of the Grapevine Basin involved the determination of several hydrologic parameters associated with each subbasin. These parameters are summarized in the following paragraphs.

4.3.1 Subbasin Delineation and Basin Characteristics

The Grapevine Basin was subdivided into smaller subbasins, ranging in size from approximately 9 acres to nearly 286 acres. The need for relatively detailed hydrologic information at specific points within the basin resulted in this wide range of subbasin drainage areas. The subbasins delineated for the 1997 Comp Plan were largely retained in areas where significant development had already occurred; this includes the majority of the area south of the Greeley No. 3 Ditch. Subbasin delineation was based on several considerations, including the location of drainage facilities, road crossings, and potential flooding problems; however, the main reason for further subdivision of the basin (five new subbasins were added since the 1997 Comp Plan) was due to development that has occurred over the past eight years in the basin since the completion of the 1997 Comp Plan.

The subbasin delineation for the Grapevine Basin is presented on Sheet A-1, provided in Appendix A of this report. The hydrologic model representation of the system of subbasins and conveyance elements is shown on Sheets A-2, A-3 and A-4; these are the schematic diagrams for the three hydrologic scenarios analyzed for this study. It is noted that the subbasin delineations are identical for all three scenarios. The 2-foot topographic mapping developed as part of the 1997 Comp Plan for the Grapevine Basin was used to determine geometric subbasin characteristics and hydrologic parameters. These parameters included subbasin area, basin length (distance from downstream design point along the flow path to the high point in the subbasin), distance to basin centroid, and basin slope.

4.3.2 Land Use

Land use in the Grapevine Basin has not changed significantly from that documented in the 1997 Comp Plan, due to over 80 percent of the basin south of the Greeley No. 3 Ditch already having been developed at the time of that study. The majority of land use in the Grapevine Basin consists of single- and multi-family residential developments, commercial development located along West 10th Street, and Highland Hills Golf Course southwest of 20th Street and 47th Avenue.

GIS mapping, consisting of numerous data layers, was provided by the City of Greeley for use during the current study. In part, this mapping displays existing development as well as miscellaneous pavement and road information. Additional developments and drainage improvements (including those approved for construction or already constructed as of November 30, 2001) were also provided by the City of Greeley. In addition, the City provided land use zoning mapping (as of October 2003), with designation classes indicating the type of land use within the basin. A land use map of the Grapevine Basin is provided on Sheet C-1, in Appendix C of this report.

Using a combination of the GIS data, zoning information, and development information, impervious percentages were calculated for both Existing and Future Conditions by: (a) assessing the GIS information within each subbasin; (b) assigning a zoning class most closely matching the land use; and (c) matching the zoning classes to land use and percent impervious values published in the USDCM (1978, Volume II, updated 2001). It should be noted that after investigation of percent impervious values for the Downtown and North Greeley Basin Comp Plan update (Anderson Consulting Engineers, Inc., January 2005), it was determined that impervious percentages from the original USDCM (not the updated 2001 values) were more representative of land use conditions in the Greeley area. The updated values were found to be conservatively high for the City of Greeley; therefore, the original values were retained. Backup documentation for the calculation of existing and future percent impervious values is provided in Section 2.1 of the Project Notebook.

4.3.3 Soils, Infiltration, and Depression Storage

Soils information for the Grapevine Basin was obtained from GIS data provided by the City of Greeley; these data were based on the Soil Survey of Weld County, Southern Part, Colorado (1980), published by the Soil Conservation Service. The soil types specified in the associated GIS attribute tables include soil codes and names. This information was correlated to the Soil Survey of Weld County, where each soil code/name is classified into the four hydrologic

soil groups. The four groups classify the soils according to infiltration rates, ranging from Type A representing well-drained soils to Type D representing poorly-drained soils. The soil types represented within the Grapevine Basin are predominantly classified as relatively well-drained soils in the Type B hydrologic soils group. Soils mapping pertinent to the Grapevine Basin is provided on Sheet C-2, in Appendix C of this report. It is noted that in the 1997 Comp Plan, one area of soils near the north end of the basin and a small area in the central portion of the basin were assumed to be part of hydrologic soils group A, when the actual classification is hydrologic soils group D; this situation was corrected in the current study.

The UDFCD analyzed rainfall/runoff data for each of the hydrologic soil groups and established recommended values for infiltration rates and decay coefficients for use with CUHP. The infiltration parameters recommended for each of the soil groups are summarized in Table 4.1. For subbasins containing more than one soil group classification, the coverage of each soil group was determined, measured, and an area-weighted average calculated.

Table 4.1 Infiltration Parameters for SCS Hydrologic Soil Groups.

SCS Hydrologic Soil Group	Infiltration (in/hr)		Horton's Decay Coefficient
	Initial	Final	
A	5.0	1.0	0.0007
B	4.5	0.6	0.0018
C	3.0	0.5	0.0018
D	3.0	0.5	0.0018

Surface depression storage losses and abstractions (rainfall intercepted by trees, bushes, and other vegetation) play an important role in the hydrologic cycle and the determination of rainfall available for runoff. The CUHP method requires estimation of these losses for both impervious and pervious areas to facilitate the calculation of the effective rainfall for each storm event. Values for surface depression storage and interception losses were selected in accordance with the values presented in the USDCM. Backup documentation related to the soil infiltration parameters and depression storage losses is provided in Section 2.1 of the Project Notebook.

4.3.4 Time of Concentration

The subbasin time of concentration represents the final hydrologic parameter needed to complete the CUHP model. The procedure for determining the time of concentration is outlined in the USDCM. Depending on subbasin area, this parameter is only required for subbasins less than 90 acres. Specifying the time of concentration for these smaller, urbanized subbasins allows

the hydrograph peaks to be computed and displayed in the output using both the CUHP method and the Rational Formula for comparison purposes only; however, the default subbasin peak discharge calculation uses the CUHP method. Documentation related to the calculation of subbasin time of concentration values may be found in the Project Notebook in Section 2.1.

4.4 Conveyance Modeling Parameters

Several hydraulic modeling parameters are required by the EPA SWMM model to simulate the routing of storm flows through storm sewers, open channels, and street sections. The parameters required by the model to simulate the routing of stormwater through storm sewers are listed below:

1. Pipe diameter or maximum allowable depth prior to surcharging
2. Pipe length
3. Invert slope
4. Manning's *n*
5. Number of modeled elements

For the modeling of open channels and street sections, the hydraulic parameters required by the EPA SWMM model are as follows:

1. Maximum allowable channel depth prior to surcharging
2. Bottom width of channel or channel cross section bank width
3. Channel side slopes (x H:1V)
4. Invert slope
5. Channel length
6. Manning's *n*
7. Number of modeled elements

A summary of all conveyance element parameters defined in the hydrologic models is provided in Section 3.1 of the Project Notebook.

4.5 Special Modeling Features

In addition to the basic channel routing functions incorporated in the hydrologic model for the Grapevine Basin, special modeling functions were required in order to simulate complicated drainage situations in specific areas of the basin. The EPA SWMM model includes the capability to simulate detention storage facilities, flow diversions, imported flows to a basin (also referred to as inflow hydrographs), and exported flows out of a basin. For the Grapevine Basin modeling efforts, all of the above features were utilized.

4.5.1 Detention Storage

The detention facilities simulated in the hydrologic models and evaluated in conjunction with this Comp Plan update included the following: (a) the utilization of individual detention ponds, or multiple on-site ponds represented as a single pond, associated with commercial or residential development, totaling four for the entire Grapevine Basin; and (b) the use of six existing on-line regional detention ponds, with four located on the major drainageway and two located on the secondary drainageway. Detailed information concerning one of the individual ponds and the six regional ponds is provided in Section 3.1 of this report. As seen in the 1997 Comp Plan, due to the relatively large number of drainage facilities specifically located within Subbasin 16 (south of 10th Street, generally along 43rd Avenue), detention ponds linked to commercial and residential development were recognized as draining to the same location, and therefore combined to reduce the total number of modeled elements. Detention facilities simulated in the hydrologic models were generally limited to those facilities that were effective in reducing peak runoff rates associated with, at a minimum, the 2-year storm event; extremely small, isolated detention ponds were generally not included in the overall basin hydrologic modeling efforts.

Storage-discharge relationships were derived for each of the four development-based detention ponds included in the hydrologic models, with two ponds retained from the Existing Condition model prepared for the 1997 Comp Plan. The remaining two ponds constructed after 1997 were defined based on the associated design drawings for each pond. All drainage-related development information was obtained from the City of Greeley. In each case, storage values that define the volume of stormwater detained in each pond were defined by manual iteration using the EPA SWMM model in order to accommodate either the combining of storage volumes from more than one pond, differences in hydrologic modeling techniques between the drainage studies and this Comp Plan analysis, or both. Discharge rates for the pond rating curves were set based on maximum release rates defined in the associated drainage reports. Three of the six on-

line detention ponds were largely retained in their entirety from the 1997 Comp Plan, with changes made to one of the facilities due to new design information; the remaining three ponds were constructed since the completion of the previous Comp Plan.

Each of the ten detention ponds in the EPA SWMM model was delineated in such a way so as to fall into one of the three following release rate categories: (a) a single detention pond serving an entire subbasin as designated in the accompanying drainage report or design plan set; (b) two or more detention ponds consolidated into one pond, serving an entire subbasin, as designated by their respective drainage reports; or (c) a single detention pond serving an entire subbasin, with tributary off-site flows from within the subbasin included in the overall subbasin release rate.

The ten detention facilities considered to be effective for more than just the most frequently occurring storms were incorporated into the hydrologic model based on the storage-discharge relationship developed for each detention pond. The hydrologic model utilized these pond characteristics to evaluate the ponds' response to a range of storm events, including determination of the maximum volume of stormwater detained in each pond and the corresponding peak discharge released from each pond for the subject storm events. Documentation of the storage-discharge rating curves developed for each of the four development-based ponds as well as the six on-line regional detention ponds is included in Section 3.2 of the Project Notebook.

4.5.2 Diversions

Diversions, referred to as flow dividers by the EPA SWMM model, were used in the hydrologic model to accommodate the following four split flow conditions: (1) a pipe with an overflow channel (i.e., when a pipe reaches its full flow capacity, the remaining flows in excess of this amount are diverted to a surface conveyance element); (2) a major drainage basin transfer (see Section 4.5.4 on Exported Flows from the Basin); (3) a capacity-limited surface conveyance element (i.e., when a surface conveyance element reaches its full flow capacity, the remaining flows in excess of this amount are diverted to another surface conveyance element or diversion); and (4) a detention pond with an outlet pipe and an emergency spillway (i.e., when the outlet pipe reaches its full flow capacity, the remaining flows in excess of this amount are diverted over the emergency spillway or spill over the pond embankment).

For the first split flow condition, the maximum capacity of the pipe prior to diversion is required as input to the model. Flows are routed through the main conveyance element until its capacity is exceeded. Once exceeded, the excess flows are diverted to an overflow channel designated in the flow divider configuration. The storm sewer capacity must be calculated and

input into the flow divider table. In order to more accurately define flow diversions in the Existing Condition hydrologic models, particularly for frequently occurring storms, nine pipe with overflow channel diversions, most of which are located along the major drainageway, were included in the hydrologic models.

The second split flow condition will be described in Section 4.5.4. It is based upon a portion of subbasin runoff entering the Grapevine Basin from the Country Club Basin via the Grapevine Ditch, which traverses both basins. This accounts for one flow diversion within the Grapevine Basin.

For the third split flow condition, similar to the first split flow condition, the maximum capacity of the surface conveyance element (i.e., typically a street cross section) prior to diversion is required as input to the model. Flows are routed through the surface conveyance element until its capacity is exceeded. Once exceeded, the excess flows are diverted to either another surface conveyance element or to a separate flow diversion, as designated in the flow divider configuration. The surface conveyance element capacity must be calculated and input into the flow divider table. In order to more accurately define flow diversions in the Existing Condition hydrologic models, particularly for frequently occurring storms, two surface conveyance element diversions were included in the hydrologic models.

The fourth and final split flow condition represents the Monfort Park Regional Detention Pond and the Stoneybrook Subdivision Detention Pond. Flows are routed through both ponds and released based on the associated storage-discharge curve. For the Monfort Park Regional Detention Pond, once the maximum capacity of the outlet pipe is exceeded, the remaining flows are diverted over the embankment to the north. For the Stoneybrook Subdivision Detention Pond, outlet flows are released through an orifice plate into the 35th Avenue Outfall Channel until the maximum capacity of the orifice plate is exceeded. The remaining flows are diverted over the emergency spillway into Subbasin 7 to the north. The maximum capacity of the outlet pipe and orifice plate were considered as input into the flow divider table for each respective diversion. These account for the final two flow diversions within the Grapevine Basin. Backup information concerning these diversions is provided in Section 3.3 of the Project Notebook.

4.5.3 Imported Flows to the Basin/Inflow Hydrographs

The Grapevine Basin has incorporated a significant number of improvements since completion of the 1997 Comp Plan. One of those improvements included the construction of the Northview Regional Detention Pond (previously discussed in Section 3.1). The pond was originally designed in the 1997 Comp Plan to attenuate 100-year flows along the secondary drainageway (proposed to pass over the ditch) and route them at a significantly lowered discharge back to the 35th Avenue Outfall Channel. The pond was modified from the 1997

Comp Plan by construction of an underchute in order to route the secondary drainageway flows beneath the ditch. The pond design, in addition to the underchute, also incorporated the proposed side channel weir along the left bank of the ditch (discussed in Section 3.5). The weir is intended to spill excess stormwater from the ditch into the pond. The outfall for the pond conveys releases to the Greeley No. 3 Ditch Wasteway Channel, rather than the 35th Avenue Outfall Channel, as previously planned.

The Northview Detention Pond was simulated as part of the Grapevine Basin hydrologic model, which combines the secondary drainageway flows and the Greeley No. 3 Ditch spills over the weir and routes them into the pond. The ditch spill was input as an inflow hydrograph (No. 36) into the hydrologic model. The pond outflow hydrograph was input as an inflow hydrograph into the 28th Avenue Basin hydrologic model. The commingled flows were then directed to the east (immediately north of C Street) under the Colorado and Southern Railroad, where they were combined with flows from the Greeley No. 3 Ditch Wasteway Channel.

In addition to the Greeley No. 3 Ditch spill inflow hydrograph, the model simulated a second inflow hydrograph (No. 37), the result of spills from the Greeley No. 3 Ditch west of 35th Avenue. The hydrologic model was disconnected at the ditch and separated into upper and lower basins, incorporating both inflow hydrographs into the lower portion of the basin. Runoff hydrographs from the hydrologic model representing the upper basin were incorporated into the hydraulic model of the ditch as inflow hydrographs. The hydraulic (HEC-RAS) model for the ditch was executed in the unsteady flow mode using inflow hydrographs from all five basins for all return periods and scenarios analyzed for this study. Included in this model were lateral weirs that were defined along the entire left (downslope) bank of the canal, including the Northview Side Channel Weir.

Lateral spill hydrographs from the weirs were defined based on the unsteady flow analyses. Due to the proximity of the spills (specifically Inflow Hydrograph No. 37) in relation to one another and local topography that generally slopes toward C Street and 35th Avenue, the hydrographs were incorporated into the hydrologic model as a single inflow hydrograph along the downslope side of the ditch. Documentation summarizing both inflow and outflow hydrographs as well as all unsteady hydraulic modeling of the Greeley No. 3 Ditch may be found in the "City of Greeley, Comprehensive Drainage Plan, Greeley No. 3 Ditch Final Summary Hydraulics Report," Anderson Consulting Engineers, Inc., March 2006.

4.5.4 Exported Flows from the Basin

Near the southern tip of the Country Club Basin, on the Aims Community College Campus, a channel adjacent to one of the east-west campus access roads conveys stormwater flows across the basin boundary into the Grapevine Basin. Hydraulic analyses of the channel indicate that its capacity is approximately 18 cfs. The flows that exceed the capacity of the side

channel overtop the crown of the road and continue north along the major drainageway within the Country Club Basin. Therefore, a maximum of 18 cfs is diverted to the Grapevine Basin. In the EPA SWMM model, a flow divider function is used in the drainage network to simulate this diversion. To simplify the procedures for modeling the diversion hydrograph from the Country Club Basin, the drainage area is modeled as part of the Grapevine Basin (Subbasin No. 3). A maximum of 18 cfs is allowed to enter the Grapevine Basin into Subbasin No. 6, while the flow in excess of 18 cfs is exported to the Country Club Basin utilizing the diversion function.

4.6 Hydraulic Modeling of the Greeley No. 3 Ditch

The determination of ditch spills was seen as an important part of the overall hydrologic modeling not only for the Grapevine Basin, but also for the 28th Avenue and Country Club Basins. At the request of the City of Greeley, the hydraulic (HEC-2) model for the Greeley No. 3 Ditch that was prepared for the 1997 Comp Plan was converted to HEC-RAS Version 3.1.2. The reach beginning at the downstream terminus of the original model (east of 1st Avenue) and continuing upstream nearly to the Clarkson Spill Structure (west of 23rd Avenue) was recently converted for the Downtown and North Greeley Basin HEC-RAS analyses (Anderson Consulting Engineers, Inc., January 2005). The remainder of the ditch (from the Clarkson Spill Structure up to the headgate at the Cache la Poudre River) was converted to HEC-RAS for analyses related to the Country Club, Grapevine, and 28th Avenue Basins; these two reaches were then connected, producing a single hydraulic model for the entire ditch. For purposes of analyses related to all three basins, it was assumed that only normal irrigation flows (70 cfs) would enter the Greeley No. 3 Ditch from the Poudre River.

Modeling parameters for bridges and culverts were modified to accommodate improved modeling techniques available in HEC-RAS; however, these modifications were based on geometric information gathered for the 1997 Comp Plan. The ditch was not resurveyed as part of the current study; consequently, inherent in this analysis is the assumption that the previously defined cross sectional data for the ditch provides a reasonably accurate hydraulic representation of existing conditions. The exception to the use of previously defined geometric ditch data is the incorporation of the left (downslope) ditch bank spill structures constructed since completion of the 1997 Comp Plan. Ditch bank data were modified in the hydraulic model based on design drawings/modifications of four spill structures.

Lateral weirs were defined along the entire length of the left (downslope) bank through the basin; these weirs include the controlled spill structures. Where bank improvements have not been implemented, lateral weirs were defined based on top of left bank elevations provided in the original HEC-2 model.

Uniform lateral inflow hydrographs and point inflow hydrographs, for all storm events and scenarios analyzed for this study, were defined as boundary conditions for the ditch based on the results of the hydrologic modeling of the upper portions of the five major basins contributing flow to the ditch.

The unsteady flow analyses were conducted and the resulting spill hydrographs defined and incorporated into the hydrologic models for the lower portion of the basin as inflow hydrographs at the appropriate locations along the downslope side of the ditch. It is noted that the unsteady flow analyses were conducted, and inflow hydrographs to the basin due to ditch spills determined, for the Existing and Proposed Conditions only. The Future Condition described in Section 4.8 simply represents an intermediate step between Existing and Proposed Conditions. Consequently, in order to simplify the modeling associated with this study, the Existing Condition inflow hydrographs to the basin north of the Greeley No. 3 Ditch (corresponding to spills from the ditch) were also used in the Future Condition hydrologic model.

4.7 Summary of the Existing Condition Hydrologic Analyses

4.7.1 Definition of the Existing Condition Scenario

The definition of the Existing Condition scenario includes all development that presently exists or was approved for construction prior to November 30, 2001. All basin development after this date is considered under the Future and Proposed Condition analyses. Table 4.2 presents a summary of all subbasin hydrologic modeling parameters developed for the Existing Condition analyses. All hydrologic subbasin parameters, conveyance parameters, and special modeling features associated with the Existing Condition scenario are defined in Sections 4.3, 4.4, and 4.5, respectively, of this report. CUHP input files for each return period are provided in Section 2.2 of the Project Notebook; EPA SWMM input files for the 10- and 100-year return periods are included in Section 3.5 of the Project Notebook.

4.7.2 Storm Drainage Criteria

The drainage criteria prepared as part of the 1997 Comp Plan were utilized to identify potential problems along the major and secondary drainageways. In general, violations related to the criteria were specifically noted where road crossings were exceeded by maximum allowable overtopping depths, or ponded water surface elevations within detention facilities overtopped pond embankments during specified storm events. A summary of existing drainage problems within the basin is provided in Section 4.7.4 of this report.

Table 4.2 Hydrologic Subbasin Parameters for the Existing Condition.

Subbasin No.	Basin Area (acres)	Basin Length (ft)	Distance to Basin Centroid (ft)	Average Basin Slope (ft/ft)	Time of Conc. (minutes)	Percent Imperv. (%)	Depression Storage (inches)		Infiltration Rates (in/hr)		Horton's Decay Rate
							Pervious	Imperv.	Initial	Final	
1	62.6	2500	1000	0.014	24.0	24.5	0.40	0.10	4.5	0.6	0.0017
2	143.1	2500	1500	0.024	N/A	22.7	0.40	0.10	4.4	0.6	0.0018
3	25.7	1500	600	0.012	18.0	45.6	0.40	0.10	4.5	0.6	0.0018
4	71.9	2300	900	0.019	23.0	24.9	0.40	0.10	4.5	0.6	0.0018
5	61.2	2200	600	0.016	22.0	54.5	0.40	0.10	4.5	0.6	0.0018
6	81.8	2600	1300	0.024	24.0	10.2	0.40	0.10	4.5	0.6	0.0018
7	50.2	2100	1100	0.015	22.0	57.2	0.40	0.10	4.5	0.6	0.0018
8	112.6	3000	1500	0.018	N/A	37.0	0.40	0.10	4.5	0.6	0.0017
9	57.3	2700	1800	0.022	25.0	20.7	0.40	0.10	4.5	0.6	0.0018
10	97.6	3000	1400	0.015	N/A	37.2	0.40	0.10	4.5	0.6	0.0018
11	44.2	1800	1200	0.028	20.0	37.0	0.40	0.10	4.4	0.6	0.0018
12	34.9	1600	700	0.031	19.0	28.3	0.40	0.10	4.5	0.6	0.0018
13	42.8	1800	900	0.033	20.0	40.0	0.40	0.10	4.5	0.6	0.0017
14	49.3	2000	1000	0.028	21.0	17.8	0.40	0.10	4.5	0.6	0.0018
15	33.7	1800	1000	0.025	20.0	40.2	0.40	0.10	4.5	0.6	0.0018
16	78.4	3000	1400	0.021	27.0	43.9	0.40	0.10	4.5	0.6	0.0018
17	46.7	2400	1000	0.025	23.0	37.0	0.40	0.10	4.5	0.6	0.0018
18	51.4	3000	1000	0.021	27.0	70.0	0.40	0.10	4.5	0.6	0.0018
19	57.4	1800	800	0.012	20.0	47.5	0.40	0.10	4.5	0.6	0.0018
20	185.6	4200	2100	0.014	N/A	45.3	0.40	0.10	4.5	0.6	0.0018
21	100.6	2600	1400	0.017	N/A	58.3	0.40	0.10	4.5	0.6	0.0018
22	41.3	1800	700	0.022	20.0	41.5	0.40	0.10	4.5	0.6	0.0018
23	45.6	2300	1200	0.017	23.0	13.0	0.40	0.10	4.5	0.6	0.0017
24	43.7	2700	900	0.019	25.0	7.7	0.40	0.10	4.6	0.7	0.0015
25	50.4	1900	1000	0.021	21.0	35.5	0.40	0.10	4.5	0.6	0.0018
26	42.2	2500	1200	0.006	24.0	47.0	0.40	0.10	4.5	0.6	0.0018
27	81.1	2900	1100	0.009	26.0	43.3	0.40	0.10	3.4	0.5	0.0018
28	14.5	1300	600	0.005	17.0	2.0	0.40	0.10	3.0	0.5	0.0018
29	49.9	900	400	0.010	15.0	7.9	0.40	0.10	3.0	0.5	0.0018
30	285.8	3000	1500	0.010	N/A	29.8	0.40	0.10	3.2	0.5	0.0018
31	15.3	1200	300	0.021	17.0	32.3	0.40	0.10	4.5	0.6	0.0018
32	9.3	1300	600	0.011	17.0	2.0	0.40	0.10	4.5	0.6	0.0018
33	23.9	1400	700	0.010	18.0	2.0	0.40	0.10	4.3	0.6	0.0018
34	24.5	1500	500	0.005	18.0	2.0	0.40	0.10	3.2	0.5	0.0018
35	39.5	2100	900	0.025	22.0	7.7	0.40	0.10	4.5	0.6	0.0018

4.7.3 Hydrologic Modeling Results for the Existing Condition

Based on the Existing Condition analyses of the Grapevine Basin, several facilities, structures or streets lack the capacity to safely convey flows arising from the 100-year design storm and, consequently, create potential flooding problems within the basin. The basin map and a schematic diagram of the hydrologic model representing the drainage network for the Existing Condition is provided on Sheet A-2 in Appendix A of this report. A summary of peak discharges resulting from the hydrologic modeling effort is provided in Table 4.3 for selected locations within the basin. A graphical representation of the discharge profiles along the major drainageway is also provided in Figure 4.1. Flood hydrographs at selected locations throughout the basin are presented in Appendix D of this report. Summary output from the EPA SWMM models of the Existing Condition analyses are also provided in Appendix D and in Section 3.6 of the Project Notebook. A description of the program written to summarize the EPA SWMM output as well as a copy of the program itself is provided in Section 3.4. All input and output files for both CUHP and EPA SWMM are provided electronically in Section 7 of the Project Notebook.

4.7.4 Summary of Existing Drainage Problems

Specific problem areas identified during the hydrologic modeling efforts associated with the 1997 Comp Plan were re-evaluated as part of the current study in order to re-define the magnitude of the flooding problems. Many flooding problems associated with existing facilities located along the major and secondary drainageways can be directly attributable to: (a) revisions in the rainfall- intensity-duration curves that were completed in conjunction with changes to the drainage criteria manual associated with the 1997 Comp Plan; and (b) previous facility design standards that are not compatible with current design standards (e.g., the Franklin Park Detention Pond was originally designed to detain runoff from a 25-year storm event, rather than for a 100-year event). A brief summary of the major problem areas noted during the 1997 Comp Plan and the current study is presented in the following paragraphs. This summary is generally limited to those locations along the major and secondary drainageways.

Highland Park West Pond. The existing outlet facilities for the Highland Park West Pond are not adequate to safely release stormwater runoff for events greater than a 10-year event. The outlet facilities consist of a single 15-inch CMP with a maximum discharge capacity of 5 cfs prior to overtopping the pond embankment. No emergency spillway or outfall channel presently exists. Stormwater that overtops the pond embankment is conveyed to the east and potentially inundates several residences along 52nd Avenue Court. The maximum discharge from the pond during the 100-year storm event is estimated to be 109 cfs.

Table 4.3 Summary of Selected Peak Discharges for the Existing Condition Scenario.

Location	EPA SWMM Element	Drainage Area (acres)	Distance above the Confluence with the Poudre River (1,000 feet)	Peak Discharge (cfs)				
				2-yr	5-yr	10-yr	50-yr	100-yr
Inflow to Highland Park West Pond	1	63	25.2	20	49	70	152	182
Outflow from Highland Park West Pond	301	63	25.0	1	4	5	71	109
Inflow to Highland Hills Golf Course Irrigation Pond	402	206	24.3	41	109	150	332	396
Outflow from Highland Hills Golf Course Irrigation Pond	302	206	22.9	0	0	24	145	161
Inflow to Monfort Park Irrigation Pond	204	206	22.9	0	0	24	145	161
Outflow From Monfort Park Irrigation Pond	304	206	22.4	0	0	18	133	142
Inflow to Monfort Park Regional Detention Pond	403	278	22.0	25	60	85	181	215
Outflow from Monfort Park Regional Detention Pond	331	278	21.5	20	34	40	86	92
47th Avenue/20th Street Intersection (surface flows only)	431	293	20.3	7	14	19	39	46
46th Avenue/20th Street Intersection (surface flows only)	705	354	19.6	0	0	8	128	172
16th Street at 44th Avenue Court (surface flows only)	709	584	17.3	52	234	335	760	921
16th Street at 42nd Avenue Court (surface flows only)	709	584	16.2	52	234	335	760	921
16th Street at 40th Avenue (surface flows only)	711	696	15.1	91	302	439	1,002	1,215
16th Street Crossing at Bittersweet Park	412	833	13.9	240	494	681	1,414	1,690
[illegible]low to Bittersweet Park Detention Pond	413	972	13.2	284	600	822	1,714	2,056
[illegible]tflow from Bittersweet Park Detention Pond	314	972	11.8	14	32	50	107	123
35th Avenue at 13th Street (surface flows only)	713	1,005	11.6	0	0	0	0	19
35th Avenue at 10th Street (surface flows only)[a]	415	1,135	10.1	56	90	111	216	232
35th Avenue at 4th Street (surface flows only)	723	1,321	7.5	0	0	0	281	376
35th Avenue at Greeley No. 3 Ditch (surface flows only)	524	1,321	5.7	0	0	0	271	376
35th Avenue at C Street	426	1,468	4.7	214	389	498	621	647
35th Avenue at F Street	428	1,507	3.3	206	390	497	690	867
Cache La Poudre River	429	1,557	0.0	147	326	409	652	860
10th Street at 32nd Avenue	421	57	[b]	44	80	106	248	319
Inflow to Franklin Park Detention Pond	461	158	[b]	139	242	313	561	682
Outflow from Franklin Park Detention Pond	321	158	[b]	16	22	41	484	603
4th Street/30th Avenue Intersection	422	199	[b]	37	64	83	566	724
Greeley No. 3 Underchute	422	199	[b]	37	64	83	566	724
Inflow to Northview Regional Detention Pond	432	209	[b]	37	157	195	805	976
Outflow from Northview Regional Detention Pond	332	209	[b]	7	9	10	74	146
Northview Side Channel Weir	36	N/A	[c]	9	99	122	243	277
Uncontrolled Spill on the Greeley No. 3 Ditch west of 35th Avenue	37	N/A	[c]	0	0	0	0	115

[a] Total discharge values have been reduced by flows in 48-inch RCP from Bittersweet Park to 10th Street.
[b] Secondary drainageway draining into the 28th Avenue Basin.
[c] Spills from the Greeley No. 3 Ditch.

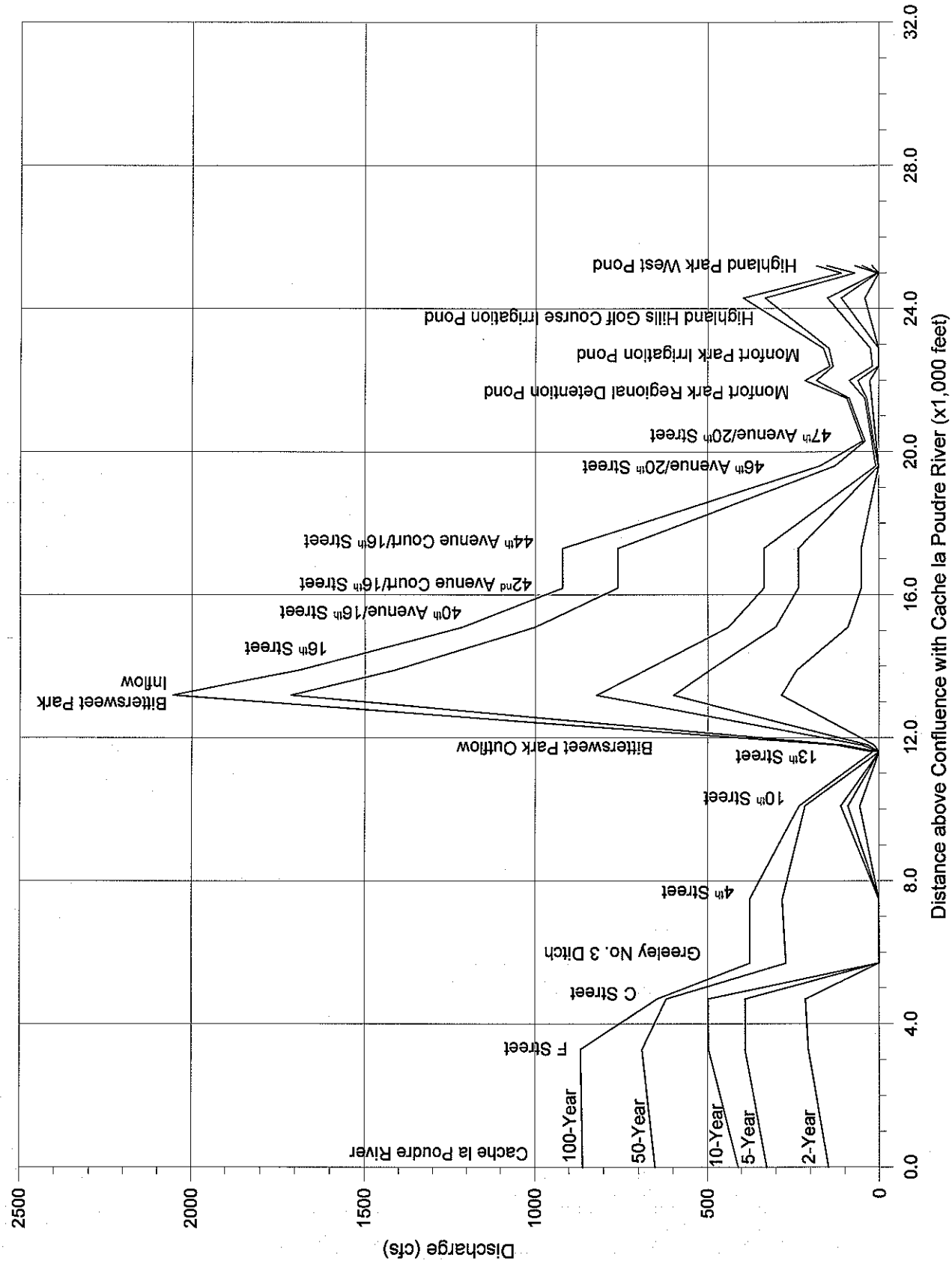

Figure 4.1 Discharge Profiles for the Existing Condition.

Highland Hills Golf Course Irrigation Pond. The Highland Hills Golf Course Irrigation Pond captures local runoff from adjacent residential areas, the Highland Hills Golf Course, and stormwater released from the Highland Park West Pond. The pond presently lies in a sump area, with a 54-inch RCP and two segments of 43"H x 68"W HERCP installed as part of recommendations outlined in the 1997 Comp Plan. During a storm event, storm flows are conveyed to the irrigation pond; the water surface in the pond continues to rise and eventually encroaches onto 51st Avenue, West 22nd Street Road, West 23rd Street, and 50th Avenue.

According to the 1997 Comp Plan, construction of these improvements were intended to reduce the ponded water surface elevation during the 100-year event to approximately 4884.2 ft, NGVD29; the updated 100-year event analysis indicates a ponded water surface elevation of approximately 4884.1 ft. The 1997 Comp Plan also indicated that even with the installation of the proposed improvements, flooding potential adjacent to the irrigation pond would still be an issue for five residential properties. Further investigation of the topography indicates that all of the properties along West 23rd Street between 50th Avenue and 51st Avenue, along 51st Avenue between West 22nd Street Road and West 23rd Street, and along the south side of West 22nd Street Road between 50th Avenue and 51st Avenue (total of 14 properties) would have flooding potential during the 100-year event. In the event of the inlets clogging along West 23rd Street, stormwater runoff will overtop the road at the intersection of 23rd Street and 50th Avenue, continue east through the residential homes located adjacent to 50th Avenue, and either spill into the Grapevine Ditch or be conveyed to the Monfort Park Irrigation Pond.

44th Avenue Court at 16th Street. The existing crossing structure at 44th Avenue Court is a 36-inch RCP along the 16th Street Channel that ties into the 16th Street Storm Sewer downstream of 44th Avenue Court. The structure has a maximum capacity of approximately 83 cfs prior to overtopping the roadway, and is not adequate to pass flows greater than a 2-year event. During the 100-year event, the overtopping depth at 44th Avenue Court is estimated to be 5.6 feet with a discharge of 921 cfs.

42nd Avenue Court at 16th Street. The 16th Street Channel crossing of 42nd Avenue Court includes twin 10'W x 3'H RCBs. The culverts have a maximum combined capacity of 515 cfs prior to overtopping the roadway, and are capable of passing a discharge up to and including that associated with a 10-year event. The overtopping depth at 42nd Avenue Court is approximately 2.2 feet during a 100-year event with a discharge of 921 cfs.

40th Avenue at 16th Street. The existing crossing structure at 40th Avenue are twin 10'W x 4'H RCBs along the 16th Street Channel at 16th Street. The structures have a maximum capacity of 725 cfs prior to overtopping the roadway, and are capable of passing a discharge up to and including that associated with a 10-year event. During the 100-year event, the overtopping depth at 40th Avenue is estimated to be 2.4 feet with a discharge of 1,215 cfs.

16th Street at Bittersweet Park. During the 100-year storm event, 16th Street near Bittersweet Park would overtop by approximately 1.7 feet at the channel crossing, with a discharge of 1,690 cfs. The structure has a maximum capacity of 566 cfs prior to overtopping the roadway, and is capable of passing a discharge up to that associated with a 5-year event. Improvements upstream of the 16th Street crossing have included the realignment of the 16th Street Channel along with the installation of three drop structures.

35th Avenue Storm Sewer. The 35th Avenue Storm Sewer ranges in diameter from a 48-inch RCP at Bittersweet Park to a 68"H x 106"W HERCP at C Street. Per the 1974 Comprehensive Drainage Plan, this storm sewer was designed to convey the storm runoff from the 50-year event as determined from the 1974 rainfall intensity-duration-frequency curves. Consequently, given the revised rainfall curves and a 100-year design event, the capacity of the existing storm sewer is exceeded for each pipe segment along its entire length. For that portion of the storm sewer located south of 4th Street, the street section of 35th Avenue has adequate capacity to convey the excess 100-year storm flows within the limits of the current storm drainage criteria. North of 4th Street to the Greeley No. 3 Ditch, the 100-year peak discharge greatly exceeds the capacity of the storm sewer and cannot be conveyed within the street section of 35th Avenue without exceeding drainage criteria. A majority, if not all, of the 100-year flow conveyed within the street section north of 4th Street is likely to be intercepted by the Greeley No. 3 Ditch. Due to limited capacity within the ditch, the additional inflows have the potential to overtop the northern ditch bank and flood the properties immediately north of the Greeley No. 3 Ditch.

Greeley No. 3 Ditch. The capacity of the Greeley No. 3 Ditch is limited to less than 200 cfs at several locations through the Grapevine Basin. The ditch capacity is potentially exceeded at these locations by stormwater contributed from local runoff west of 35th Avenue and from flows along 35th Avenue. Stormwater captured by the ditch tends to overtop the northern ditch bank at those locations where the capacity is exceeded. Consequently, property located immediately north of the ditch has the potential to incur flooding damage at several locations within the Grapevine Basin.

35th Avenue Outfall Channel. The 35th Avenue Storm Sewer discharges stormwater runoff into the outfall channel, located immediately east of 35th Avenue and directly north of C Street. The outfall channel conveys flow north from this location to the Cache La Poudre River. From C Street to F Street, the bankfull capacity of the outfall channel is approximately 470 cfs; from F Street to the Cache la Poudre River, the bankfull capacity is reduced to 300 cfs as the channel slope decreases. The 100-year discharge at C Street is estimated to be 647 cfs; the 100-year discharge at F Street was determined to be approximately 867 cfs.

35th Avenue Outfall Channel Crossings. The 35th Avenue Outfall Channel crosses F Street, the Colorado and Southern Railroad, and a small county access road. The F Street

crossing has a maximum capacity of approximately 499 cfs prior to overtopping. The crossing at the Colorado and Southern Railroad has a maximum capacity of 772 cfs prior to overtopping the embankment. The county access road crossing can pass approximately 600 cfs prior to overtopping the road. Under the Existing Condition, stormwater flows overtop the F Street crossing during all events greater than the 10-year storm; the Colorado and Southern Railroad and county access road crossings are overtopped by events that exceed the 50-year storm.

Intersection of 10th Street and 32nd Avenue. Potential flooding problems currently exist at a sump area located immediately south of the intersection of 10th Street and 32nd Avenue, which is roughly the beginning of the secondary drainageway. In the Existing Condition, a single 36-inch RCP conveys stormwater northward beneath 10th Street approximately 630 feet to the Franklin Middle School Channel. The capacity of the existing storm sewer is exceeded during storms greater than the 2-year event. Stormwater runoff ponds at the intersection until 10th Street is overtopped. As ponding occurs at the intersection, flooding of several residences and businesses south of 10th Street can occur. First floor elevations of these buildings often lie below the gutter flowline, further exacerbating the magnitude of the flooding potential in this area.

Franklin Middle School Channel and Franklin Park Storm Sewer. The Franklin Middle School Channel and Franklin Park Storm Sewer convey runoff along the eastern edge of Franklin Middle School, and then north into the Franklin Park Detention Pond. The channel has a maximum capacity of approximately 147 cfs, while the storm sewer has a maximum full-flow capacity estimated to be 170 cfs. The channel and storm sewer currently have the capacity to safely pass flows up to that associated with a 10-year event. Discharges in excess of this return period have the potential to inundate local residences along this corridor. The 100-year discharge at 10th Street and 32nd Avenue is approximately 319 cfs.

Franklin Park Detention Pond. The Franklin Park Detention Pond was originally designed to detain the runoff generated by the 25-year storm event. Stormwater runoff is released from the pond via a 24-inch RCP outlet pipe, and a lowered section of the western pond embankment serves as an emergency spillway. Presently, flows in excess of that associated with the 5-year event exceed the storage and discharge capacity of the pond. As the capacity of the outlet facilities is exceeded, stormwater runoff overtops the northern and eastern embankments and creates a potential flooding problem for adjacent residences. Stormwater that is released from the emergency spillway onto 31st Avenue, 5th Street, and 30th Avenue Court exceeds the street capacity; flooding of residences adjacent to these streets is likely to occur for storms greater than that associated with the 10-year event.

30th Avenue at 4th Street. The existing crossing structure at 30th Avenue north of 4th Street incorporates two 54-inch RCPs. The structures have a maximum combined capacity of 299 cfs prior to overtopping the roadway, and can pass flows up to and including that associated

with a 10-year event. The overtopping depth during the 100-year event at 30th Avenue is approximately 3.0 feet with a discharge of 724 cfs.

Northview Mini Storage Complex. The Northview Regional Detention Pond was constructed as part of recommendations outlined in the 1997 Comp Plan. Hydraulic modeling of the Greeley No. 3 Ditch (as described in Section 4.6) indicated a 100-year spill into the pond of approximately 276 cfs. It appears that this inflow was not accounted for in the pond design. Consequently, during the 100-year event the pond spills an estimated 134 cfs over the emergency spillway to the north, potentially causing flooding within for the Northview Mini Storage Complex.

It should be noted that the potential for flooding could occur at almost any location throughout the basin. The previous discussion highlighted general locations along the major drainageway; it is not intended to be a comprehensive summary of basin-wide flooding problems. The aforementioned information should be used as a starting point along with more accurate data and analyses if the precise determination of flooding extents and damages is required throughout the basin.

4.8 Summary of the Future Condition Hydrologic Analyses

4.8.1 Definition of the Future Condition Scenario

The hydrologic model representing the Future Condition scenario was prepared by modifying the Existing Condition model to incorporate all potential future development, based on current zoning and land use for the Grapevine Basin. The model simulated all existing detention ponds utilized in the Existing Condition model. Future development, according to City of Greeley drainage criteria, is generally required to provide on-site detention limiting releases to the 5-year Existing Condition runoff during the 100-year design storm. For areas outside the existing city limits but within the City's Long Range Expected Growth Area (LREGA), it was assumed that future development would be required to provide on-site detention limiting releases to the 100-year Existing Condition runoff during the 100-year storm. This latter requirement specifically pertains to those areas north of the Greeley No. 3 Ditch and outside the city limits.

Modifications to the overland flow lengths and time of concentration were made to reflect potential urbanization of the basin. Table 4.4 presents hydrologic modeling parameters defined for the Future Condition analyses. All hydrologic subbasin parameters, conveyance parameters, and special modeling features associated with the Future Condition scenario are defined in Sections 4.3, 4.4, and 4.5, respectively, of this report. CUHP input files for each

return period are provided in Section 2.2 of the Project Notebook; EPA SWMM input files for the 10- and 100-year return periods are included in Section 3.5.

With respect to special modeling features, Detention Pond No. 806 was added to the Future Condition hydrologic model to represent detention associated with future development in Subbasin No. 6. Detention Pond No. 824 was added to the hydrologic model to represent detention associated with the Best Way Park development in Subbasin No. 24. Detention Pond No. 325 was re-named to Detention Pond No. 825 in order to accommodate a reduced release rate from Subbasin No. 25 due to completion of development in that subbasin. Detention Pond No.'s 828, 833, and 834 were added to the Future Condition hydrologic model to represent detention associated with future development in Subbasin No.'s 28, 33, and 34, respectively.

No flow diversions were added or modified for the Future Condition hydrologic model. As noted in Section 4.6, inflow hydrographs to the basin (due to spills from the Greeley No. 3 Ditch) used in the Future Condition model were identical to those used in the Existing Condition model. It is recognized that assuming the Existing Condition inflow hydrographs are applicable to the Future Condition may result in slightly over-estimated peak discharges north of the No. 3 Ditch. However, City Staff concurred that this was an acceptable compromise in order to simplify the analyses for the Future Condition, since this condition simply represents an intermediate step between Existing and Proposed Conditions. Exported flows to the Country Club Basin also remained the same in the Future Condition.

4.8.2 Hydrologic Modeling Results for the Future Condition

Approximately ninety-two percent of the Grapevine Basin south of the Greeley No. Ditch has been developed, while approximately twenty-three percent of the basin north of the Greeley No. 3 Ditch has been developed. On-site detention was simulated for the remaining subbasins based on the assumption that they would be fully developed in the Future Condition. As a result of the additional assumption of on-site detention for these areas of future development, flows along the 16th Street Channel generally decreased for all return periods. Of the thirty-four delineated subbasins in the Grapevine Basin (Subbasin No. 3 is located in the Country Club Basin), seven subbasins (6, 24, 25, 28, 33, 34, and 35) were revised to represent Future Conditions based on the proposed zoning. The basin map and a schematic diagram of the hydrologic model representing the drainage network for the Future Condition is provided on Sheet A-3 in Appendix A of this report. A summary of peak discharges resulting from the Future Condition hydrologic modeling effort is provided in Table 4.5 for selected locations within the basin. A graphical representation of the discharge profile along the major drainageway is also provided in Figure 4.2. Flood hydrographs at selected locations throughout

Table 4.4 Hydrologic Subbasin Parameters for the Future Condition.

Subbasin No.	Basin Area (acres)	Basin Length (ft)	Distance to Basin Centroid (ft)	Average Basin Slope (ft/ft)	Time of Conc. (minutes)	Percent Imperv. (%)	Depression Storage (inches)		Infiltration Rates (in/hr)		Horton's Decay Rate
							Pervious	Imperv.	Initial	Final	
1	62.6	2500	1000	0.014	24.0	24.5	0.40	0.10	4.5	0.6	0.0017
2	143.1	2500	1500	0.024	N/A	22.7	0.40	0.10	4.4	0.6	0.0018
3	25.7	1500	600	0.012	18.0	45.6	0.40	0.10	4.5	0.6	0.0018
4	71.9	2300	900	0.019	23.0	24.9	0.40	0.10	4.5	0.6	0.0018
5	61.2	2200	600	0.016	22.0	54.5	0.40	0.10	4.5	0.6	0.0018
6	81.8	2900	1300	0.024	26.0	32.4	0.40	0.10	4.5	0.6	0.0018
7	50.2	2100	1100	0.015	22.0	57.2	0.40	0.10	4.5	0.6	0.0018
8	112.6	3000	1500	0.018	N/A	37.0	0.40	0.10	4.5	0.6	0.0017
9	57.3	2700	1800	0.022	25.0	20.7	0.40	0.10	4.5	0.6	0.0018
10	97.6	3000	1400	0.015	N/A	37.2	0.40	0.10	4.5	0.6	0.0018
11	44.2	1800	1200	0.028	20.0	37.0	0.40	0.10	4.4	0.6	0.0018
12	34.9	1600	700	0.031	19.0	28.3	0.40	0.10	4.5	0.6	0.0018
13	42.8	1800	900	0.033	20.0	40.0	0.40	0.10	4.5	0.6	0.0017
14	49.3	2000	1000	0.028	21.0	17.8	0.40	0.10	4.5	0.6	0.0018
15	33.7	1800	1000	0.025	20.0	40.2	0.40	0.10	4.5	0.6	0.0018
16	78.4	3000	1400	0.021	27.0	43.9	0.40	0.10	4.5	0.6	0.0018
17	46.7	2400	1000	0.025	23.0	37.0	0.40	0.10	4.5	0.6	0.0018
18	51.4	3000	1000	0.021	27.0	70.0	0.40	0.10	4.5	0.6	0.0018
19	57.4	1800	800	0.012	20.0	47.5	0.40	0.10	4.5	0.6	0.0018
20	185.6	4200	2100	0.014	N/A	45.3	0.40	0.10	4.5	0.6	0.0018
21	100.6	2600	1400	0.017	N/A	58.3	0.40	0.10	4.5	0.6	0.0018
22	41.3	1800	700	0.022	20.0	41.5	0.40	0.10	4.5	0.6	0.0018
23	45.6	2300	1200	0.017	23.0	13.0	0.40	0.10	4.5	0.6	0.0017
24	43.7	2700	900	0.019	25.0	46.2	0.40	0.10	4.6	0.7	0.0015
25	50.4	1900	1000	0.021	21.0	45.0	0.40	0.10	4.5	0.6	0.0018
26	42.2	2500	1200	0.006	24.0	47.0	0.40	0.10	4.5	0.6	0.0018
27	81.1	2900	1100	0.009	26.0	43.3	0.40	0.10	3.4	0.5	0.0018
28	14.5	1600	600	0.005	19.0	40.0	0.40	0.10	3.0	0.5	0.0018
29	49.9	900	400	0.010	15.0	7.9	0.40	0.10	3.0	0.5	0.0018
30	285.8	3000	1500	0.010	N/A	29.8	0.40	0.10	3.2	0.5	0.0018
31	15.3	1200	300	0.021	17.0	32.3	0.40	0.10	4.5	0.6	0.0018
32	9.3	1300	600	0.011	17.0	2.0	0.40	0.10	4.5	0.6	0.0018
33	23.9	1700	700	0.010	19.0	70.0	0.40	0.10	4.3	0.6	0.0018
34	24.5	1800	500	0.005	20.0	76.4	0.40	0.10	3.2	0.5	0.0018
35	39.5	2100	900	0.025	22.0	23.7	0.40	0.10	4.5	0.6	0.0018

the basin are presented in Appendix D of this report. Summary output from the EPA SWMM models representing the Future Condition analyses are also provided in Appendix D and in Section 3.6 of the Project Notebook. A description of the program written to summarize the EPA SWMM output as well as a copy of the program itself is provided in Section 3.4. All input and output files for both CUHP and EPA SWMM are provided electronically in Section 7 of the Project Notebook.

The Existing Condition flooding problems described in Section 4.7.4 will continue to persist due the basin being nearly completely developed in the Existing Condition; some areas along the major drainageway might see reduced discharges due to implementation of on-site detention in undeveloped areas. Overall, the magnitude of Future Condition flooding problems is generally the same as for Existing Conditions due to similar peak discharges.

Table 4.5 Summary of Selected Peak Discharges for the Future Condition Scenario.

Location	EPA SWMM Element	Drainage Area (acres)	Distance above the Confluence with the Poudre River (1,000 feet)	Peak Discharge (cfs)				
				2-yr	5-yr	10-yr	50-yr	100-yr
Inflow to Highland Park West Pond	1	63	25.2	20	49	70	152	182
Outflow from Highland Park West Pond	301	63	25.0	1	4	5	71	109
Inflow to Highland Hills Golf Course Irrigation Pond	402	206	24.3	41	109	150	332	396
Outflow from Highland Hills Golf Course Irrigation Pond	302	206	22.9	0	0	24	145	161
Inflow to Monfort Park Irrigation Pond	204	206	22.9	0	0	24	145	161
Outflow From Monfort Park Irrigation Pond	304	206	22.4	0	0	18	133	142
Inflow to Monfort Park Regional Detention Pond	403	278	22.0	25	60	85	181	215
Outflow from Monfort Park Regional Detention Pond	331	278	21.5	20	34	40	86	92
47th Avenue/20th Street Intersection (surface flows only)	431	293	20.3	7	14	19	39	46
46th Avenue/20th Street Intersection (surface flows only)	705	354	19.6	0	0	8	128	172
16th Street at 44th Avenue Court (surface flows only)	709	584	17.3	37	183	262	594	721
16th Street at 42nd Avenue Court (surface flows only)	709	584	16.2	37	183	262	594	721
16th Street at 40th Avenue (surface flows only)	711	696	15.1	80	253	369	839	1,018
16th Street Crossing at Bittersweet Park	412	833	13.9	230	450	611	1,250	1,494
Inflow to Bittersweet Park Detention Pond	413	972	13.2	279	556	752	1,550	1,859
Outflow from Bittersweet Park Detention Pond	314	972	11.8	13	30	47	101	118
35th Avenue at 13th Street (surface flows only)	713	1,005	11.6	0	0	0	0	12
35th Avenue at 10th Street (surface flows only)[a]	415	1,135	10.1	56	90	111	216	226
35th Avenue at 4th Street (surface flows only)	723	1,321	7.5	0	0	0	281	376
35th Avenue at Greeley No. 3 Ditch (surface flows only)	524	1,321	5.7	0	0	0	271	376
35th Avenue at C Street	426	1,468	4.7	216	392	501	620	642
35th Avenue at F Street	428	1,507	3.3	212	383	483	633	746
Cache La Poudre River	429	1,557	0.0	152	308	395	620	752
10th Street at 32nd Avenue	421	57	[b]	45	80	106	247	319
Inflow to Franklin Park Detention Pond	461	158	[b]	139	242	313	561	682
Outflow from Franklin Park Detention Pond	321	158	[b]	16	22	41	482	603
4th Street/30th Avenue Intersection	422	199	[b]	37	64	83	564	724
Greeley No. 3 Underchute	422	199	[b]	37	64	83	564	724
Inflow to Northview Regional Detention Pond	432	209	[b]	37	157	195	804	975
Outflow from Northview Regional Detention Pond	332	209	[b]	7	9	10	74	142
Northview Side Channel Weir	36	N/A	[c]	9	99	122	243	277
Uncontrolled Spill on the Greeley No. 3 Ditch west of 35th Avenue	37	N/A	[c]	0	0	0	0	115

[a] Total discharge values have been reduced by flows in 48-inch RCP from Bittersweet Park to 10th Street.
[b] Secondary drainageway draining into the 28th Avenue Basin.
[c] Spills from the Greeley No. 3 Ditch.

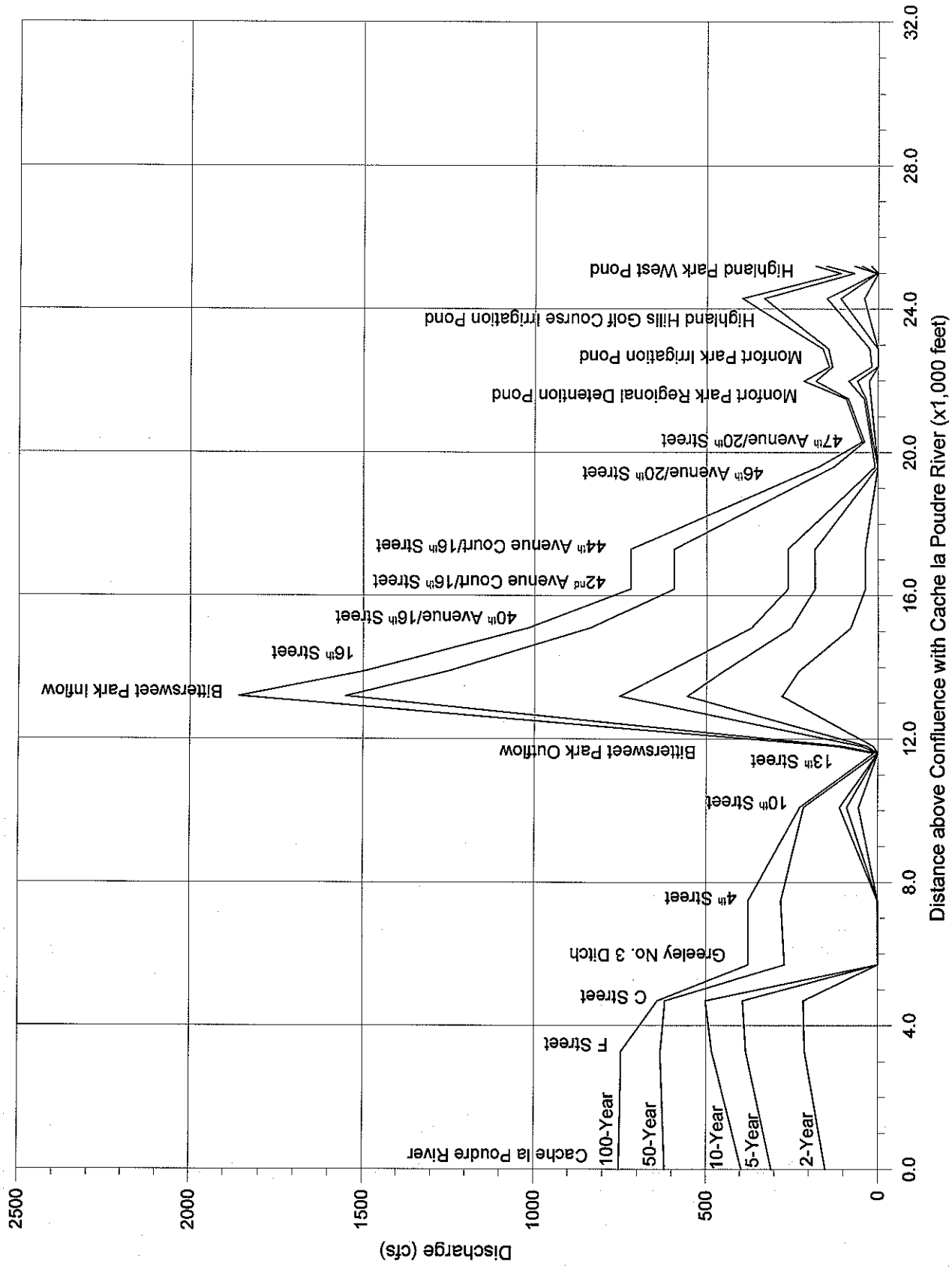

Figure 4.2 Discharge Profiles for the Future Condition.

V. RECOMMENDED PLAN OF DRAINAGE IMPROVEMENTS

The 1997 Comp Plan included an alternative evaluation that considered a wide array of drainage improvements for the Grapevine Basin, including the following: regional detention, existing detention pond improvements, existing major storm sewer enlargements, Greeley No. 3 Ditch modifications, channel improvements, enhancements, and the replacement of several channel-crossing structures. Of these recommendations, specific drainage-related improvements that have been implemented since 1997 include the following: (a) completion of improvements to the Highland Hills Golf Course Irrigation Pond; (b) construction of the Monfort Park Irrigation Pond and the Monfort Park Regional Detention Pond; (c) construction of the Northview Subdivision Bypass Channel; (d) construction of the Greeley No. 3 Ditch Underchute; and (e) construction of the Northview Regional Detention Pond (including the Northview Side Channel Weir and in-line ditch control structure, both of which are located on the Greeley No. 3 Ditch). Additional improvements that have not yet been implemented but are currently in the design phase include modifications to the Franklin Park Detention Pond and construction of the Best-Way Park Regional Detention Pond at 4th Street and 35th Avenue. Although the City's implementation of these improvements has significantly reduced flood hazards in several specific areas of the basin, basin-wide drainage conditions and the potential for flooding along the major and secondary drainageways remain an issue. This study focused primarily on refining the previously recommended plan of improvements, including upgrading conceptual cost estimates.

5.1 Formulation of the Drainage Improvement Plan

In the context of the revised hydrologic and hydraulic modeling for the basin, as well as drainage improvements that have been implemented since completion of the previous Comp Plan, revisions to the drainage improvement plan are identified in this report. In addition, construction cost estimates associated with the proposed improvements have been updated to reflect the escalation of construction costs since 1997.

On-site detention that limits releases to the 5-year existing condition discharge will continue to be required within the limits of the City of Greeley. The use of existing as well as recently constructed on-line regional detention facilities along both the major and secondary drainageways will continue to be an important factor in reducing 100-year discharges. Details associated with the overall drainage plan are provided in the following sections.

5.2 Drainage Criteria

Where appropriate, preliminary design of the proposed drainage facilities was completed in accordance with the criteria presented in the City of Greeley Storm Drainage Criteria Manual (Greeley Public Works Department, May 2002). The City's drainage criteria manual reflects local standards and procedures and is consistent with the information presented in the Urban Storm Drainage Criteria Manual prepared by the Denver Regional Council of Governments.

5.3 Major Storm Drainage Improvements

The major storm drainage improvement plan for the Grapevine Basin, as adapted from the 1997 Comp Plan, consists of eleven components. New plan components have been added since the 1997 Comp Plan, while some have been eliminated. Plan and profile drawings that provide detailed configuration information for the major storm drainage improvements are included in Figures 5.1 through 5.5. The improvements have been sized for this study based on 100-year flows associated with the Proposed Condition scenario as defined in Section 5.6 of this report. Analyses related to all of the proposed improvements are provided in Section 4 of the Project Notebook.

1. ***Highland Park West Pond.*** The Highland Park West Pond currently is equipped with only a 15-inch CMP outlet and no emergency spillway. The outlet culvert has a capacity of 5 cfs prior to overtopping the embankment, which is the approximate release rate during a 10-year Existing Condition event. The 1997 Comp Plan called for construction of an emergency spillway along the eastern embankment along with raising the northern and eastern embankments up to an elevation of 4897.0 ft. NGVD29. At the time the previous Comp Plan was completed, construction of the Highland Park subdivision did not appear to be complete; GIS information indicates the subdivision is now built out and an emergency spillway does not appear to be feasible due to the presence of additional homes along 52nd Avenue Court immediately east of the pond. The revised improvement calls for the addition of a 42-inch RCP outlet to supplement the existing 15-inch CMP. The new outlet facilities would reduce the maximum 100-year water surface elevation in the pond to approximately 4896.8 ft., with roughly 1.2 feet of freeboard. Large sections of the northern and eastern pond embankments, according to the 2-foot topography, appear to be at an elevation of 4898.0 ft; it is proposed to raise the northwestern corner and southern embankment sections up to a 4898.0 ft. to provide the minimum required 1-foot of freeboard.

REACH 4

REACH 3

REACH 2

REACH 1

NORTHVIEW REGIONAL DETENTION POND

26TH AVENUE

35TH AVENUE

43RD AVENUE

47TH AVENUE

C STREET

DITCH NO. 3

F STREET

4TH STREET

6TH STREET

10TH STREET

16TH STREET

20TH STREET

26TH STREET

FRANKLIN PARK

FRANKLIN MIDDLE SCHOOL

WEST LAKE

SANBORN PARK

BITTERSWEET PARK

EPPLE PARK

GREELEY COUNTRY CLUB

ALLEN PARK

MONFORT ELEMENTARY SCHOOL

GRAPEVINE DITCH

AIMS COMMUNITY COLLEGE

HIGHLAND HILLS GOLF COURSE

CACHE LA POUDRE RIVER

COLORADO AND SOUTHERN RAILROAD

GREELEY

City of Greeley

N

SCALE:1"=1500'

0 750 1500 3000

GRAPEVINE BASIN
PROPOSED DRAINAGE IMPROVEMENTS
INDEX SHEET

Anderson Consulting Engineers, Inc
Civil - Water Resources - Environmental
772 Wilken Way, Suite 200, Fort Collins, CO 80525
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Project No.	COCOG05
Date:	11/23/05
Design:	BLV\BAS
Drawn:	TAW\BAS
Revisions:	
ACADFILE:	GRAPEVINEPROF

FIGURE 5.1

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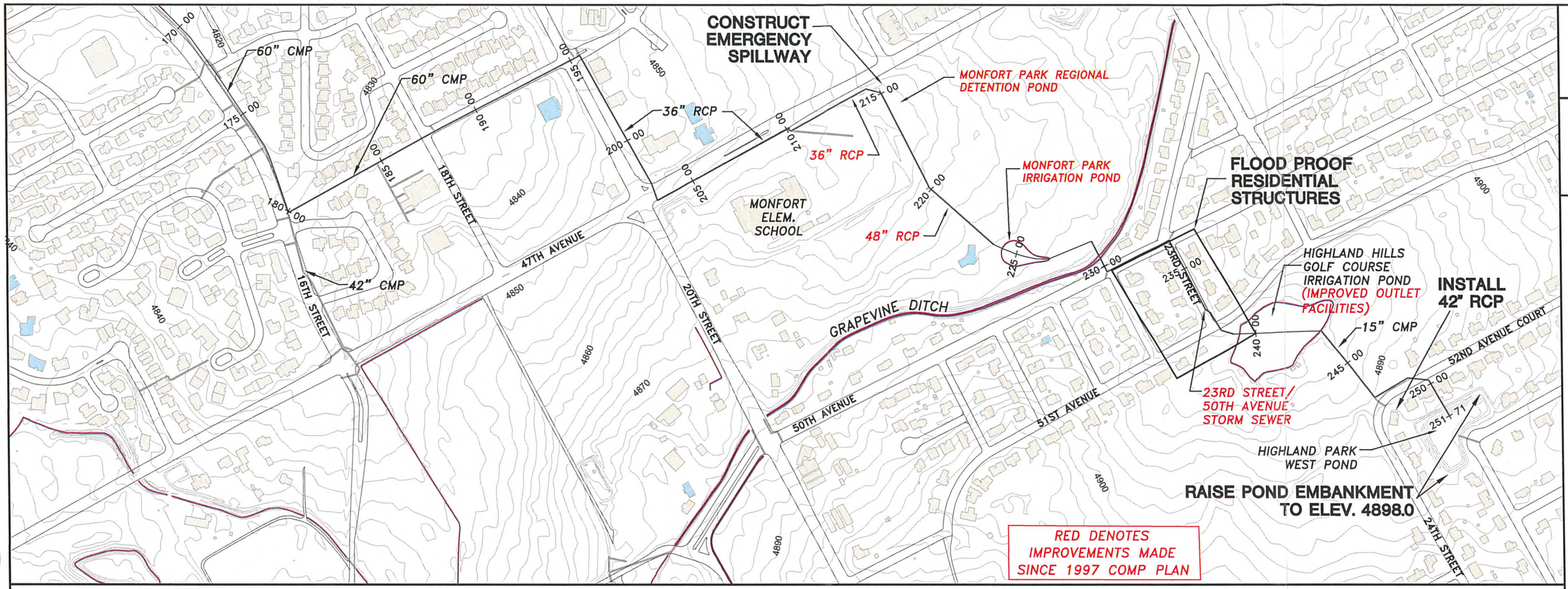

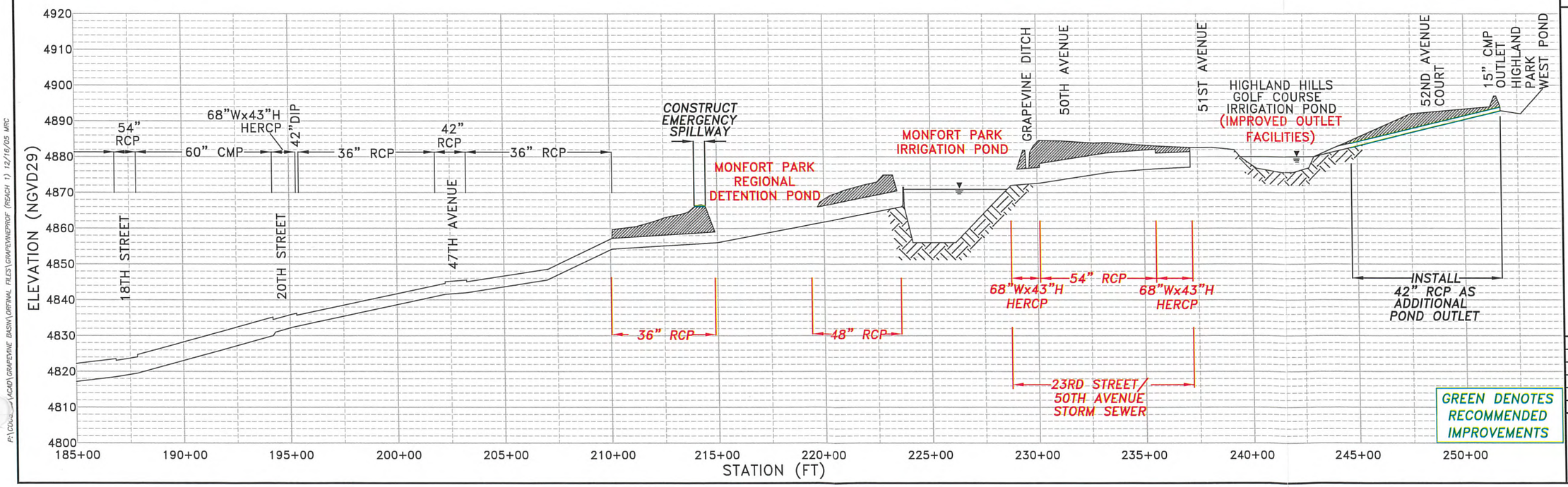

City of Greeley

SCALE:
HORIZONTAL 1"=500'
VERTICAL 1"=30'

GRAPEVINE BASIN
PROPOSED DRAINAGE IMPROVEMENTS
REACH 1

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Project No.	COCOG05
Date:	11/23/05
Design:	BLV\BAS
Drawn:	TAW\BAS
Revisions:	
ACADFILE:	GRAPEVINEPROF

FIGURE 5.2

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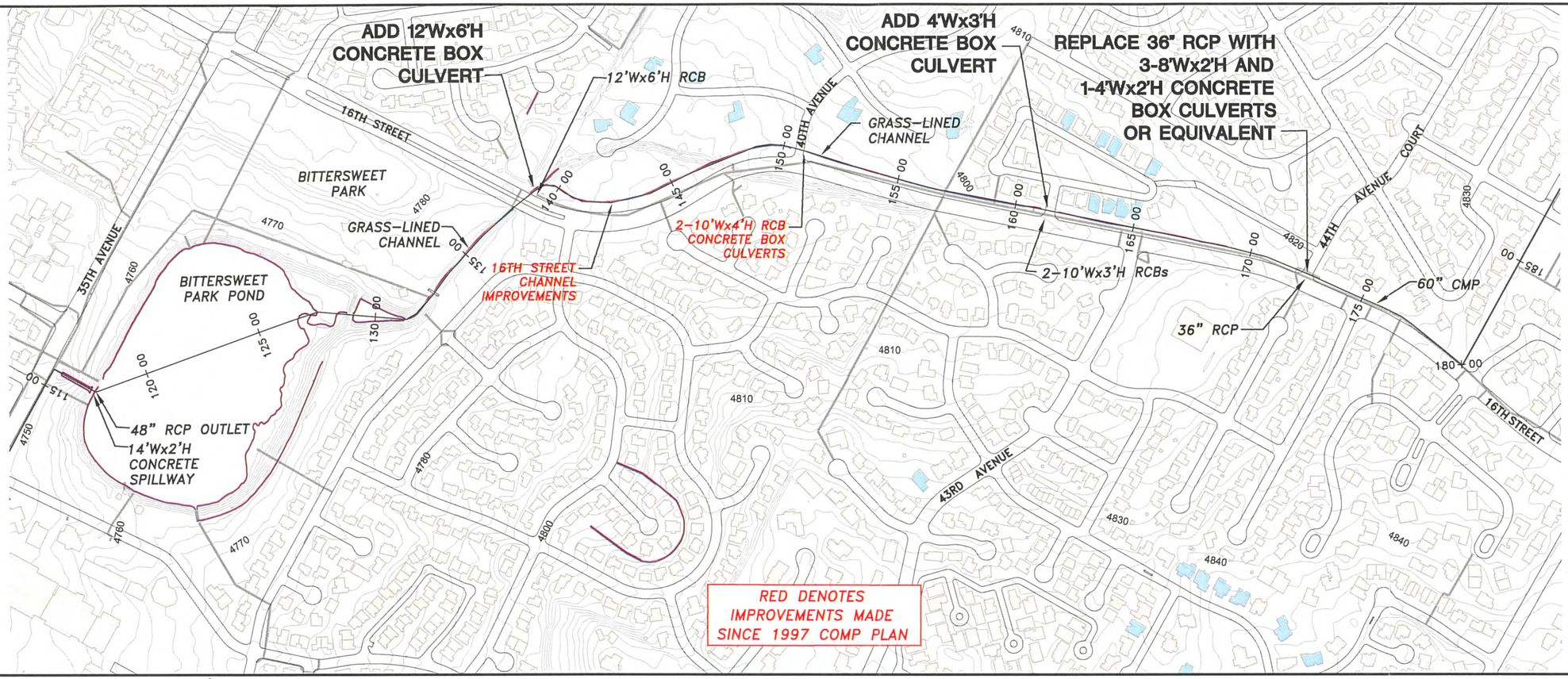

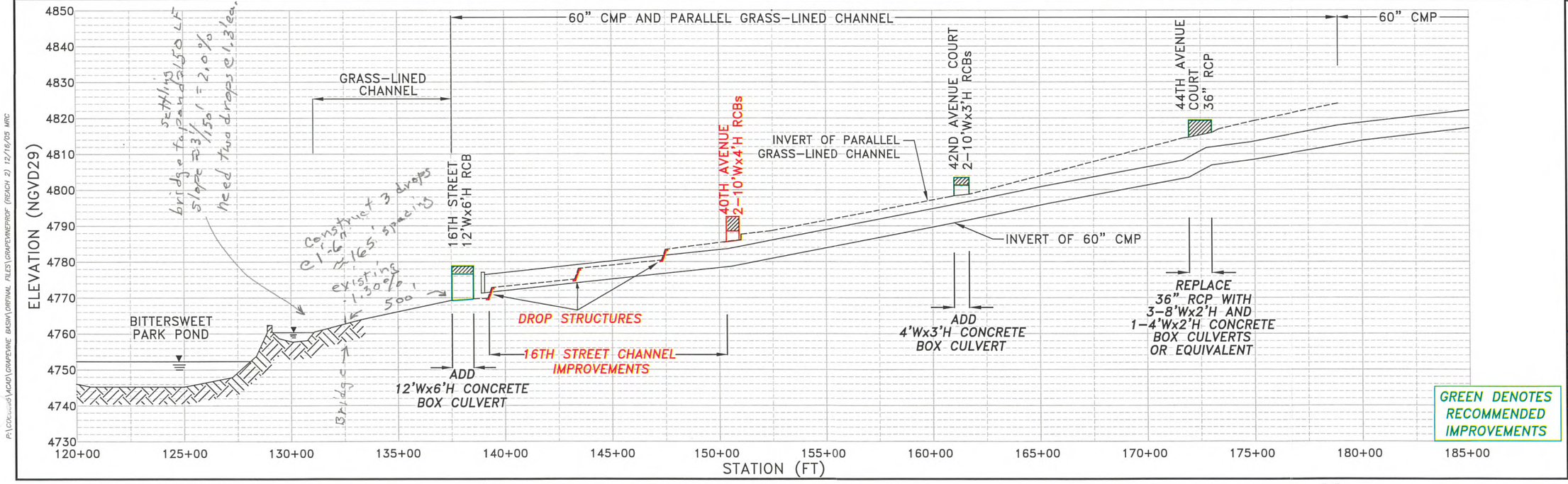

City of Greeley

SCALE:
HORIZONTAL 1"=500'
VERTICAL 1"=30'

GRAPEVINE BASIN
PROPOSED DRAINAGE IMPROVEMENTS
REACH 2

Anderson Consulting Engineers, Inc
Civil · Water Resources · Environmental
772 Whalers Way, Suite 200, Fort Collins, CO 80525
Phone (970) 226-0120 / Fax (970) 226-0121

Project No.	COCOG05
Date:	11/23/05
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Revisions:	
ACADFILE:	GRAPEVINEPROF

FIGURE 5.3

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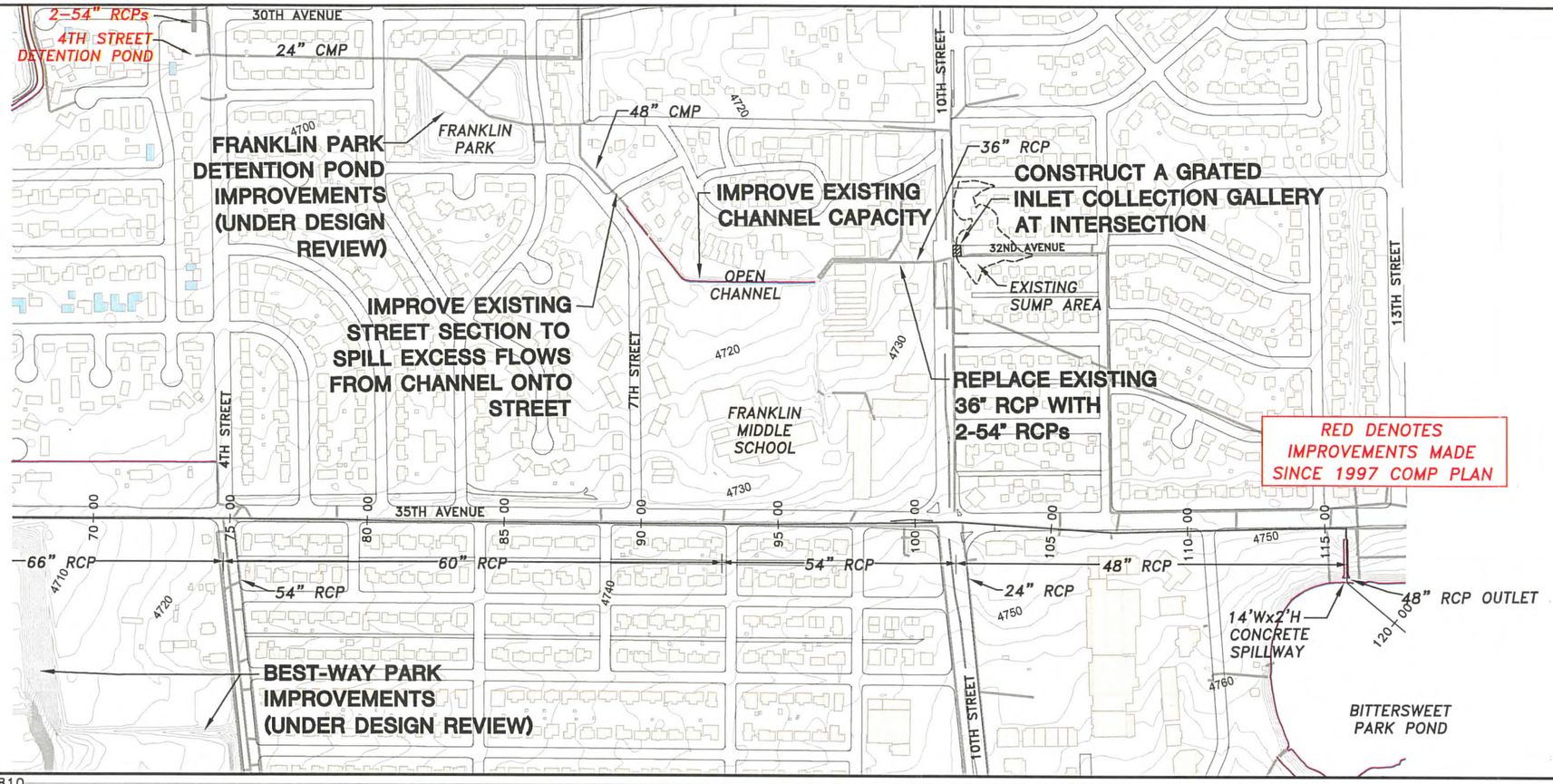

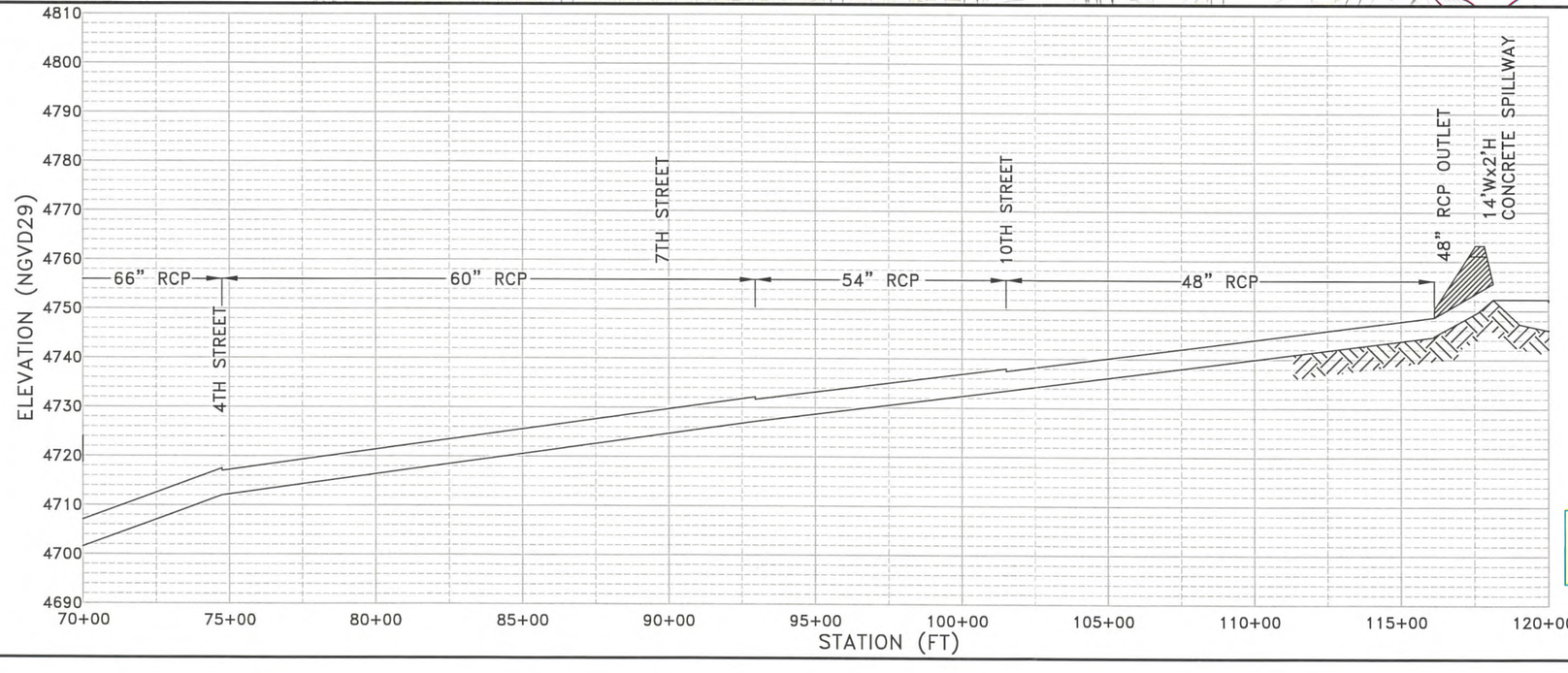

City of Greeley

SCALE:
HORIZONTAL 1"=500'
VERTICAL 1"=30'

GRAPEVINE BASIN
PROPOSED DRAINAGE IMPROVEMENTS
REACH 3

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Project No.	COCOG05
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FIGURE 5.4

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RED DENOTES IMPROVEMENTS MADE SINCE 1997 COMP PLAN

IMPROVE EXISTING CHANNEL CAPACITY

NORTHVIEW SIDE CHANNEL WEIR AND 16'Wx3'H RCB UNDERCHUTE

30" RCP

NORTHVIEW REGIONAL DETENTION POND

NORTHVIEW SUBDIVISION BYPASS CHANNEL

TO 28TH AVE BASIN

COLORADO AND SOUTHERN RAILROAD

F STREET

C STREET

GREELEY NO.3 DITCH

CACHE LA POUDRE RIVER

WATER QUALITY/ AUGMENTATION POND

UTILITY CULVERTS

35TH AVENUE OUTFALL CHANNEL

35TH AVENUE

BEST-WAY PARK IMPROVEMENTS (UNDER DESIGN REVEIW)

RAILROAD CULVERTS

F STREET CULVERTS

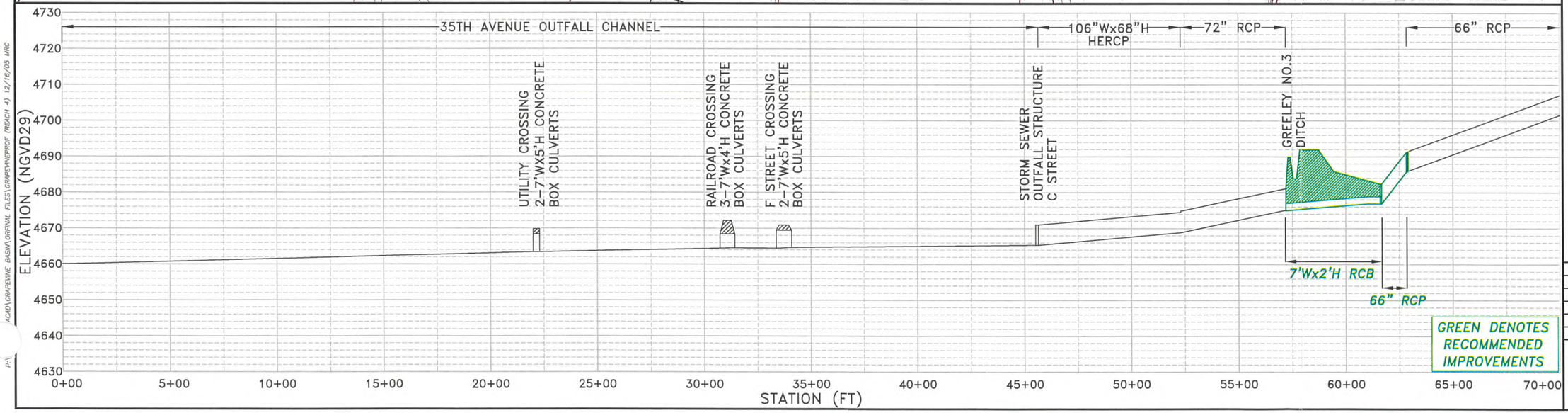
106"Wx68"H HERCP

72" RCP

66" RCP

4650 4660 4670 4680 4700 4710

0+00 5+00 10+00 15+00 20+00 25+00 30+00 35+00 40+00 45+00 50+00 55+00 60+00 65+00 70+00



City of Greeley

SCALE:
HORIZONTAL 1"=500'
VERTICAL 1"=30'

GRAPEVINE BASIN

PROPOSED DRAINAGE IMPROVEMENTS

REACH 4

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Project No.	COCOG05
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Revisions:	
ACADFILE:	GRAPEVINEPROF

FIGURE 5.5

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2. ***Highland Hills Golf Course Irrigation Pond.*** The 1997 Comp Plan called for the construction of a 68"H x 43"W HERCP storm sewer from the expanded curb inlets along 23rd Street near 51st Avenue to the east toward 50th Avenue, and then northeast toward Monfort Elementary School. These improvements have essentially been constructed; a more detailed description of the improvements may be found in Section 3.1. The updated 100-year Proposed Condition ponded water surface elevation was found to be 4884.2 ft., NGVD29 similar to the 1997 Comp Plan. The previous plan called for floodproofing of five residential properties. After additional investigation of the 2-foot topography, it was found that approximately 14 properties may be subject to 100-year flooding, and therefore would require floodproofing measures. Such measures include low-profile floodwalls, watertight shields for doors and windows, brick veneer sealants and shields, and construction of berms or other landscape improvements.

3. ***Monfort Park Regional Detention Pond.*** The 1997 Comp Plan included the construction of a 15 acre-foot detention pond immediately south of Monfort Elementary School, with a 36-inch RCP outlet pipe that would tie into the existing 47th Avenue Storm Sewer. The intended 100-year release rate from the pond was estimated to be 52 cfs. The pond was generally constructed according to the Comp Plan recommendations; a more detailed description of the improvements may be found in Section 3.1. The updated 100-year Existing Condition release rate from the pond was estimated to be 92 cfs, all of which would be contained in the outlet pipe. However, due to proposed improvements at the Highland Park West Pond, it appears that pond inflows have generally increased, causing it to overtop the north embankment and spill toward Monfort Elementary School. The improvement calls for construction of an emergency spillway near the northeast corner of the pond, parallel to 47th Avenue and immediately north of West 21st Street Road. The spillway would be approximately 50 feet long, have 4H:1V side slopes, maximum depth of 0.5 feet, and set at an elevation of 4866.0 ft. Pond outflows (approximately 41 cfs would overtop the emergency spillway during the 100-year Proposed Condition event) in excess of the outlet pipe capacity would be forced onto 47th Avenue without overtopping the pond embankment to the north.

4. ***44th Avenue Court.*** The 44th Avenue Court crossing of the 16th Street Channel currently has a capacity of approximately 83 cfs, which corresponds to less than a 5-year Proposed Condition storm event. The 1997 Comp Plan did not call for any improvements at this crossing; however, as the crossing lies along the major drainageway, it was considered for potential improvements as part of the current study. The installation of three 8'W x 2'H RCBs and one 4'W x 2'H RCB (or an equivalent bridge opening) would reduce

potential flooding at this crossing to within drainage criteria limits. The required structure size would need to be confirmed by a detailed analysis completed as part of final design of this crossing. The structure would minimize roadway overtopping at the flowline to approximately 1.3 feet during a 100-year storm, which is the maximum depth at the flow line for a local street crossing by City of Greeley storm drainage criteria.

5. ***42nd Avenue Court.*** The 42nd Avenue Court crossing of the 16th Street Channel currently has a capacity of approximately 515 cfs, which is less than the flow associated with a 50-year Proposed Condition storm event. The 1997 Comp Plan did not call for any improvements as this crossing; however, as the crossing lies along the major drainageway, it was considered for potential improvements as part of the current study. The addition of a 4'W x 3'H RCB to the existing double 10'W x 3'H RCB would reduce potential flooding at this crossing to within drainage criteria limits. The required structure size would need to be confirmed by a detailed analysis completed as part of final design of this crossing. The structure would minimize roadway overtopping at the flowline to approximately 1.1 feet during a 100-year storm, which is less than the maximum of 1.5 feet for a local street crossing by City of Greeley drainage criteria.

6. ***16th Street.*** The 16th Street crossing of the 16th Street Channel currently has a capacity of approximately 566 cfs, which is less than the flow associated with a 10-year Proposed Condition event. The 1997 Comp Plan called for replacement of the existing culvert with a 16'W x 6'H RCB. Due to generally increased discharges as compared to the 1997 Comp Plan along 16th Street for the updated Comp Plan, the current study calls for an additional 12'W x 6'H RCB to supplement the existing 12'W x 6'H RCB. The required structure size would need to be confirmed by a detailed analysis completed as part of final design of this crossing. The structure would minimize roadway overtopping at the street crown to approximately 0.3 feet during a 100-year storm, which is less than the maximum of 0.5 feet for a minor arterial crossing by City of Greeley drainage criteria.

7. ***4th Street and 35th Avenue.*** The 1997 Comp Plan called for improvements along 4th Street west of 35th Avenue to divert 100-year discharges into a proposed gravel pit detention pond northwest of 4th Street and 35th Avenue. That project, now known as Best-Way Park, has been designed and is under review by the City of Greeley ("Final Drainage Report, Best-Way Park," Civil Design Group, Inc., October 2004). The previous Comp Plan assumed approximately 530 cfs would be diverted off of 4th Street west of 35th Avenue into the regional detention pond during the 100-year event; the updated Comp Plan hydrologic model indicates 428 cfs being diverted into the pond.

The previous Comp Plan also recommended 60 acre-feet of detention for the pond, along with a 54-inch RCP outlet designed to release a maximum 100-year discharge of 189 cfs. The final design provides approximately 69.2 acre-feet of detention (6.4 acre-feet of on-site detention for the Best-Way Park development, and 62.8 acre-feet of on-line regional detention for the major drainageway) along with an 18-inch RCP outlet (reduced down via a 9.5-inch orifice plate) for the Best-Way Park development pond and a single 7'W x 2'H RCB outlet (as cited by City staff; reduced down via an orifice plate, size unknown) for the on-line regional pond. Both ponds were modeled using storage volumes and release rates from the preliminary design of the Best-Way Park development ("Preliminary Design Report, Best-Way Park," Civil Design Group, Inc., February 2004). However, based on uncertainty if the project will be constructed and discussions with City staff, the preliminary design values were retained in all hydrologic models. The maximum combined release rate during the 100-year Proposed Condition event for the two ponds is approximately 170 cfs, all of which is released into the 35th Avenue Storm Sewer.

8. ***10th Street and 32nd Avenue.*** The 1997 Comp Plan called for the replacement of the existing 36-inch RCP crossing 10th Street at 32nd Avenue with two 54-inch RCPs. It also called for the construction of a grated collection gallery across 32nd Avenue south of 10th Street in order to reduce ponding at the intersection and meet the overtopping drainage criteria. Due to the virtually identical discharges at this location determined by both the 1997 Comp Plan and this study, no changes were made to the previously recommended improvements. Construction of the improvements would eliminate overtopping of 10th Street for all events including the 100-year storm (estimated to be a maximum of approximately 319 cfs for the Proposed Condition). According to City of Greeley drainage criteria, the elimination of street overtopping at this crossing for the 100-year event is necessary as 10th Street is considered a major arterial. The grated collection gallery should be designed to remove approximately 319 cfs from the intersection in order to eliminate overtopping of the roadway and reduce the potential flooding of adjacent residences and businesses.

9. ***Franklin Middle School Channel and 7th Street.*** Proposed improvements as outlined in the 1997 Comp Plan included enlargement of the channel section to a 12-foot bottom width, design depth of 3 feet, and side slopes of 2H:1V. Curb cuts were also recommended along 7th Street near the beginning of the Franklin Park Storm Sewer to allow flows greater than the capacity of the storm sewer to spill onto 7th Street and be conveyed north. Only minimal changes were made to the proposed channel as 100-year

discharges for this Comp Plan update were generally the same as the previous Comp Plan. The installation of the twin 54-inch culverts at 10th Street and 32nd Avenue will increase the 100-year discharge into the Franklin Middle School Channel. The capacity of the existing channel is approximately 147 cfs; the culverts will discharge an estimated 319 cfs to this location for the Proposed Condition. The dimensions of the existing channel section should be increased to incorporate a bottom width of 13 feet, design depth of 2.3 feet, and typical side slopes of 2H:1V. All flows will be conveyed to the Franklin Park Storm Sewer. The existing storm sewer has a maximum capacity of 170 cfs; therefore, approximately 149 cfs will overtop the road at 30th Avenue Place and spill west onto 7th Street, which runs parallel to the outfall channel and storm sewer. This portion of 7th Street presently does not include curb and gutter. As 7th Street is improved, curb cuts should be included as part of the curb and gutter installation to allow stormwater to spill onto the street as the capacity of the existing 48-inch RCP is exceeded.

DOES HAVE CURB

10. ***Franklin Park Detention Pond.*** The 1997 Comp Plan indicated that the Franklin Park Detention Pond was originally designed to provide detention for the 25-year storm event with the intensity-duration-frequency curves utilized in 1974. The Comp Plan included an alternative analysis for the pond to determine a more economical solution to completely eliminate flooding due to the 100-year event. The selected alternative included raising the northern and eastern embankments approximately 1 foot, along with widening the existing emergency spillway section from 150 feet to 300 feet. This alternative was intended to spill approximately 525 cfs through the emergency spillway to the west onto 31st Avenue. The updated improvements, which are currently being designed by BCE, Ltd., include raising the northern and eastern embankments 1-foot to elevation 4709.0 ft. NAVD88, lengthening the west spillway from approximately 140 feet to 200 feet, installation of twin 38"H x 60"W HERCPs from the pond to a small on-line detention pond at the northwest corner of 4th Street and 30th Avenue, and installation of an additional 54-inch RCP beneath 30th Avenue that connects the small detention pond to the Northview Subdivision Bypass Channel. The maximum release rate from the pond is approximately 473 cfs during the 100-year Proposed Condition event, of which approximately 164 cfs will spill through the emergency spillway.

11. ***Northview Mini Storage Complex.*** The 1997 Comp Plan called for improvements along the secondary drainageway in the vicinity of the Greeley No. 3 Ditch. Specifically, the plan called for the construction of a concrete flume to pass secondary drainageway flows over the ditch, the construction of a side channel weir to spill excessive flows over the

left bank of the ditch, and construction of a 40 acre-foot regional detention pond to receive the drainageway flows along with the ditch spills. The improvements were constructed according to the plan except drainageway flows are passed beneath the ditch via an underchute, and the pond (Northview Regional Detention Pond) maintains approximately 46 acre-feet to the crest of the emergency spillway. Based on results from the unsteady flow hydraulic modeling of the Greeley No. 3 Ditch (see Section 4.6), the side channel weir spills approximately 151 cfs during the 100-year Proposed Condition event. These ditch spills cause the pond to pass approximately 142 cfs over the emergency spillway, potentially inundating the Northview Mini-Storage Complex immediately north of the pond. The improvements call for elevating the left bank of the existing outfall channel approximately 1 foot in order to contain flows within the channel. The channel improvements would be made from the emergency spillway to approximately the northeast corner of the site. The improvements would increase the channel capacity from approximately 29 cfs to 175 cfs.

5.4 Conceptual Construction Cost Estimates

Estimates of potential construction costs were prepared for all of the improvements proposed as part of the 1997 Comp Plan, as well as any new improvements. These costs were updated for the current Comp Plan to reflect changes to the proposed facilities and escalation of construction and land acquisition costs since 1997. Where necessary for the current study, data used to develop unit costs were obtained from bid tabulations, quotations from various suppliers and manufacturers, and information supplied by local contractors and various municipal utility departments. Total estimated costs for the projects have been divided into the following categories: (a) actual construction of drainage improvements; (b) land acquisition; and (c) engineering and project management fees.

Actual construction costs are defined as those costs associated with the labor and materials needed to implement the drainage improvements. Considering that the facilities associated with the recommended plan of improvements have only been designed at a conceptual level as part of this study, a construction contingency of 35 percent was added to each project based on the initial cost estimate. Land acquisition costs include the cost to purchase land and associated structures in order to facilitate the construction and maintenance of the proposed improvements. The final cost category, engineering and project management fees, was based on the sum of the initial construction cost estimate and the construction contingency. For all projects, this cost was estimated using a factor of 20 percent. The sum of the three cost categories determined the total project cost. A summary of the estimated cost to construct each of the eleven proposed projects for the Grapevine Basin is provided in Table 5.1.

Table 5.1 Summary of Conceptual Construction Cost Estimates.

Description	Construction Cost [a]	Property Acquisition	Engineering and Project Management	Total Cost
Highland Park West Pond	$284,000	$0[b]	$57,000	$341,000
Highland Hills Golf Course Irrigation Pond	$189,000	$0[b]	$38,000	$227,000
Monfort Park Regional Detention Pond	$21,000	$0[b]	$4,000	$25,000
44th Avenue Court	$175,000	$0[b]	$35,000	$210,000
42nd Avenue Court	$44,000	$0[b]	$9,000	$53,000
16th Street	$190,000	$0[b]	$38,000	$228,000
4th Street and 35th Avenue	$	$	$	$560,000[c]
10th Street and 32nd Avenue	$1,085,000	$0[b]	$217,000	$1,302,000
Franklin Middle School Channel and 7th Street	$46,000	$6,000	$9,000	$61,000
Franklin Park Detention Pond	$	$	$	$832,000[d]
Northview Mini Storage Complex	$42,000	$0[b]	$9,000	$51,000
Total Project Costs				**$3,890,000**

[a] Includes initial estimate and 35 percent contingency.
[b] It is assumed that existing easements are adequate for constructing this improvement.
[c] Total cost based on proposed estimate from City of Greeley.
[d] Total cost based on proposed estimate from Burnett Consulting Engineers, Ltd.

For the proposed ***Highland Park West Pond*** improvements, estimated construction costs were based on current unit cost data for the major elements associated with the required culvert at this location. Detailed information used in the preparation of the construction cost estimates for this project and each of the remaining ten projects is included in Section 5 of the Project Notebook. For drainage improvements associated with the ***Franklin Middle School Channel and 7th Street,*** the 1997 cost estimate was converted from 1997 to 2004 dollars based on a cumulative increase of 27 percent in the Construction Cost Index (CCI) computed by the Engineering News Record (ENR). Estimated construction costs for the crossings at ***44th Avenue Court, 42nd Avenue Court, and 16th Street*** were based on current unit cost data for the major elements associated with the required culverts at each of these three locations. For drainage improvements associated with ***4th Street and 35th Avenue and the Franklin Park Detention Pond***, actual proposed construction costs were taken from the City of Greeley and the associated design report, respectively. The remaining four projects, improvements for the ***Highland Hills Golf Course Irrigation Pond, the Monfort Park Regional Detention Pond, 10th Street and 32nd***

Avenue, and the Northview Mini Storage Complex, had estimated construction costs based on current unit cost data for the major elements associated with each project.

5.5 Implementation Plan

In order to promote the construction of the drainage improvements as funding becomes available, implementation priorities were established and an implementation plan developed during the completion of the 1997 Comp Plan. The implementation and phasing of the drainage improvements continue to be dependent on several factors. The following factors, originally established from the 1997 Comp Plan, were utilized to establish the priority of implementation for the improvements.

- Health and safety hazards to the public and vehicular traffic were considered the highest priority.
- Areas likely to incur the most flood damages were considered to be the next highest priority.
- Construction phasing of adjacent improvements was considered. For example, improving a culvert crossing may significantly reduce flood damage upstream of the crossing; however, the downstream channel must be improved in conjunction with the roadway crossing to prevent an increase in flood damages on the downstream property.

Recommended implementation priorities for projects in the Grapevine Basin have been prepared and are presented in Table 5.2. It is recommended that a proactive approach be taken to facilitate the administration of the implementation plan and the construction of the improvements. Obstacles that hinder the implementation of the plan are frequently encountered; in many instances these obstacles should be addressed or considered as early as conceivably possible in the planning process. Consequently, administration of the plan should provide immediate consideration of: (a) acquisition of the property, easements and rights-of-way necessary to construct the improvements; and (b) identification of potential utility conflicts that will require resolution prior to construction of the improvements.

Table 5.2 Implementation Plan.

Implementation Priority	Description	Total Cost
1	4th Street and 35th Avenue (currently under design)	$560,000
2	Franklin Park Detention Pond (currently under design)	$832,000
3	10th Street and 32nd Avenue	$1,302,000
4	16th Street	$228,000
5	44th Avenue Court	$210,000
6	42nd Avenue Court	$53,000
7	Monfort Park Regional Detention Pond	$25,000
8	Highland Park West Pond	$341,000
9	Highland Hills Golf Course Irrigation Pond	$227,000
10	Franklin Middle School Channel and 7th Street	$61,000
11	Northview Mini Storage Complex	$51,000

5.6 Hydrologic Analysis of the Recommended Plan of Drainage Improvements

Hydrologic impacts of the recommended plan of drainage improvements were evaluated using a methodology similar to that used for the Existing Condition, as discussed in Chapter 4. Consistent with the terminology used in Chapter 4, the scenario associated with the recommended plan of improvements is identified as the Proposed Condition, which includes future development with the drainage improvements proposed in this report.

For the Proposed Condition, subbasin delineations and hydrologic parameters were not modified from those defined for the Future Condition analysis described in Section 4.3 of this report. As a result, the Future Condition CUHP analysis documented in Section 2.2 of the Project Notebook applies to the Proposed Condition. Hydraulic conveyance modeling parameters defined for the Existing Condition were modified to reflect the recommended plan of improvements. This included the addition of a pipe conveyance element, a modification of a pipe conveyance element, and the modification of a channel conveyance element. A summary of all conveyance element parameters defined for the Proposed Condition is provided in Section 3.1 of the Project Notebook.

With respect to special modeling features, Detention Pond No. 301 was re-named to Detention Pond No. 801 in order to accommodate a modified release rate from the pond. Detention Pond No. 321 was re-named to Detention Pond No. 821 in order to reflect proposed

improvements to the pond. Detention Pond No. 331 was re-named to Detention Pond No. 831, also to reflect proposed improvements to the pond. Detention Pond No. 835 was added to the Proposed Condition hydrologic model to represent detention associated with the Best-Way Park regional detention pond in Subbasin No. 35. One existing pipe diversion was modified in the Proposed Condition model to reflect an upgraded segment of proposed storm sewer into the Best-Way Park Regional Detention Pond, while an additional pipe diversion was added to more accurately reflect inflows entering the 35th Avenue Storm Sewer. Applicable inflow hydrographs were modified to reflect spills from the unsteady flow hydraulic analyses of the Greeley No. 3 Ditch. Exported flows to the Country Club Basin also remained the same in the Proposed Condition. The basin map and a schematic diagram of the hydrologic model representing the drainage network for the Proposed Condition is provided on Sheet A-4 in Appendix A of this report.

A summary of peak discharges along the major drainageway resulting from the Proposed Condition hydrologic modeling effort is provided in Table 5.3. EPA SWMM input files for the 10- and 100-year return period events are included in Section 3.5 of the Project Notebook; summary output for all return periods are included in Appendix D of this report and Section 3.6 of the Project Notebook. A description of the program written to summarize the EPA SWMM output as well as a copy of the program itself is provided in Section 3.4. All input and output files for EPA SWMM are provided electronically in Section 7 of the Project Notebook. Figure 5.6 presents discharge profiles along the major drainageway that graphically portray the hydrologic results of the Proposed Condition modeling effort. In addition, selected flood hydrographs associated with the Proposed Condition are presented in Appendix D of this report.

The results of the proposed condition analysis along the major drainageway indicate no overtopping for the Highland Park West Pond, while overtopping of the proposed crossings at 44th Avenue Court, 42nd Avenue Court, and 16th Street appear to be within set drainage criteria limits for the City of Greeley. Due to on-site detention assumed in Subbasin No. 6, it appears that discharges will be reduced enough along the 16th Street Channel that overtopping of 40th Avenue will be within set drainage criteria limits. Moving further downstream, surface flows along 35th Avenue for all return periods up to the 100-year event will be eliminated from 4th Street north to the 35th Avenue Outfall Channel, due to construction of the Best-Way Park Regional Detention Pond at 4th Street and 35th Avenue. The implementation of the complete Best-Way Park drainage facilities would eliminate nearly all flows entering the Greeley No. 3 Ditch west of 35th Avenue within the limits of the Grapevine Basin. It appears that the removal of these flows will eliminate the spill from the Greeley No. 3 Ditch west of 35th Avenue during the 100-year event. The 35th Avenue Outfall Channel will have adequate

Table 5.3 Summary of Selected Peak Discharges for the Proposed Condition Scenario.

Location	EPA SWMM Element	Drainage Area (acres)	Distance above the Confluence with the Poudre River (1,000 feet)	Peak Discharge (cfs)				
				2-yr	5-yr	10-yr	50-yr	100-yr
Inflow to Highland Park West Pond	1	63	25.2	20	49	70	152	182
Outflow from Highland Park West Pond	801	63	25.0	9	23	32	73	86
Inflow to Highland Hills Golf Course Irrigation Pond	402	206	24.3	46	122	170	374	447
Outflow from Highland Hills Golf Course Irrigation Pond	302	206	22.9	0	13	54	150	162
Inflow to Monfort Park Irrigation Pond	204	206	22.9	0	13	54	150	162
Outflow From Monfort Park Irrigation Pond	304	206	22.4	0	5	51	137	145
Inflow to Monfort Park Regional Detention Pond	403	278	22.0	25	60	85	181	223
Outflow from Monfort Park Regional Detention Pond	831	278	21.5	20	34	43	90	133
47th Avenue/20th Street Intersection (surface flows only)	431	293	20.3	7	14	19	39	46
46th Avenue/20th Street Intersection (surface flows only)	705	354	19.6	0	0	8	128	172
16th Street at 44th Avenue Court (surface flows only)	709	584	17.3	37	183	262	594	721
16th Street at 42nd Avenue Court (surface flows only)	709	584	16.2	37	183	262	594	721
16th Street at 40th Avenue (surface flows only)	711	696	15.1	80	253	369	839	1,018
16th Street Crossing at Bittersweet Park	412	833	13.9	230	450	611	1,250	1,494
Inflow to Bittersweet Park Detention Pond	413	972	13.2	279	556	752	1,550	1,859
Outflow from Bittersweet Park Detention Pond	314	972	11.8	13	30	49	102	120
35th Avenue at 13th Street (surface flows only)	713	1,005	11.6	0	0	0	0	12
35th Avenue at 10th Street (surface flows only)[a]	415	1,135	10.1	56	90	111	216	226
35th Avenue at 4th Street (surface flows only)	723	1,321	7.5	0	0	0	0	0
35th Avenue at Greeley No. 3 Ditch (surface flows only)	524	1,321	5.7	0	0	0	0	0
35th Avenue at C Street	426	1,468	4.7	84	120	141	221	248
35th Avenue at F Street	428	1,507	3.3	88	128	150	232	302
Cache La Poudre River	429	1,557	0.0	84	127	154	252	312
10th Street at 32nd Avenue	421	57	[b]	44	80	106	247	319
Inflow to Franklin Park Detention Pond	461	158	[b]	136	238	310	572	702
Outflow from Franklin Park Detention Pond	821	158	[b]	77	131	162	306	473
4th Street/30th Avenue Intersection	422	199	[b]	94	165	206	373	573
Greeley No. 3 Underchute	422	199	[b]	94	165	206	373	573
Inflow to Northview Regional Detention Pond	432	209	[b]	94	260	318	527	735
Outflow from Northview Regional Detention Pond	332	209	[b]	7	9	10	60	155
Northview Side Channel Weir	36	N/A	[c]	7	93	108	142	151
Uncontrolled Spill on the Greeley No. 3 Ditch west of 35th Avenue	37	N/A	[c]	0	0	0	0	0

[a] Total discharge values have been reduced by flows in 48-inch RCP from Bittersweet Park to 10th Street.
[b] Secondary drainageway draining into the 28th Avenue Basin.
[c] Spills from the Greeley No. 3 Ditch.

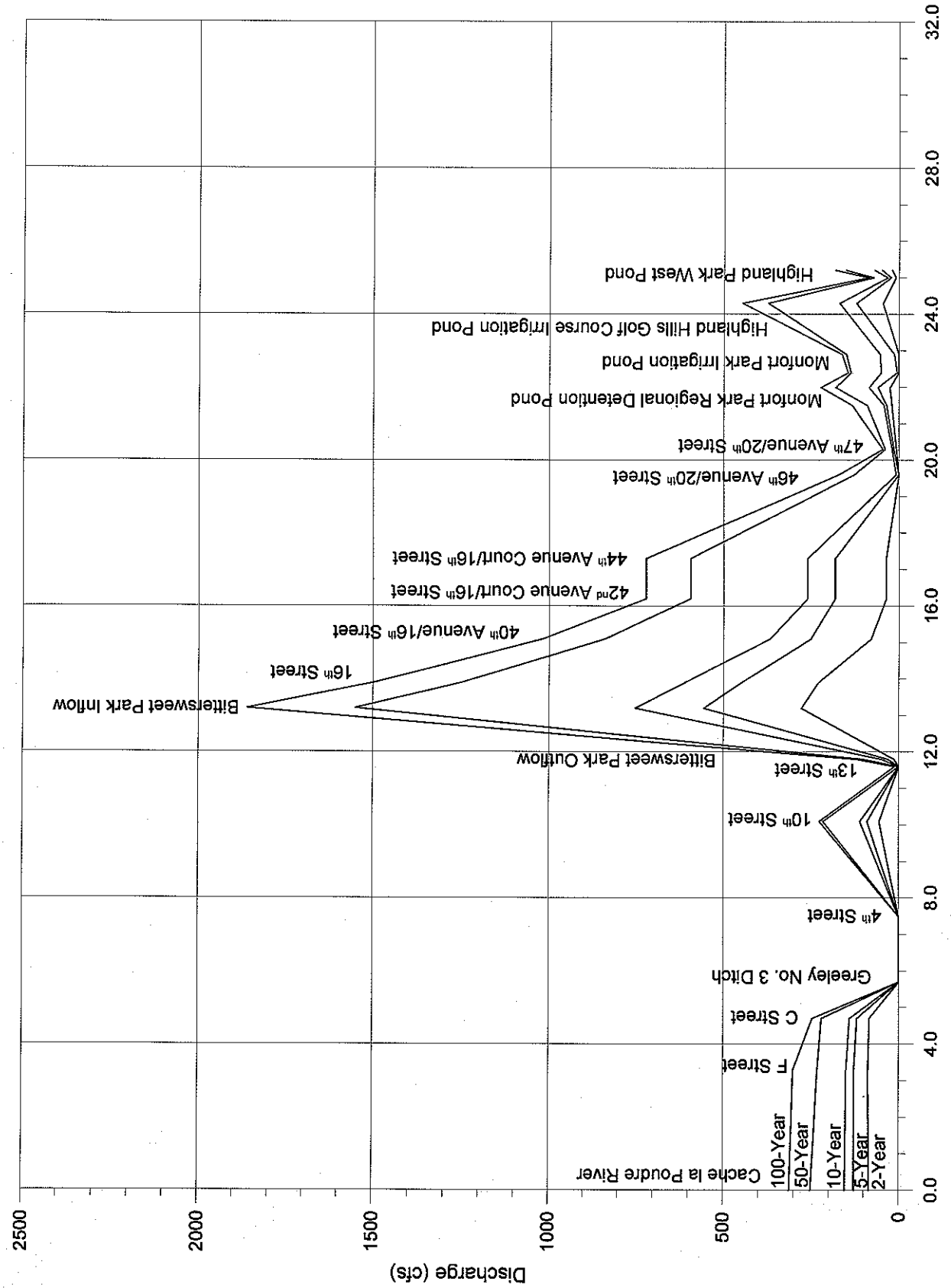

Figure 5.6 Discharge Profiles for the Proposed Condition.

capacity to convey 100-year discharges. The crossing structures also appear to be able to pass 100-year flows without overtopping.

Overtopping of 10th Street at 32nd Avenue along the secondary drainageway will be eliminated. Flows along the secondary drainageway would generally be contained within storm sewers and the Franklin Middle School Channel up to the 100-year event from 10th Street and 32nd Avenue to 30th Avenue Place. At this location, overflows that spill onto 7th Street/31st Avenue will commingle with spills from the Franklin Park Detention Pond. The pond will not overtop the northern and eastern embankments during the 100-year event, with overflows contained to the emergency spillway. According to the analyses performed for the Franklin Park Detention Pond improvements by Burnett Consulting Engineers, Inc. (BCE), flows would generally be contained along the street corridor from the pond to 4th Street and 30th Avenue. The 100-year discharge at 4th Street and 30th Avenue will be reduced such that overtopping of the 30th Avenue crossing is within set drainage criteria limits.

In general, the proposed improvements will reduce flooding in many areas of the basin, specifically along the major and secondary drainageways. The proposed improvements are not intended to solve all the flooding problems within the basin. In general, structures that are not elevated above curb level and those with basements that have ingress and egress access at relatively low levels may continue to experience flooding on a relatively frequent basis at any location along either drainageway.

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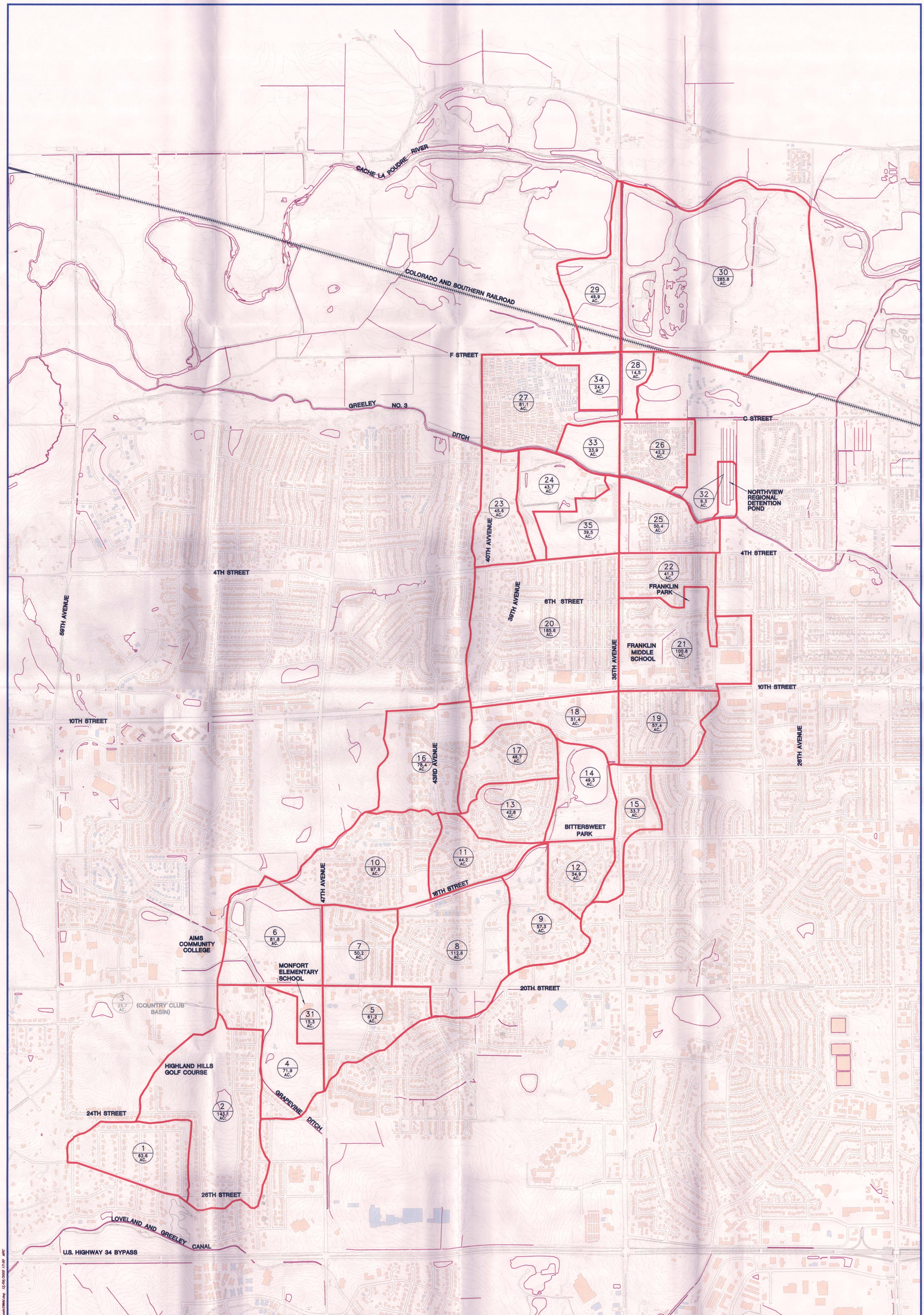
APPENDIX A

SUBBASIN MAP AND HYDROLOGIC MODEL SCHEMATICS



SHEET
A-1

CONTOUR INTERVAL
2-FOOT
ORIGINAL SCALE: 1"=800'
0 400 800 1600

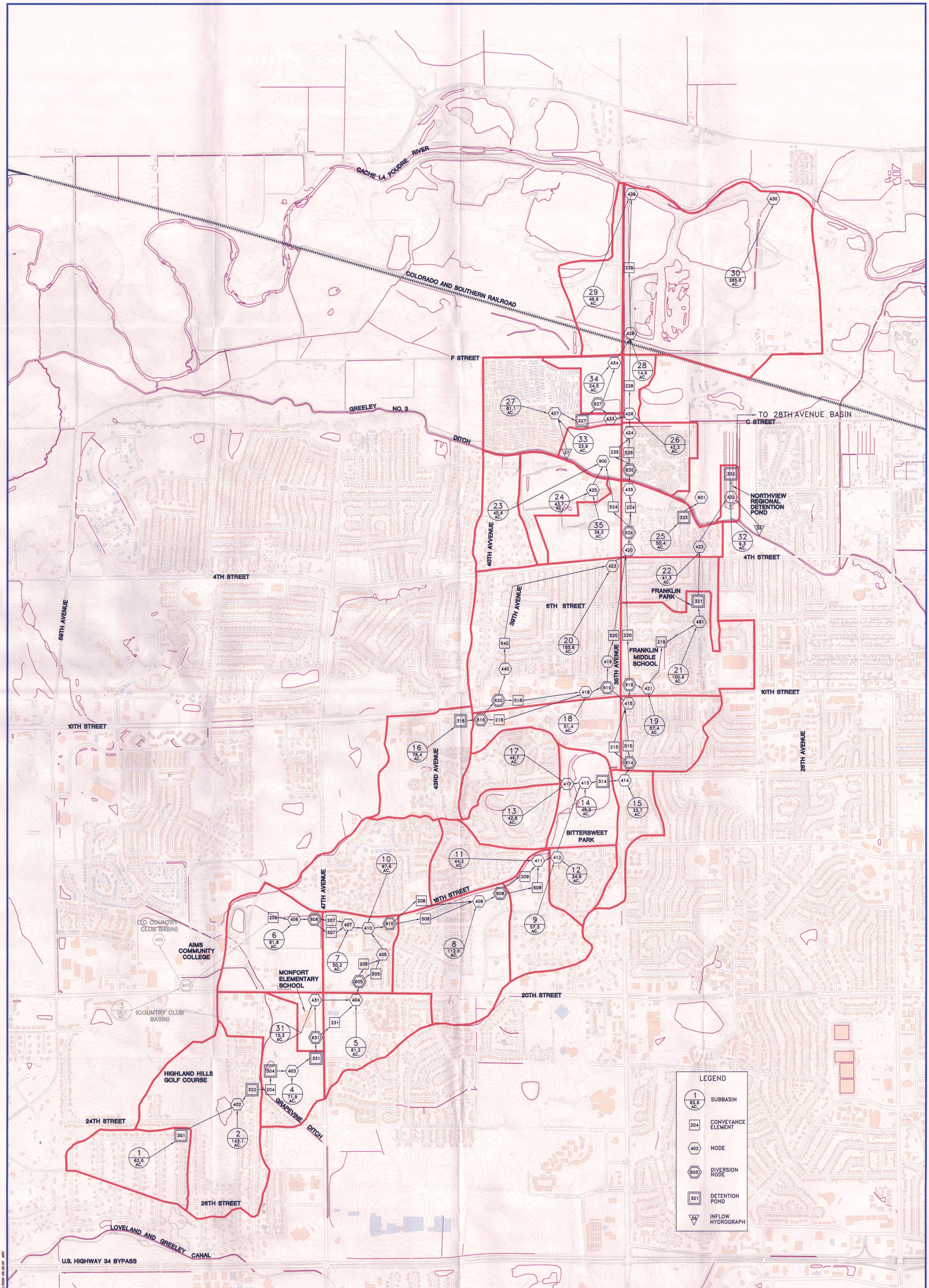
City of Greeley

CITY OF GREELEY COMPREHENSIVE DRAINAGE PLAN
GRAPEVINE BASIN
SUBBASIN MAP

PROJECT NUMBER: COCOG05	DRAWN BY: MRC
ACAD FILE: SUBBASIN SWMM	DESIGNED BY: BLV
DATE: 11/10/2005	CHECKED BY: BLV

Anderson Consulting Engineers, Inc
Civil · Water Resources · Environmental
772 Whalers Way, Suite 200, Fort Collins, CO 80525
Phone (970) 226-0120 / Fax (970) 226-0121

P:\acm2005\mxd\ Grapevine Basin\Subbasin\SWMM.dwg 12/09/2005 13:57 MRC



SHEET

A-2

CONTOUR INTERVAL
2-FOOT

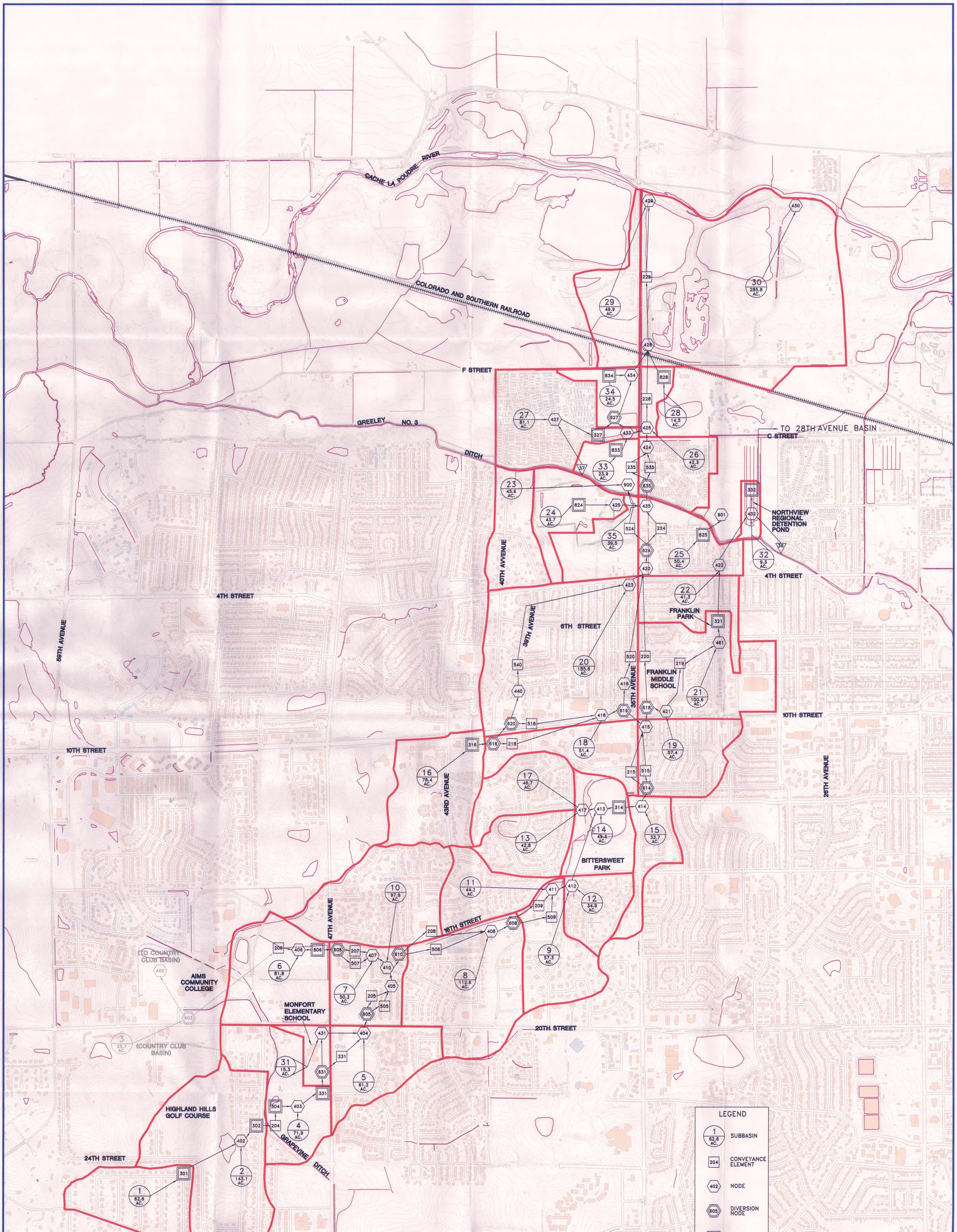
ORIGINAL SCALE: 1"=800'

0 400 800 1600

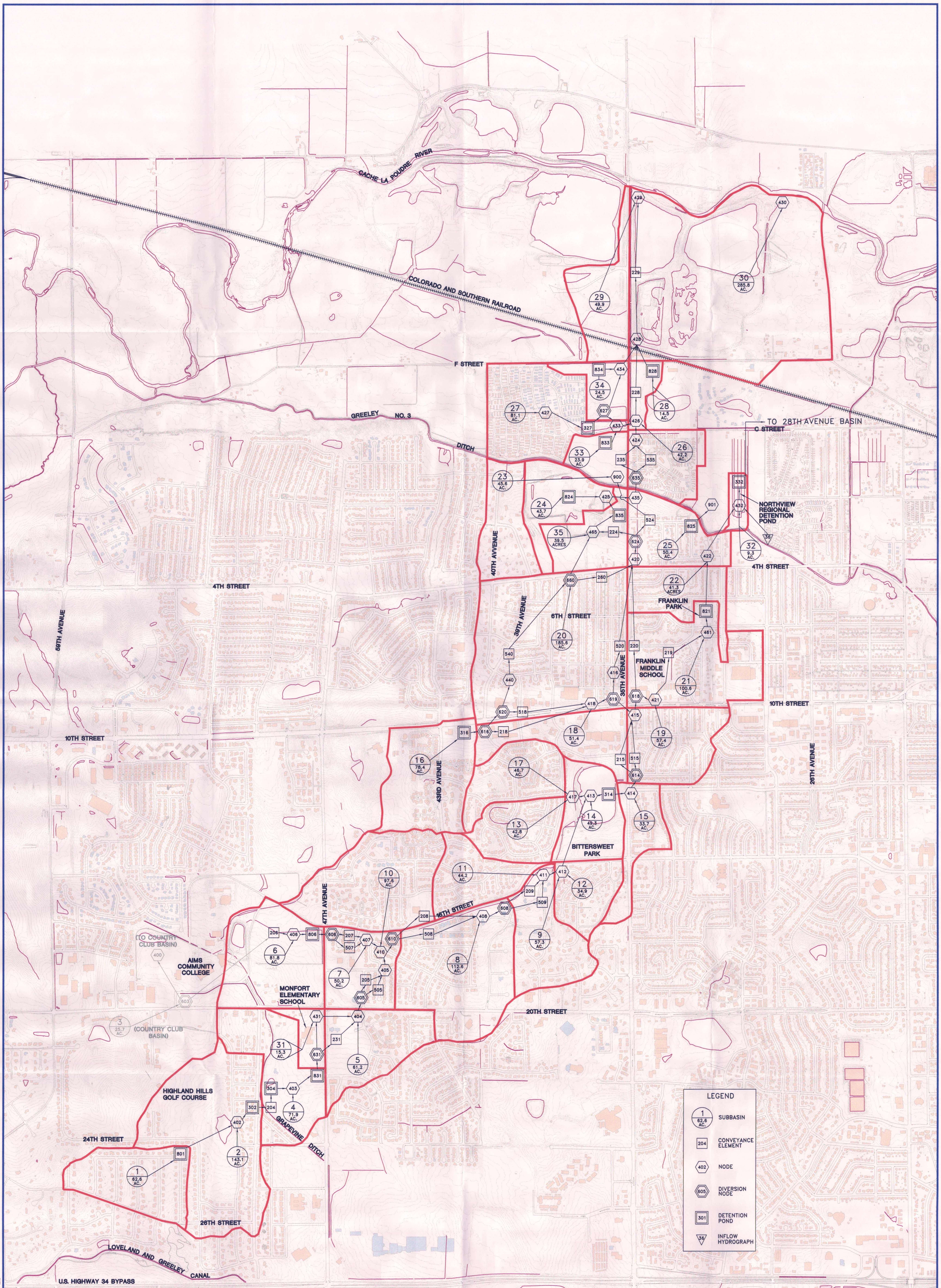
CITY OF GREELEY COMPREHENSIVE DRAINAGE PLAN
GRAPEVINE BASIN
EXISTING CONDITION SWMM SCHEMATIC

PROJECT NUMBER: COCOG05	DRAWN BY: MRC
ACAD FILE: SUBBASIN SWMM	DESIGNED BY: BLV
DATE: 11/10/2005	CHECKED BY: BLV

Anderson Consulting Engineers, Inc
Civil · Water Resources · Environmental
772 Whalers Way, Suite 200, Fort Collins, CO 80525
Phone (970) 226-0120 / Fax (970) 226-0121



SHEET		CONTOUR INTERVAL 2-FOOT; ORIGINAL SCALE: 1"=800'; 0 400 800 1600	City of Greeley	CITY OF GREELEY COMPREHENSIVE DRAINAGE PLAN GRAPEVINE BASIN FUTURE CONDITION SWMM SCHEMATIC	PROJECT NUMBER: COCOGO5	DRAWN BY: MRC	Anderson Consulting Engineers, Inc
A-3	N				ACAD FILE: SUBBASIN SWMM	DESIGNED BY: BLV	Civil · Water Resources · Environmental 772 Whalers Way, Suite 200, Fort Collins, CO 80525 Phone (970) 226-0120 / Fax (970) 226-0121
					DATE: 11/04/2005	CHECKED BY: BLV	



SHEET A-4

CONTOUR INTERVAL 2-FOOT

ORIGINAL SCALE: 1"=800'

0 400 800 1600

City of Greeley

CITY OF GREELEY COMPREHENSIVE DRAINAGE PLAN
GRAPEVINE BASIN
PROPOSED CONDITION SWMM SCHEMATIC

PROJECT NUMBER: COCOG05	DRAWN BY: MRC		
ACAD FILE: SUBBASIN SWMM	DESIGNED BY: BLV		
DATE: 11/10/2005	CHECKED BY: BLV		

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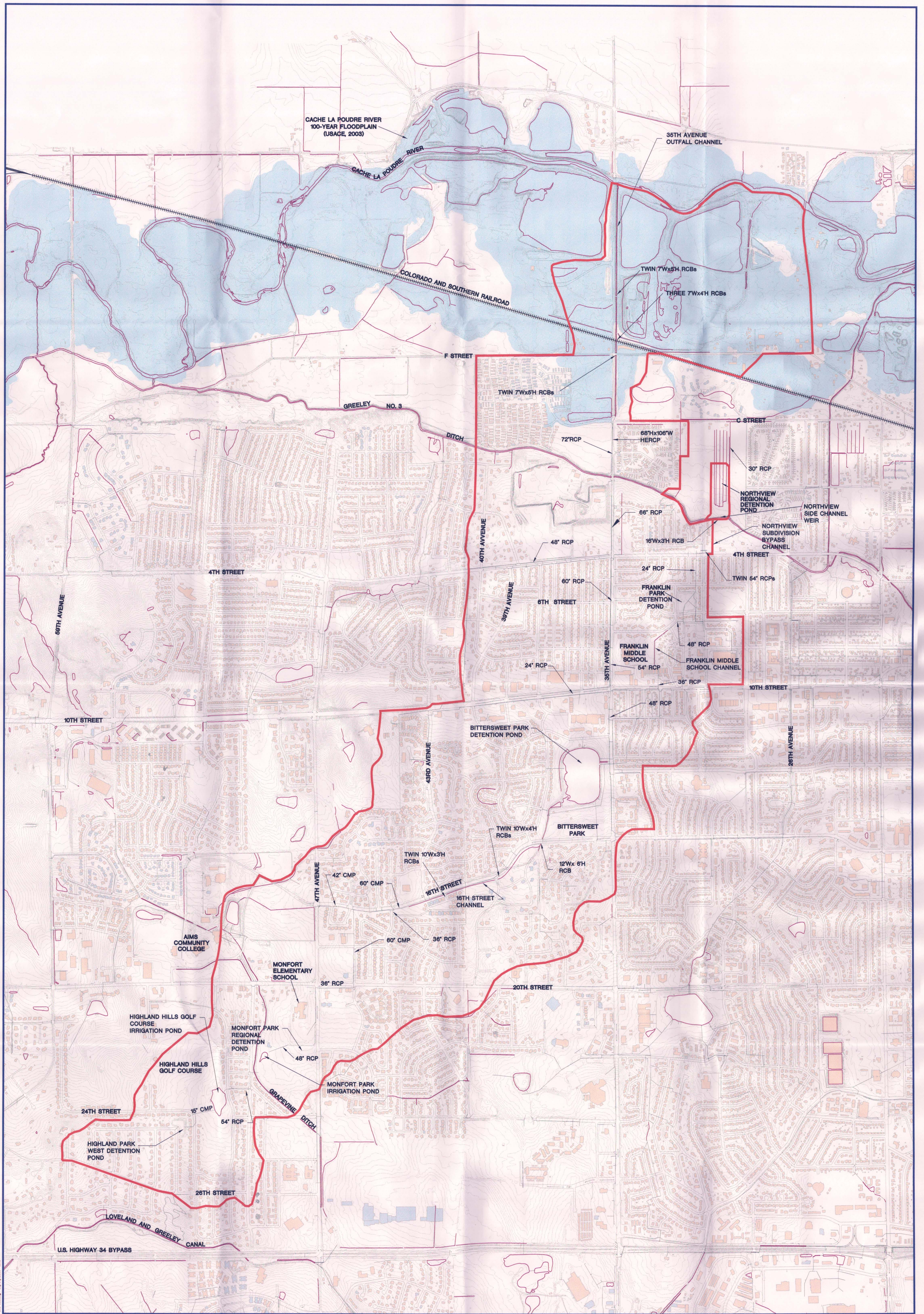
APPENDIX B

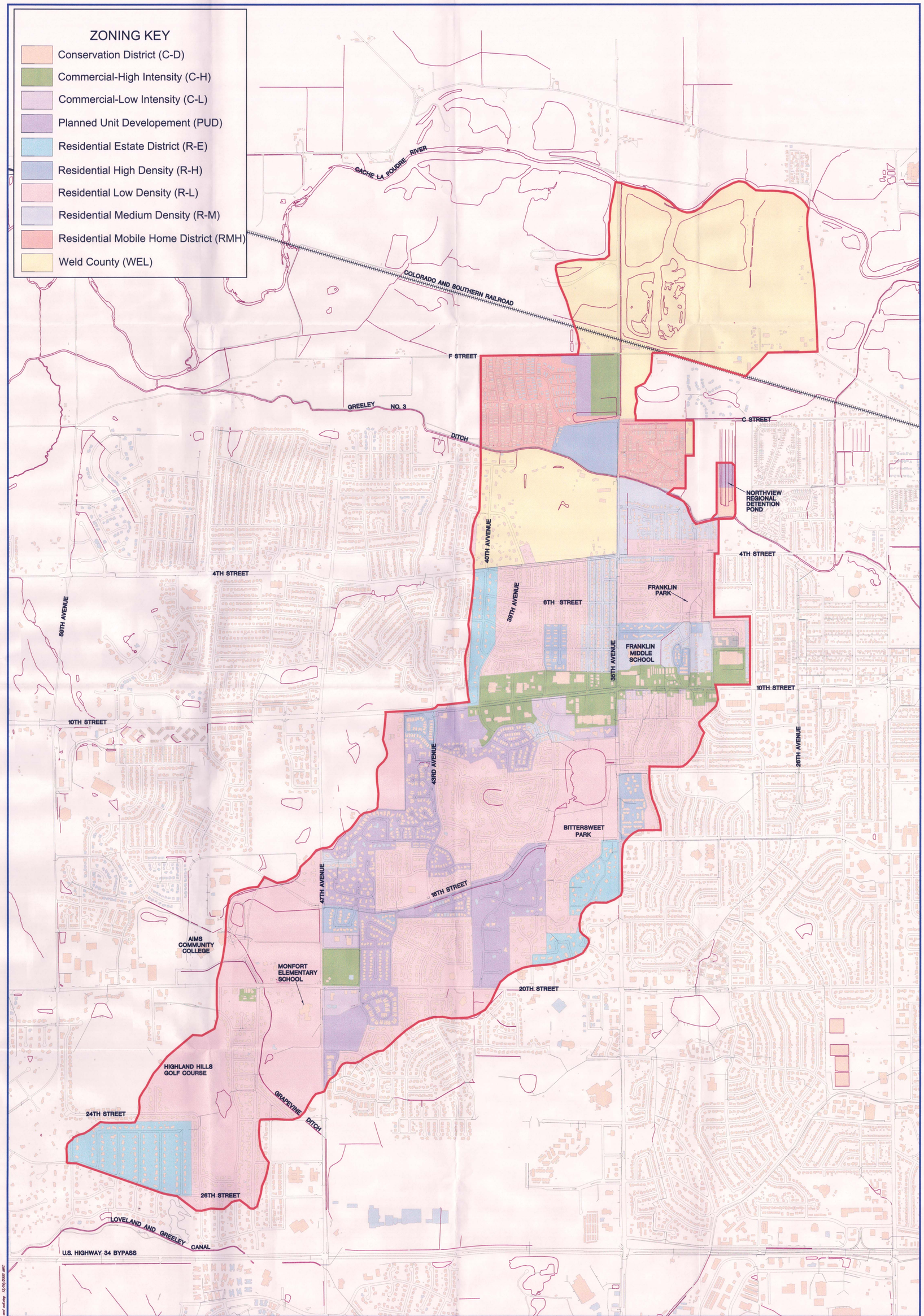
EXISTING FACILITIES MAPPING



SHEET		CONTOUR INTERVAL			PROJECT NUMBER:	DRAWN BY:	
B-1	N	CONTOUR INTERVAL 2-FOOT ORIGINAL SCALE: 1"=800' 0 400 800 1600	City of Greeley	CITY OF GREELEY COMPREHENSIVE DRAINAGE PLAN GRAPEVINE BASIN EXISTING DRAINAGE FACILITIES	PROJECT NUMBER: COCOG05 ACAD FILE: LAND AND SOIL DATE: 11/10/2005	DRAWN BY: MRC DESIGNED BY: BLV CHECKED BY: BLV	Anderson Consulting Engineers, Inc Civil • Water Resources • Environmental 772 Whalers Way, Suite 200, Fort Collins, CO 80525 Phone (970) 226-0120 / Fax (970) 226-0121

APPENDIX C

LAND USE AND SOILS MAPPING



SHEET
C-1

ORIGINAL SCALE: 1"=800'
0 400 800 1600

City of Greeley

CITY OF GREELEY COMPREHENSIVE DRAINAGE PLAN
GRAPEVINE BASIN
LAND USE MAP

PROJECT NUMBER:	COCOG05
ACAD FILE:	LAND AND SOIL
DATE:	11/10/2005
DRAWN BY:	MRC
DESIGNED BY:	BLV
CHECKED BY:	BLV

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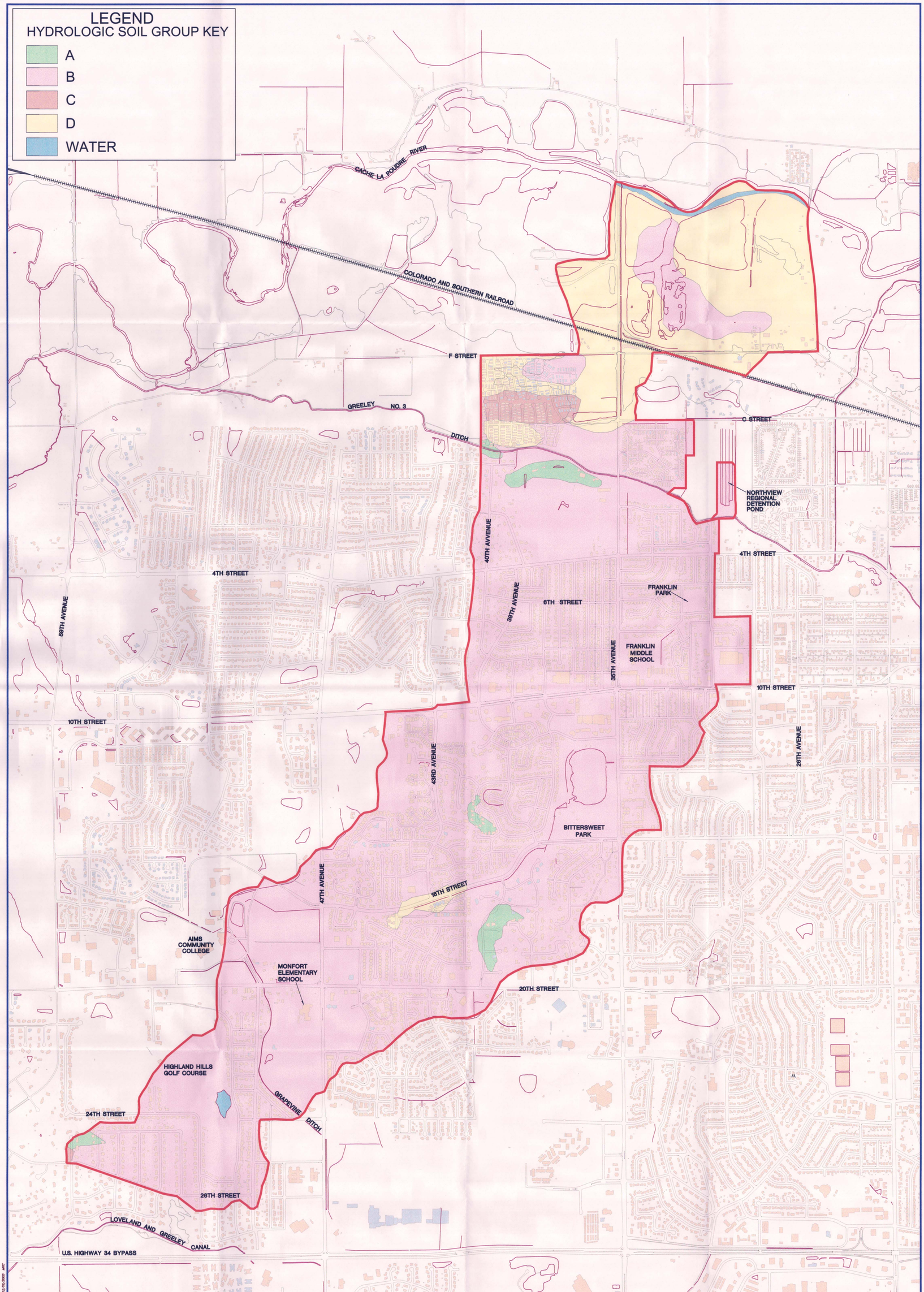

SHEET
C-2

ORIGINAL SCALE: 1"=800'
0 400 800 1600

City of Greeley

CITY OF GREELEY COMPREHENSIVE DRAINAGE PLAN
GRAPEVINE BASIN
HYDROLOGIC SOILS MAP

PROJECT NUMBER: COCOG05	DRAWN BY: MRC
ACAD FILE: LAND AND SOIL	DESIGNED BY: BLV
DATE: 11/10/2005	CHECKED BY: BLV

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Civil • Water Resources • Environmental
772 Whalers Way, Suite 200, Fort Collins, CO 80525
Phone (970) 226-0120 / Fax (970) 226-0121

APPENDIX D

HYDROLOGIC MODELING SUMMARIES

EXISTING CONDITION
(EXISTING DEVELOPMENT WITH EXISTING FACILITIES)

GRAPEVINE BASIN
FILENAME: GVB002EC.SUM
EXISTING CONDITION WITH EXISTING FACILITIES
EPA SWMM SUMMARY OUTPUT FILE
2-YEAR EVENT

SUMMARY OF EPA SWMM ANALYSIS
(See detailed output for more information)

City of Greeley Comprehensive Drainage Plan Update - ACE Inc.
Grapevine Basin - Existing Conditions - 2-Year Storm

SUB-BASIN INFLOWS

MO/DA/YR HR:MIN:SEC STEP	1	2	3	4	5	6	7	8	9	10
AVERAGE FLOW.....	1.295	2.768	1.106	1.532	3.361	0.568	2.864	3.898	0.949	3.412
STANDARD DEVIATION OF FLOW.....	0.346	0.719	0.300	0.412	0.865	0.168	0.737	1.021	0.262	0.885
MAXIMUM FLOW.....	20.270	40.770	18.960	24.510	52.100	9.425	44.180	63.020	14.730	53.680
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	4.62E+04	9.88E+04	3.95E+04	5.47E+04	1.20E+05	2.03E+04	1.02E+05	1.39E+05	3.39E+04	1.22E+05

MO/DA/YR HR:MIN:SEC STEP	11	12	13	14	15	16	17	18	19	20
AVERAGE FLOW.....	1.526	0.838	1.637	0.662	1.305	3.315	1.602	3.720	2.675	8.207
STANDARD DEVIATION OF FLOW.....	0.405	0.231	0.429	0.186	0.341	0.810	0.412	0.913	0.707	2.052
MAXIMUM FLOW.....	25.150	13.360	26.440	10.080	20.770	46.103	24.180	53.228	44.450	121.933
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	5.45E+04	2.99E+04	5.84E+04	2.36E+04	4.66E+04	1.18E+05	5.72E+04	1.33E+05	9.55E+04	2.93E+05

MO/DA/YR HR:MIN:SEC STEP	21	22	23	24	25	26	27	28	29	30
AVERAGE FLOW.....	5.624	1.655	0.395	0.137	1.658	1.911	3.509	0.000	0.336	8.228
STANDARD DEVIATION OF FLOW.....	1.582	0.435	0.116	0.051	0.438	0.478	0.939	0.000	0.103	2.071
MAXIMUM FLOW.....	110.390	26.870	6.241	3.059	26.910	27.049	59.800	0.000	5.522	116.310
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	2.01E+05	5.91E+04	1.41E+04	4.88E+03	5.92E+04	6.82E+04	1.25E+05	0.00E+00	1.20E+04	2.94E+05

MO/DA/YR HR:MIN:SEC STEP	31	32	33	34	35	36	37
AVERAGE FLOW.....	0.409	0.000	0.000	0.000	0.159	3.533	0.006
STANDARD DEVIATION OF FLOW.....	0.121	0.000	0.000	0.000	0.056	0.390	0.006
MAXIMUM FLOW.....	6.520	0.000	0.000	0.000	3.201	8.900	0.713
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.46E+04	0.00E+00	0.00E+00	0.00E+00	5.68E+03	1.26E+05	2.22E+02

CONVEYANCE ELEMENT OUTFLOWS

MO/DA/YR HR:MIN:SEC STEP	301	402	302	204	304	403	331	631	700	701
AVERAGE FLOW.....	0.537	3.305	0.000	0.000	0.000	1.532	1.532	1.532	1.532	0.000
STANDARD DEVIATION OF FLOW.....	0.013	0.715	0.000	0.000	0.000	0.412	0.390	0.390	0.390	0.000
MAXIMUM FLOW.....	0.700	40.911	0.000	0.000	0.000	24.510	19.585	19.585	19.585	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.92E+04	1.18E+05	0.00E+00	0.00E+00	0.00E+00	5.47E+04	5.47E+04	5.47E+04	5.47E+04	5.36E-05

MO/DA/YR HR:MIN:SEC STEP	231	431	404	605	704	705	205	505	405	603
AVERAGE FLOW.....	1.532	0.409	5.303	5.303	5.303	0.000	5.303	0.000	5.303	1.106
STANDARD DEVIATION OF FLOW.....	0.387	0.121	1.336	1.336	1.336	0.000	1.324	0.000	1.324	0.300
MAXIMUM FLOW.....	19.281	6.520	73.753	73.753	73.753	0.000	74.084	0.000	74.084	18.960
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	5.47E+04	1.46E+04	1.89E+05	1.89E+05	1.89E+05	3.49E-08	1.89E+05	3.11E-08	1.89E+05	3.95E+04

MO/DA/YR HR:MIN:SEC STEP	702	703	400	206	406	606	706	707	207	507
AVERAGE FLOW.....	1.098	0.008	0.008	1.199	1.766	1.766	1.766	0.000	1.762	0.000
STANDARD DEVIATION OF FLOW.....	0.296	0.008	0.008	0.265	0.413	0.413	0.413	0.000	0.412	0.000
MAXIMUM FLOW.....	18.000	0.960	0.960	14.216	21.679	21.679	21.679	0.000	21.570	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.92E+04	2.88E+02	2.88E+02	4.28E+04	6.31E+04	6.31E+04	6.31E+04	3.98E-04	6.29E+04	3.37E-04

MO/DA/YR HR:MIN:SEC STEP	407	410	610	708	709	208	508	408	608	710
AVERAGE FLOW.....	4.626	13.341	13.341	12.247	1.094	12.256	1.303	17.457	17.457	14.005
STANDARD DEVIATION OF FLOW.....	1.110	3.289	3.289	2.861	0.597	2.806	0.501	4.124	4.124	2.975
MAXIMUM FLOW.....	61.042	186.204	186.204	134.000	52.204	132.862	38.743	209.206	209.206	118.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.65E+05	4.76E+05	4.76E+05	4.37E+05	3.90E+04	4.38E+05	4.65E+04	6.23E+05	6.23E+05	5.00E+05

MO/DA/YR HR:MIN:SEC STEP	711	209	509	411	412	417	413	314	414	614
AVERAGE FLOW.....	3.451	13.997	3.451	18.975	20.762	3.239	24.663	10.490	11.795	11.795
STANDARD DEVIATION OF FLOW.....	1.420	2.959	1.373	4.419	4.860	0.841	5.787	0.281	0.295	0.295
MAXIMUM FLOW.....	91.206	120.624	87.399	220.226	239.756	50.620	284.059	13.711	22.138	22.138
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.23E+05	5.00E+05	1.23E+05	6.77E+05	7.41E+05	1.16E+05	8.80E+05	3.74E+05	4.21E+05	4.21E+05

MO/DA/YR HR:MIN:SEC STEP	712	713	215	515	316	616	714	715	218	620
AVERAGE FLOW.....	11.795	0.000	11.731	0.000	3.308	3.308	3.308	0.000	3.306	0.000
STANDARD DEVIATION OF FLOW.....	0.295	0.000	0.305	0.000	0.375	0.375	0.375	0.000	0.374	0.000
MAXIMUM FLOW.....	22.138	0.000	22.364	0.000	12.400	12.400	12.400	0.000	12.382	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FLOW VOLUME (CUBIC FEET).....	4.21E+05	2.86E-04	4.19E+05	0.00E+00	1.18E+05	1.18E+05	1.18E+05	7.15E-05	1.18E+05	7.15E-05

MO/DA/YR HR:MIN:SEC STEP	716	518	717	440	540	418	619	718	415	719
AVERAGE FLOW.....	0.000	0.000	0.000	0.000	0.000	7.026	7.026	7.026	18.757	0.000
STANDARD DEVIATION OF FLOW.....	0.000	0.000	0.000	0.000	0.000	1.105	1.105	1.105	1.342	0.000
MAXIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	56.233	56.233	56.233	78.596	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	7.15E-05	0.00E+00	4.26E-12	4.26E-12	0.00E+00	2.51E+05	2.51E+05	2.51E+05	6.70E+05	6.19E-04

MO/DA/YR HR:MIN:SEC STEP	618	720	721	416	520	220	423	420	624	722
AVERAGE FLOW.....	18.757	18.757	0.000	0.000	0.000	18.647	8.207	26.855	26.855	26.855
STANDARD DEVIATION OF FLOW.....	1.342	1.342	0.000	0.000	0.000	1.333	2.052	3.243	3.243	3.243
MAXIMUM FLOW.....	78.596	78.596	0.000	0.000	0.000	76.168	121.933	193.801	193.801	193.801
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	6.70E+05	6.70E+05	5.72E-04	6.19E-04	1.05E-03	6.66E+05	2.93E+05	9.59E+05	9.59E+05	9.59E+05

MO/DA/YR HR:MIN:SEC STEP	723	224	524	425	435	635	726	727	235	535
AVERAGE FLOW.....	0.000	26.809	0.000	0.296	26.809	26.809	26.809	0.000	26.749	0.000
STANDARD DEVIATION OF FLOW.....	0.000	3.236	0.000	0.107	3.236	3.236	3.236	0.000	3.222	0.000
MAXIMUM FLOW.....	0.000	190.867	0.000	6.260	190.867	190.867	190.867	0.000	188.973	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	0.00E+00	9.57E+05	0.00E+00	1.06E+04	9.57E+05	9.57E+05	9.57E+05	1.43E-03	9.55E+05	1.09E-03

MO/DA/YR HR:MIN:SEC STEP	424	421	219	461	321	422	325	432	332	427
AVERAGE FLOW.....	26.749	2.675	2.684	8.308	7.807	9.462	1.386	12.995	5.760	3.515
STANDARD DEVIATION OF FLOW.....	3.222	0.707	0.683	2.187	0.582	0.806	0.064	0.980	0.190	0.941
MAXIMUM FLOW.....	188.973	44.450	41.865	139.064	16.374	37.461	2.554	37.488	7.175	59.800
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	9.55E+05	9.55E+04	9.58E+04	2.97E+05	2.79E+05	3.38E+05	4.95E+04	4.64E+05	2.06E+05	1.25E+05

MO/DA/YR HR:MIN:SEC STEP	327	627	724	725	433	426	228	434	428	229
AVERAGE FLOW.....	2.034	2.034	2.034	0.000	2.034	30.694	30.480	0.000	30.480	30.335
STANDARD DEVIATION OF FLOW.....	0.058	0.058	0.058	0.000	0.058	3.670	3.538	0.000	3.538	3.038
MAXIMUM FLOW.....	2.909	2.909	2.909	0.000	2.909	214.025	205.595	0.000	205.595	143.731
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	7.26E+04	7.26E+04	7.26E+04	5.01E-04	7.26E+04	1.10E+06	1.09E+06	5.01E-04	1.09E+06	1.08E+06

MO/DA/YR HR:MIN:SEC STEP	429	430	900	901
AVERAGE FLOW.....	30.671	8.228	0.691	1.386
STANDARD DEVIATION OF FLOW.....	3.076	2.071	0.219	0.064
MAXIMUM FLOW.....	147.094	116.310	12.501	2.554
MINIMUM FLOW.....	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.09E+06	2.94E+05	2.47E+04	4.95E+04

CONVEYANCE ELEMENT FLOW DEPTHS (IN FEET)

MO/DA/YR HR:MIN:SEC STEP	301	302	204	304	331	231	205	505	206	207
MAXIMUM DEPTH.....	1.100	0.755	0.000	0.000	2.161	0.991	2.421	0.000	0.409	1.201
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1										

MO/DA/YR HR:MIN:SEC STEP	507	208	508	209	509	314	215	515	218	518
MAXIMUM DEPTH.....	0.000	4.074	0.592	4.097	0.967	1.426	1.155	0.000	0.919	0.000
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000	0.300	0.000	0.000	0.000	0.000
1										

MO/DA/YR HR:MIN:SEC STEP	540	520	220	224	524	235	535	219	321	332
MAXIMUM DEPTH.....	0.000	0.000	1.948	2.372	0.000	3.147	0.000	1.141	3.250	3.875
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1										

MO/DA/YR HR:MIN:SEC STEP	327	228	229
MAXIMUM DEPTH.....	0.763	3.652	3.421
MINIMUM DEPTH.....	0.000	0.000	0.000

GRAPEVINE BASIN
FILENAME: GVB005EC.SUM
EXISTING CONDITION WITH EXISTING FACILITIES
EPA SWMM SUMMARY OUTPUT FILE
5-YEAR EVENT

SUMMARY OF EPA SWMM ANALYSIS
(See detailed output for more information)

City of Greeley Comprehensive Drainage Plan Update - ACE Inc.
Grapevine Basin - Existing Conditions - 5-Year Storm

SUB-BASIN INFLOWS

MO/DA/YR HR:MIN:SEC STEP	1	2	3	4	5	6	7	8	9	10
AVERAGE FLOW.....	3.052	6.899	1.997	3.648	5.704	2.538	4.779	7.477	2.598	6.607
STANDARD DEVIATION OF FLOW.....	0.827	1.830	0.549	0.995	1.482	0.731	1.242	2.012	0.699	1.765
MAXIMUM FLOW.....	48.800	108.015	35.190	59.570	89.706	43.591	74.673	124.010	40.417	107.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.09E+05	2.46E+05	7.13E+04	1.30E+05	2.04E+05	9.06E+04	1.71E+05	2.67E+05	9.28E+04	2.36E+05

MO/DA/YR HR:MIN:SEC STEP	11	12	13	14	15	16	17	18	19	20
AVERAGE FLOW.....	2.980	1.922	3.044	2.006	2.450	6.019	3.128	5.876	4.738	14.716
STANDARD DEVIATION OF FLOW.....	0.813	0.521	0.816	0.543	0.655	1.502	0.823	1.440	1.273	3.763
MAXIMUM FLOW.....	51.270	30.510	50.770	30.962	40.410	87.850	48.620	84.377	80.240	229.671
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.06E+05	6.86E+04	1.09E+05	7.16E+04	8.75E+04	2.15E+05	1.12E+05	2.10E+05	1.69E+05	5.25E+05

MO/DA/YR HR:MIN:SEC STEP	21	22	23	24	25	26	27	28	29	30
AVERAGE FLOW.....	9.341	3.073	1.464	0.771	3.296	3.405	6.823	0.593	2.078	19.365
STANDARD DEVIATION OF FLOW.....	2.643	0.826	0.409	0.229	0.892	0.864	1.874	0.161	0.590	5.014
MAXIMUM FLOW.....	186.820	51.470	23.222	13.618	55.550	50.249	120.480	8.276	33.020	292.828
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.33E+05	1.10E+05	5.23E+04	2.75E+04	1.18E+05	1.22E+05	2.44E+05	2.12E+04	7.42E+04	6.91E+05

MO/DA/YR HR:MIN:SEC STEP	31	32	33	34	35	36	37
AVERAGE FLOW.....	0.970	0.249	0.534	0.857	1.086	12.044	0.000
STANDARD DEVIATION OF FLOW.....	0.257	0.067	0.164	0.253	0.320	1.512	0.000
MAXIMUM FLOW.....	14.020	3.387	9.849	14.179	18.551	97.893	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.46E+04	8.91E+03	1.90E+04	3.06E+04	3.88E+04	4.30E+05	0.00E+00

CONVEYANCE ELEMENT OUTFLOWS

MO/DA/YR HR:MIN:SEC STEP	301	402	302	204	304	403	331	631	700	701
AVERAGE FLOW.....	1.769	8.669	0.000	0.000	0.000	3.648	3.648	3.648	3.648	0.000
STANDARD DEVIATION OF FLOW.....	0.110	1.832	0.000	0.000	0.000	0.995	0.840	0.840	0.840	0.000
MAXIMUM FLOW.....	4.144	108.554	0.000	0.000	0.000	59.570	33.740	33.740	33.740	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	6.32E+04	3.09E+05	0.00E+00	0.00E+00	0.00E+00	1.30E+05	1.30E+05	1.30E+05	1.30E+05	5.72E-04

MO/DA/YR HR:MIN:SEC STEP	231	431	404	605	704	705	205	505	405	603
AVERAGE FLOW.....	3.647	0.970	10.321	10.321	10.321	0.000	10.320	0.000	10.320	1.997
STANDARD DEVIATION OF FLOW.....	0.837	0.257	2.455	2.455	2.455	0.000	2.438	0.000	2.438	0.549
MAXIMUM FLOW.....	33.709	14.020	131.838	131.838	131.838	0.000	131.120	0.000	131.120	35.190
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.30E+05	3.46E+04	3.68E+05	3.68E+05	3.68E+05	5.59E-07	3.68E+05	4.97E-07	3.68E+05	7.13E+04

MO/DA/YR HR:MIN:SEC STEP	702	703	400	206	406	606	706	707	207	507
AVERAGE FLOW.....	1.608	0.389	0.389	1.713	4.251	4.251	4.251	0.000	4.247	0.000
STANDARD DEVIATION OF FLOW.....	0.390	0.202	0.202	0.362	1.049	1.049	1.049	0.000	1.046	0.000
MAXIMUM FLOW.....	18.000	17.190	17.190	17.471	55.187	55.187	55.187	0.000	55.809	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	5.74E+04	1.39E+04	1.39E+04	6.12E+04	1.52E+05	1.52E+05	1.52E+05	3.09E-03	1.52E+05	3.10E-03

MO/DA/YR HR:MIN:SEC STEP	407	410	610	708	709	208	508	408	608	710
AVERAGE FLOW.....	9.025	25.953	25.953	17.791	8.161	17.809	8.376	33.662	33.662	18.770
STANDARD DEVIATION OF FLOW.....	2.242	6.381	6.381	3.705	3.284	3.656	2.960	7.922	7.922	3.625
MAXIMUM FLOW.....	130.483	368.358	368.358	134.000	234.358	133.987	189.242	419.552	419.552	118.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.22E+05	9.27E+05	9.27E+05	6.35E+05	2.91E+05	6.36E+05	2.99E+05	1.20E+06	1.20E+06	6.70E+05

MO/DA/YR HR:MIN:SEC STEP	711	209	509	411	412	417	413	314	414	614
AVERAGE FLOW.....	14.892	18.762	14.892	36.635	41.154	6.172	49.332	21.930	24.380	24.380
STANDARD DEVIATION OF FLOW.....	4.936	3.606	4.863	8.531	9.637	1.638	11.633	0.673	0.672	0.672
MAXIMUM FLOW.....	301.552	120.080	293.345	440.920	494.162	99.390	600.215	32.063	43.469	43.469
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	5.32E+05	6.70E+05	5.32E+05	1.31E+06	1.47E+06	2.20E+05	1.76E+06	7.83E+05	8.70E+05	8.70E+05

MO/DA/YR HR:MIN:SEC STEP	712	713	215	515	316	616	714	715	218	620
AVERAGE FLOW.....	24.380	0.000	24.278	0.000	6.006	6.006	6.006	0.000	6.003	0.000
STANDARD DEVIATION OF FLOW.....	0.672	0.000	0.688	0.000	0.687	0.687	0.687	0.000	0.686	0.000
MAXIMUM FLOW.....	43.469	0.000	44.532	0.000	23.010	23.010	23.010	0.000	22.987	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FLOW VOLUME (CUBIC FEET).....	8.70E+05	1.72E-03	8.67E+05	9.38E-04	2.14E+05	2.14E+05	2.14E+05	1.01E-04	2.14E+05	1.01E-04

MO/DA/YR HR:MIN:SEC STEP	716	518	717	440	540	418	619	718	415	719
AVERAGE FLOW.....	0.000	0.000	0.000	0.000	0.000	11.879	11.879	11.879	36.157	0.000
STANDARD DEVIATION OF FLOW.....	0.000	0.000	0.000	0.000	0.000	1.814	1.814	1.814	2.328	0.000
MAXIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	90.371	90.371	90.371	134.903	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.01E-04	1.36E-04	6.00E-12	6.00E-12	9.70E-12	4.24E+05	4.24E+05	4.24E+05	1.29E+06	2.64E-03

MO/DA/YR HR:MIN:SEC STEP	618	720	721	416	520	220	423	420	624	722
AVERAGE FLOW.....	36.157	36.157	0.000	0.000	0.000	35.980	14.716	50.696	50.696	50.696
STANDARD DEVIATION OF FLOW.....	2.328	2.328	0.000	0.000	0.000	2.322	3.763	5.781	5.781	5.781
MAXIMUM FLOW.....	134.903	134.903	0.000	0.000	0.000	131.909	229.671	352.790	352.790	352.790
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.29E+06	1.29E+06	4.58E-03	2.64E-03	4.22E-03	1.28E+06	5.25E+05	1.81E+06	1.81E+06	1.81E+06

MO/DA/YR HR:MIN:SEC STEP	723	224	524	425	435	635	726	727	235	535
AVERAGE FLOW.....	0.000	50.625	0.000	1.857	50.625	50.625	50.625	0.000	50.528	0.000
STANDARD DEVIATION OF FLOW.....	0.000	5.771	0.000	0.548	5.771	5.771	5.771	0.000	5.749	0.000
MAXIMUM FLOW.....	0.000	347.390	0.000	32.170	347.390	347.390	347.390	0.000	342.412	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	0.00E+00	1.81E+06	0.00E+00	6.63E+04	1.81E+06	1.81E+06	1.81E+06	6.29E-03	1.80E+06	4.95E-03

MO/DA/YR HR:MIN:SEC STEP	424	421	219	461	321	422	325	432	332	427
AVERAGE FLOW.....	50.528	4.738	4.754	14.094	13.376	16.450	2.757	28.744	7.892	7.357
STANDARD DEVIATION OF FLOW.....	5.749	1.273	1.242	3.771	0.621	1.098	0.129	2.523	0.196	2.029
MAXIMUM FLOW.....	342.412	80.240	78.277	241.703	21.662	64.407	5.106	157.399	9.037	128.950
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.80E+06	1.69E+05	1.70E+05	5.03E+05	4.78E+05	5.87E+05	9.84E+04	1.03E+06	2.82E+05	2.63E+05

MO/DA/YR HR:MIN:SEC STEP	327	627	724	725	433	426	228	434	428	229
AVERAGE FLOW.....	4.225	4.225	4.225	0.000	4.225	58.158	57.745	0.857	59.195	58.753
STANDARD DEVIATION OF FLOW.....	0.118	0.118	0.118	0.000	0.118	6.565	6.371	0.253	6.732	5.909
MAXIMUM FLOW.....	5.896	5.896	5.896	0.000	5.896	388.607	372.719	14.179	390.329	304.042
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.51E+05	1.51E+05	1.51E+05	1.04E-03	1.51E+05	2.08E+06	2.06E+06	3.06E+04	2.11E+06	2.10E+06

MO/DA/YR HR:MIN:SEC STEP	429	430	900	901
AVERAGE FLOW.....	60.831	19.365	3.321	2.757
STANDARD DEVIATION OF FLOW.....	6.226	5.014	0.956	0.129
MAXIMUM FLOW.....	325.761	292.828	55.391	5.106
MINIMUM FLOW.....	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	2.17E+06	6.91E+05	1.19E+05	9.84E+04

CONVEYANCE ELEMENT FLOW DEPTHS (IN FEET)

MO/DA/YR HR:MIN:SEC STEP	301	302	204	304	331	231	205	505	206	207
MAXIMUM DEPTH.....	2.189	1.982	0.000	0.000	3.291	1.328	3.503	0.000	0.446	2.061
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1										

MO/DA/YR HR:MIN:SEC STEP	507	208	508	209	509	314	215	515	218	518
MAXIMUM DEPTH.....	0.000	4.104	1.502	4.140	1.767	2.512	1.663	0.000	1.357	0.000
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000	0.300	0.000	0.000	0.000	0.000
1										

MO/DA/YR HR:MIN:SEC STEP	540	520	220	224	524	235	535	219	321	332
MAXIMUM DEPTH.....	0.000	0.000	2.648	3.402	0.000	4.538	0.000	1.554	4.761	5.874
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1										

MO/DA/YR HR:MIN:SEC STEP	327	228	229
MAXIMUM DEPTH.....	1.548	4.971	4.811
MINIMUM DEPTH.....	0.000	0.000	0.000

GRAPEVINE BASIN
FILENAME: GVB010EC.SUM
EXISTING CONDITION WITH EXISTING FACILITIES
EPA SWMM SUMMARY OUTPUT FILE
10-YEAR EVENT

SUMMARY OF EPA SWMM ANALYSIS
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Grapevine Basin - Existing Conditions - 10-Year Storm

SUB-BASIN INFLOWS

MO/DA/YR HR:MIN:SEC STEP	1	2	3	4	5	6	7	8	9	10
AVERAGE FLOW.....	4.503	10.275	2.639	5.340	7.313	4.320	6.101	10.188	3.930	8.996
STANDARD DEVIATION OF FLOW.....	1.179	2.640	0.713	1.413	1.875	1.170	1.560	2.692	1.021	2.359
MAXIMUM FLOW.....	69.560	149.770	46.130	84.720	115.590	65.692	95.740	168.990	57.680	145.760
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.61E+05	3.67E+05	9.42E+04	1.91E+05	2.61E+05	1.54E+05	2.18E+05	3.64E+05	1.40E+05	3.21E+05

MO/DA/YR HR:MIN:SEC STEP	11	12	13	14	15	16	17	18	19	20
AVERAGE FLOW.....	4.069	2.769	4.096	3.142	3.285	7.976	4.271	7.297	6.208	19.380
STANDARD DEVIATION OF FLOW.....	1.087	0.726	1.080	0.811	0.866	1.963	1.102	1.759	1.643	4.893
MAXIMUM FLOW.....	68.960	42.530	68.130	44.164	54.120	112.764	65.770	102.437	105.950	293.758
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.45E+05	9.89E+04	1.46E+05	1.12E+05	1.17E+05	2.85E+05	1.52E+05	2.60E+05	2.22E+05	6.92E+05

MO/DA/YR HR:MIN:SEC STEP	21	22	23	24	25	26	27	28	29	30
AVERAGE FLOW.....	11.867	4.113	2.451	1.463	4.532	4.473	9.026	0.991	3.332	26.925
STANDARD DEVIATION OF FLOW.....	3.315	1.088	0.641	0.427	1.200	1.116	2.408	0.254	0.876	6.721
MAXIMUM FLOW.....	237.480	68.800	34.521	24.727	75.190	63.573	157.010	12.113	46.495	379.538
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	4.24E+05	1.47E+05	8.75E+04	5.22E+04	1.62E+05	1.60E+05	3.22E+05	3.54E+04	1.19E+05	9.61E+05

MO/DA/YR HR:MIN:SEC STEP	31	32	33	34	35	36	37
AVERAGE FLOW.....	1.394	0.496	1.030	1.462	1.929	23.578	0.000
STANDARD DEVIATION OF FLOW.....	0.351	0.124	0.296	0.398	0.528	2.481	0.000
MAXIMUM FLOW.....	19.150	5.595	16.322	20.851	28.784	120.940	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	4.98E+04	1.77E+04	3.68E+04	5.22E+04	6.89E+04	8.42E+05	0.00E+00

CONVEYANCE ELEMENT OUTFLOWS

MO/DA/YR HR:MIN:SEC STEP	301	402	302	204	304	403	331	631	700	701
AVERAGE FLOW.....	2.942	13.217	4.443	4.431	3.691	9.031	9.026	9.026	9.026	0.000
STANDARD DEVIATION OF FLOW.....	0.139	2.634	0.496	0.495	0.365	1.362	1.057	1.057	1.057	0.000
MAXIMUM FLOW.....	4.594	150.229	23.419	23.518	18.104	84.720	40.255	40.255	40.255	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.05E+05	4.72E+05	1.59E+05	1.58E+05	1.32E+05	3.22E+05	3.22E+05	3.22E+05	3.22E+05	2.50E-04

MO/DA/YR HR:MIN:SEC STEP	231	431	404	605	704	705	205	505	405	603
AVERAGE FLOW.....	9.011	1.394	17.719	17.719	17.601	0.117	17.579	0.128	17.707	2.639
STANDARD DEVIATION OF FLOW.....	1.056	0.351	3.056	3.056	3.010	0.084	2.991	0.068	3.036	0.713
MAXIMUM FLOW.....	40.276	19.150	161.983	161.983	154.000	7.983	157.409	6.660	160.714	46.130
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.22E+05	4.98E+04	6.33E+05	6.33E+05	6.28E+05	4.19E+03	6.28E+05	4.55E+03	6.32E+05	9.42E+04

MO/DA/YR HR:MIN:SEC STEP	702	703	400	206	406	606	706	707	207	507
AVERAGE FLOW.....	1.898	0.741	0.741	2.007	6.327	6.327	6.327	0.000	6.323	0.000
STANDARD DEVIATION OF FLOW.....	0.427	0.349	0.349	0.401	1.513	1.513	1.513	0.000	1.510	0.000
MAXIMUM FLOW.....	18.000	28.130	28.130	17.957	77.988	77.988	77.988	0.000	78.678	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	6.78E+04	2.65E+04	2.65E+04	7.17E+04	2.26E+05	2.26E+05	2.26E+05	4.34E-04	2.26E+05	3.15E-04

MO/DA/YR HR:MIN:SEC STEP	407	410	610	708	709	208	508	408	608	710
AVERAGE FLOW.....	12.424	39.126	39.126	24.658	14.469	24.642	14.757	49.587	49.587	25.007
STANDARD DEVIATION OF FLOW.....	3.027	8.314	8.314	3.987	5.117	3.944	4.773	10.420	10.420	3.813
MAXIMUM FLOW.....	170.641	468.980	468.980	134.000	334.980	133.998	297.668	556.770	556.770	118.000
MINIMUM FLOW.....	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.001	0.001
FLOW VOLUME (CUBIC FEET).....	4.44E+05	1.40E+06	1.40E+06	8.80E+05	5.17E+05	8.80E+05	5.27E+05	1.77E+06	1.77E+06	8.93E+05

MO/DA/YR HR:MIN:SEC STEP	711	209	509	411	412	417	413	314	414	614
AVERAGE FLOW.....	24.580	24.985	24.580	53.634	60.333	8.367	71.843	34.515	37.799	37.799
STANDARD DEVIATION OF FLOW.....	7.414	3.798	7.333	11.256	12.854	2.180	15.620	1.079	0.982	0.982
MAXIMUM FLOW.....	438.770	118.663	430.231	597.831	680.987	133.900	821.518	49.627	57.815	57.815
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	8.78E+05	8.92E+05	8.78E+05	1.91E+06	2.15E+06	2.99E+05	2.56E+06	1.23E+06	1.35E+06	1.35E+06

MO/DA/YR HR:MIN:SEC STEP	712	713	215	515	316	616	714	715	218	620
AVERAGE FLOW.....	37.799	0.000	37.666	0.000	7.960	7.960	7.221	0.739	7.218	0.739
STANDARD DEVIATION OF FLOW.....	0.982	0.000	1.006	0.000	1.034	1.034	0.837	0.313	0.835	0.313
MAXIMUM FLOW.....	57.815	0.000	58.532	0.000	49.878	49.878	28.600	21.278	28.600	21.278
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FLOW VOLUME (CUBIC FEET).....	1.35E+06	5.72E-04	1.34E+06	0.00E+00	2.84E+05	2.84E+05	2.58E+05	2.64E+04	2.58E+05	2.64E+04

MO/DA/YR HR:MIN:SEC STEP	716	518	717	440	540	418	619	718	415	719
AVERAGE FLOW.....	0.739	0.793	0.000	0.000	0.000	15.308	15.308	15.308	52.974	0.000
STANDARD DEVIATION OF FLOW.....	0.313	0.280	0.000	0.000	0.000	2.387	2.387	2.387	3.030	0.000
MAXIMUM FLOW.....	21.278	17.192	0.000	0.000	0.000	110.731	110.731	110.731	169.263	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	2.64E+04	2.83E+04	2.08E-11	2.08E-11	2.89E-11	5.47E+05	5.47E+05	5.47E+05	1.89E+06	6.26E-04

MO/DA/YR HR:MIN:SEC STEP	618	720	721	416	520	220	423	420	624	722
AVERAGE FLOW.....	52.974	52.974	0.000	0.000	0.000	52.740	19.380	72.120	72.120	72.120
STANDARD DEVIATION OF FLOW.....	3.030	3.030	0.000	0.000	0.000	3.029	4.893	7.447	7.447	7.447
MAXIMUM FLOW.....	169.263	169.263	0.000	0.000	0.000	164.615	293.758	451.480	451.480	451.480
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001
FLOW VOLUME (CUBIC FEET).....	1.89E+06	1.89E+06	6.29E-03	6.26E-04	1.13E-03	1.88E+06	6.92E+05	2.57E+06	2.57E+06	2.57E+06

MO/DA/YR HR:MIN:SEC STEP	723	224	524	425	435	635	726	727	235	535
AVERAGE FLOW.....	0.000	72.026	0.000	3.393	72.026	72.026	72.026	0.000	71.899	0.000
STANDARD DEVIATION OF FLOW.....	0.000	7.435	0.000	0.954	7.435	7.435	7.435	0.000	7.407	0.000
MAXIMUM FLOW.....	0.000	448.476	0.000	53.510	448.476	448.476	448.476	0.000	432.252	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	4.58E-03	2.57E+06	4.03E-03	1.21E+05	2.57E+06	2.57E+06	2.57E+06	1.03E-02	2.57E+06	8.79E-03

MO/DA/YR HR:MIN:SEC STEP	424	421	219	461	321	422	325	432	332	427
AVERAGE FLOW.....	71.899	6.208	6.223	18.090	17.043	21.157	3.788	45.230	9.108	10.057
STANDARD DEVIATION OF FLOW.....	7.407	1.643	1.606	4.785	0.729	1.375	0.177	3.760	0.222	2.692
MAXIMUM FLOW.....	432.252	105.950	102.610	312.934	41.228	82.832	6.985	195.394	10.457	172.590
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	2.57E+06	2.22E+05	2.22E+05	6.46E+05	6.08E+05	7.55E+05	1.35E+05	1.61E+06	3.25E+05	3.59E+05

MO/DA/YR HR:MIN:SEC STEP	327	627	724	725	433	426	228	434	428	229
AVERAGE FLOW.....	5.696	5.696	5.696	0.000	5.696	82.068	81.536	1.462	83.990	82.950
STANDARD DEVIATION OF FLOW.....	0.156	0.156	0.156	0.000	0.156	8.456	8.226	0.398	8.799	7.771
MAXIMUM FLOW.....	7.777	7.777	7.777	0.000	7.777	498.219	470.773	20.851	497.173	382.095
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	2.03E+05	2.03E+05	2.03E+05	1.61E-03	2.03E+05	2.93E+06	2.91E+06	5.22E+04	3.00E+06	2.96E+06

MO/DA/YR HR:MIN:SEC STEP	429	430	900	901
AVERAGE FLOW.....	86.282	26.925	5.844	3.788
STANDARD DEVIATION OF FLOW.....	8.278	6.721	1.593	0.177
MAXIMUM FLOW.....	409.301	379.538	88.032	6.985
MINIMUM FLOW.....	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.08E+06	9.61E+05	2.09E+05	1.35E+05

CONVEYANCE ELEMENT FLOW DEPTHS (IN FEET)

MO/DA/YR HR:MIN:SEC STEP	301	302	204	304	331	231	205	505	206	207
MAXIMUM DEPTH.....	3.088	2.119	1.192	0.703	3.881	1.464	4.054	0.246	0.451	2.654
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000	0.002	0.004	0.000	0.007	0.000
1										

MO/DA/YR HR:MIN:SEC STEP	507	208	508	209	509	314	215	515	218	518
MAXIMUM DEPTH.....	0.000	4.105	1.878	4.110	2.188	3.303	1.933	0.000	1.639	0.535
MINIMUM DEPTH.....	0.000	0.007	0.000	0.006	0.000	0.300	0.003	0.000	0.001	0.000
1										

MO/DA/YR HR:MIN:SEC STEP	540	520	220	224	524	235	535	219	321	332
MAXIMUM DEPTH.....	0.000	0.000	3.079	4.095	0.000	5.452	0.000	1.763	5.559	7.696
MINIMUM DEPTH.....	0.000	0.000	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.000
1										

MO/DA/YR HR:MIN:SEC STEP	327	228	229
MAXIMUM DEPTH.....	2.085	5.630	5.515
MINIMUM DEPTH.....	0.000	0.000	0.000

GRAPEVINE BASIN
FILENAME: GVB050EC.SUM
EXISTING CONDITION WITH EXISTING FACILITIES
EPA SWMM SUMMARY OUTPUT FILE
50-YEAR EVENT

SUMMARY OF EPA SWMM ANALYSIS
(See detailed output for more information)

City of Greeley Comprehensive Drainage Plan Update - ACE Inc.
Grapevine Basin - Existing Conditions - 50-Year Storm

SUB-BASIN INFLOWS

MO/DA/YR HR:MIN:SEC STEP	1	2	3	4	5	6	7	8	9	10
AVERAGE FLOW.....	9.762	22.188	4.736	11.333	12.487	11.108	10.274	19.580	8.750	17.087
STANDARD DEVIATION OF FLOW.....	2.708	6.000	1.366	3.168	3.407	3.075	2.797	5.538	2.382	4.784
MAXIMUM FLOW.....	152.309	329.229	85.237	180.880	206.936	164.463	168.801	339.471	128.204	288.465
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.49E+05	7.92E+05	1.69E+05	4.05E+05	4.46E+05	3.97E+05	3.67E+05	6.99E+05	3.12E+05	6.10E+05

MO/DA/YR HR:MIN:SEC STEP	11	12	13	14	15	16	17	18	19	20
AVERAGE FLOW.....	7.725	5.682	7.698	7.247	6.129	14.460	8.150	11.582	11.006	34.827
STANDARD DEVIATION OF FLOW.....	2.204	1.583	2.175	1.950	1.722	3.801	2.240	2.974	3.109	9.384
MAXIMUM FLOW.....	133.988	88.390	132.663	102.689	103.882	213.034	129.630	169.903	195.893	546.952
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	2.76E+05	2.03E+05	2.75E+05	2.59E+05	2.19E+05	5.16E+05	2.91E+05	4.13E+05	3.93E+05	1.24E+06

MO/DA/YR HR:MIN:SEC STEP	21	22	23	24	25	26	27	28	29	30
AVERAGE FLOW.....	19.855	7.581	6.242	5.041	8.741	7.972	15.746	2.417	7.448	50.490
STANDARD DEVIATION OF FLOW.....	5.862	2.142	1.676	1.414	2.467	2.123	4.477	0.610	2.009	13.367
MAXIMUM FLOW.....	405.271	131.199	86.657	74.892	148.560	118.550	283.538	28.348	103.885	737.097
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	7.09E+05	2.71E+05	2.23E+05	1.80E+05	3.12E+05	2.85E+05	5.62E+05	8.63E+04	2.66E+05	1.80E+06

MO/DA/YR HR:MIN:SEC STEP	31	32	33	34	35	36	37
AVERAGE FLOW.....	2.790	1.540	3.071	3.555	5.249	47.305	0.000
STANDARD DEVIATION OF FLOW.....	0.741	0.370	0.859	0.971	1.435	5.542	0.000
MAXIMUM FLOW.....	38.683	15.459	44.221	49.238	74.284	243.210	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	9.96E+04	5.50E+04	1.10E+05	1.27E+05	1.87E+05	1.69E+06	0.00E+00

CONVEYANCE ELEMENT OUTFLOWS

MO/DA/YR HR:MIN:SEC STEP	301	402	302	204	304	403	331	631	700	701
AVERAGE FLOW.....	7.688	29.877	21.060	21.042	20.256	31.589	31.577	31.577	31.577	0.000
STANDARD DEVIATION OF FLOW.....	1.139	6.545	3.808	3.800	3.514	5.058	2.962	2.962	2.962	0.000
MAXIMUM FLOW.....	71.038	331.781	144.784	144.680	132.974	180.880	85.659	85.659	85.659	0.000
MINIMUM FLOW.....	0.000	0.022	0.000	0.000	0.000	0.017	0.009	0.009	0.009	0.000
FLOW VOLUME (CUBIC FEET).....	2.74E+05	1.07E+06	7.52E+05	7.51E+05	7.23E+05	1.13E+06	1.13E+06	1.13E+06	1.13E+06	8.63E-04

MO/DA/YR HR:MIN:SEC STEP	231	431	404	605	704	705	205	505	405	603
AVERAGE FLOW.....	31.548	2.790	46.825	46.825	42.558	4.267	42.519	4.267	46.786	4.736
STANDARD DEVIATION OF FLOW.....	2.963	0.741	5.580	5.580	4.430	1.841	4.417	1.750	5.538	1.366
MAXIMUM FLOW.....	85.612	38.683	282.370	282.370	154.000	128.370	159.834	130.492	281.752	85.237
MINIMUM FLOW.....	0.000	0.000	0.039	0.039	0.039	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.13E+06	9.96E+04	1.67E+06	1.67E+06	1.52E+06	1.52E+05	1.52E+06	1.52E+05	1.67E+06	1.69E+05

MO/DA/YR HR:MIN:SEC STEP	702	703	400	206	406	606	706	707	207	507
AVERAGE FLOW.....	2.245	2.492	2.492	2.333	13.441	13.441	9.632	3.809	9.627	3.809
STANDARD DEVIATION OF FLOW.....	0.487	0.979	0.979	0.464	3.463	3.463	2.231	1.466	2.221	1.442
MAXIMUM FLOW.....	18.000	67.237	67.237	18.554	178.854	178.854	84.400	94.454	91.300	96.239
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.003	0.003	0.003	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	8.01E+04	8.90E+04	8.90E+04	8.33E+04	4.80E+05	4.80E+05	3.44E+05	1.36E+05	3.44E+05	1.36E+05

MO/DA/YR HR:MIN:SEC STEP	407	410	610	708	709	208	508	408	608	710
AVERAGE FLOW.....	23.711	87.583	87.583	45.460	42.123	45.378	42.311	107.269	107.269	43.780
STANDARD DEVIATION OF FLOW.....	6.163	15.809	15.809	4.608	12.843	4.581	12.355	20.263	20.263	4.216
MAXIMUM FLOW.....	339.486	893.833	893.833	134.000	759.833	134.000	722.769	1119.529	1119.529	118.000
MINIMUM FLOW.....	0.029	0.073	0.073	0.073	0.000	0.000	0.000	0.052	0.052	0.052
FLOW VOLUME (CUBIC FEET).....	8.46E+05	3.13E+06	3.13E+06	1.62E+06	1.50E+06	1.62E+06	1.51E+06	3.83E+06	3.83E+06	1.56E+06

MO/DA/YR HR:MIN:SEC STEP	711	209	509	411	412	417	413	314	414	614
AVERAGE FLOW.....	63.489	43.737	63.489	114.951	129.383	15.848	152.477	81.020	87.149	87.149
STANDARD DEVIATION OF FLOW.....	17.671	4.205	17.555	22.045	25.739	4.412	31.728	2.433	2.112	2.112
MAXIMUM FLOW.....	1001.529	119.845	1007.188	1226.843	1414.143	262.292	1714.343	107.093	112.535	112.535
MINIMUM FLOW.....	0.000	0.000	0.000	0.024	0.043	0.000	0.096	0.000	0.021	0.021
FLOW VOLUME (CUBIC FEET).....	2.27E+06	1.56E+06	2.27E+06	4.10E+06	4.62E+06	5.66E+05	5.44E+06	2.89E+06	3.11E+06	3.11E+06

MO/DA/YR HR:MIN:SEC STEP	712	713	215	515	316	616	714	715	218	620
AVERAGE FLOW.....	87.149	0.000	86.890	0.000	14.443	14.443	7.774	6.670	7.771	6.670
STANDARD DEVIATION OF FLOW.....	2.112	0.000	2.164	0.000	2.977	2.977	0.898	2.383	0.895	2.383
MAXIMUM FLOW.....	112.535	0.000	112.539	0.000	181.289	181.289	28.600	152.689	28.600	152.689
MINIMUM FLOW.....	0.021	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000

FLOW VOLUME (CUBIC FEET).....	3.11E+06	4.58E-03	3.10E+06	4.21E-03	5.16E+05	5.16E+05	2.78E+05	2.38E+05	2.77E+05	2.38E+05
MO/DA/YR HR:MIN:SEC STEP	716	518	717	440	540	418	619	718	415	719
AVERAGE FLOW.....	5.529	5.567	1.141	1.141	1.241	24.919	24.919	24.874	111.764	0.045
STANDARD DEVIATION OF FLOW.....	1.856	1.748	0.672	0.672	0.541	4.782	4.782	4.767	5.866	0.045
MAXIMUM FLOW.....	97.000	94.728	55.689	55.689	41.764	221.786	221.786	216.400	325.473	5.386
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.022	0.022	0.022	0.022	0.000
FLOW VOLUME (CUBIC FEET).....	1.97E+05	1.99E+05	4.07E+04	4.07E+04	4.43E+04	8.90E+05	8.90E+05	8.88E+05	3.99E+06	1.62E+03
MO/DA/YR HR:MIN:SEC STEP	618	720	721	416	520	220	423	420	624	722
AVERAGE FLOW.....	111.764	106.953	4.811	0.045	0.074	106.502	36.068	142.644	142.644	134.146
STANDARD DEVIATION OF FLOW.....	5.866	4.611	1.669	0.045	0.030	4.645	9.670	13.228	13.228	10.381
MAXIMUM FLOW.....	325.473	233.000	92.473	5.386	2.519	233.000	546.952	778.688	778.688	498.000
MINIMUM FLOW.....	0.022	0.022	0.000	0.000	0.000	0.000	0.000	0.056	0.056	0.056
FLOW VOLUME (CUBIC FEET).....	3.99E+06	3.82E+06	1.72E+05	1.62E+03	2.66E+03	3.80E+06	1.29E+06	5.09E+06	5.09E+06	4.79E+06
MO/DA/YR HR:MIN:SEC STEP	723	224	524	425	435	635	726	727	235	535
AVERAGE FLOW.....	8.498	133.968	8.498	10.289	133.968	133.968	131.522	2.446	131.284	2.446
STANDARD DEVIATION OF FLOW.....	3.790	10.379	3.665	2.848	10.379	10.379	9.668	0.926	9.663	0.895
MAXIMUM FLOW.....	280.688	501.534	270.864	149.176	501.534	501.534	452.000	49.534	459.230	48.361
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.03E+05	4.78E+06	3.03E+05	3.67E+05	4.78E+06	4.78E+06	4.70E+06	8.73E+04	4.69E+06	8.73E+04
MO/DA/YR HR:MIN:SEC STEP	424	421	219	461	321	422	325	432	332	427
AVERAGE FLOW.....	133.730	15.816	15.823	35.678	34.610	42.191	7.305	91.036	35.059	18.817
STANDARD DEVIATION OF FLOW.....	10.367	4.503	4.440	9.780	6.202	7.608	0.352	12.924	2.482	5.301
MAXIMUM FLOW.....	498.633	247.791	235.064	561.278	483.877	565.650	14.003	805.357	74.441	326.046
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.026	0.000	0.026	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	4.77E+06	5.65E+05	5.65E+05	1.27E+06	1.24E+06	1.51E+06	2.61E+05	3.25E+06	1.25E+06	6.72E+05
MO/DA/YR HR:MIN:SEC STEP	327	627	724	725	433	426	228	434	428	229
AVERAGE FLOW.....	10.760	10.760	8.728	2.032	8.728	150.430	149.454	5.587	157.457	154.936
STANDARD DEVIATION OF FLOW.....	0.847	0.847	0.209	0.776	0.209	12.280	12.108	1.375	13.872	12.790
MAXIMUM FLOW.....	62.046	62.046	10.800	51.246	10.800	621.237	618.635	71.418	690.405	595.830
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.019	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.84E+05	3.84E+05	3.12E+05	7.25E+04	3.12E+05	5.37E+06	5.34E+06	1.99E+05	5.62E+06	5.53E+06
MO/DA/YR HR:MIN:SEC STEP	429	430	900	901						
AVERAGE FLOW.....	162.384	50.490	25.029	7.305						
STANDARD DEVIATION OF FLOW.....	13.988	13.367	7.818	0.352						
MAXIMUM FLOW.....	652.323	737.097	506.697	14.003						
MINIMUM FLOW.....	0.001	0.000	0.000	0.000						
FLOW VOLUME (CUBIC FEET).....	5.80E+06	1.80E+06	8.94E+05	2.61E+05						

CONVEYANCE ELEMENT FLOW DEPTHS (IN FEET)

MO/DA/YR HR:MIN:SEC STEP	301	302	204	304	331	231	205	505	206	207
MAXIMUM DEPTH.....	4.417	3.448	3.502	2.187	9.411	2.319	4.084	0.749	0.455	2.965
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.001	0.013	0.032	0.000	0.020	0.008
1										
MO/DA/YR HR:MIN:SEC STEP	507	208	508	209	509	314	215	515	218	518
MAXIMUM DEPTH.....	1.333	4.105	2.947	4.135	3.354	5.870	3.071	0.000	1.639	0.920
MINIMUM DEPTH.....	0.000	0.045	0.000	0.041	0.000	0.300	0.021	0.000	0.004	0.000
1										
MO/DA/YR HR:MIN:SEC STEP	540	520	220	224	524	235	535	219	321	332
MAXIMUM DEPTH.....	0.568	0.170	4.100	4.527	1.006	5.738	0.586	2.792	6.190	10.469
MINIMUM DEPTH.....	0.000	0.000	0.020	0.024	0.000	0.000	0.000	0.000	0.001	0.000
1										
MO/DA/YR HR:MIN:SEC STEP	327	228	229							
MAXIMUM DEPTH.....	3.469	6.379	6.952							
MINIMUM DEPTH.....	0.000	0.001	0.000							

GRAPEVINE BASIN
FILENAME: GVB100EC.SUM
EXISTING CONDITION WITH EXISTING FACILITIES
EPA SWMM SUMMARY OUTPUT FILE
100-YEAR EVENT

SUMMARY OF EPA SWMM ANALYSIS
(See detailed output for more information)

City of Greeley Comprehensive Drainage Plan Update - ACE Inc.
Grapevine Basin - Existing Conditions - 100-Year Storm

SUB-BASIN INFLOWS

MO/DA/YR HR:MIN:SEC STEP	1	2	3	4	5	6	7	8	9	10
AVERAGE FLOW.....	11.918	27.139	5.573	13.811	14.506	14.001	11.883	23.363	10.763	20.355
STANDARD DEVIATION OF FLOW.....	3.312	7.336	1.624	3.859	4.018	3.829	3.290	6.663	2.921	5.744
MAXIMUM FLOW.....	181.557	391.534	99.181	214.733	235.435	198.636	191.647	396.811	152.830	335.858
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	4.25E+05	9.69E+05	1.99E+05	4.93E+05	5.18E+05	5.00E+05	4.24E+05	8.34E+05	3.84E+05	7.27E+05

MO/DA/YR HR:MIN:SEC STEP	11	12	13	14	15	16	17	18	19	20
AVERAGE FLOW.....	9.208	6.884	9.143	8.960	7.268	17.047	9.715	13.226	12.907	40.961
STANDARD DEVIATION OF FLOW.....	2.645	1.922	2.609	2.404	2.061	4.539	2.694	3.462	3.690	11.175
MAXIMUM FLOW.....	157.181	104.581	155.291	123.046	121.220	250.273	151.434	195.463	225.680	642.813
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.29E+05	2.46E+05	3.26E+05	3.20E+05	2.59E+05	6.09E+05	3.47E+05	4.72E+05	4.61E+05	1.46E+06

MO/DA/YR HR:MIN:SEC STEP	21	22	23	24	25	26	27	28	29	30
AVERAGE FLOW.....	22.941	8.972	7.826	6.627	10.434	9.346	18.418	3.034	9.202	60.098
STANDARD DEVIATION OF FLOW.....	6.867	2.559	2.090	1.820	2.967	2.528	5.302	0.757	2.469	16.040
MAXIMUM FLOW.....	467.853	152.724	104.680	92.770	174.323	139.085	327.010	34.070	124.210	870.707
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	8.19E+05	3.20E+05	2.79E+05	2.37E+05	3.72E+05	3.34E+05	6.58E+05	1.08E+05	3.29E+05	2.15E+06

MO/DA/YR HR:MIN:SEC STEP	31	32	33	34	35	36	37
AVERAGE FLOW.....	3.349	1.994	3.967	4.465	6.669	50.803	2.640
STANDARD DEVIATION OF FLOW.....	0.897	0.470	1.085	1.204	1.799	6.456	1.412
MAXIMUM FLOW.....	45.575	18.903	53.899	59.276	89.951	275.550	113.839
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.20E+05	7.12E+04	1.42E+05	1.59E+05	2.38E+05	1.81E+06	9.42E+04

CONVEYANCE ELEMENT OUTFLOWS

MO/DA/YR HR:MIN:SEC STEP	301	402	302	204	304	403	331	631	700	701
AVERAGE FLOW.....	9.854	36.993	28.177	28.160	27.375	41.186	41.174	41.174	41.174	0.000
STANDARD DEVIATION OF FLOW.....	1.815	8.470	4.781	4.773	4.410	6.244	3.347	3.347	3.347	0.000
MAXIMUM FLOW.....	109.079	396.066	160.721	160.607	142.003	214.733	92.046	92.046	92.046	0.000
MINIMUM FLOW.....	0.000	0.012	0.000	0.000	0.000	0.009	0.005	0.005	0.005	0.000
FLOW VOLUME (CUBIC FEET).....	3.52E+05	1.32E+06	1.01E+06	1.01E+06	9.77E+05	1.47E+06	1.47E+06	1.47E+06	1.47E+06	6.04E-03

MO/DA/YR HR:MIN:SEC STEP	231	431	404	605	704	705	205	505	405	603
AVERAGE FLOW.....	41.145	3.349	59.000	59.000	52.034	6.966	51.995	6.966	58.961	5.573
STANDARD DEVIATION OF FLOW.....	3.348	0.897	6.313	6.313	4.567	2.619	4.556	2.532	6.266	1.624
MAXIMUM FLOW.....	92.035	45.575	326.134	326.134	154.000	172.134	159.188	175.794	327.308	99.181
MINIMUM FLOW.....	0.000	0.000	0.021	0.021	0.021	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.47E+06	1.20E+05	2.11E+06	2.11E+06	1.86E+06	2.49E+05	1.86E+06	2.49E+05	2.10E+06	1.99E+05

MO/DA/YR HR:MIN:SEC STEP	702	703	400	206	406	606	706	707	207	507
AVERAGE FLOW.....	2.259	3.314	3.314	2.360	16.361	16.361	10.184	6.176	10.180	6.176
STANDARD DEVIATION OF FLOW.....	0.497	1.224	1.224	0.473	4.227	4.227	2.317	2.160	2.310	2.135
MAXIMUM FLOW.....	18.000	81.181	81.181	18.750	213.120	213.120	84.400	128.720	89.993	131.587
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	8.06E+04	1.18E+05	1.18E+05	8.42E+04	5.84E+05	5.84E+05	3.64E+05	2.20E+05	3.63E+05	2.20E+05

MO/DA/YR HR:MIN:SEC STEP	407	410	610	708	709	208	508	408	608	710
AVERAGE FLOW.....	28.239	107.556	107.556	54.094	53.462	54.020	53.694	131.077	131.077	52.395
STANDARD DEVIATION OF FLOW.....	7.412	18.630	18.630	4.599	15.903	4.572	15.405	24.123	24.123	4.232
MAXIMUM FLOW.....	403.710	1054.820	1054.820	134.000	920.820	134.000	879.850	1332.729	1332.729	118.000
MINIMUM FLOW.....	0.016	0.039	0.039	0.039	0.000	0.000	0.000	0.029	0.029	0.029
FLOW VOLUME (CUBIC FEET).....	1.01E+06	3.84E+06	3.84E+06	1.93E+06	1.91E+06	1.93E+06	1.92E+06	4.68E+06	4.68E+06	1.87E+06

MO/DA/YR HR:MIN:SEC STEP	711	209	509	411	412	417	413	314	414	614
AVERAGE FLOW.....	78.681	52.352	78.681	140.242	157.889	18.858	185.707	98.381	105.649	105.649
STANDARD DEVIATION OF FLOW.....	21.813	4.222	21.685	26.307	30.864	5.299	38.169	2.800	2.402	2.402
MAXIMUM FLOW.....	1214.729	119.705	1219.118	1460.723	1690.393	306.726	2055.773	123.143	138.788	138.788
MINIMUM FLOW.....	0.000	0.000	0.000	0.013	0.023	0.000	0.052	0.000	0.011	0.011
FLOW VOLUME (CUBIC FEET).....	2.81E+06	1.87E+06	2.81E+06	5.01E+06	5.64E+06	6.73E+05	6.63E+06	3.51E+06	3.77E+06	3.77E+06

MO/DA/YR HR:MIN:SEC STEP	712	713	215	515	316	616	714	715	218	620
AVERAGE FLOW.....	103.650	1.999	103.339	2.034	17.030	17.030	7.774	9.257	7.771	9.257
STANDARD DEVIATION OF FLOW.....	2.251	0.379	2.320	0.365	3.729	3.729	0.901	3.130	0.898	3.130
MAXIMUM FLOW.....	120.000	18.788	120.093	17.987	228.013	228.013	28.600	199.413	28.600	199.413
MINIMUM FLOW.....	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FLOW VOLUME (CUBIC FEET).....	3.70E+06	7.14E+04	3.69E+06	7.26E+04	6.08E+05	6.08E+05	2.78E+05	3.30E+05	2.77E+05	3.30E+05

MO/DA/YR HR:MIN:SEC STEP	716	518	717	440	540	418	619	718	415	719
AVERAGE FLOW.....	6.802	6.866	2.455	2.455	2.501	27.862	27.862	26.937	132.310	0.926
STANDARD DEVIATION OF FLOW.....	2.104	2.027	1.260	1.260	1.036	5.563	5.563	5.265	6.511	0.482
MAXIMUM FLOW.....	97.000	96.703	102.413	102.413	76.438	255.893	255.893	216.400	351.602	39.493
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.012	0.012	0.012	0.012	0.000
FLOW VOLUME (CUBIC FEET).....	2.43E+05	2.45E+05	8.76E+04	8.76E+04	8.93E+04	9.95E+05	9.95E+05	9.62E+05	4.72E+06	3.30E+04

MO/DA/YR HR:MIN:SEC STEP	618	720	721	416	520	220	423	420	624	722
AVERAGE FLOW.....	132.310	123.829	8.481	0.926	1.036	123.291	43.463	167.789	167.789	152.939
STANDARD DEVIATION OF FLOW.....	6.511	4.440	2.619	0.482	0.414	4.499	11.783	15.214	15.214	10.507
MAXIMUM FLOW.....	351.602	233.000	118.602	39.493	29.974	233.011	642.813	873.691	873.691	498.000
MINIMUM FLOW.....	0.012	0.012	0.000	0.000	0.000	0.000	0.000	0.031	0.031	0.031
FLOW VOLUME (CUBIC FEET).....	4.72E+06	4.42E+06	3.03E+05	3.30E+04	3.70E+04	4.40E+06	1.55E+06	5.99E+06	5.99E+06	5.46E+06

MO/DA/YR HR:MIN:SEC STEP	723	224	524	425	435	635	726	727	235	535
AVERAGE FLOW.....	14.850	152.727	14.850	13.296	152.727	152.727	149.585	3.143	149.302	3.143
STANDARD DEVIATION OF FLOW.....	5.787	10.506	5.651	3.618	10.506	10.506	9.643	1.072	9.640	1.032
MAXIMUM FLOW.....	375.691	501.375	375.933	182.721	501.375	501.375	452.000	49.375	455.580	46.287
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	5.30E+05	5.45E+06	5.30E+05	4.75E+05	5.45E+06	5.45E+06	5.34E+06	1.12E+05	5.33E+06	1.12E+05

MO/DA/YR HR:MIN:SEC STEP	424	421	219	461	321	422	325	432	332	427
AVERAGE FLOW.....	152.444	21.388	21.398	44.339	43.279	52.251	8.722	105.048	49.088	25.025
STANDARD DEVIATION OF FLOW.....	10.495	5.984	5.910	12.091	8.937	10.755	0.424	16.948	3.615	7.106
MAXIMUM FLOW.....	500.779	319.031	308.405	682.390	602.912	723.692	16.998	975.562	146.448	378.882
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.014	0.000	0.014	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	5.44E+06	7.64E+05	7.64E+05	1.58E+06	1.55E+06	1.87E+06	3.11E+05	3.75E+06	1.75E+06	8.93E+05

MO/DA/YR HR:MIN:SEC STEP	327	627	724	725	433	426	228	434	428	229
AVERAGE FLOW.....	16.977	16.977	8.772	8.206	8.772	170.562	169.416	12.671	185.121	182.061
STANDARD DEVIATION OF FLOW.....	3.099	3.099	0.209	3.046	0.209	12.766	12.596	3.824	16.575	15.425
MAXIMUM FLOW.....	220.221	220.221	10.800	209.421	10.800	646.851	642.139	251.431	866.976	784.661
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	6.06E+05	6.06E+05	3.13E+05	2.93E+05	3.13E+05	6.09E+06	6.05E+06	4.52E+05	6.61E+06	6.50E+06

MO/DA/YR HR:MIN:SEC STEP	429	430	900	901
AVERAGE FLOW.....	191.263	60.098	35.973	8.722
STANDARD DEVIATION OF FLOW.....	16.933	16.040	10.984	0.424
MAXIMUM FLOW.....	860.292	870.707	663.334	16.998
MINIMUM FLOW.....	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	6.83E+06	2.15E+06	1.28E+06	3.11E+05

CONVEYANCE ELEMENT FLOW DEPTHS (IN FEET)

MO/DA/YR HR:MIN:SEC STEP	301	302	204	304	331	231	205	505	206	207
MAXIMUM DEPTH.....	4.527	4.101	3.950	2.818	10.977	2.446	4.084	0.832	0.455	3.000
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.001	0.010	0.024	0.000	0.017	0.006
1										

MO/DA/YR HR:MIN:SEC STEP	507	208	508	209	509	314	215	515	218	518
MAXIMUM DEPTH.....	1.535	4.105	3.260	4.132	3.703	6.821	3.274	0.463	1.639	0.924
MINIMUM DEPTH.....	0.000	0.034	0.000	0.031	0.000	0.300	0.016	0.000	0.003	0.000
1										

MO/DA/YR HR:MIN:SEC STEP	540	520	220	224	524	235	535	219	321	332
MAXIMUM DEPTH.....	0.688	0.538	4.100	4.526	1.142	5.742	0.584	3.099	6.262	10.723
MINIMUM DEPTH.....	0.000	0.000	0.015	0.018	0.000	0.000	0.000	0.000	0.001	0.000
1										

MO/DA/YR HR:MIN:SEC STEP	327	228	229
MAXIMUM DEPTH.....	3.715	6.486	7.818
MINIMUM DEPTH.....	0.000	0.000	0.000

FUTURE CONDITION
(FUTURE DEVELOPMENT WITH EXISTING FACILITIES)

GRAPEVINE BASIN
FILENAME: GVB002FC.SUM
FUTURE CONDITION WITH EXISTING FACILITIES
EPA SWMM SUMMARY OUTPUT FILE
2-YEAR EVENT

SUMMARY OF EPA SWMM ANALYSIS
(See detailed output for more information)

City of Greeley Comprehensive Drainage Plan Update - ACE Inc.
Grapevine Basin - Future Conditions - 2-Year Storm

SUB-BASIN INFLOWS

MO/DA/YR HR:MIN:SEC STEP	1	2	3	4	5	6	7	8	9	10
AVERAGE FLOW.....	1.295	2.768	1.106	1.532	3.361	2.401	2.864	3.898	0.949	3.412
STANDARD DEVIATION OF FLOW.....	0.346	0.719	0.300	0.412	0.865	0.613	0.737	1.021	0.262	0.885
MAXIMUM FLOW.....	20.270	40.770	18.960	24.510	52.100	35.430	44.180	63.020	14.730	53.680
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	4.62E+04	9.88E+04	3.95E+04	5.47E+04	1.20E+05	8.57E+04	1.02E+05	1.39E+05	3.39E+04	1.22E+05

MO/DA/YR HR:MIN:SEC STEP	11	12	13	14	15	16	17	18	19	20
AVERAGE FLOW.....	1.526	0.838	1.637	0.662	1.305	3.315	1.602	3.720	2.675	8.207
STANDARD DEVIATION OF FLOW.....	0.405	0.231	0.429	0.186	0.341	0.810	0.412	0.913	0.707	2.052
MAXIMUM FLOW.....	25.150	13.360	26.440	10.080	20.770	46.103	24.180	53.228	44.450	121.933
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	5.45E+04	2.99E+04	5.84E+04	2.36E+04	4.66E+04	1.18E+05	5.72E+04	1.33E+05	9.55E+04	2.93E+05

MO/DA/YR HR:MIN:SEC STEP	21	22	23	24	25	26	27	28	29	30
AVERAGE FLOW.....	5.624	1.655	0.395	1.890	2.202	1.911	3.509	0.536	0.336	8.228
STANDARD DEVIATION OF FLOW.....	1.582	0.435	0.116	0.462	0.574	0.478	0.939	0.159	0.103	2.071
MAXIMUM FLOW.....	110.390	26.870	6.241	25.824	34.980	27.049	59.800	9.060	5.522	116.310
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	2.01E+05	5.91E+04	1.41E+04	6.75E+04	7.86E+04	6.82E+04	1.25E+05	1.91E+04	1.20E+04	2.94E+05

MO/DA/YR HR:MIN:SEC STEP	31	32	33	34	35	36	37
AVERAGE FLOW.....	0.409	0.000	1.703	1.948	0.735	3.533	0.000
STANDARD DEVIATION OF FLOW.....	0.121	0.000	0.453	0.516	0.209	0.390	0.000
MAXIMUM FLOW.....	6.520	0.000	29.020	33.010	11.690	8.900	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.46E+04	0.00E+00	6.08E+04	6.95E+04	2.63E+04	1.26E+05	0.00E+00

CONVEYANCE ELEMENT OUTFLOWS

MO/DA/YR HR:MIN:SEC STEP	301	402	302	204	304	403	331	631	700	701
AVERAGE FLOW.....	0.537	3.305	0.000	0.000	0.000	1.532	1.532	1.532	1.532	0.000
STANDARD DEVIATION OF FLOW.....	0.013	0.715	0.000	0.000	0.000	0.412	0.390	0.390	0.390	0.000
MAXIMUM FLOW.....	0.700	40.911	0.000	0.000	0.000	24.510	19.585	19.585	19.585	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.92E+04	1.18E+05	0.00E+00	0.00E+00	0.00E+00	5.47E+04	5.47E+04	5.47E+04	5.47E+04	5.36E-05

MO/DA/YR HR:MIN:SEC STEP	231	431	404	605	704	705	205	505	405	603
AVERAGE FLOW.....	1.532	0.409	5.303	5.303	5.303	0.000	5.303	0.000	5.303	1.106
STANDARD DEVIATION OF FLOW.....	0.387	0.121	1.336	1.336	1.336	0.000	1.324	0.000	1.324	0.300
MAXIMUM FLOW.....	19.281	6.520	73.753	73.753	73.753	0.000	74.084	0.000	74.084	18.960
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	5.47E+04	1.46E+04	1.89E+05	1.89E+05	1.89E+05	3.49E-08	1.89E+05	3.11E-08	1.89E+05	3.95E+04

MO/DA/YR HR:MIN:SEC STEP	702	703	400	206	406	806	606	706	707	207
AVERAGE FLOW.....	1.098	0.008	0.008	1.199	3.599	3.365	3.365	3.365	0.000	3.359
STANDARD DEVIATION OF FLOW.....	0.296	0.008	0.008	0.265	0.840	0.217	0.217	0.217	0.000	0.218
MAXIMUM FLOW.....	18.000	0.960	0.960	14.216	43.619	7.622	7.622	7.622	0.000	7.621
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.92E+04	2.88E+02	2.88E+02	4.28E+04	1.29E+05	1.20E+05	1.20E+05	1.20E+05	1.23E-03	1.20E+05

MO/DA/YR HR:MIN:SEC STEP	507	407	410	610	708	709	208	508	408	608
AVERAGE FLOW.....	0.000	6.224	14.938	14.938	14.303	0.635	14.291	0.805	18.994	18.994
STANDARD DEVIATION OF FLOW.....	0.000	0.787	2.946	2.946	2.689	0.385	2.632	0.317	3.798	3.798
MAXIMUM FLOW.....	0.000	45.433	170.595	170.595	134.000	36.595	132.257	24.789	197.655	197.655
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.16E-03	2.22E+05	5.33E+05	5.33E+05	5.11E+05	2.27E+04	5.10E+05	2.87E+04	6.78E+05	6.78E+05

MO/DA/YR HR:MIN:SEC STEP	710	711	209	509	411	412	417	413	314	414
AVERAGE FLOW.....	16.234	2.760	16.217	2.760	20.502	22.290	3.239	26.190	10.775	12.080
STANDARD DEVIATION OF FLOW.....	2.857	1.208	2.841	1.158	4.098	4.542	0.841	5.478	0.276	0.273
MAXIMUM FLOW.....	118.000	79.655	120.683	77.827	210.657	230.187	50.620	278.617	13.396	22.134
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	5.80E+05	9.85E+04	5.79E+05	9.85E+04	7.32E+05	7.96E+05	1.16E+05	9.35E+05	3.85E+05	4.31E+05

MO/DA/YR HR:MIN:SEC STEP	614	712	713	215	515	316	616	714	715	218
AVERAGE FLOW.....	12.080	12.080	0.000	12.013	0.000	3.308	3.308	3.308	0.000	3.306
STANDARD DEVIATION OF FLOW.....	0.273	0.273	0.000	0.285	0.000	0.375	0.375	0.375	0.000	0.374
MAXIMUM FLOW.....	22.134	22.134	0.000	22.356	0.000	12.400	12.400	12.400	0.000	12.382
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FLOW VOLUME (CUBIC FEET).....	4.31E+05	4.31E+05	2.86E-04	4.29E+05	0.00E+00	1.18E+05	1.18E+05	1.18E+05	7.15E-05	1.18E+05
MO/DA/YR HR:MIN:SEC STEP	620	716	518	717	440	540	418	619	718	415
AVERAGE FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	7.026	7.026	7.026	19.039
STANDARD DEVIATION OF FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	1.105	1.105	1.105	1.316
MAXIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	56.233	56.233	56.233	78.588
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	7.15E-05	7.15E-05	0.00E+00	4.26E-12	4.26E-12	0.00E+00	2.51E+05	2.51E+05	2.51E+05	6.80E+05
MO/DA/YR HR:MIN:SEC STEP	719	618	720	721	416	520	220	423	420	624
AVERAGE FLOW.....	0.000	19.039	19.039	0.000	0.000	0.000	18.922	8.207	27.129	27.129
STANDARD DEVIATION OF FLOW.....	0.000	1.316	1.316	0.000	0.000	0.000	1.308	2.052	3.223	3.223
MAXIMUM FLOW.....	0.000	78.588	78.588	0.000	0.000	0.000	76.154	121.933	193.797	193.797
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	6.19E-04	6.80E+05	6.80E+05	5.72E-04	6.19E-04	1.05E-03	6.76E+05	2.93E+05	9.69E+05	9.69E+05
MO/DA/YR HR:MIN:SEC STEP	722	723	224	524	824	425	435	635	726	727
AVERAGE FLOW.....	27.129	0.000	27.081	0.000	1.118	1.118	28.200	28.200	28.200	0.000
STANDARD DEVIATION OF FLOW.....	3.223	0.000	3.217	0.000	0.033	0.033	3.216	3.216	3.216	0.000
MAXIMUM FLOW.....	193.797	0.000	190.863	0.000	1.634	1.634	191.367	191.367	191.367	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	9.69E+05	1.14E-03	9.67E+05	0.00E+00	3.99E+04	3.99E+04	1.01E+06	1.01E+06	1.01E+06	5.72E-04
MO/DA/YR HR:MIN:SEC STEP	235	535	424	421	219	461	321	422	825	432
AVERAGE FLOW.....	28.132	0.000	28.132	2.675	2.684	8.308	7.807	9.462	0.648	12.995
STANDARD DEVIATION OF FLOW.....	3.203	0.000	3.203	0.707	0.683	2.187	0.582	0.806	0.015	0.980
MAXIMUM FLOW.....	189.609	0.000	189.609	44.450	41.865	139.064	16.374	37.461	0.794	37.488
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.00E+06	4.88E-04	1.00E+06	9.55E+04	9.58E+04	2.97E+05	2.79E+05	3.38E+05	2.31E+04	4.64E+05
MO/DA/YR HR:MIN:SEC STEP	332	427	327	627	724	725	833	433	426	228
AVERAGE FLOW.....	5.760	3.509	2.030	2.030	2.030	0.000	1.439	3.469	33.513	33.250
STANDARD DEVIATION OF FLOW.....	0.190	0.939	0.058	0.058	0.058	0.000	0.068	0.123	3.677	3.548
MAXIMUM FLOW.....	7.175	59.800	2.904	2.904	2.904	0.000	2.684	5.582	216.255	207.951
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	2.06E+05	1.25E+05	7.25E+04	7.25E+04	7.25E+04	2.86E-04	5.14E+04	1.24E+05	1.20E+06	1.19E+06
MO/DA/YR HR:MIN:SEC STEP	834	434	828	428	229	429	430	900	901	
AVERAGE FLOW.....	1.807	1.807	0.506	35.564	35.200	35.536	8.228	1.131	0.648	
STANDARD DEVIATION OF FLOW.....	0.112	0.112	0.036	3.643	3.145	3.179	2.071	0.325	0.015	
MAXIMUM FLOW.....	3.952	3.952	1.362	211.848	148.691	152.054	116.310	17.770	0.794	
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
FLOW VOLUME (CUBIC FEET).....	6.45E+04	6.45E+04	1.81E+04	1.27E+06	1.26E+06	1.27E+06	2.94E+05	4.04E+04	2.31E+04	

CONVEYANCE ELEMENT FLOW DEPTHS (IN FEET)

MO/DA/YR HR:MIN:SEC STEP	301	302	204	304	331	231	205	505	206	207
MAXIMUM DEPTH.....	1.100	0.755	0.000	0.000	2.161	0.991	2.421	0.000	0.409	0.710
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1										
MO/DA/YR HR:MIN:SEC STEP	507	208	508	209	509	314	215	515	218	518
MAXIMUM DEPTH.....	0.000	4.018	0.406	4.095	0.898	1.400	1.155	0.000	0.919	0.000
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000	0.300	0.000	0.000	0.000	0.000
1										
MO/DA/YR HR:MIN:SEC STEP	540	520	220	224	524	235	535	219	321	332
MAXIMUM DEPTH.....	0.000	0.000	1.948	2.372	0.000	3.153	0.000	1.141	3.250	3.875
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1										
MO/DA/YR HR:MIN:SEC STEP	327	228	229							
MAXIMUM DEPTH.....	0.761	3.670	3.495							
MINIMUM DEPTH.....	0.000	0.000	0.000							

GRAPEVINE BASIN
FILENAME: GVB005FC.SUM
FUTURE CONDITION WITH EXISTING FACILITIES
EPA SWMM SUMMARY OUTPUT FILE
5-YEAR EVENT

SUMMARY OF EPA SWMM ANALYSIS
(See detailed output for more information)

City of Greeley Comprehensive Drainage Plan Update - ACE Inc.
Grapevine Basin - Future Conditions - 5-Year Storm

SUB-BASIN INFLOWS

MO/DA/YR HR:MIN:SEC STEP	1	2	3	4	5	6	7	8	9	10
AVERAGE FLOW.....	3.052	6.899	1.997	3.648	5.704	4.990	4.779	7.477	2.598	6.607
STANDARD DEVIATION OF FLOW.....	0.827	1.830	0.549	0.995	1.482	1.302	1.242	2.012	0.699	1.765
MAXIMUM FLOW.....	48.800	108.015	35.190	59.570	89.706	76.253	74.673	124.010	40.417	107.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.09E+05	2.46E+05	7.13E+04	1.30E+05	2.04E+05	1.78E+05	1.71E+05	2.67E+05	9.28E+04	2.36E+05

MO/DA/YR HR:MIN:SEC STEP	11	12	13	14	15	16	17	18	19	20
AVERAGE FLOW.....	2.980	1.922	3.044	2.006	2.450	6.019	3.128	5.876	4.738	14.716
STANDARD DEVIATION OF FLOW.....	0.813	0.521	0.816	0.543	0.655	1.502	0.823	1.440	1.273	3.763
MAXIMUM FLOW.....	51.270	30.510	50.770	30.962	40.410	87.850	48.620	84.377	80.240	229.671
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.06E+05	6.86E+04	1.09E+05	7.16E+04	8.75E+04	2.15E+05	1.12E+05	2.10E+05	1.69E+05	5.25E+05

MO/DA/YR HR:MIN:SEC STEP	21	22	23	24	25	26	27	28	29	30
AVERAGE FLOW.....	9.341	3.073	1.464	3.192	3.970	3.405	6.823	1.226	2.078	19.365
STANDARD DEVIATION OF FLOW.....	2.643	0.826	0.409	0.787	1.055	0.864	1.874	0.331	0.590	5.014
MAXIMUM FLOW.....	186.820	51.470	23.222	44.890	64.350	50.249	120.480	19.400	33.020	292.828
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.33E+05	1.10E+05	5.23E+04	1.14E+05	1.42E+05	1.22E+05	2.44E+05	4.38E+04	7.42E+04	6.91E+05

MO/DA/YR HR:MIN:SEC STEP	31	32	33	34	35	36	37
AVERAGE FLOW.....	0.970	0.249	2.703	3.077	1.919	12.044	0.000
STANDARD DEVIATION OF FLOW.....	0.257	0.067	0.714	0.807	0.517	1.512	0.000
MAXIMUM FLOW.....	14.020	3.387	46.120	52.020	29.495	97.893	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.46E+04	8.91E+03	9.65E+04	1.10E+05	6.85E+04	4.30E+05	0.00E+00

CONVEYANCE ELEMENT OUTFLOWS

MO/DA/YR HR:MIN:SEC STEP	301	402	302	204	304	403	331	631	700	701
AVERAGE FLOW.....	1.769	8.669	0.000	0.000	0.000	3.648	3.648	3.648	3.648	0.000
STANDARD DEVIATION OF FLOW.....	0.110	1.832	0.000	0.000	0.000	0.995	0.840	0.840	0.840	0.000
MAXIMUM FLOW.....	4.144	108.554	0.000	0.000	0.000	59.570	33.740	33.740	33.740	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	6.32E+04	3.09E+05	0.00E+00	0.00E+00	0.00E+00	1.30E+05	1.30E+05	1.30E+05	1.30E+05	5.72E-04

MO/DA/YR HR:MIN:SEC STEP	231	431	404	605	704	705	205	505	405	603
AVERAGE FLOW.....	3.647	0.970	10.321	10.321	10.321	0.000	10.320	0.000	10.320	1.997
STANDARD DEVIATION OF FLOW.....	0.837	0.257	2.455	2.455	2.455	0.000	2.438	0.000	2.438	0.549
MAXIMUM FLOW.....	33.709	14.020	131.838	131.838	131.838	0.000	131.120	0.000	131.120	35.190
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.30E+05	3.46E+04	3.68E+05	3.68E+05	3.68E+05	5.59E-07	3.68E+05	4.97E-07	3.68E+05	7.13E+04

MO/DA/YR HR:MIN:SEC STEP	702	703	400	206	406	806	606	706	707	207
AVERAGE FLOW.....	1.608	0.389	0.389	1.713	6.704	6.287	6.287	6.287	0.000	6.280
STANDARD DEVIATION OF FLOW.....	0.390	0.202	0.202	0.362	1.606	0.412	0.412	0.412	0.000	0.412
MAXIMUM FLOW.....	18.000	17.190	17.190	17.471	87.849	14.521	14.521	14.521	0.000	14.516
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	5.74E+04	1.39E+04	1.39E+04	6.12E+04	2.39E+05	2.24E+05	2.24E+05	2.24E+05	1.07E-03	2.24E+05

MO/DA/YR HR:MIN:SEC STEP	507	407	410	610	708	709	208	508	408	608
AVERAGE FLOW.....	0.000	11.058	27.986	27.986	22.200	5.786	22.181	5.962	35.619	35.619
STANDARD DEVIATION OF FLOW.....	0.000	1.348	5.451	5.451	3.539	2.478	3.491	2.179	7.028	7.028
MAXIMUM FLOW.....	0.000	78.684	316.559	316.559	134.000	182.559	133.973	142.401	371.337	371.337
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	8.28E-04	3.95E+05	9.99E+05	9.99E+05	7.93E+05	2.07E+05	7.92E+05	2.13E+05	1.27E+06	1.27E+06

MO/DA/YR HR:MIN:SEC STEP	710	711	209	509	411	412	417	413	314	414
AVERAGE FLOW.....	23.292	12.327	23.268	12.328	38.576	43.096	6.172	51.274	22.059	24.509
STANDARD DEVIATION OF FLOW.....	3.497	4.149	3.478	4.081	7.647	8.760	1.638	10.772	0.630	0.601
MAXIMUM FLOW.....	118.000	253.337	120.099	246.278	393.852	449.648	99.390	555.701	30.154	43.396
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	8.32E+05	4.40E+05	8.31E+05	4.40E+05	1.38E+06	1.54E+06	2.20E+05	1.83E+06	7.88E+05	8.75E+05

MO/DA/YR HR:MIN:SEC STEP	614	712	713	215	515	316	616	714	715	218
AVERAGE FLOW.....	24.509	24.509	0.000	24.402	0.000	6.006	6.006	6.006	0.000	6.003
STANDARD DEVIATION OF FLOW.....	0.601	0.601	0.000	0.619	0.000	0.687	0.687	0.687	0.000	0.686
MAXIMUM FLOW.....	43.396	43.396	0.000	44.488	0.000	23.010	23.010	23.010	0.000	22.987
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FLOW VOLUME (CUBIC FEET).....	8.75E+05	8.75E+05	1.72E-03	8.71E+05	9.38E-04	2.14E+05	2.14E+05	2.14E+05	1.01E-04	2.14E+05
MO/DA/YR HR:MIN:SEC STEP	620	716	518	717	440	540	418	619	718	415
AVERAGE FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	11.879	11.879	11.879	36.281
STANDARD DEVIATION OF FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	1.814	1.814	1.814	2.256
MAXIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	90.371	90.371	90.371	134.860
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.01E-04	1.01E-04	1.36E-04	6.00E-12	6.00E-12	9.70E-12	4.24E+05	4.24E+05	4.24E+05	1.30E+06
MO/DA/YR HR:MIN:SEC STEP	719	618	720	721	416	520	220	423	420	624
AVERAGE FLOW.....	0.000	36.281	36.281	0.000	0.000	0.000	36.097	14.716	50.813	50.813
STANDARD DEVIATION OF FLOW.....	0.000	2.256	2.256	0.000	0.000	0.000	2.251	3.763	5.735	5.735
MAXIMUM FLOW.....	0.000	134.860	134.860	0.000	0.000	0.000	131.816	229.671	352.768	352.768
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	2.64E-03	1.30E+06	1.30E+06	3.43E-03	2.64E-03	4.22E-03	1.29E+06	5.25E+05	1.81E+06	1.81E+06
MO/DA/YR HR:MIN:SEC STEP	722	723	224	524	824	425	435	635	726	727
AVERAGE FLOW.....	50.813	0.000	50.737	0.000	1.891	1.891	52.628	52.628	52.628	0.000
STANDARD DEVIATION OF FLOW.....	5.735	0.000	5.725	0.000	0.056	0.056	5.726	5.726	5.726	0.000
MAXIMUM FLOW.....	352.768	0.000	347.373	0.000	2.744	2.744	348.233	348.233	348.233	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.81E+06	0.00E+00	1.81E+06	0.00E+00	6.75E+04	6.75E+04	1.88E+06	1.88E+06	1.88E+06	1.14E-02
MO/DA/YR HR:MIN:SEC STEP	235	535	424	421	219	461	321	422	825	432
AVERAGE FLOW.....	52.521	0.000	52.521	4.738	4.754	14.094	13.376	16.450	1.171	28.744
STANDARD DEVIATION OF FLOW.....	5.704	0.000	5.704	1.273	1.242	3.771	0.621	1.098	0.027	2.523
MAXIMUM FLOW.....	343.451	0.000	343.451	80.240	78.277	241.703	21.662	64.407	1.428	157.399
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.88E+06	9.87E-03	1.88E+06	1.69E+05	1.70E+05	5.03E+05	4.78E+05	5.87E+05	4.18E+04	1.03E+06
MO/DA/YR HR:MIN:SEC STEP	332	427	327	627	724	725	833	433	426	228
AVERAGE FLOW.....	7.892	6.823	3.926	3.926	3.926	0.000	2.284	6.210	62.137	61.683
STANDARD DEVIATION OF FLOW.....	0.196	1.874	0.109	0.109	0.109	0.000	0.108	0.211	6.563	6.371
MAXIMUM FLOW.....	9.037	120.480	5.485	5.485	5.485	0.000	4.227	9.703	392.005	376.278
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	2.82E+05	2.44E+05	1.40E+05	1.40E+05	1.40E+05	7.87E-04	8.15E+04	2.22E+05	2.22E+06	2.20E+06
MO/DA/YR HR:MIN:SEC STEP	834	434	828	428	229	429	430	900	901	
AVERAGE FLOW.....	2.855	2.855	1.157	65.695	64.883	66.961	19.365	3.383	1.171	
STANDARD DEVIATION OF FLOW.....	0.177	0.177	0.079	6.529	5.722	6.005	5.014	0.924	0.027	
MAXIMUM FLOW.....	6.250	6.250	2.808	382.868	289.998	308.420	292.828	52.717	1.428	
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
FLOW VOLUME (CUBIC FEET).....	1.02E+05	1.02E+05	4.13E+04	2.35E+06	2.32E+06	2.39E+06	6.91E+05	1.21E+05	4.18E+04	

CONVEYANCE ELEMENT FLOW DEPTHS (IN FEET)

MO/DA/YR HR:MIN:SEC STEP	301	302	204	304	331	231	205	505	206	207
MAXIMUM DEPTH.....	2.189	1.982	0.000	0.000	3.291	1.328	3.503	0.000	0.446	0.982
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1										
MO/DA/YR HR:MIN:SEC STEP	507	208	508	209	509	314	215	515	218	518
MAXIMUM DEPTH.....	0.000	4.104	1.295	4.140	1.615	2.426	1.662	0.000	1.357	0.000
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000	0.300	0.000	0.000	0.000	0.000
1										
MO/DA/YR HR:MIN:SEC STEP	540	520	220	224	524	235	535	219	321	332
MAXIMUM DEPTH.....	0.000	0.000	2.648	3.401	0.000	4.549	0.000	1.554	4.761	5.874
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1										

MO/DA/YR HR:MIN:SEC STEP	327	228	229
MAXIMUM DEPTH.....	1.440	4.991	4.753
MINIMUM DEPTH.....	0.000	0.000	0.000

GRAPEVINE BASIN
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SUB-BASIN INFLOWS

MO/DA/YR HR:MIN:SEC STEP	1	2	3	4	5	6	7	8	9	10
AVERAGE FLOW.....	4.503	10.275	2.639	5.340	7.313	6.967	6.101	10.188	3.930	8.996
STANDARD DEVIATION OF FLOW.....	1.179	2.640	0.713	1.413	1.875	1.778	1.560	2.692	1.021	2.359
MAXIMUM FLOW.....	69.560	149.770	46.130	84.720	115.590	103.860	95.740	168.990	57.680	145.760
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.61E+05	3.67E+05	9.42E+04	1.91E+05	2.61E+05	2.49E+05	2.18E+05	3.64E+05	1.40E+05	3.21E+05

MO/DA/YR HR:MIN:SEC STEP	11	12	13	14	15	16	17	18	19	20
AVERAGE FLOW.....	4.069	2.769	4.096	3.142	3.285	7.976	4.271	7.297	6.208	19.380
STANDARD DEVIATION OF FLOW.....	1.087	0.726	1.080	0.811	0.866	1.963	1.102	1.759	1.643	4.893
MAXIMUM FLOW.....	68.960	42.530	68.130	44.164	54.120	112.764	65.770	102.437	105.950	293.758
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.45E+05	9.89E+04	1.46E+05	1.12E+05	1.17E+05	2.85E+05	1.52E+05	2.60E+05	2.22E+05	6.92E+05

MO/DA/YR HR:MIN:SEC STEP	21	22	23	24	25	26	27	28	29	30
AVERAGE FLOW.....	11.867	4.113	2.451	4.177	5.233	4.473	9.026	1.656	3.332	26.925
STANDARD DEVIATION OF FLOW.....	3.315	1.088	0.641	1.027	1.372	1.116	2.408	0.427	0.876	6.721
MAXIMUM FLOW.....	237.480	68.800	34.521	58.447	85.600	63.573	157.010	25.010	46.495	379.538
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	4.24E+05	1.47E+05	8.75E+04	1.49E+05	1.87E+05	1.60E+05	3.22E+05	5.91E+04	1.19E+05	9.61E+05

MO/DA/YR HR:MIN:SEC STEP	31	32	33	34	35	36	37
AVERAGE FLOW.....	1.394	0.496	3.351	3.784	2.838	23.578	0.000
STANDARD DEVIATION OF FLOW.....	0.351	0.124	0.873	0.971	0.741	2.481	0.000
MAXIMUM FLOW.....	19.150	5.595	57.200	63.250	41.680	120.940	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	4.98E+04	1.77E+04	1.20E+05	1.35E+05	1.01E+05	8.42E+05	0.00E+00

CONVEYANCE ELEMENT OUTFLOWS

MO/DA/YR HR:MIN:SEC STEP	301	402	302	204	304	403	331	631	700	701
AVERAGE FLOW.....	2.942	13.217	4.443	4.431	3.691	9.031	9.026	9.026	9.026	0.000
STANDARD DEVIATION OF FLOW.....	0.139	2.634	0.496	0.495	0.365	1.362	1.057	1.057	1.057	0.000
MAXIMUM FLOW.....	4.594	150.229	23.419	23.518	18.104	84.720	40.255	40.255	40.255	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.05E+05	4.72E+05	1.59E+05	1.58E+05	1.32E+05	3.22E+05	3.22E+05	3.22E+05	3.22E+05	2.50E-04

MO/DA/YR HR:MIN:SEC STEP	231	431	404	605	704	705	205	505	405	603
AVERAGE FLOW.....	9.011	1.394	17.719	17.719	17.601	0.117	17.579	0.128	17.707	2.639
STANDARD DEVIATION OF FLOW.....	1.056	0.351	3.056	3.056	3.010	0.084	2.991	0.068	3.036	0.713
MAXIMUM FLOW.....	40.276	19.150	161.983	161.983	154.000	7.983	157.409	6.660	160.714	46.130
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.22E+05	4.98E+04	6.33E+05	6.33E+05	6.28E+05	4.19E+03	6.28E+05	4.55E+03	6.32E+05	9.42E+04

MO/DA/YR HR:MIN:SEC STEP	702	703	400	206	406	806	606	706	707	207
AVERAGE FLOW.....	1.898	0.741	0.741	2.007	8.974	8.420	8.420	8.420	0.000	8.411
STANDARD DEVIATION OF FLOW.....	0.427	0.349	0.349	0.401	2.108	0.549	0.549	0.549	0.000	0.550
MAXIMUM FLOW.....	18.000	28.130	28.130	17.957	112.662	19.363	19.363	19.363	0.000	19.370
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	6.78E+04	2.65E+04	2.65E+04	7.17E+04	3.20E+05	3.01E+05	3.01E+05	3.01E+05	1.22E-03	3.00E+05

MO/DA/YR HR:MIN:SEC STEP	507	407	410	610	708	709	208	508	408	608
AVERAGE FLOW.....	0.000	14.512	41.215	41.215	30.669	10.546	30.615	10.830	51.633	51.633
STANDARD DEVIATION OF FLOW.....	0.000	1.713	6.975	6.975	3.852	3.898	3.812	3.594	9.122	9.122
MAXIMUM FLOW.....	0.000	98.538	395.982	395.982	134.000	261.982	133.997	227.856	486.933	486.933
MINIMUM FLOW.....	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.001
FLOW VOLUME (CUBIC FEET).....	9.30E-04	5.18E+05	1.47E+06	1.47E+06	1.09E+06	3.76E+05	1.09E+06	3.87E+05	1.84E+06	1.84E+06

MO/DA/YR HR:MIN:SEC STEP	710	711	209	509	411	412	417	413	314	414
AVERAGE FLOW.....	30.979	20.655	30.939	20.655	55.662	62.361	8.367	73.871	34.601	37.885
STANDARD DEVIATION OF FLOW.....	3.689	6.235	3.676	6.162	9.968	11.571	2.180	14.352	1.012	0.863
MAXIMUM FLOW.....	118.000	368.933	118.709	360.681	528.281	611.437	133.900	751.967	46.715	57.784
MINIMUM FLOW.....	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.11E+06	7.37E+05	1.10E+06	7.37E+05	1.99E+06	2.23E+06	2.99E+05	2.64E+06	1.24E+06	1.35E+06

MO/DA/YR HR:MIN:SEC STEP	614	712	713	215	515	316	616	714	715	218
AVERAGE FLOW.....	37.885	37.885	0.000	37.744	0.000	7.960	7.960	7.221	0.739	7.218
STANDARD DEVIATION OF FLOW.....	0.863	0.863	0.000	0.892	0.000	1.034	1.034	0.837	0.313	0.835
MAXIMUM FLOW.....	57.784	57.784	0.000	58.420	0.000	49.878	49.878	28.600	21.278	28.600
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FLOW VOLUME (CUBIC FEET).....	1.35E+06	1.35E+06	1.14E-03	1.35E+06	1.35E-03	2.84E+05	2.84E+05	2.58E+05	2.64E+04	2.58E+05
MO/DA/YR HR:MIN:SEC STEP	620	716	518	717	440	540	418	619	718	415
AVERAGE FLOW.....	0.739	0.739	0.793	0.000	0.000	0.000	15.308	15.308	15.308	53.053
STANDARD DEVIATION OF FLOW.....	0.313	0.313	0.280	0.000	0.000	0.000	2.387	2.387	2.387	2.905
MAXIMUM FLOW.....	21.278	21.278	17.192	0.000	0.000	0.000	110.731	110.731	110.731	169.151
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	2.64E+04	2.64E+04	2.83E+04	2.08E-11	2.08E-11	2.89E-11	5.47E+05	5.47E+05	5.47E+05	1.89E+06
MO/DA/YR HR:MIN:SEC STEP	719	618	720	721	416	520	220	423	420	624
AVERAGE FLOW.....	0.000	53.053	53.053	0.000	0.000	0.000	52.805	19.380	72.185	72.185
STANDARD DEVIATION OF FLOW.....	0.000	2.905	2.905	0.000	0.000	0.000	2.905	4.893	7.366	7.366
MAXIMUM FLOW.....	0.000	169.151	169.151	0.000	0.000	0.000	164.404	293.758	451.420	451.420
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001
FLOW VOLUME (CUBIC FEET).....	6.26E-04	1.89E+06	1.89E+06	9.16E-03	6.26E-04	1.13E-03	1.89E+06	6.92E+05	2.58E+06	2.58E+06
MO/DA/YR HR:MIN:SEC STEP	722	723	224	524	824	425	435	635	726	727
AVERAGE FLOW.....	72.185	0.000	72.085	0.000	2.473	2.473	74.558	74.558	74.558	0.000
STANDARD DEVIATION OF FLOW.....	7.366	0.000	7.355	0.000	0.074	0.074	7.357	7.357	7.357	0.000
MAXIMUM FLOW.....	451.420	0.000	448.428	0.000	3.578	3.578	449.550	449.550	449.550	0.000
MINIMUM FLOW.....	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	2.58E+06	0.00E+00	2.57E+06	0.00E+00	8.83E+04	8.83E+04	2.66E+06	2.66E+06	2.66E+06	7.44E-03
MO/DA/YR HR:MIN:SEC STEP	235	535	424	421	219	461	321	422	825	432
AVERAGE FLOW.....	74.418	0.000	74.418	6.208	6.223	18.090	17.043	21.157	1.542	45.230
STANDARD DEVIATION OF FLOW.....	7.330	0.000	7.330	1.643	1.606	4.785	0.729	1.375	0.035	3.760
MAXIMUM FLOW.....	433.546	0.000	433.546	105.950	102.610	312.934	41.228	82.832	1.883	195.394
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	2.66E+06	5.83E-03	2.66E+06	2.22E+05	2.22E+05	6.46E+05	6.08E+05	7.55E+05	5.51E+04	1.61E+06
MO/DA/YR HR:MIN:SEC STEP	332	427	327	627	724	725	833	433	426	228
AVERAGE FLOW.....	9.108	9.026	5.140	5.140	5.140	0.000	2.830	7.970	86.862	86.274
STANDARD DEVIATION OF FLOW.....	0.222	2.408	0.141	0.141	0.141	0.000	0.133	0.266	8.435	8.208
MAXIMUM FLOW.....	10.457	157.010	7.163	7.163	7.163	0.000	5.243	12.399	501.314	475.032
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.25E+05	3.22E+05	1.83E+05	1.83E+05	1.83E+05	1.50E-03	1.01E+05	2.85E+05	3.10E+06	3.08E+06
MO/DA/YR HR:MIN:SEC STEP	834	434	828	428	229	429	430	900	901	
AVERAGE FLOW.....	3.510	3.510	1.561	91.344	90.071	93.403	26.925	5.289	1.542	
STANDARD DEVIATION OF FLOW.....	0.216	0.216	0.105	8.405	7.432	7.900	6.721	1.379	0.035	
MAXIMUM FLOW.....	7.633	7.633	3.718	483.096	367.525	394.731	379.538	75.160	1.883	
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
FLOW VOLUME (CUBIC FEET).....	1.25E+05	1.25E+05	5.57E+04	3.26E+06	3.22E+06	3.33E+06	9.61E+05	1.89E+05	5.51E+04	

CONVEYANCE ELEMENT FLOW DEPTHS (IN FEET)

MO/DA/YR HR:MIN:SEC STEP	301	302	204	304	331	231	205	505	206	207
MAXIMUM DEPTH.....	3.088	2.119	1.192	0.703	3.881	1.464	4.054	0.246	0.451	1.140
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000	0.002	0.004	0.000	0.007	0.000
1										
MO/DA/YR HR:MIN:SEC STEP	507	208	508	209	509	314	215	515	218	518
MAXIMUM DEPTH.....	0.000	4.105	1.632	4.111	1.997	3.172	1.931	0.000	1.639	0.535
MINIMUM DEPTH.....	0.000	0.007	0.000	0.006	0.000	0.300	0.003	0.000	0.001	0.000
1										
MO/DA/YR HR:MIN:SEC STEP	540	520	220	224	524	235	535	219	321	332
MAXIMUM DEPTH.....	0.000	0.000	3.077	4.095	0.000	5.468	0.000	1.763	5.559	7.696
MINIMUM DEPTH.....	0.000	0.000	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.000
1										
MO/DA/YR HR:MIN:SEC STEP	327	228	229							
MAXIMUM DEPTH.....	1.881	5.651	5.421							
MINIMUM DEPTH.....	0.000	0.000	0.000							

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SUB-BASIN INFLOWS

MO/DA/YR HR:MIN:SEC STEP	1	2	3	4	5	6	7	8	9	10
AVERAGE FLOW.....	9.762	22.188	4.736	11.333	12.487	13.755	10.274	19.580	8.750	17.087
STANDARD DEVIATION OF FLOW.....	2.708	6.000	1.366	3.168	3.407	3.741	2.797	5.538	2.382	4.784
MAXIMUM FLOW.....	152.309	329.229	85.237	180.880	206.936	212.323	168.801	339.471	128.204	288.465
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.49E+05	7.92E+05	1.69E+05	4.05E+05	4.46E+05	4.91E+05	3.67E+05	6.99E+05	3.12E+05	6.10E+05

MO/DA/YR HR:MIN:SEC STEP	11	12	13	14	15	16	17	18	19	20
AVERAGE FLOW.....	7.725	5.682	7.698	7.247	6.129	14.460	8.150	11.582	11.006	34.827
STANDARD DEVIATION OF FLOW.....	2.204	1.583	2.175	1.950	1.722	3.801	2.240	2.974	3.109	9.384
MAXIMUM FLOW.....	133.988	88.390	132.663	102.689	103.882	213.034	129.630	169.903	195.893	546.952
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	2.76E+05	2.03E+05	2.75E+05	2.59E+05	2.19E+05	5.16E+05	2.91E+05	4.13E+05	3.93E+05	1.24E+06

MO/DA/YR HR:MIN:SEC STEP	21	22	23	24	25	26	27	28	29	30
AVERAGE FLOW.....	19.855	7.581	6.242	7.764	9.442	7.972	15.746	2.932	7.448	50.490
STANDARD DEVIATION OF FLOW.....	5.862	2.142	1.676	2.046	2.640	2.123	4.477	0.804	2.009	13.367
MAXIMUM FLOW.....	405.271	131.199	86.657	113.411	160.978	118.550	283.538	45.159	103.885	737.097
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	7.09E+05	2.71E+05	2.23E+05	2.77E+05	3.37E+05	2.85E+05	5.62E+05	1.05E+05	2.66E+05	1.80E+06

MO/DA/YR HR:MIN:SEC STEP	31	32	33	34	35	36	37
AVERAGE FLOW.....	2.790	1.540	5.331	5.807	6.125	47.305	0.000
STANDARD DEVIATION OF FLOW.....	0.741	0.370	1.466	1.573	1.680	5.542	0.000
MAXIMUM FLOW.....	38.683	15.459	93.561	99.607	90.148	243.210	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	9.96E+04	5.50E+04	1.90E+05	2.07E+05	2.19E+05	1.69E+06	0.00E+00

CONVEYANCE ELEMENT OUTFLOWS

MO/DA/YR HR:MIN:SEC STEP	301	402	302	204	304	403	331	631	700	701
AVERAGE FLOW.....	7.688	29.877	21.060	21.042	20.256	31.589	31.577	31.577	31.577	0.000
STANDARD DEVIATION OF FLOW.....	1.139	6.545	3.808	3.800	3.514	5.058	2.962	2.962	2.962	0.000
MAXIMUM FLOW.....	71.038	331.781	144.784	144.680	132.974	180.880	85.659	85.659	85.659	0.000
MINIMUM FLOW.....	0.000	0.022	0.000	0.000	0.000	0.017	0.009	0.009	0.009	0.000
FLOW VOLUME (CUBIC FEET).....	2.74E+05	1.07E+06	7.52E+05	7.51E+05	7.23E+05	1.13E+06	1.13E+06	1.13E+06	1.13E+06	8.63E-04

MO/DA/YR HR:MIN:SEC STEP	231	431	404	605	704	705	205	505	405	603
AVERAGE FLOW.....	31.548	2.790	46.825	46.825	42.558	4.267	42.519	4.267	46.786	4.736
STANDARD DEVIATION OF FLOW.....	2.963	0.741	5.580	5.580	4.430	1.841	4.417	1.750	5.538	1.366
MAXIMUM FLOW.....	85.612	38.683	282.370	282.370	154.000	128.370	159.834	130.492	281.752	85.237
MINIMUM FLOW.....	0.000	0.000	0.039	0.039	0.039	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.13E+06	9.96E+04	1.67E+06	1.67E+06	1.52E+06	1.52E+05	1.52E+06	1.52E+05	1.67E+06	1.69E+05

MO/DA/YR HR:MIN:SEC STEP	702	703	400	206	406	806	606	706	707	207
AVERAGE FLOW.....	2.245	2.492	2.492	2.333	16.088	15.116	15.116	15.116	0.000	15.102
STANDARD DEVIATION OF FLOW.....	0.487	0.979	0.979	0.464	4.113	1.020	1.020	1.020	0.000	1.021
MAXIMUM FLOW.....	18.000	67.237	67.237	18.554	223.915	36.599	36.599	36.599	0.000	36.583
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.027	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	8.01E+04	8.90E+04	8.90E+04	8.33E+04	5.74E+05	5.40E+05	5.40E+05	5.40E+05	3.15E-03	5.39E+05

MO/DA/YR HR:MIN:SEC STEP	507	407	410	610	708	709	208	508	408	608
AVERAGE FLOW.....	0.000	25.376	89.249	89.249	55.473	33.776	55.336	33.912	108.828	108.828
STANDARD DEVIATION OF FLOW.....	0.000	3.090	12.867	12.867	4.696	9.909	4.676	9.472	17.286	17.286
MAXIMUM FLOW.....	0.000	175.457	728.357	728.357	134.000	594.357	134.000	560.094	956.850	956.850
MINIMUM FLOW.....	0.000	0.029	0.073	0.073	0.073	0.000	0.000	0.000	0.052	0.052
FLOW VOLUME (CUBIC FEET).....	2.86E-03	9.06E+05	3.19E+06	3.19E+06	1.98E+06	1.21E+06	1.98E+06	1.21E+06	3.89E+06	3.89E+06

MO/DA/YR HR:MIN:SEC STEP	710	711	209	509	411	412	417	413	314	414
AVERAGE FLOW.....	53.255	55.573	53.186	55.574	116.485	130.917	15.848	154.011	79.885	86.014
STANDARD DEVIATION OF FLOW.....	4.284	14.796	4.277	14.693	19.070	22.753	4.412	28.751	2.313	1.915
MAXIMUM FLOW.....	118.000	838.850	119.868	842.710	1062.365	1249.665	262.292	1549.865	101.374	112.369
MINIMUM FLOW.....	0.052	0.000	0.000	0.000	0.024	0.043	0.000	0.096	0.000	0.021
FLOW VOLUME (CUBIC FEET).....	1.90E+06	1.98E+06	1.90E+06	1.98E+06	4.16E+06	4.67E+06	5.66E+05	5.50E+06	2.85E+06	3.07E+06

MO/DA/YR HR:MIN:SEC STEP	614	712	713	215	515	316	616	714	715	218
AVERAGE FLOW.....	86.014	86.014	0.000	85.746	0.000	14.443	14.443	7.774	6.670	7.771
STANDARD DEVIATION OF FLOW.....	1.915	1.915	0.000	1.971	0.000	2.977	2.977	0.898	2.383	0.895
MAXIMUM FLOW.....	112.369	112.369	0.000	112.108	0.000	181.289	181.289	28.600	152.689	28.600
MINIMUM FLOW.....	0.021	0.021	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.000

FLOW VOLUME (CUBIC FEET).....	3.07E+06	3.07E+06	0.00E+00	3.06E+06	0.00E+00	5.16E+05	5.16E+05	2.78E+05	2.38E+05	2.77E+05
MO/DA/YR HR:MIN:SEC STEP	620	716	518	717	440	540	418	619	718	415
AVERAGE FLOW.....	6.670	5.529	5.567	1.141	1.141	1.241	24.919	24.919	24.874	110.620
STANDARD DEVIATION OF FLOW.....	2.383	1.856	1.748	0.672	0.672	0.541	4.782	4.782	4.767	5.661
MAXIMUM FLOW.....	152.689	97.000	94.728	55.689	55.689	41.764	221.786	221.786	216.400	320.920
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022	0.022	0.022
FLOW VOLUME (CUBIC FEET).....	2.38E+05	1.97E+05	1.99E+05	4.07E+04	4.07E+04	4.43E+04	8.90E+05	8.90E+05	8.88E+05	3.95E+06
MO/DA/YR HR:MIN:SEC STEP	719	618	720	721	416	520	220	423	420	624
AVERAGE FLOW.....	0.045	110.620	106.119	4.502	0.045	0.074	105.652	36.068	141.794	141.794
STANDARD DEVIATION OF FLOW.....	0.045	5.661	4.448	1.581	0.045	0.030	4.484	9.670	13.166	13.166
MAXIMUM FLOW.....	5.386	320.920	233.000	87.920	5.386	2.519	233.000	546.952	778.689	778.689
MINIMUM FLOW.....	0.000	0.022	0.022	0.000	0.000	0.000	0.000	0.000	0.056	0.056
FLOW VOLUME (CUBIC FEET).....	1.62E+03	3.95E+06	3.79E+06	1.61E+05	1.62E+03	2.66E+03	3.77E+06	1.29E+06	5.06E+06	5.06E+06
MO/DA/YR HR:MIN:SEC STEP	722	723	224	524	824	425	435	635	726	727
AVERAGE FLOW.....	133.296	8.498	133.112	8.498	4.596	4.596	137.708	137.708	135.047	2.662
STANDARD DEVIATION OF FLOW.....	10.296	3.790	10.295	3.665	0.143	0.143	10.318	10.318	9.541	1.003
MAXIMUM FLOW.....	498.000	280.689	501.534	270.861	6.684	6.684	503.814	503.814	452.000	51.814
MINIMUM FLOW.....	0.056	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	4.76E+06	3.03E+05	4.75E+06	3.03E+05	1.64E+05	1.64E+05	4.92E+06	4.92E+06	4.82E+06	9.50E+04
MO/DA/YR HR:MIN:SEC STEP	235	535	424	421	219	461	321	422	825	432
AVERAGE FLOW.....	134.791	2.662	137.453	15.507	15.513	35.369	34.301	41.882	2.781	90.727
STANDARD DEVIATION OF FLOW.....	9.535	0.971	10.303	4.436	4.373	9.733	6.130	7.538	0.067	12.849
MAXIMUM FLOW.....	452.755	50.985	503.740	247.360	234.287	561.085	482.249	564.023	3.395	803.729
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.026	0.000	0.026
FLOW VOLUME (CUBIC FEET).....	4.81E+06	9.50E+04	4.91E+06	5.54E+05	5.54E+05	1.26E+06	1.22E+06	1.50E+06	9.93E+04	3.24E+06
MO/DA/YR HR:MIN:SEC STEP	332	427	327	627	724	725	833	433	426	228
AVERAGE FLOW.....	34.750	15.746	8.302	8.302	8.302	0.000	4.504	12.806	158.231	157.184
STANDARD DEVIATION OF FLOW.....	2.470	4.477	0.201	0.201	0.201	0.000	0.219	0.395	12.318	12.151
MAXIMUM FLOW.....	74.248	283.538	10.387	10.387	10.387	0.000	8.495	18.793	620.224	620.505
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.019	0.000
FLOW VOLUME (CUBIC FEET).....	1.24E+06	5.62E+05	2.96E+05	2.96E+05	2.96E+05	2.86E-04	1.61E+05	4.57E+05	5.65E+06	5.61E+06
MO/DA/YR HR:MIN:SEC STEP	834	434	828	428	229	429	430	900	901	
AVERAGE FLOW.....	5.387	5.387	2.765	165.336	162.447	169.895	50.490	20.864	2.781	
STANDARD DEVIATION OF FLOW.....	0.342	0.342	0.192	12.511	11.543	12.644	13.367	6.687	0.067	
MAXIMUM FLOW.....	12.218	12.218	6.922	632.613	567.250	619.836	737.097	447.110	3.395	
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	
FLOW VOLUME (CUBIC FEET).....	1.92E+05	1.92E+05	9.87E+04	5.90E+06	5.80E+06	6.07E+06	1.80E+06	7.45E+05	9.93E+04	

CONVEYANCE ELEMENT FLOW DEPTHS (IN FEET)

MO/DA/YR HR:MIN:SEC STEP	301	302	204	304	331	231	205	505	206	207
MAXIMUM DEPTH.....	4.417	3.448	3.502	2.187	9.411	2.319	4.084	0.749	0.455	1.611
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.001	0.013	0.032	0.000	0.020	0.003
1										
MO/DA/YR HR:MIN:SEC STEP	507	208	508	209	509	314	215	515	218	518
MAXIMUM DEPTH.....	0.000	4.105	2.581	4.135	3.063	5.616	3.058	0.000	1.639	0.920
MINIMUM DEPTH.....	0.000	0.045	0.000	0.041	0.000	0.300	0.021	0.000	0.004	0.000
1										
MO/DA/YR HR:MIN:SEC STEP	540	520	220	224	524	235	535	219	321	332
MAXIMUM DEPTH.....	0.568	0.170	4.100	4.527	1.006	5.742	0.602	2.790	6.189	10.468
MINIMUM DEPTH.....	0.000	0.000	0.020	0.024	0.000	0.002	0.000	0.000	0.001	0.000
1										
MO/DA/YR HR:MIN:SEC STEP	327	228	229							
MAXIMUM DEPTH.....	3.201	6.447	6.805							
MINIMUM DEPTH.....	0.000	0.001	0.000							

GRAPEVINE BASIN
FILENAME: GVB100FC.SUM
FUTURE CONDITION WITH EXISTING FACILITIES
EPA SWMM SUMMARY OUTPUT FILE
100-YEAR EVENT

SUMMARY OF EPA SWMM ANALYSIS
(See detailed output for more information)

City of Greeley Comprehensive Drainage Plan Update - ACE Inc.
Grapevine Basin - Future Conditions - 100-Year Storm

SUB-BASIN INFLOWS

MO/DA/YR HR:MIN:SEC STEP	1	2	3	4	5	6	7	8	9	10
AVERAGE FLOW.....	11.918	27.139	5.573	13.811	14.506	16.526	11.883	23.363	10.763	20.355
STANDARD DEVIATION OF FLOW.....	3.312	7.336	1.624	3.859	4.018	4.519	3.290	6.663	2.921	5.744
MAXIMUM FLOW.....	181.557	391.534	99.181	214.733	235.435	248.590	191.647	396.811	152.830	335.858
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	4.25E+05	9.69E+05	1.99E+05	4.93E+05	5.18E+05	5.90E+05	4.24E+05	8.34E+05	3.84E+05	7.27E+05

MO/DA/YR HR:MIN:SEC STEP	11	12	13	14	15	16	17	18	19	20
AVERAGE FLOW.....	9.208	6.884	9.143	8.960	7.268	17.047	9.715	13.226	12.907	40.961
STANDARD DEVIATION OF FLOW.....	2.645	1.922	2.609	2.404	2.061	4.539	2.694	3.462	3.690	11.175
MAXIMUM FLOW.....	157.181	104.581	155.291	123.046	121.220	250.273	151.434	195.463	225.680	642.813
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.29E+05	2.46E+05	3.26E+05	3.20E+05	2.59E+05	6.09E+05	3.47E+05	4.72E+05	4.61E+05	1.46E+06

MO/DA/YR HR:MIN:SEC STEP	21	22	23	24	25	26	27	28	29	30
AVERAGE FLOW.....	22.941	8.972	7.826	9.230	11.113	9.346	18.418	3.447	9.202	60.098
STANDARD DEVIATION OF FLOW.....	6.867	2.559	2.090	2.462	3.143	2.528	5.302	0.956	2.469	16.040
MAXIMUM FLOW.....	467.853	152.724	104.680	134.561	185.837	139.085	327.010	52.549	124.210	870.707
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	8.19E+05	3.20E+05	2.79E+05	3.30E+05	3.97E+05	3.34E+05	6.58E+05	1.23E+05	3.29E+05	2.15E+06

MO/DA/YR HR:MIN:SEC STEP	31	32	33	34	35	36	37
AVERAGE FLOW.....	3.349	1.994	6.089	6.572	7.489	50.803	2.640
STANDARD DEVIATION OF FLOW.....	0.897	0.470	1.703	1.813	2.054	6.456	1.412
MAXIMUM FLOW.....	45.575	18.903	106.134	112.121	107.119	275.550	113.839
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.20E+05	7.12E+04	2.17E+05	2.35E+05	2.67E+05	1.81E+06	9.42E+04

CONVEYANCE ELEMENT OUTFLOWS

MO/DA/YR HR:MIN:SEC STEP	301	402	302	204	304	403	331	631	700	701
AVERAGE FLOW.....	9.854	36.993	28.177	28.160	27.375	41.186	41.174	41.174	41.174	0.000
STANDARD DEVIATION OF FLOW.....	1.815	8.470	4.781	4.773	4.410	6.244	3.347	3.347	3.347	0.000
MAXIMUM FLOW.....	109.079	396.066	160.721	160.607	142.003	214.733	92.046	92.046	92.046	0.000
MINIMUM FLOW.....	0.000	0.012	0.000	0.000	0.000	0.009	0.005	0.005	0.005	0.000
FLOW VOLUME (CUBIC FEET).....	3.52E+05	1.32E+06	1.01E+06	1.01E+06	9.77E+05	1.47E+06	1.47E+06	1.47E+06	1.47E+06	6.04E-03

MO/DA/YR HR:MIN:SEC STEP	231	431	404	605	704	705	205	505	405	603
AVERAGE FLOW.....	41.145	3.349	59.000	59.000	52.034	6.966	51.995	6.966	58.961	5.573
STANDARD DEVIATION OF FLOW.....	3.348	0.897	6.313	6.313	4.567	2.619	4.556	2.532	6.266	1.624
MAXIMUM FLOW.....	92.035	45.575	326.134	326.134	154.000	172.134	159.188	175.794	327.308	99.181
MINIMUM FLOW.....	0.000	0.000	0.021	0.021	0.021	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.47E+06	1.20E+05	2.11E+06	2.11E+06	1.86E+06	2.49E+05	1.86E+06	2.49E+05	2.10E+06	1.99E+05

MO/DA/YR HR:MIN:SEC STEP	702	703	400	206	406	806	606	706	707	207
AVERAGE FLOW.....	2.259	3.314	3.314	2.360	18.886	17.750	17.750	17.750	0.000	17.735
STANDARD DEVIATION OF FLOW.....	0.497	1.224	1.224	0.473	4.899	1.208	1.208	1.208	0.000	1.209
MAXIMUM FLOW.....	18.000	81.181	81.181	18.750	260.339	43.799	43.799	43.799	0.000	43.777
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	8.06E+04	1.18E+05	1.18E+05	8.42E+04	6.74E+05	6.34E+05	6.34E+05	6.34E+05	2.86E-03	6.33E+05

MO/DA/YR HR:MIN:SEC STEP	507	407	410	610	708	709	208	508	408	608
AVERAGE FLOW.....	0.000	29.618	108.934	108.934	65.654	43.281	65.517	43.493	132.372	132.372
STANDARD DEVIATION OF FLOW.....	0.000	3.642	15.012	15.012	4.824	12.310	4.807	11.868	20.459	20.459
MAXIMUM FLOW.....	0.000	203.904	855.014	855.014	134.000	721.014	134.000	683.499	1136.376	1136.376
MINIMUM FLOW.....	0.000	0.016	0.039	0.039	0.039	0.000	0.000	0.000	0.029	0.029
FLOW VOLUME (CUBIC FEET).....	2.52E-03	1.06E+06	3.89E+06	3.89E+06	2.34E+06	1.55E+06	2.34E+06	1.55E+06	4.73E+06	4.73E+06

MO/DA/YR HR:MIN:SEC STEP	710	711	209	509	411	412	417	413	314	414
AVERAGE FLOW.....	62.724	69.648	62.652	69.649	141.510	159.157	18.858	186.975	97.057	104.325
STANDARD DEVIATION OF FLOW.....	4.386	18.262	4.381	18.150	22.646	27.189	5.299	34.503	2.709	2.227
MAXIMUM FLOW.....	118.000	1018.376	119.732	1022.589	1264.194	1493.864	306.726	1859.244	117.792	132.029
MINIMUM FLOW.....	0.029	0.000	0.000	0.000	0.013	0.023	0.000	0.052	0.000	0.011
FLOW VOLUME (CUBIC FEET).....	2.24E+06	2.49E+06	2.24E+06	2.49E+06	5.05E+06	5.68E+06	6.73E+05	6.67E+06	3.46E+06	3.72E+06

MO/DA/YR HR:MIN:SEC STEP	614	712	713	215	515	316	616	714	715	218
AVERAGE FLOW.....	104.325	103.640	0.686	103.321	0.720	17.030	17.030	7.774	9.257	7.771
STANDARD DEVIATION OF FLOW.....	2.227	2.171	0.231	2.243	0.216	3.729	3.729	0.901	3.130	0.898
MAXIMUM FLOW.....	132.029	120.000	12.029	120.092	10.574	228.013	228.013	28.600	199.413	28.600
MINIMUM FLOW.....	0.011	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FLOW VOLUME (CUBIC FEET).....	3.72E+06	3.70E+06	2.45E+04	3.69E+06	2.57E+04	6.08E+05	6.08E+05	2.78E+05	3.30E+05	2.77E+05
MO/DA/YR HR:MIN:SEC STEP	620	716	518	717	440	540	418	619	718	415
AVERAGE FLOW.....	9.257	6.802	6.866	2.455	2.455	2.501	27.862	27.862	26.937	130.977
STANDARD DEVIATION OF FLOW.....	3.130	2.104	2.027	1.260	1.260	1.036	5.563	5.563	5.265	6.337
MAXIMUM FLOW.....	199.413	97.000	96.703	102.413	102.413	76.438	255.893	255.893	216.400	345.660
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.012	0.012	0.012
FLOW VOLUME (CUBIC FEET).....	3.30E+05	2.43E+05	2.45E+05	8.76E+04	8.76E+04	8.93E+04	9.95E+05	9.95E+05	9.62E+05	4.68E+06
MO/DA/YR HR:MIN:SEC STEP	719	618	720	721	416	520	220	423	420	624
AVERAGE FLOW.....	0.926	130.977	122.903	8.074	0.926	1.036	122.352	43.463	166.850	166.850
STANDARD DEVIATION OF FLOW.....	0.482	6.337	4.311	2.526	0.482	0.414	4.371	11.783	15.187	15.187
MAXIMUM FLOW.....	39.493	345.660	233.000	112.660	39.493	29.974	233.011	642.813	873.692	873.692
MINIMUM FLOW.....	0.000	0.012	0.012	0.000	0.000	0.000	0.000	0.000	0.031	0.031
FLOW VOLUME (CUBIC FEET).....	3.30E+04	4.68E+06	4.39E+06	2.88E+05	3.30E+04	3.70E+04	4.37E+06	1.55E+06	5.96E+06	5.96E+06
MO/DA/YR HR:MIN:SEC STEP	722	723	224	524	824	425	435	635	726	727
AVERAGE FLOW.....	152.000	14.850	151.783	14.850	5.466	5.466	157.249	157.249	153.734	3.514
STANDARD DEVIATION OF FLOW.....	10.455	5.787	10.455	5.651	0.172	0.172	10.487	10.487	9.522	1.181
MAXIMUM FLOW.....	498.000	375.692	501.373	375.929	7.999	7.999	504.954	504.954	452.000	52.954
MINIMUM FLOW.....	0.031	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	5.43E+06	5.30E+05	5.42E+06	5.30E+05	1.95E+05	1.95E+05	5.61E+06	5.61E+06	5.49E+06	1.25E+05
MO/DA/YR HR:MIN:SEC STEP	235	535	424	421	219	461	321	422	825	432
AVERAGE FLOW.....	153.435	3.514	156.949	20.981	20.992	43.933	42.872	51.845	3.275	104.642
STANDARD DEVIATION OF FLOW.....	9.519	1.142	10.473	5.917	5.842	12.045	8.874	10.695	0.080	16.873
MAXIMUM FLOW.....	454.056	52.733	504.647	318.956	308.284	682.357	602.801	723.581	4.000	975.451
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.000	0.014
FLOW VOLUME (CUBIC FEET).....	5.48E+06	1.25E+05	5.60E+06	7.49E+05	7.49E+05	1.57E+06	1.53E+06	1.85E+06	1.17E+05	3.74E+06
MO/DA/YR HR:MIN:SEC STEP	332	427	327	627	724	725	833	433	426	228
AVERAGE FLOW.....	48.681	21.058	13.010	13.010	8.740	4.270	5.146	13.887	180.182	178.964
STANDARD DEVIATION OF FLOW.....	3.549	6.055	1.741	1.741	0.210	1.684	0.252	0.436	12.861	12.699
MAXIMUM FLOW.....	142.161	327.010	137.932	137.932	10.800	127.132	9.898	20.698	642.454	643.803
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.000
FLOW VOLUME (CUBIC FEET).....	1.74E+06	7.52E+05	4.64E+05	4.64E+05	3.12E+05	1.52E+05	1.84E+05	4.96E+05	6.43E+06	6.39E+06
MO/DA/YR HR:MIN:SEC STEP	834	434	828	428	229	429	430	900	901	
AVERAGE FLOW.....	6.099	10.369	3.250	192.583	189.178	198.380	60.098	30.166	3.275	
STANDARD DEVIATION OF FLOW.....	0.391	1.883	0.227	14.240	13.294	14.647	16.040	9.465	0.080	
MAXIMUM FLOW.....	14.200	140.515	8.299	746.443	698.950	752.230	870.707	587.451	4.000	
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
FLOW VOLUME (CUBIC FEET).....	2.18E+05	3.70E+05	1.16E+05	6.88E+06	6.75E+06	7.08E+06	2.15E+06	1.08E+06	1.17E+05	

CONVEYANCE ELEMENT FLOW DEPTHS (IN FEET)

MO/DA/YR HR:MIN:SEC STEP	301	302	204	304	331	231	205	505	206	207
MAXIMUM DEPTH.....	4.527	4.101	3.950	2.818	10.977	2.446	4.084	0.832	0.455	1.788
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.001	0.010	0.024	0.000	0.017	0.003
1										
MO/DA/YR HR:MIN:SEC STEP	507	208	508	209	509	314	215	515	218	518
MAXIMUM DEPTH.....	0.000	4.105	2.863	4.133	3.382	6.487	3.274	0.386	1.639	0.924
MINIMUM DEPTH.....	0.000	0.034	0.000	0.031	0.000	0.300	0.016	0.000	0.003	0.000
1										
MO/DA/YR HR:MIN:SEC STEP	540	520	220	224	524	235	535	219	321	332
MAXIMUM DEPTH.....	0.688	0.538	4.100	4.526	1.142	5.742	0.608	3.099	6.261	10.709
MINIMUM DEPTH.....	0.000	0.000	0.015	0.018	0.000	0.001	0.000	0.000	0.001	0.000
1										
MO/DA/YR HR:MIN:SEC STEP	327	228	229							
MAXIMUM DEPTH.....	3.587	6.557	7.381							
MINIMUM DEPTH.....	0.000	0.000	0.000							

PROPOSED CONDITION
(FUTURE DEVELOPMENT WITH PROPOSED FACILITIES)

GRAPEVINE BASIN
FILENAME: GVB002PC.SUM
FUTURE CONDITION WITH PROPOSED FACILITIES
EPA SWMM SUMMARY OUTPUT FILE
2-YEAR EVENT

SUMMARY OF EPA SWMM ANALYSIS
(See detailed output for more information)

City of Greeley Comprehensive Drainage Plan Update - ACE Inc.
Grapevine Basin - Proposed Conditions - 2-Year Storm

SUB-BASIN INFLOWS

MO/DA/YR HR:MIN:SEC STEP	1	2	3	4	5	6	7	8	9	10
AVERAGE FLOW.....	1.295	2.768	1.106	1.532	3.361	2.401	2.864	3.898	0.949	3.412
STANDARD DEVIATION OF FLOW.....	0.346	0.719	0.300	0.412	0.865	0.613	0.737	1.021	0.262	0.885
MAXIMUM FLOW.....	20.270	40.770	18.960	24.510	52.100	35.430	44.180	63.020	14.730	53.680
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	4.62E+04	9.88E+04	3.95E+04	5.47E+04	1.20E+05	8.57E+04	1.02E+05	1.39E+05	3.39E+04	1.22E+05

MO/DA/YR HR:MIN:SEC STEP	11	12	13	14	15	16	17	18	19	20
AVERAGE FLOW.....	1.526	0.838	1.637	0.662	1.305	3.315	1.602	3.720	2.675	8.207
STANDARD DEVIATION OF FLOW.....	0.405	0.231	0.429	0.186	0.341	0.810	0.412	0.913	0.707	2.052
MAXIMUM FLOW.....	25.150	13.360	26.440	10.080	20.770	46.103	24.180	53.228	44.450	121.933
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	5.45E+04	2.99E+04	5.84E+04	2.36E+04	4.66E+04	1.18E+05	5.72E+04	1.33E+05	9.55E+04	2.93E+05

MO/DA/YR HR:MIN:SEC STEP	21	22	23	24	25	26	27	28	29	30
AVERAGE FLOW.....	5.624	1.655	0.395	1.890	2.202	1.911	3.509	0.536	0.336	8.228
STANDARD DEVIATION OF FLOW.....	1.582	0.435	0.116	0.462	0.574	0.478	0.939	0.159	0.103	2.071
MAXIMUM FLOW.....	110.390	26.870	6.241	25.824	34.980	27.049	59.800	9.060	5.522	116.310
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	2.01E+05	5.91E+04	1.41E+04	6.75E+04	7.86E+04	6.82E+04	1.25E+05	1.91E+04	1.20E+04	2.94E+05

MO/DA/YR HR:MIN:SEC STEP	31	32	33	34	35	36
AVERAGE FLOW.....	0.409	0.000	1.703	1.948	0.735	2.965
STANDARD DEVIATION OF FLOW.....	0.121	0.000	0.453	0.516	0.209	0.327
MAXIMUM FLOW.....	6.520	0.000	29.020	33.010	11.690	7.440
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.46E+04	0.00E+00	6.08E+04	6.95E+04	2.63E+04	1.06E+05

CONVEYANCE ELEMENT OUTFLOWS

MO/DA/YR HR:MIN:SEC STEP	801	402	302	204	304	403	831	631	700	701
AVERAGE FLOW.....	1.295	4.064	0.000	0.000	0.000	1.532	1.532	1.532	1.532	0.000
STANDARD DEVIATION OF FLOW.....	0.240	0.908	0.000	0.000	0.000	0.412	0.390	0.390	0.390	0.000
MAXIMUM FLOW.....	9.438	46.403	0.000	0.000	0.000	24.510	19.585	19.585	19.585	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	4.62E+04	1.45E+05	0.00E+00	0.00E+00	0.00E+00	5.47E+04	5.47E+04	5.47E+04	5.47E+04	5.36E-05

MO/DA/YR HR:MIN:SEC STEP	231	431	404	605	704	705	205	505	405	603
AVERAGE FLOW.....	1.532	0.409	5.303	5.303	5.303	0.000	5.303	0.000	5.303	1.106
STANDARD DEVIATION OF FLOW.....	0.387	0.121	1.336	1.336	1.336	0.000	1.324	0.000	1.324	0.300
MAXIMUM FLOW.....	19.281	6.520	73.753	73.753	73.753	0.000	74.084	0.000	74.084	18.960
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	5.47E+04	1.46E+04	1.89E+05	1.89E+05	1.89E+05	3.49E-08	1.89E+05	3.11E-08	1.89E+05	3.95E+04

MO/DA/YR HR:MIN:SEC STEP	702	703	400	206	406	806	606	706	707	207
AVERAGE FLOW.....	1.098	0.008	0.008	1.199	3.599	3.365	3.365	3.365	0.000	3.359
STANDARD DEVIATION OF FLOW.....	0.296	0.008	0.008	0.265	0.840	0.217	0.217	0.217	0.000	0.218
MAXIMUM FLOW.....	18.000	0.960	0.960	14.216	43.619	7.622	7.622	7.622	0.000	7.621
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.92E+04	2.88E+02	2.88E+02	4.28E+04	1.29E+05	1.20E+05	1.20E+05	1.20E+05	1.23E-03	1.20E+05

MO/DA/YR HR:MIN:SEC STEP	507	407	410	610	708	709	208	508	408	608
AVERAGE FLOW.....	0.000	6.224	14.938	14.938	14.303	0.635	14.291	0.805	18.994	18.994
STANDARD DEVIATION OF FLOW.....	0.000	0.787	2.946	2.946	2.689	0.385	2.632	0.317	3.798	3.798
MAXIMUM FLOW.....	0.000	45.433	170.595	170.595	134.000	36.595	132.257	24.789	197.655	197.655
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.16E-03	2.22E+05	5.33E+05	5.33E+05	5.11E+05	2.27E+04	5.10E+05	2.87E+04	6.78E+05	6.78E+05

MO/DA/YR HR:MIN:SEC STEP	710	711	209	509	411	412	417	413	314	414
AVERAGE FLOW.....	16.234	2.760	16.217	2.760	20.502	22.290	3.239	26.190	10.775	12.080
STANDARD DEVIATION OF FLOW.....	2.857	1.208	2.841	1.158	4.098	4.542	0.841	5.478	0.276	0.273
MAXIMUM FLOW.....	118.000	79.655	120.683	77.827	210.657	230.187	50.620	278.617	13.396	22.134
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	5.80E+05	9.85E+04	5.79E+05	9.85E+04	7.32E+05	7.96E+05	1.16E+05	9.35E+05	3.85E+05	4.31E+05

MO/DA/YR HR:MIN:SEC STEP	614	712	713	215	515	316	616	714	715	218
AVERAGE FLOW.....	12.080	12.080	0.000	12.013	0.000	3.308	3.308	3.308	0.000	3.306
STANDARD DEVIATION OF FLOW.....	0.273	0.273	0.000	0.285	0.000	0.375	0.375	0.375	0.000	0.374
MAXIMUM FLOW.....	22.134	22.134	0.000	22.356	0.000	12.400	12.400	12.400	0.000	12.382
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FLOW VOLUME (CUBIC FEET).....	4.31E+05	4.31E+05	2.86E-04	4.29E+05	0.00E+00	1.18E+05	1.18E+05	1.18E+05	7.15E-05	1.18E+05
MO/DA/YR HR:MIN:SEC STEP	620	716	518	717	440	540	418	619	718	415
AVERAGE FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	7.026	7.026	7.026	19.039
STANDARD DEVIATION OF FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	1.105	1.105	1.105	1.316
MAXIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	56.233	56.233	56.233	78.588
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	7.15E-05	7.15E-05	0.00E+00	4.26E-12	4.26E-12	0.00E+00	2.51E+05	2.51E+05	2.51E+05	6.80E+05
MO/DA/YR HR:MIN:SEC STEP	719	618	720	721	416	520	220	660	728	729
AVERAGE FLOW.....	0.000	19.039	19.039	0.000	0.000	0.000	18.922	8.207	8.207	0.000
STANDARD DEVIATION OF FLOW.....	0.000	1.316	1.316	0.000	0.000	0.000	1.308	2.052	2.052	0.000
MAXIMUM FLOW.....	0.000	78.588	78.588	0.000	0.000	0.000	76.154	121.933	121.933	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	6.19E-04	6.80E+05	6.80E+05	5.72E-04	6.19E-04	1.05E-03	6.76E+05	2.93E+05	2.93E+05	1.43E-03
MO/DA/YR HR:MIN:SEC STEP	260	420	624	722	723	224	524	465	835	824
AVERAGE FLOW.....	8.206	27.128	27.128	27.128	0.000	27.090	0.000	27.825	27.050	1.118
STANDARD DEVIATION OF FLOW.....	2.034	3.251	3.251	3.251	0.000	3.246	0.000	3.434	2.032	0.033
MAXIMUM FLOW.....	121.397	193.261	193.261	193.261	0.000	192.685	0.000	202.765	69.027	1.634
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	2.93E+05	9.68E+05	9.68E+05	9.68E+05	2.57E-03	9.67E+05	2.16E-03	9.93E+05	9.66E+05	3.99E+04
MO/DA/YR HR:MIN:SEC STEP	425	435	635	726	727	235	535	424	421	219
AVERAGE FLOW.....	28.169	28.169	28.169	28.169	0.000	28.099	0.000	28.099	2.675	2.701
STANDARD DEVIATION OF FLOW.....	2.055	2.055	2.055	2.055	0.000	2.058	0.000	2.058	0.707	0.677
MAXIMUM FLOW.....	70.463	70.463	70.463	70.463	0.000	70.436	0.000	70.436	44.450	40.606
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.01E+06	1.01E+06	1.01E+06	1.01E+06	1.72E-03	1.00E+06	1.38E-03	1.00E+06	9.55E+04	9.64E+04
MO/DA/YR HR:MIN:SEC STEP	461	821	422	825	432	332	427	327	627	724
AVERAGE FLOW.....	8.325	8.325	9.980	0.648	12.945	6.432	3.509	2.030	2.030	2.030
STANDARD DEVIATION OF FLOW.....	2.167	1.768	2.143	0.015	2.067	0.152	0.939	0.058	0.058	0.058
MAXIMUM FLOW.....	136.439	76.962	94.326	0.794	94.326	7.142	59.800	2.904	2.904	2.904
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	2.97E+05	2.97E+05	3.56E+05	2.31E+04	4.62E+05	2.30E+05	1.25E+05	7.25E+04	7.25E+04	7.25E+04
MO/DA/YR HR:MIN:SEC STEP	725	833	433	426	228	834	434	828	428	229
AVERAGE FLOW.....	0.000	1.439	3.469	33.480	33.196	1.807	1.807	0.506	35.510	34.825
STANDARD DEVIATION OF FLOW.....	0.000	0.068	0.123	2.336	2.332	0.112	0.112	0.036	2.476	2.378
MAXIMUM FLOW.....	0.000	2.684	5.582	83.718	83.101	3.952	3.952	1.362	88.116	83.608
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	2.86E-04	5.14E+04	1.24E+05	1.20E+06	1.19E+06	6.45E+04	6.45E+04	1.81E+04	1.27E+06	1.24E+06
MO/DA/YR HR:MIN:SEC STEP	429	430	900	901						
AVERAGE FLOW.....	35.161	8.228	0.395	0.648						
STANDARD DEVIATION OF FLOW.....	2.360	2.071	0.116	0.015						
MAXIMUM FLOW.....	83.608	116.310	6.241	0.794						
MINIMUM FLOW.....	0.000	0.000	0.000	0.000						
FLOW VOLUME (CUBIC FEET).....	1.26E+06	2.94E+05	1.41E+04	2.31E+04						

CONVEYANCE ELEMENT FLOW DEPTHS (IN FEET)

MO/DA/YR HR:MIN:SEC STEP	801	302	204	304	831	231	205	505	206	207
MAXIMUM DEPTH.....	0.470	0.929	0.000	0.000	2.161	0.991	2.421	0.000	0.409	0.710
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1										
MO/DA/YR HR:MIN:SEC STEP	507	208	508	209	509	314	215	515	218	518
MAXIMUM DEPTH.....	0.000	4.018	0.406	4.095	0.898	1.400	1.155	0.000	0.919	0.000
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000	0.300	0.000	0.000	0.000	0.000
1										
MO/DA/YR HR:MIN:SEC STEP	540	520	220	260	224	524	835	235	535	219
MAXIMUM DEPTH.....	0.000	0.000	1.948	2.841	2.232	0.000	3.557	1.868	0.000	0.690
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1										
MO/DA/YR HR:MIN:SEC STEP	821	332	327	228	229					
MAXIMUM DEPTH.....	2.029	3.842	0.761	2.409	2.687					
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000					

GRAPEVINE BASIN
FILENAME: GVB005PC.SUM
FUTURE CONDITION WITH PROPOSED FACILITIES
EPA SWMM SUMMARY OUTPUT FILE
5-YEAR EVENT

SUMMARY OF EPA SWMM ANALYSIS
(See detailed output for more information)

City of Greeley Comprehensive Drainage Plan Update - ACE Inc.
Grapevine Basin - Proposed Conditions - 5-Year Storm

SUB-BASIN INFLOWS

MO/DA/YR HR:MIN:SEC STEP	1	2	3	4	5	6	7	8	9	10
AVERAGE FLOW.....	3.052	6.899	1.997	3.648	5.704	4.990	4.779	7.477	2.598	6.607
STANDARD DEVIATION OF FLOW.....	0.827	1.830	0.549	0.995	1.482	1.302	1.242	2.012	0.699	1.765
MAXIMUM FLOW.....	48.800	108.015	35.190	59.570	89.706	76.253	74.673	124.010	40.417	107.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.09E+05	2.46E+05	7.13E+04	1.30E+05	2.04E+05	1.78E+05	1.71E+05	2.67E+05	9.28E+04	2.36E+05

MO/DA/YR HR:MIN:SEC STEP	11	12	13	14	15	16	17	18	19	20
AVERAGE FLOW.....	2.980	1.922	3.044	2.006	2.450	6.019	3.128	5.876	4.738	14.716
STANDARD DEVIATION OF FLOW.....	0.813	0.521	0.816	0.543	0.655	1.502	0.823	1.440	1.273	3.763
MAXIMUM FLOW.....	51.270	30.510	50.770	30.962	40.410	87.850	48.620	84.377	80.240	229.671
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.06E+05	6.86E+04	1.09E+05	7.16E+04	8.75E+04	2.15E+05	1.12E+05	2.10E+05	1.69E+05	5.25E+05

MO/DA/YR HR:MIN:SEC STEP	21	22	23	24	25	26	27	28	29	30
AVERAGE FLOW.....	9.341	3.073	1.464	3.192	3.970	3.405	6.823	1.226	2.078	19.365
STANDARD DEVIATION OF FLOW.....	2.643	0.826	0.409	0.787	1.055	0.864	1.874	0.331	0.590	5.014
MAXIMUM FLOW.....	186.820	51.470	23.222	44.890	64.350	50.249	120.480	19.400	33.020	292.828
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.33E+05	1.10E+05	5.23E+04	1.14E+05	1.42E+05	1.22E+05	2.44E+05	4.38E+04	7.42E+04	6.91E+05

MO/DA/YR HR:MIN:SEC STEP	31	32	33	34	35	36
AVERAGE FLOW.....	0.970	0.249	2.703	3.077	1.919	9.496
STANDARD DEVIATION OF FLOW.....	0.257	0.067	0.714	0.807	0.517	1.314
MAXIMUM FLOW.....	14.020	3.387	46.120	52.020	29.495	92.231
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.46E+04	8.91E+03	9.65E+04	1.10E+05	6.85E+04	3.39E+05

CONVEYANCE ELEMENT OUTFLOWS

MO/DA/YR HR:MIN:SEC STEP	801	402	302	204	304	403	831	631	700	701
AVERAGE FLOW.....	3.052	9.951	1.206	1.203	0.488	4.136	4.136	4.136	4.136	0.000
STANDARD DEVIATION OF FLOW.....	0.569	2.272	0.273	0.272	0.107	0.985	0.829	0.829	0.829	0.000
MAXIMUM FLOW.....	22.560	122.087	12.521	12.511	4.862	59.570	33.740	33.740	33.740	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.09E+05	3.55E+05	4.30E+04	4.29E+04	1.74E+04	1.48E+05	1.48E+05	1.48E+05	1.48E+05	5.83E-04

MO/DA/YR HR:MIN:SEC STEP	231	431	404	605	704	705	205	505	405	603
AVERAGE FLOW.....	4.134	0.970	10.808	10.808	10.808	0.000	10.804	0.000	10.804	1.997
STANDARD DEVIATION OF FLOW.....	0.826	0.257	2.440	2.440	2.440	0.000	2.422	0.000	2.422	0.549
MAXIMUM FLOW.....	33.709	14.020	131.838	131.838	131.838	0.000	131.120	0.000	131.120	35.190
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.48E+05	3.46E+04	3.86E+05	3.86E+05	3.86E+05	1.83E-08	3.86E+05	1.64E-08	3.86E+05	7.13E+04

MO/DA/YR HR:MIN:SEC STEP	702	703	400	206	406	806	606	706	707	207
AVERAGE FLOW.....	1.608	0.389	0.389	1.713	6.704	6.287	6.287	6.287	0.000	6.280
STANDARD DEVIATION OF FLOW.....	0.390	0.202	0.202	0.362	1.606	0.412	0.412	0.412	0.000	0.412
MAXIMUM FLOW.....	18.000	17.190	17.190	17.471	87.849	14.521	14.521	14.521	0.000	14.516
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	5.74E+04	1.39E+04	1.39E+04	6.12E+04	2.39E+05	2.24E+05	2.24E+05	2.24E+05	1.07E-03	2.24E+05

MO/DA/YR HR:MIN:SEC STEP	507	407	410	610	708	709	208	508	408	608
AVERAGE FLOW.....	0.000	11.058	28.470	28.470	22.684	5.786	22.665	5.962	36.103	36.103
STANDARD DEVIATION OF FLOW.....	0.000	1.348	5.439	5.439	3.526	2.478	3.478	2.179	7.014	7.014
MAXIMUM FLOW.....	0.000	78.684	316.559	316.559	134.000	182.559	133.973	142.401	371.337	371.337
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	8.28E-04	3.95E+05	1.02E+06	1.02E+06	8.10E+05	2.07E+05	8.09E+05	2.13E+05	1.29E+06	1.29E+06

MO/DA/YR HR:MIN:SEC STEP	710	711	209	509	411	412	417	413	314	414
AVERAGE FLOW.....	23.776	12.327	23.752	12.328	39.060	43.580	6.172	51.758	22.266	24.716
STANDARD DEVIATION OF FLOW.....	3.482	4.149	3.464	4.081	7.632	8.745	1.638	10.757	0.634	0.598
MAXIMUM FLOW.....	118.000	253.337	120.099	246.278	393.852	449.648	99.390	555.701	30.154	43.396
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	8.49E+05	4.40E+05	8.48E+05	4.40E+05	1.39E+06	1.56E+06	2.20E+05	1.85E+06	7.95E+05	8.82E+05

MO/DA/YR HR:MIN:SEC STEP	614	712	713	215	515	316	616	714	715	218
AVERAGE FLOW.....	24.716	24.716	0.000	24.609	0.000	6.006	6.006	6.006	0.000	6.003
STANDARD DEVIATION OF FLOW.....	0.598	0.598	0.000	0.616	0.000	0.687	0.687	0.687	0.000	0.686
MAXIMUM FLOW.....	43.396	43.396	0.000	44.488	0.000	23.010	23.010	23.010	0.000	22.987
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FLOW VOLUME (CUBIC FEET).....	8.82E+05	8.82E+05	1.72E-03	8.79E+05	9.38E-04	2.14E+05	2.14E+05	2.14E+05	1.01E-04	2.14E+05
MO/DA/YR HR:MIN:SEC STEP	620	716	518	717	440	540	418	619	718	415
AVERAGE FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	11.879	11.879	11.879	36.488
STANDARD DEVIATION OF FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	1.814	1.814	1.814	2.248
MAXIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	90.371	90.371	90.371	134.860
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.01E-04	1.01E-04	1.36E-04	6.00E-12	6.00E-12	9.70E-12	4.24E+05	4.24E+05	4.24E+05	1.30E+06
MO/DA/YR HR:MIN:SEC STEP	719	618	720	721	416	520	220	660	728	729
AVERAGE FLOW.....	0.000	36.488	36.488	0.000	0.000	0.000	36.302	14.716	13.585	1.131
STANDARD DEVIATION OF FLOW.....	0.000	2.248	2.248	0.000	0.000	0.000	2.243	3.763	3.282	0.682
MAXIMUM FLOW.....	0.000	134.860	134.860	0.000	0.000	0.000	131.816	229.671	165.000	64.671
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	2.64E-03	1.30E+06	1.30E+06	2.86E-03	2.64E-03	4.22E-03	1.30E+06	5.25E+05	4.85E+05	4.04E+04
MO/DA/YR HR:MIN:SEC STEP	260	420	624	722	723	224	524	465	835	824
AVERAGE FLOW.....	13.584	49.886	49.886	49.886	0.000	49.825	0.000	52.875	51.501	1.891
STANDARD DEVIATION OF FLOW.....	3.261	5.321	5.321	5.321	0.000	5.317	0.000	6.223	2.824	0.056
MAXIMUM FLOW.....	166.160	296.679	296.679	296.679	0.000	297.836	0.000	377.766	97.890	2.744
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	4.85E+05	1.78E+06	1.78E+06	1.78E+06	1.14E-03	1.78E+06	1.01E-03	1.89E+06	1.84E+06	6.75E+04
MO/DA/YR HR:MIN:SEC STEP	425	435	635	726	727	235	535	424	421	219
AVERAGE FLOW.....	53.392	53.392	53.392	53.392	0.000	53.283	0.000	53.283	4.738	4.773
STANDARD DEVIATION OF FLOW.....	2.872	2.872	2.872	2.872	0.000	2.883	0.000	2.883	1.273	1.235
MAXIMUM FLOW.....	100.551	100.551	100.551	100.551	0.000	100.544	0.000	100.544	80.240	76.701
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.91E+06	1.91E+06	1.91E+06	1.91E+06	2.86E-03	1.90E+06	1.95E-03	1.90E+06	1.69E+05	1.70E+05
MO/DA/YR HR:MIN:SEC STEP	461	821	422	825	432	332	427	327	627	724
AVERAGE FLOW.....	14.113	14.113	17.186	1.171	26.931	8.307	6.823	3.926	3.926	3.926
STANDARD DEVIATION OF FLOW.....	3.747	2.946	3.644	0.027	4.766	0.181	1.874	0.109	0.109	0.109
MAXIMUM FLOW.....	238.429	131.102	164.671	1.428	259.965	9.063	120.480	5.485	5.485	5.485
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	5.04E+05	5.04E+05	6.14E+05	4.18E+04	9.61E+05	2.97E+05	2.44E+05	1.40E+05	1.40E+05	1.40E+05
MO/DA/YR HR:MIN:SEC STEP	725	833	433	426	228	834	434	828	428	229
AVERAGE FLOW.....	0.000	2.284	6.210	62.898	62.428	2.855	2.855	1.157	66.439	65.312
STANDARD DEVIATION OF FLOW.....	0.000	0.108	0.211	3.306	3.323	0.177	0.177	0.079	3.575	3.505
MAXIMUM FLOW.....	0.000	4.227	9.703	119.834	119.568	6.250	6.250	2.808	128.403	124.806
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	7.87E-04	8.15E+04	2.22E+05	2.25E+06	2.23E+06	1.02E+05	1.02E+05	4.13E+04	2.37E+06	2.33E+06
MO/DA/YR HR:MIN:SEC STEP	429	430	900	901						
AVERAGE FLOW.....	67.390	19.365	1.464	1.171						
STANDARD DEVIATION OF FLOW.....	3.444	5.014	0.409	0.027						
MAXIMUM FLOW.....	126.538	292.828	23.222	1.428						
MINIMUM FLOW.....	0.000	0.000	0.000	0.000						
FLOW VOLUME (CUBIC FEET).....	2.41E+06	6.91E+05	5.23E+04	4.18E+04						

CONVEYANCE ELEMENT FLOW DEPTHS (IN FEET)

MO/DA/YR HR:MIN:SEC STEP	801	302	204	304	831	231	205	505	206	207
MAXIMUM DEPTH.....	1.122	2.064	0.872	0.577	3.291	1.328	3.503	0.000	0.446	0.982
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1										
MO/DA/YR HR:MIN:SEC STEP	507	208	508	209	509	314	215	515	218	518
MAXIMUM DEPTH.....	0.000	4.104	1.295	4.140	1.615	2.426	1.662	0.000	1.357	0.000
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000	0.300	0.000	0.000	0.000	0.000
1										
MO/DA/YR HR:MIN:SEC STEP	540	520	220	260	224	524	835	235	535	219
MAXIMUM DEPTH.....	0.000	0.000	2.648	3.715	2.875	0.000	5.058	2.244	0.000	0.998
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1										
MO/DA/YR HR:MIN:SEC STEP	821	332	327	228	229					
MAXIMUM DEPTH.....	2.825	5.904	1.440	2.886	3.280					
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000					

GRAPEVINE BASIN
FILENAME: GVB010PC.SUM
FUTURE CONDITION WITH PROPOSED FACILITIES
EPA SWMM SUMMARY OUTPUT FILE
10-YEAR EVENT

SUMMARY OF EPA SWMM ANALYSIS
(See detailed output for more information)

City of Greeley Comprehensive Drainage Plan Update - ACE Inc.
Grapevine Basin - Proposed Conditions - 10-Year Storm

SUB-BASIN INFLOWS

MO/DA/YR HR:MIN:SEC STEP	1	2	3	4	5	6	7	8	9	10
AVERAGE FLOW.....	4.503	10.275	2.639	5.340	7.313	6.967	6.101	10.188	3.930	8.996
STANDARD DEVIATION OF FLOW.....	1.179	2.640	0.713	1.413	1.875	1.778	1.560	2.692	1.021	2.359
MAXIMUM FLOW.....	69.560	149.770	46.130	84.720	115.590	103.860	95.740	168.990	57.680	145.760
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.61E+05	3.67E+05	9.42E+04	1.91E+05	2.61E+05	2.49E+05	2.18E+05	3.64E+05	1.40E+05	3.21E+05

MO/DA/YR HR:MIN:SEC STEP	11	12	13	14	15	16	17	18	19	20
AVERAGE FLOW.....	4.069	2.769	4.096	3.142	3.285	7.976	4.271	7.297	6.208	19.380
STANDARD DEVIATION OF FLOW.....	1.087	0.726	1.080	0.811	0.866	1.963	1.102	1.759	1.643	4.893
MAXIMUM FLOW.....	68.960	42.530	68.130	44.164	54.120	112.764	65.770	102.437	105.950	293.758
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.45E+05	9.89E+04	1.46E+05	1.12E+05	1.17E+05	2.85E+05	1.52E+05	2.60E+05	2.22E+05	6.92E+05

MO/DA/YR HR:MIN:SEC STEP	21	22	23	24	25	26	27	28	29	30
AVERAGE FLOW.....	11.867	4.113	2.451	4.177	5.233	4.473	9.026	1.656	3.332	26.925
STANDARD DEVIATION OF FLOW.....	3.315	1.088	0.641	1.027	1.372	1.116	2.408	0.427	0.876	6.721
MAXIMUM FLOW.....	237.480	68.800	34.521	58.447	85.600	63.573	157.010	25.010	46.495	379.538
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	4.24E+05	1.47E+05	8.75E+04	1.49E+05	1.87E+05	1.60E+05	3.22E+05	5.91E+04	1.19E+05	9.61E+05

MO/DA/YR HR:MIN:SEC STEP	31	32	33	34	35	36
AVERAGE FLOW.....	1.394	0.496	3.351	3.784	2.838	16.829
STANDARD DEVIATION OF FLOW.....	0.351	0.124	0.873	0.971	0.741	1.991
MAXIMUM FLOW.....	19.150	5.595	57.200	63.250	41.680	108.270
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	4.98E+04	1.77E+04	1.20E+05	1.35E+05	1.01E+05	6.01E+05

CONVEYANCE ELEMENT OUTFLOWS

MO/DA/YR HR:MIN:SEC STEP	801	402	302	204	304	403	831	631	700	701
AVERAGE FLOW.....	4.503	14.778	6.033	6.030	5.316	10.656	10.656	10.656	10.656	0.000
STANDARD DEVIATION OF FLOW.....	0.819	3.280	1.265	1.263	1.128	1.803	1.512	1.512	1.512	0.000
MAXIMUM FLOW.....	31.548	169.558	54.374	54.122	50.933	84.720	42.594	42.594	42.594	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.61E+05	5.28E+05	2.15E+05	2.15E+05	1.90E+05	3.80E+05	3.80E+05	3.80E+05	3.80E+05	9.17E-05

MO/DA/YR HR:MIN:SEC STEP	231	431	404	605	704	705	205	505	405	603
AVERAGE FLOW.....	10.654	1.394	19.361	19.361	19.244	0.117	19.241	0.128	19.368	2.639
STANDARD DEVIATION OF FLOW.....	1.510	0.351	3.248	3.248	3.205	0.084	3.187	0.068	3.228	0.713
MAXIMUM FLOW.....	42.557	19.150	161.983	161.983	154.000	7.983	157.409	6.660	160.714	46.130
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.80E+05	4.98E+04	6.91E+05	6.91E+05	6.87E+05	4.19E+03	6.87E+05	4.55E+03	6.91E+05	9.42E+04

MO/DA/YR HR:MIN:SEC STEP	702	703	400	206	406	806	606	706	707	207
AVERAGE FLOW.....	1.898	0.741	0.741	2.007	8.974	8.420	8.420	8.420	0.000	8.411
STANDARD DEVIATION OF FLOW.....	0.427	0.349	0.349	0.401	2.108	0.549	0.549	0.549	0.000	0.550
MAXIMUM FLOW.....	18.000	28.130	28.130	17.957	112.662	19.363	19.363	19.363	0.000	19.370
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	6.78E+04	2.65E+04	2.65E+04	7.17E+04	3.20E+05	3.01E+05	3.01E+05	3.01E+05	1.22E-03	3.00E+05

MO/DA/YR HR:MIN:SEC STEP	507	407	410	610	708	709	208	508	408	608
AVERAGE FLOW.....	0.000	14.512	42.877	42.877	32.330	10.546	32.302	10.830	53.320	53.320
STANDARD DEVIATION OF FLOW.....	0.000	1.713	7.102	7.102	4.112	3.898	4.074	3.594	9.215	9.215
MAXIMUM FLOW.....	0.000	98.538	395.982	395.982	134.000	261.982	133.997	227.856	486.933	486.933
MINIMUM FLOW.....	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.001
FLOW VOLUME (CUBIC FEET).....	9.30E-04	5.18E+05	1.53E+06	1.53E+06	1.15E+06	3.76E+05	1.15E+06	3.87E+05	1.90E+06	1.90E+06

MO/DA/YR HR:MIN:SEC STEP	710	711	209	509	411	412	417	413	314	414
AVERAGE FLOW.....	32.553	20.767	32.525	20.767	57.361	64.060	8.367	75.569	35.903	39.188
STANDARD DEVIATION OF FLOW.....	3.966	6.234	3.954	6.161	10.051	11.638	2.180	14.402	1.076	0.898
MAXIMUM FLOW.....	118.000	368.933	118.709	360.681	528.281	611.437	133.900	751.967	48.542	57.784
MINIMUM FLOW.....	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.16E+06	7.41E+05	1.16E+06	7.41E+05	2.05E+06	2.29E+06	2.99E+05	2.70E+06	1.28E+06	1.40E+06

MO/DA/YR HR:MIN:SEC STEP	614	712	713	215	515	316	616	714	715	218
AVERAGE FLOW.....	39.188	39.188	0.000	39.045	0.000	7.960	7.960	7.221	0.739	7.218
STANDARD DEVIATION OF FLOW.....	0.898	0.898	0.000	0.927	0.000	1.034	1.034	0.837	0.313	0.835
MAXIMUM FLOW.....	57.784	57.784	0.000	58.420	0.000	49.878	49.878	28.600	21.278	28.600
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FLOW VOLUME (CUBIC FEET).....	1.40E+06	1.40E+06	0.00E+00	1.39E+06	0.00E+00	2.84E+05	2.84E+05	2.58E+05	2.64E+04	2.58E+05
MO/DA/YR HR:MIN:SEC STEP	620	716	518	717	440	540	418	619	718	415
AVERAGE FLOW.....	0.739	0.739	0.793	0.000	0.000	0.000	15.308	15.308	15.308	54.353
STANDARD DEVIATION OF FLOW.....	0.313	0.313	0.280	0.000	0.000	0.000	2.387	2.387	2.387	2.880
MAXIMUM FLOW.....	21.278	21.278	17.192	0.000	0.000	0.000	110.731	110.731	110.731	169.151
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	2.64E+04	2.64E+04	2.83E+04	2.08E-11	2.08E-11	2.89E-11	5.47E+05	5.47E+05	5.47E+05	1.94E+06
MO/DA/YR HR:MIN:SEC STEP	719	618	720	721	416	520	220	660	728	729
AVERAGE FLOW.....	0.000	54.353	54.353	0.000	0.000	0.000	54.103	19.380	16.389	2.991
STANDARD DEVIATION OF FLOW.....	0.000	2.880	2.880	0.000	0.000	0.000	2.881	4.893	3.715	1.595
MAXIMUM FLOW.....	0.000	169.151	169.151	0.000	0.000	0.000	164.404	293.758	165.000	128.758
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	6.26E-04	1.94E+06	1.94E+06	1.37E-02	6.26E-04	1.13E-03	1.93E+06	6.92E+05	5.85E+05	1.07E+05
MO/DA/YR HR:MIN:SEC STEP	260	420	624	722	723	224	524	465	835	824
AVERAGE FLOW.....	16.388	70.491	70.491	70.491	0.000	70.410	0.000	76.240	74.162	2.473
STANDARD DEVIATION OF FLOW.....	3.695	6.300	6.300	6.300	0.000	6.298	0.000	8.040	2.839	0.074
MAXIMUM FLOW.....	166.005	328.718	328.718	328.718	0.000	330.055	0.000	487.908	112.293	3.578
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	5.85E+05	2.52E+06	2.52E+06	2.52E+06	2.29E-03	2.51E+06	0.00E+00	2.72E+06	2.65E+06	8.83E+04
MO/DA/YR HR:MIN:SEC STEP	425	435	635	726	727	235	535	424	421	219
AVERAGE FLOW.....	76.634	76.634	76.634	76.634	0.000	76.486	0.000	76.486	6.208	6.244
STANDARD DEVIATION OF FLOW.....	2.908	2.908	2.908	2.908	0.000	2.931	0.000	2.931	1.643	1.598
MAXIMUM FLOW.....	115.864	115.864	115.864	115.864	0.000	115.853	0.000	115.853	105.950	101.660
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	2.74E+06	2.74E+06	2.74E+06	2.74E+06	1.60E-02	2.73E+06	1.42E-02	2.73E+06	2.22E+05	2.23E+05
MO/DA/YR HR:MIN:SEC STEP	461	821	422	825	432	332	427	327	627	724
AVERAGE FLOW.....	18.111	18.111	22.224	1.542	39.549	9.329	9.026	5.140	5.140	5.140
STANDARD DEVIATION OF FLOW.....	4.760	3.706	4.622	0.035	6.450	0.201	2.408	0.141	0.141	0.141
MAXIMUM FLOW.....	309.600	162.006	206.021	1.883	317.795	10.233	157.010	7.163	7.163	7.163
MINIMUM FLOW.....	0.002	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	6.47E+05	6.47E+05	7.93E+05	5.51E+04	1.41E+06	3.33E+05	3.22E+05	1.83E+05	1.83E+05	1.83E+05
MO/DA/YR HR:MIN:SEC STEP	725	833	433	426	228	834	434	828	428	229
AVERAGE FLOW.....	0.000	2.830	7.970	88.929	88.299	3.510	3.510	1.561	93.370	91.666
STANDARD DEVIATION OF FLOW.....	0.000	0.133	0.266	3.369	3.421	0.216	0.216	0.105	3.722	3.731
MAXIMUM FLOW.....	0.000	5.243	12.399	140.925	139.671	7.633	7.633	3.718	150.154	146.243
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.50E-03	1.01E+05	2.85E+05	3.17E+06	3.15E+06	1.25E+05	1.25E+05	5.57E+04	3.33E+06	3.27E+06
MO/DA/YR HR:MIN:SEC STEP	429	430	900	901						
AVERAGE FLOW.....	94.998	26.925	2.451	1.542						
STANDARD DEVIATION OF FLOW.....	3.608	6.721	0.641	0.035						
MAXIMUM FLOW.....	154.202	379.538	34.521	1.883						
MINIMUM FLOW.....	0.000	0.000	0.000	0.000						
FLOW VOLUME (CUBIC FEET).....	3.39E+06	9.61E+05	8.75E+04	5.51E+04						

CONVEYANCE ELEMENT FLOW DEPTHS (IN FEET)

MO/DA/YR HR:MIN:SEC STEP	801	302	204	304	831	231	205	505	206	207
MAXIMUM DEPTH.....	1.550	2.277	1.852	0.904	4.096	1.510	4.054	0.246	0.451	1.140
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000
1										
MO/DA/YR HR:MIN:SEC STEP	507	208	508	209	509	314	215	515	218	518
MAXIMUM DEPTH.....	0.000	4.105	1.632	4.111	1.997	3.254	1.931	0.000	1.639	0.535
MINIMUM DEPTH.....	0.000	0.007	0.000	0.006	0.000	0.300	0.003	0.000	0.001	0.000
1										
MO/DA/YR HR:MIN:SEC STEP	540	520	220	260	224	524	835	235	535	219
MAXIMUM DEPTH.....	0.000	0.000	3.077	3.699	3.062	0.000	6.117	2.417	0.000	1.153
MINIMUM DEPTH.....	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.001
1										
MO/DA/YR HR:MIN:SEC STEP	821	332	327	228	229					
MAXIMUM DEPTH.....	3.273	7.405	1.881	3.122	3.549					
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000					

GRAPEVINE BASIN
FILENAME: GVB050PC.SUM
FUTURE CONDITION WITH PROPOSED FACILITIES
EPA SWMM SUMMARY OUTPUT FILE
50-YEAR EVENT

SUMMARY OF EPA SWMM ANALYSIS
(See detailed output for more information)

City of Greeley Comprehensive Drainage Plan Update - ACE Inc.
Grapevine Basin - Proposed Conditions - 50-Year Storm

SUB-BASIN INFLOWS

MO/DA/YR HR:MIN:SEC STEP	1	2	3	4	5	6	7	8	9	10
AVERAGE FLOW.....	9.762	22.188	4.736	11.333	12.487	13.755	10.274	19.580	8.750	17.087
STANDARD DEVIATION OF FLOW.....	2.708	6.000	1.366	3.168	3.407	3.741	2.797	5.538	2.382	4.784
MAXIMUM FLOW.....	152.309	329.229	85.237	180.880	206.936	212.323	168.801	339.471	128.204	288.465
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.49E+05	7.92E+05	1.69E+05	4.05E+05	4.46E+05	4.91E+05	3.67E+05	6.99E+05	3.12E+05	6.10E+05

MO/DA/YR HR:MIN:SEC STEP	11	12	13	14	15	16	17	18	19	20
AVERAGE FLOW.....	7.725	5.682	7.698	7.247	6.129	14.460	8.150	11.582	11.006	34.827
STANDARD DEVIATION OF FLOW.....	2.204	1.583	2.175	1.950	1.722	3.801	2.240	2.974	3.109	9.384
MAXIMUM FLOW.....	133.988	88.390	132.663	102.689	103.882	213.034	129.630	169.903	195.893	546.952
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	2.76E+05	2.03E+05	2.75E+05	2.59E+05	2.19E+05	5.16E+05	2.91E+05	4.13E+05	3.93E+05	1.24E+06

MO/DA/YR HR:MIN:SEC STEP	21	22	23	24	25	26	27	28	29	30
AVERAGE FLOW.....	19.855	7.581	6.242	7.764	9.442	7.972	15.746	2.932	7.448	50.490
STANDARD DEVIATION OF FLOW.....	5.862	2.142	1.676	2.046	2.640	2.123	4.477	0.804	2.009	13.367
MAXIMUM FLOW.....	405.271	131.199	86.657	113.411	160.978	118.550	283.538	45.159	103.885	737.097
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	7.09E+05	2.71E+05	2.23E+05	2.77E+05	3.37E+05	2.85E+05	5.62E+05	1.05E+05	2.66E+05	1.80E+06

MO/DA/YR HR:MIN:SEC STEP	31	32	33	34	35	36
AVERAGE FLOW.....	2.790	1.540	5.331	5.807	6.125	36.558
STANDARD DEVIATION OF FLOW.....	0.741	0.370	1.466	1.573	1.680	3.626
MAXIMUM FLOW.....	38.683	15.459	93.561	99.607	90.148	141.440
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	9.96E+04	5.50E+04	1.90E+05	2.07E+05	2.19E+05	1.31E+06

CONVEYANCE ELEMENT OUTFLOWS

MO/DA/YR HR:MIN:SEC STEP	801	402	302	204	304	403	831	631	700	701
AVERAGE FLOW.....	9.762	31.950	23.205	23.202	22.488	33.820	33.820	33.820	33.820	0.000
STANDARD DEVIATION OF FLOW.....	1.851	7.439	4.484	4.476	4.181	5.614	3.346	3.346	3.346	0.000
MAXIMUM FLOW.....	73.096	374.353	149.754	149.567	136.574	180.880	89.571	89.571	89.571	0.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.49E+05	1.14E+06	8.28E+05	8.28E+05	8.03E+05	1.21E+06	1.21E+06	1.21E+06	1.21E+06	1.15E-03

MO/DA/YR HR:MIN:SEC STEP	231	431	404	605	704	705	205	505	405	603
AVERAGE FLOW.....	33.820	2.790	49.097	49.097	44.799	4.298	44.799	4.298	49.097	4.736
STANDARD DEVIATION OF FLOW.....	3.344	0.741	5.753	5.753	4.656	1.843	4.641	1.751	5.709	1.366
MAXIMUM FLOW.....	89.542	38.683	282.370	282.370	154.000	128.370	159.834	130.492	281.752	85.237
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.21E+06	9.96E+04	1.75E+06	1.75E+06	1.60E+06	1.53E+05	1.60E+06	1.53E+05	1.75E+06	1.69E+05

MO/DA/YR HR:MIN:SEC STEP	702	703	400	206	406	806	606	706	707	207
AVERAGE FLOW.....	2.245	2.492	2.492	2.333	16.088	15.116	15.116	15.116	0.000	15.102
STANDARD DEVIATION OF FLOW.....	0.487	0.979	0.979	0.464	4.113	1.020	1.020	1.020	0.000	1.021
MAXIMUM FLOW.....	18.000	67.237	67.237	18.554	223.915	36.599	36.599	36.599	0.000	36.583
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.027	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	8.01E+04	8.90E+04	8.90E+04	8.33E+04	5.74E+05	5.40E+05	5.40E+05	5.40E+05	3.15E-03	5.39E+05

MO/DA/YR HR:MIN:SEC STEP	507	407	410	610	708	709	208	508	408	608
AVERAGE FLOW.....	0.000	25.376	91.560	91.560	57.571	33.988	57.496	34.125	111.201	111.201
STANDARD DEVIATION OF FLOW.....	0.000	3.090	12.932	12.932	4.949	9.916	4.925	9.480	17.312	17.312
MAXIMUM FLOW.....	0.000	175.457	728.357	728.357	134.000	594.357	134.000	560.094	956.850	956.850
MINIMUM FLOW.....	0.000	0.029	0.073	0.073	0.073	0.000	0.000	0.000	0.052	0.052
FLOW VOLUME (CUBIC FEET).....	2.86E-03	9.06E+05	3.27E+06	3.27E+06	2.06E+06	1.21E+06	2.05E+06	1.22E+06	3.97E+06	3.97E+06

MO/DA/YR HR:MIN:SEC STEP	710	711	209	509	411	412	417	413	314	414
AVERAGE FLOW.....	55.231	55.970	55.191	55.970	118.887	133.318	15.848	156.413	81.385	87.514
STANDARD DEVIATION OF FLOW.....	4.541	14.799	4.532	14.696	19.085	22.754	4.412	28.737	2.352	1.922
MAXIMUM FLOW.....	118.000	838.850	119.868	842.710	1062.365	1249.665	262.292	1549.865	102.253	112.369
MINIMUM FLOW.....	0.052	0.000	0.000	0.000	0.024	0.043	0.000	0.096	0.000	0.021
FLOW VOLUME (CUBIC FEET).....	1.97E+06	2.00E+06	1.97E+06	2.00E+06	4.24E+06	4.76E+06	5.66E+05	5.58E+06	2.91E+06	3.12E+06

MO/DA/YR HR:MIN:SEC STEP	614	712	713	215	515	316	616	714	715	218
AVERAGE FLOW.....	87.514	87.514	0.000	87.243	0.000	14.443	14.443	7.774	6.670	7.771
STANDARD DEVIATION OF FLOW.....	1.922	1.922	0.000	1.980	0.000	2.977	2.977	0.898	2.383	0.895
MAXIMUM FLOW.....	112.369	112.369	0.000	112.108	0.000	181.289	181.289	28.600	152.689	28.600
MINIMUM FLOW.....	0.021	0.021	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.000

FLOW VOLUME (CUBIC FEET).....	3.12E+06	3.12E+06	0.00E+00	3.11E+06	0.00E+00	5.16E+05	5.16E+05	2.78E+05	2.38E+05	2.77E+05

MO/DA/YR HR:MIN:SEC STEP	620	716	518	717	440	540	418	619	718	415
AVERAGE FLOW.....	6.670	5.529	5.567	1.141	1.141	1.241	24.919	24.919	24.874	112.117
STANDARD DEVIATION OF FLOW.....	2.383	1.856	1.748	0.672	0.672	0.541	4.782	4.782	4.767	5.614
MAXIMUM FLOW.....	152.689	97.000	94.728	55.689	55.689	41.764	221.786	221.786	216.400	320.920
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022	0.022	0.022
FLOW VOLUME (CUBIC FEET).....	2.38E+05	1.97E+05	1.99E+05	4.07E+04	4.07E+04	4.43E+04	8.90E+05	8.90E+05	8.88E+05	4.00E+06

MO/DA/YR HR:MIN:SEC STEP	719	618	720	721	416	520	220	660	728	729
AVERAGE FLOW.....	0.045	112.117	107.615	4.502	0.045	0.074	107.143	36.068	20.419	15.649
STANDARD DEVIATION OF FLOW.....	0.045	5.614	4.401	1.581	0.045	0.030	4.439	9.670	4.430	5.933
MAXIMUM FLOW.....	5.386	320.920	233.000	87.920	5.386	2.519	233.000	546.952	165.000	381.952
MINIMUM FLOW.....	0.000	0.022	0.022	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.62E+03	4.00E+06	3.84E+06	1.61E+05	1.62E+03	2.66E+03	3.83E+06	1.29E+06	7.29E+05	5.59E+05

MO/DA/YR HR:MIN:SEC STEP	260	420	624	722	723	224	524	465	835	824
AVERAGE FLOW.....	20.419	127.636	127.636	127.636	0.000	127.487	0.000	149.260	127.363	4.596
STANDARD DEVIATION OF FLOW.....	4.415	8.399	8.399	8.399	0.000	8.407	0.000	14.726	2.890	0.143
MAXIMUM FLOW.....	169.205	398.299	398.299	398.299	0.000	398.209	0.000	866.087	151.393	6.684
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	7.29E+05	4.56E+06	4.56E+06	4.56E+06	1.60E-02	4.55E+06	1.42E-02	5.33E+06	4.55E+06	1.64E+05

MO/DA/YR HR:MIN:SEC STEP	425	435	635	726	727	235	535	424	421	219
AVERAGE FLOW.....	131.959	131.959	131.959	131.959	0.000	131.593	0.000	131.593	15.507	15.534
STANDARD DEVIATION OF FLOW.....	3.022	3.022	3.022	3.022	0.000	3.104	0.000	3.104	4.436	4.379
MAXIMUM FLOW.....	158.041	158.041	158.041	158.041	0.000	158.065	0.000	158.065	247.360	241.690
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	4.71E+06	4.71E+06	4.71E+06	4.71E+06	1.14E-02	4.70E+06	8.37E-03	4.70E+06	5.54E+05	5.55E+05

MO/DA/YR HR:MIN:SEC STEP	461	821	422	825	432	332	427	327	627	724
AVERAGE FLOW.....	35.390	35.390	42.970	2.781	81.068	28.127	15.746	8.302	8.302	8.302
STANDARD DEVIATION OF FLOW.....	9.775	7.359	9.037	0.067	12.459	1.893	4.477	0.201	0.201	0.201
MAXIMUM FLOW.....	572.239	305.738	372.854	3.395	527.364	59.671	283.538	10.387	10.387	10.387
MINIMUM FLOW.....	0.014	0.014	0.014	0.000	0.014	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.26E+06	1.26E+06	1.53E+06	9.93E+04	2.89E+06	1.00E+06	5.62E+05	2.96E+05	2.96E+05	2.96E+05

MO/DA/YR HR:MIN:SEC STEP	725	833	433	426	228	834	434	828	428	229
AVERAGE FLOW.....	0.000	4.504	12.806	152.372	150.911	5.387	5.387	2.765	159.063	154.725
STANDARD DEVIATION OF FLOW.....	0.000	0.219	0.395	3.511	3.729	0.342	0.342	0.192	4.134	4.469
MAXIMUM FLOW.....	0.000	8.495	18.793	220.517	216.340	12.218	12.218	6.922	232.249	213.951
MINIMUM FLOW.....	0.000	0.000	0.000	0.019	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	2.86E-04	1.61E+05	4.57E+05	5.44E+06	5.39E+06	1.92E+05	1.92E+05	9.87E+04	5.68E+06	5.52E+06

MO/DA/YR HR:MIN:SEC STEP	429	430	900	901
AVERAGE FLOW.....	162.173	50.490	6.242	2.781
STANDARD DEVIATION OF FLOW.....	4.263	13.367	1.676	0.067
MAXIMUM FLOW.....	252.357	737.097	86.657	3.395
MINIMUM FLOW.....	0.001	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	5.79E+06	1.80E+06	2.23E+05	9.93E+04

CONVEYANCE ELEMENT FLOW DEPTHS (IN FEET)

MO/DA/YR HR:MIN:SEC STEP	801	302	204	304	831	231	205	505	206	207
MAXIMUM DEPTH.....	3.267	3.637	3.618	2.439	10.081	2.396	4.084	0.749	0.455	1.611
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.020	0.003
1										

MO/DA/YR HR:MIN:SEC STEP	507	208	508	209	509	314	215	515	218	518
MAXIMUM DEPTH.....	0.000	4.105	2.581	4.135	3.063	5.655	3.058	0.000	1.639	0.920
MINIMUM DEPTH.....	0.000	0.045	0.000	0.041	0.000	0.300	0.021	0.000	0.004	0.000
1										

MO/DA/YR HR:MIN:SEC STEP	540	520	220	260	224	524	835	235	535	219
MAXIMUM DEPTH.....	0.568	0.170	4.100	3.701	3.461	0.000	9.494	2.859	0.000	1.927
MINIMUM DEPTH.....	0.000	0.000	0.020	0.000	0.000	0.000	0.000	0.002	0.000	0.003
1										

MO/DA/YR HR:MIN:SEC STEP	821	332	327	228	229
MAXIMUM DEPTH.....	5.530	10.358	3.201	3.867	4.254
MINIMUM DEPTH.....	0.000	0.000	0.000	0.001	0.000

GRAPEVINE BASIN
FILENAME: GVB100PC.SUM
FUTURE CONDITION WITH PROPOSED FACILITIES
EPA SWMM SUMMARY OUTPUT FILE
100-YEAR EVENT

SUMMARY OF EPA SWMM ANALYSIS
(See detailed output for more information)

City of Greeley Comprehensive Drainage Plan Update - ACE Inc.
Grapevine Basin - Proposed Conditions - 100-Year Storm

SUB-BASIN INFLOWS

MO/DA/YR HR:MIN:SEC STEP	1	2	3	4	5	6	7	8	9	10
AVERAGE FLOW.....	11.918	27.139	5.573	13.811	14.506	16.526	11.883	23.363	10.763	20.355
STANDARD DEVIATION OF FLOW.....	3.312	7.336	1.624	3.859	4.018	4.519	3.290	6.663	2.921	5.744
MAXIMUM FLOW.....	181.557	391.534	99.181	214.733	235.435	248.590	191.647	396.811	152.830	335.858
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	4.25E+05	9.69E+05	1.99E+05	4.93E+05	5.18E+05	5.90E+05	4.24E+05	8.34E+05	3.84E+05	7.27E+05

MO/DA/YR HR:MIN:SEC STEP	11	12	13	14	15	16	17	18	19	20
AVERAGE FLOW.....	9.208	6.884	9.143	8.960	7.268	17.047	9.715	13.226	12.907	40.961
STANDARD DEVIATION OF FLOW.....	2.645	1.922	2.609	2.404	2.061	4.539	2.694	3.462	3.690	11.175
MAXIMUM FLOW.....	157.181	104.581	155.291	123.046	121.220	250.273	151.434	195.463	225.680	642.813
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.29E+05	2.46E+05	3.26E+05	3.20E+05	2.59E+05	6.09E+05	3.47E+05	4.72E+05	4.61E+05	1.46E+06

MO/DA/YR HR:MIN:SEC STEP	21	22	23	24	25	26	27	28	29	30
AVERAGE FLOW.....	22.941	8.972	7.826	9.230	11.113	9.346	18.418	3.447	9.202	60.098
STANDARD DEVIATION OF FLOW.....	6.867	2.559	2.090	2.462	3.143	2.528	5.302	0.956	2.469	16.040
MAXIMUM FLOW.....	467.853	152.724	104.680	134.561	185.837	139.085	327.010	52.549	124.210	870.707
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	8.19E+05	3.20E+05	2.79E+05	3.30E+05	3.97E+05	3.34E+05	6.58E+05	1.23E+05	3.29E+05	2.15E+06

MO/DA/YR HR:MIN:SEC STEP	31	32	33	34	35	36
AVERAGE FLOW.....	3.349	1.994	6.089	6.572	7.489	36.914
STANDARD DEVIATION OF FLOW.....	0.897	0.470	1.703	1.813	2.054	3.916
MAXIMUM FLOW.....	45.575	18.903	106.134	112.121	107.119	150.741
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.20E+05	7.12E+04	2.17E+05	2.35E+05	2.67E+05	1.32E+06

CONVEYANCE ELEMENT OUTFLOWS

MO/DA/YR HR:MIN:SEC STEP	801	402	302	204	304	403	831	631	700	701
AVERAGE FLOW.....	11.918	39.057	30.312	30.309	29.594	43.405	43.405	43.405	40.354	3.052
STANDARD DEVIATION OF FLOW.....	2.244	9.070	5.342	5.323	4.941	6.681	4.037	4.037	3.581	0.883
MAXIMUM FLOW.....	86.193	446.605	162.155	162.086	145.250	222.907	133.141	133.141	92.100	41.041
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	4.25E+05	1.39E+06	1.08E+06	1.08E+06	1.06E+06	1.55E+06	1.55E+06	1.55E+06	1.44E+06	1.09E+05

MO/DA/YR HR:MIN:SEC STEP	231	431	404	605	704	705	205	505	405	603
AVERAGE FLOW.....	40.353	6.401	61.260	61.260	54.247	7.013	54.247	7.013	61.260	5.573
STANDARD DEVIATION OF FLOW.....	3.579	1.188	6.667	6.667	5.060	2.624	5.046	2.538	6.618	1.624
MAXIMUM FLOW.....	92.106	45.575	326.134	326.134	154.000	172.134	159.188	175.794	327.308	99.181
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.44E+06	2.29E+05	2.19E+06	2.19E+06	1.94E+06	2.50E+05	1.94E+06	2.50E+05	2.19E+06	1.99E+05

MO/DA/YR HR:MIN:SEC STEP	702	703	400	206	406	806	606	706	707	207
AVERAGE FLOW.....	2.259	3.314	3.314	2.360	18.886	17.750	17.750	17.750	0.000	17.735
STANDARD DEVIATION OF FLOW.....	0.497	1.224	1.224	0.473	4.899	1.208	1.208	1.208	0.000	1.209
MAXIMUM FLOW.....	18.000	81.181	81.181	18.750	260.339	43.799	43.799	43.799	0.000	43.777
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	8.06E+04	1.18E+05	1.18E+05	8.42E+04	6.74E+05	6.34E+05	6.34E+05	6.34E+05	2.86E-03	6.33E+05

MO/DA/YR HR:MIN:SEC STEP	507	407	410	610	708	709	208	508	408	608
AVERAGE FLOW.....	0.000	29.618	111.233	111.233	65.329	45.904	65.251	46.115	134.729	134.729
STANDARD DEVIATION OF FLOW.....	0.000	3.642	15.173	15.173	5.082	12.269	5.059	11.826	20.553	20.553
MAXIMUM FLOW.....	0.000	203.904	855.014	855.014	134.000	721.014	134.000	683.499	1136.376	1136.376
MINIMUM FLOW.....	0.000	0.016	0.039	0.039	0.039	0.000	0.000	0.000	0.029	0.029
FLOW VOLUME (CUBIC FEET).....	2.52E-03	1.06E+06	3.97E+06	3.97E+06	2.33E+06	1.64E+06	2.33E+06	1.65E+06	4.81E+06	4.81E+06

MO/DA/YR HR:MIN:SEC STEP	710	711	209	509	411	412	417	413	314	414
AVERAGE FLOW.....	61.846	72.883	61.801	72.884	143.894	161.540	18.858	189.358	98.539	105.807
STANDARD DEVIATION OF FLOW.....	4.584	18.206	4.576	18.094	22.722	27.241	5.299	34.530	2.754	2.242
MAXIMUM FLOW.....	118.000	1018.376	119.732	1022.589	1264.194	1493.864	306.726	1859.244	119.935	132.029
MINIMUM FLOW.....	0.029	0.000	0.000	0.000	0.013	0.023	0.000	0.052	0.000	0.011
FLOW VOLUME (CUBIC FEET).....	2.21E+06	2.60E+06	2.21E+06	2.60E+06	5.14E+06	5.77E+06	6.73E+05	6.76E+06	3.52E+06	3.78E+06

MO/DA/YR HR:MIN:SEC STEP	614	712	713	215	515	316	616	714	715	218
AVERAGE FLOW.....	105.807	105.121	0.686	104.799	0.720	17.030	17.030	7.774	9.257	7.771
STANDARD DEVIATION OF FLOW.....	2.242	2.190	0.231	2.264	0.216	3.729	3.729	0.901	3.130	0.898
MAXIMUM FLOW.....	132.029	120.000	12.029	120.092	10.578	228.013	228.013	28.600	199.413	28.600
MINIMUM FLOW.....	0.011	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FLOW VOLUME (CUBIC FEET).....	3.78E+06	3.75E+06	2.45E+04	3.74E+06	2.57E+04	6.08E+05	6.08E+05	2.78E+05	3.30E+05	2.77E+05

MO/DA/YR HR:MIN:SEC STEP	620	716	518	717	440	540	418	619	718	415
AVERAGE FLOW.....	9.257	6.802	6.866	2.455	2.455	2.501	27.862	27.862	26.937	132.456
STANDARD DEVIATION OF FLOW.....	3.130	2.104	2.027	1.260	1.260	1.036	5.563	5.563	5.265	6.296
MAXIMUM FLOW.....	199.413	97.000	96.703	102.413	102.413	76.438	255.893	255.893	216.400	345.660
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.012	0.012	0.012
FLOW VOLUME (CUBIC FEET).....	3.30E+05	2.43E+05	2.45E+05	8.76E+04	8.76E+04	8.93E+04	9.95E+05	9.95E+05	9.62E+05	4.73E+06

MO/DA/YR HR:MIN:SEC STEP	719	618	720	721	416	520	220	660	728	729
AVERAGE FLOW.....	0.926	132.456	124.381	8.075	0.926	1.036	123.826	43.463	20.904	22.559
STANDARD DEVIATION OF FLOW.....	0.482	6.296	4.274	2.527	0.482	0.414	4.336	11.783	4.548	7.911
MAXIMUM FLOW.....	39.493	345.660	233.000	112.660	39.493	29.974	233.011	642.813	165.000	477.813
MINIMUM FLOW.....	0.000	0.012	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	3.30E+04	4.73E+06	4.44E+06	2.88E+05	3.30E+04	3.70E+04	4.42E+06	1.55E+06	7.46E+05	8.05E+05

MO/DA/YR HR:MIN:SEC STEP	260	420	624	722	723	224	524	465	835	824
AVERAGE FLOW.....	20.904	145.765	145.765	145.765	0.000	145.589	0.000	175.637	140.886	5.466
STANDARD DEVIATION OF FLOW.....	4.533	8.530	8.530	8.530	0.000	8.542	0.000	17.116	3.096	0.172
MAXIMUM FLOW.....	168.351	427.950	427.950	427.950	0.000	427.972	0.000	979.989	162.340	7.999
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	7.46E+05	5.20E+06	5.20E+06	5.20E+06	1.60E-02	5.20E+06	1.15E-02	6.27E+06	5.03E+06	1.95E+05

MO/DA/YR HR:MIN:SEC STEP	425	435	635	726	727	235	535	424	421	219
AVERAGE FLOW.....	146.352	146.352	146.352	146.352	0.000	145.935	0.000	145.935	20.982	21.014
STANDARD DEVIATION OF FLOW.....	3.246	3.246	3.246	3.246	0.000	3.339	0.000	3.339	5.917	5.852
MAXIMUM FLOW.....	170.250	170.250	170.250	170.250	0.000	170.246	0.000	170.246	318.956	309.093
MINIMUM FLOW.....	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	5.22E+06	5.22E+06	5.22E+06	5.22E+06	0.00E+00	5.21E+06	0.00E+00	5.21E+06	7.49E+05	7.50E+05

MO/DA/YR HR:MIN:SEC STEP	461	821	422	825	432	332	427	327	627	724
AVERAGE FLOW.....	43.955	43.954	52.927	3.275	91.835	38.983	18.418	10.371	10.371	8.725
STANDARD DEVIATION OF FLOW.....	12.120	9.504	11.531	0.080	15.397	3.530	5.302	0.738	0.738	0.209
MAXIMUM FLOW.....	701.520	472.535	572.679	4.000	734.964	154.842	327.010	60.852	60.852	10.800
MINIMUM FLOW.....	0.015	0.015	0.015	0.000	0.015	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	1.57E+06	1.57E+06	1.89E+06	1.17E+05	3.28E+06	1.39E+06	6.58E+05	3.70E+05	3.70E+05	3.11E+05

MO/DA/YR HR:MIN:SEC STEP	725	833	433	426	228	834	434	828	428	229
AVERAGE FLOW.....	1.646	5.146	13.871	169.152	167.509	6.099	7.745	3.250	178.504	173.579
STANDARD DEVIATION OF FLOW.....	0.665	0.252	0.435	3.773	4.014	0.391	0.905	0.227	4.696	5.031
MAXIMUM FLOW.....	50.052	9.898	20.698	247.764	242.702	14.200	64.134	8.299	301.798	277.797
MINIMUM FLOW.....	0.000	0.000	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	5.88E+04	1.84E+05	4.95E+05	6.04E+06	5.98E+06	2.18E+05	2.76E+05	1.16E+05	6.37E+06	6.20E+06

MO/DA/YR HR:MIN:SEC STEP	429	430	900	901
AVERAGE FLOW.....	182.781	60.098	7.826	3.275
STANDARD DEVIATION OF FLOW.....	4.968	16.040	2.090	0.080
MAXIMUM FLOW.....	312.457	870.707	104.680	4.000
MINIMUM FLOW.....	0.000	0.000	0.000	0.000
FLOW VOLUME (CUBIC FEET).....	6.53E+06	2.15E+06	2.79E+05	1.17E+05

CONVEYANCE ELEMENT FLOW DEPTHS (IN FEET)

MO/DA/YR HR:MIN:SEC STEP	801	302	204	304	831	231	205	505	206	207
MAXIMUM DEPTH.....	3.932	4.204	4.018	3.052	10.920	2.448	4.084	0.832	0.455	1.788
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.017	0.003
1										

MO/DA/YR HR:MIN:SEC STEP	507	208	508	209	509	314	215	515	218	518
MAXIMUM DEPTH.....	0.000	4.105	2.863	4.133	3.382	6.621	3.274	0.386	1.639	0.924
MINIMUM DEPTH.....	0.000	0.034	0.000	0.031	0.000	0.300	0.016	0.000	0.003	0.000
1										

MO/DA/YR HR:MIN:SEC STEP	540	520	220	260	224	524	835	235	535	219
MAXIMUM DEPTH.....	0.688	0.538	4.100	3.701	3.639	0.000	10.623	2.979	0.000	2.214
MINIMUM DEPTH.....	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.001	0.000	0.003
1										

MO/DA/YR HR:MIN:SEC STEP	821	332	327	228	229
MAXIMUM DEPTH.....	5.946	10.750	3.468	4.102	4.786
MINIMUM DEPTH.....	0.000	0.000	0.000	0.000	0.000

FLOOD HYDROGRAPHS

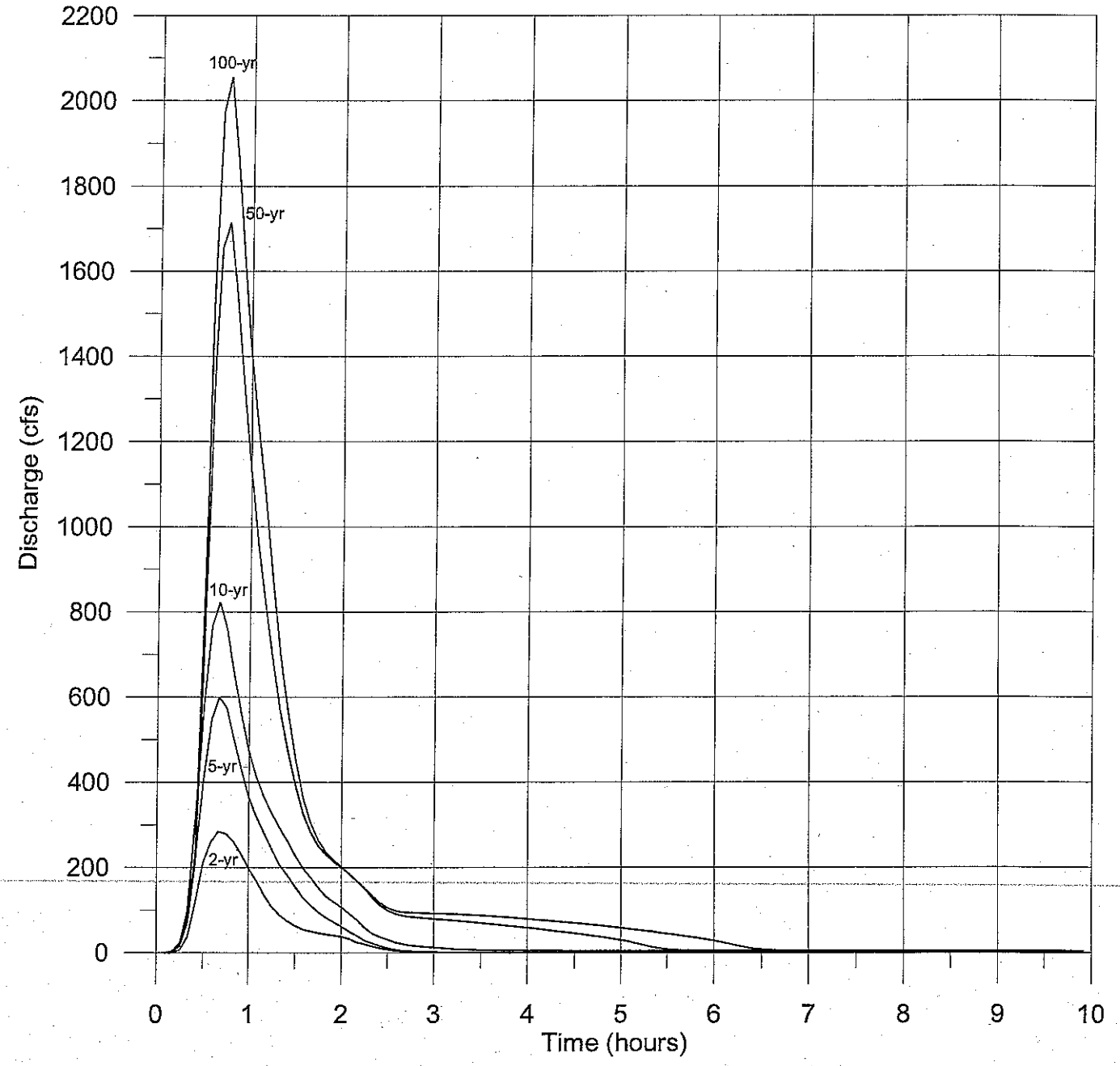

Figure D.1 Flood Hydrographs, Inflows to Bittersweet Lake
Existing Condition (EPA SWMM Node 413)

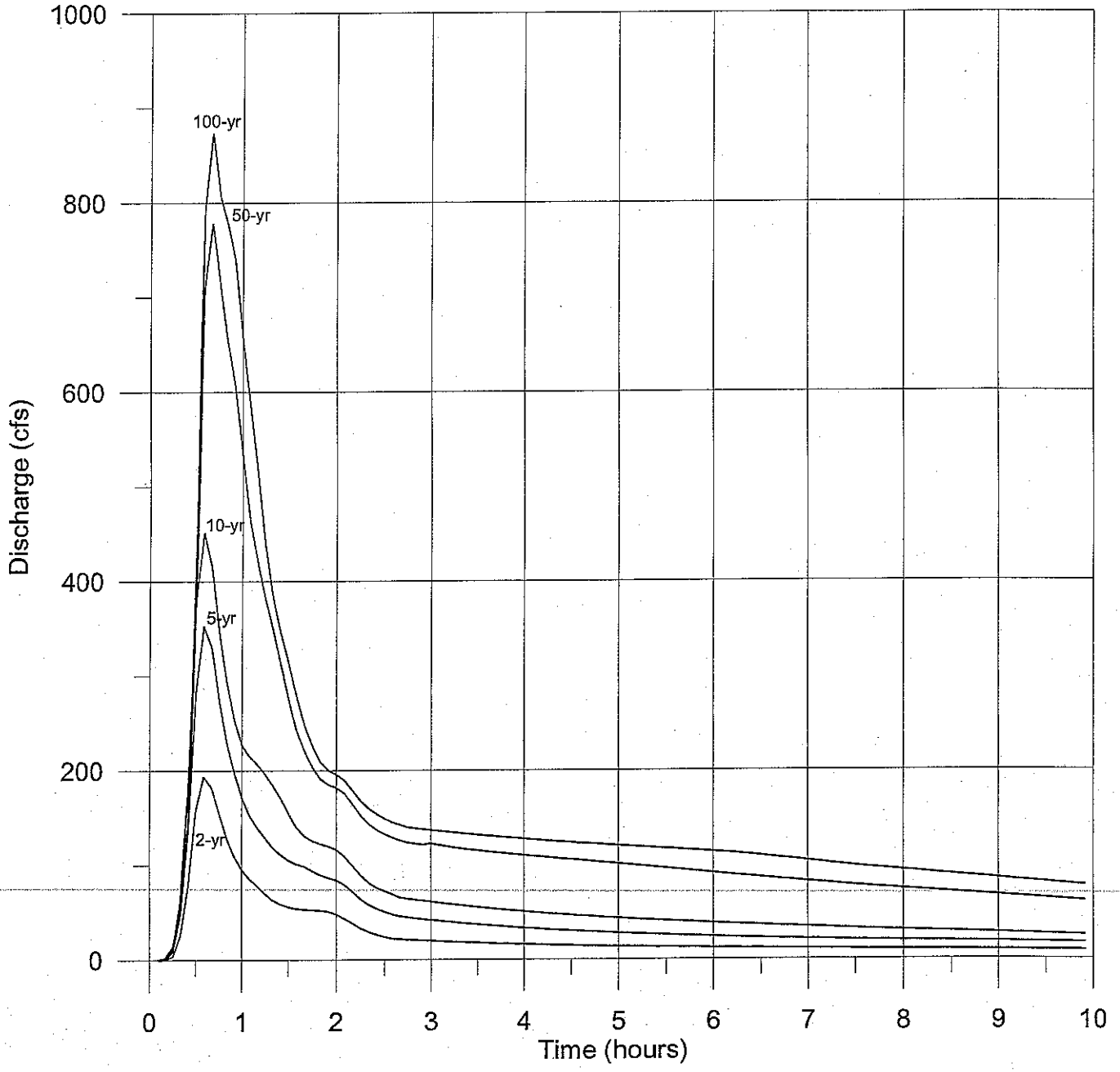

Figure D.2 Flood Hydrographs at 35th Avenue and 4th Street (all flows)
Existing Condition (EPA SWMM Node 420)

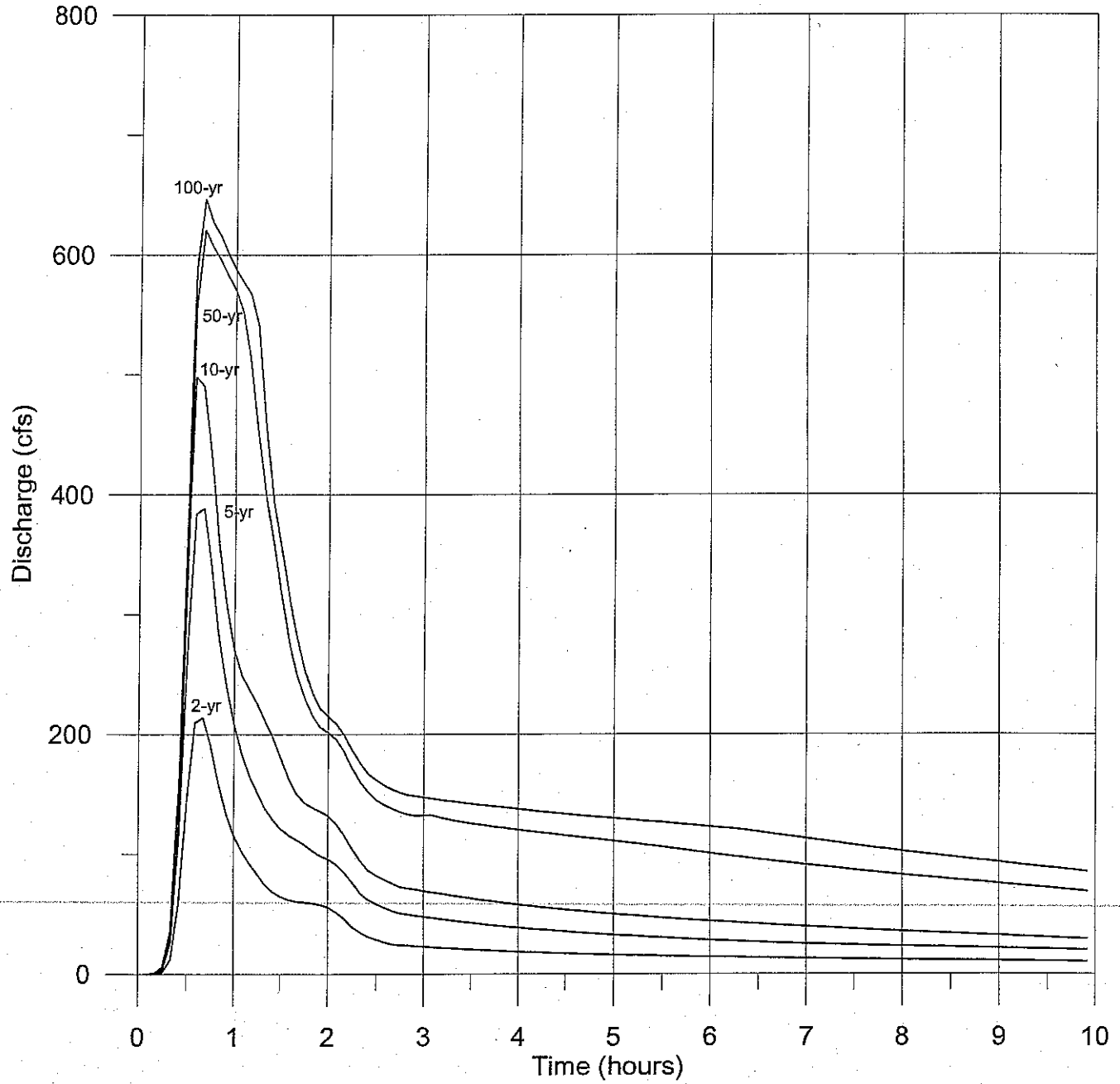

Figure D.3 Flood Hydrographs at C Street (35th Avenue Outfall Channel)
Existing Condition (EPA SWMM Node 426)

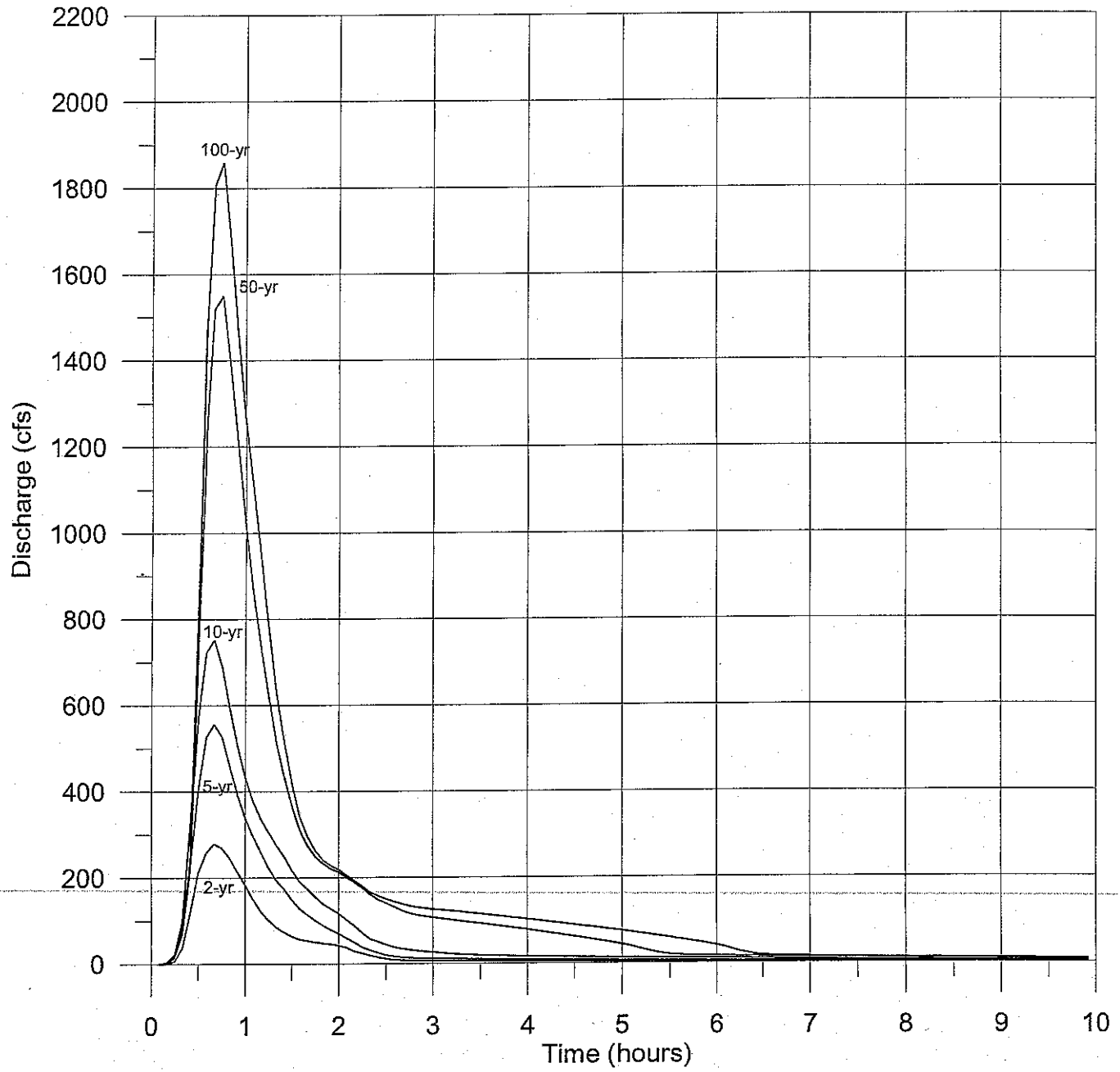

Figure D.4 Flood Hydrographs, Inflows to Bittersweet Lake
Future Condition (EPA SWMM Node 413)

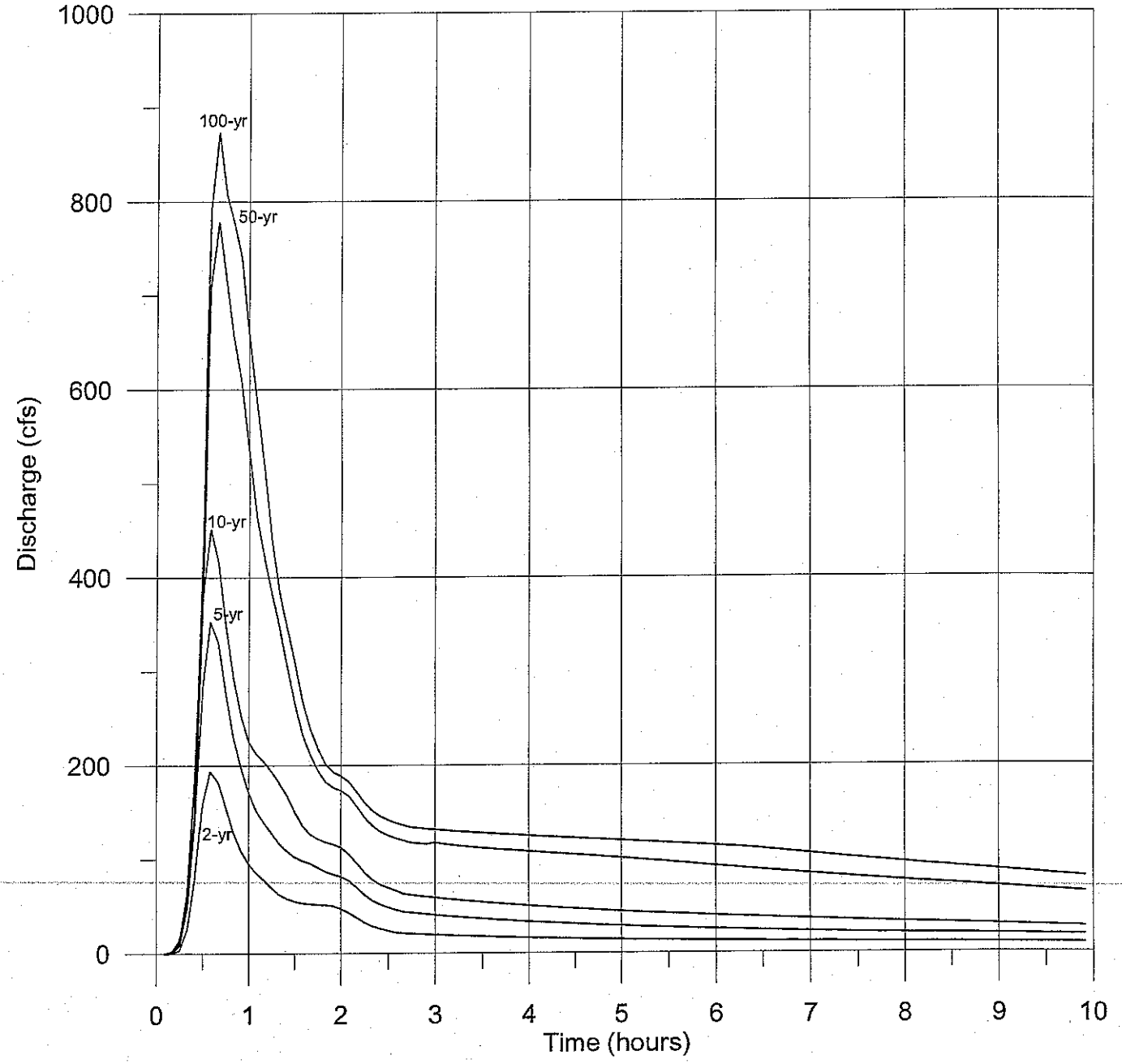

Figure D.5 Flood Hydrographs at 35th Avenue and 4th Street (all flows)
Future Condition (EPA SWMM Node 420)

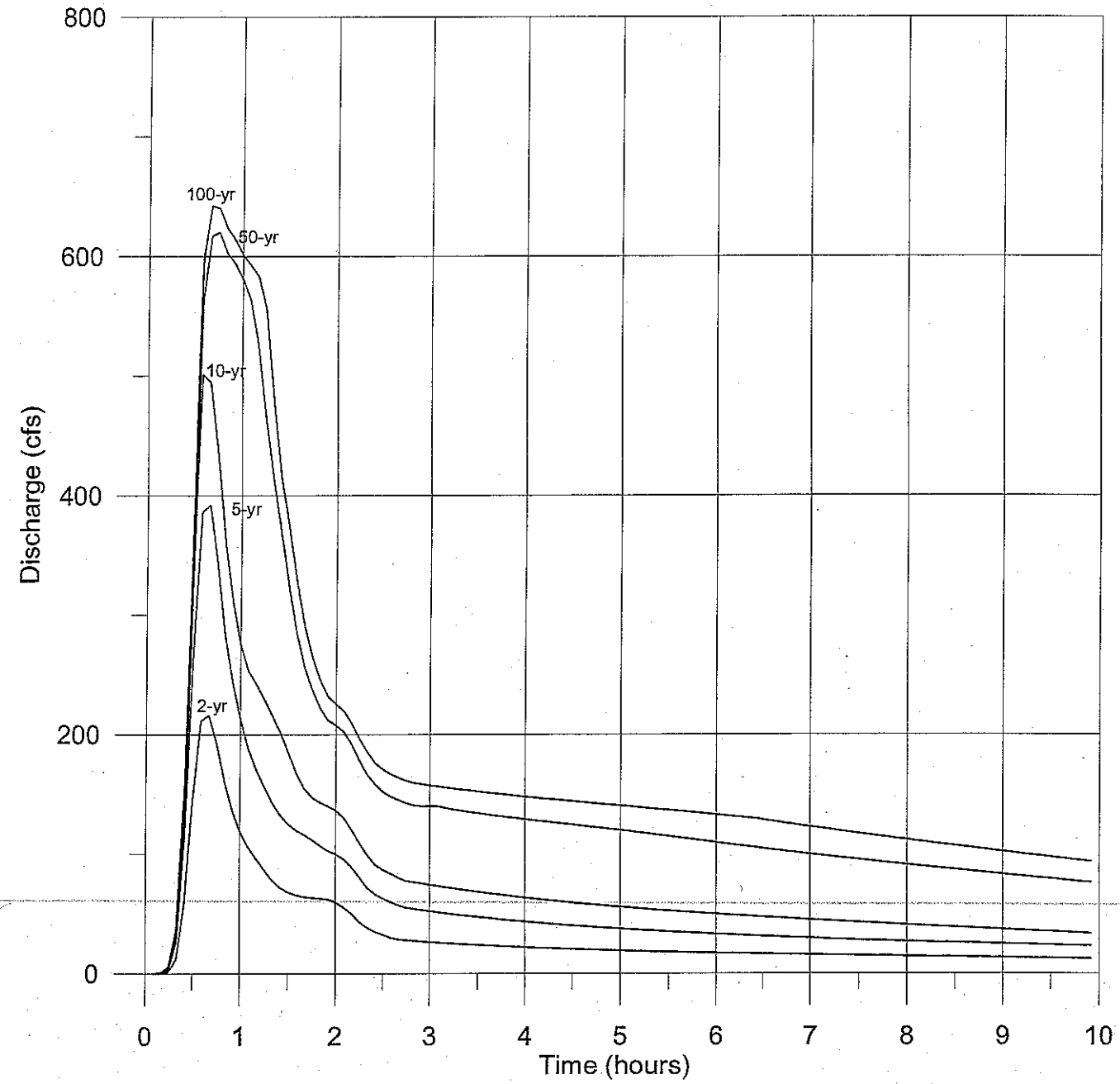

Figure D.6 Flood Hydrographs at C Street (35th Avenue Outfall Channel) Future Condition (EPA SWMM Node 426)

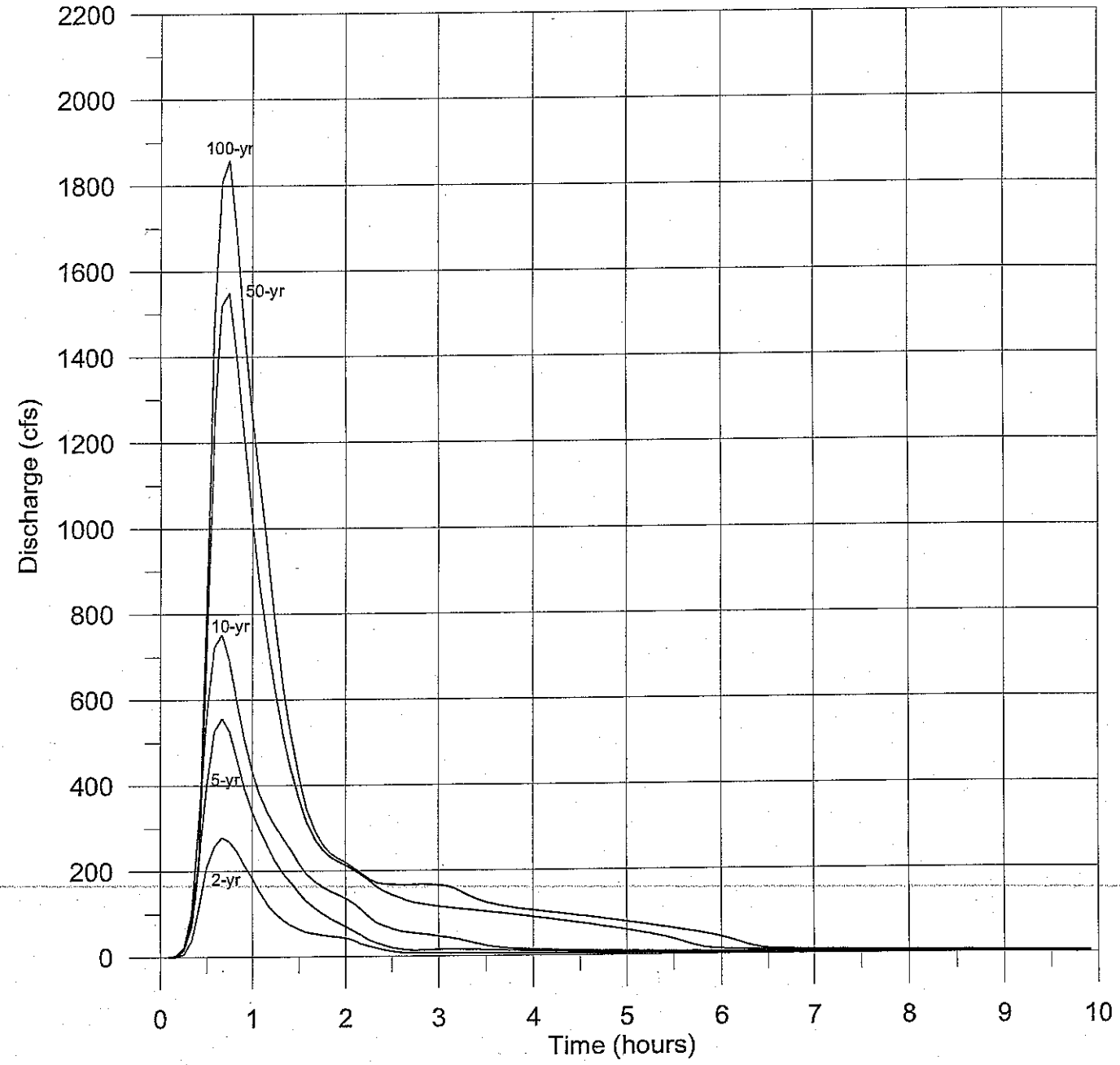

Figure D.7 Flood Hydrographs, Inflows to Bittersweet Lake
Proposed Condition (EPA SWMM Node 413)

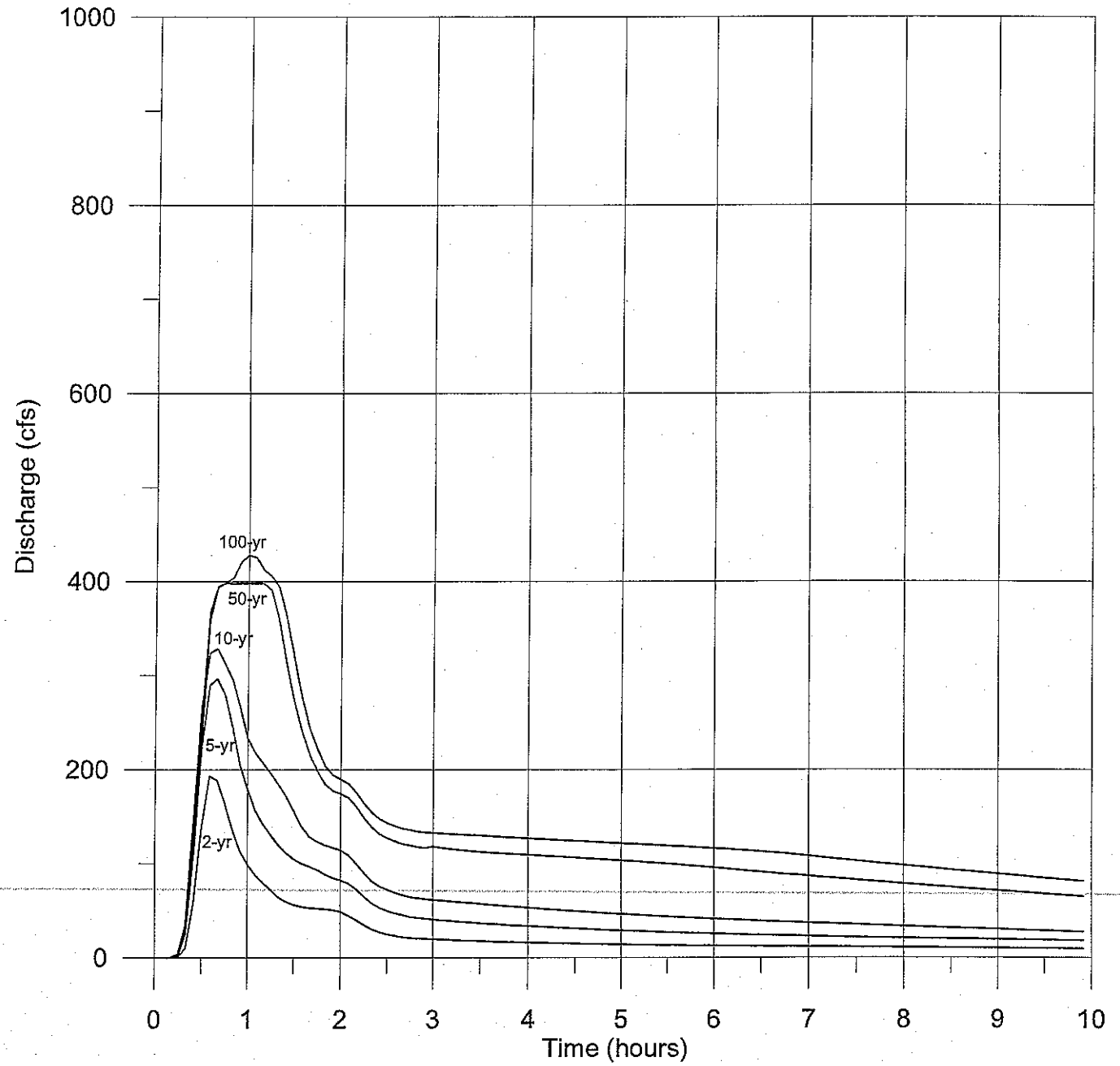

Figure D.8 Flood Hydrographs at 35th Avenue and 4th Street (all flows)
Proposed Condition (EPA SWMM Node 420)

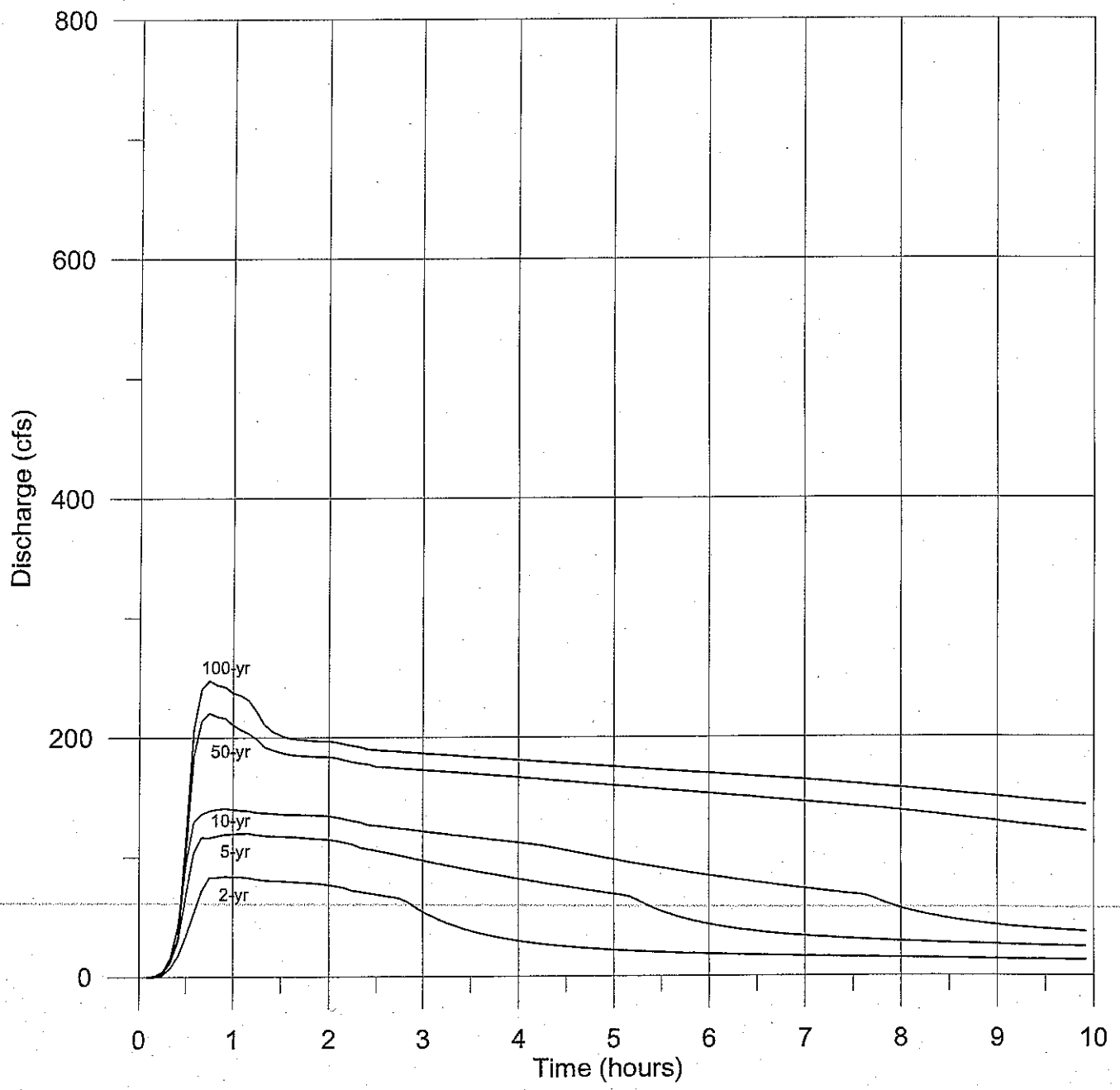

Figure D.9 Flood Hydrographs at C Street (35th Avenue Outfall Channel)
Proposed Condition (EPA SWMM Node 426)