MASTER DRAINAGE STUDY
TOWN OF BUENA VISTA
EAST OF HIGHWAY 24

MARCH, 2013
REVISED JULY, 2013

PREPARED FOR:
Town of Buena Vista
210 East Main Street
Buena Vista, CO 81211

PREPARED BY:

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RGA JOB NO.:
1011.00005

ENGINEERS CERTIFICATION STATEMENT

"I hereby affirm that this Phase II Drainage Report for the Master Drainage Plan for Buena Vista East of Highway 24 was prepared by me (or under my direct supervision) for the owners thereof in accordance with the provisions of Buena Vista Drainage Criteria and approved variances are exceptions thereto. I understand that it is the policy of Buena Vista and hat Buena Vista does not and will not assume liability for drainage facilities designed by others."

Gary E. Welp, P.E.
State of Colorado License Number 35850

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I. GENERAL

A. Purpose

The purpose of this report is to study the existing drainage features and infrastructure within the Town of Buena Vista. The Urban Storm Drainage Criteria Manual (USDCM) will be utilized for design criteria references. The study will investigate the following:

- Existing drainage patterns
- Existing drainage infrastructure
- Existing drainage issues faced by the Town
- Outline locations and recommendations for possible improvement

Design storm frequencies utilized for this study is those outlined in the draft of the town's drainage report criteria and the 1973 NOAA Atlas and are summarized below.

	1-HOUR POINT RAINFALL					
	2-YEAR	5-YEAR	10-YEAR	25-YEAR	50-YEAR	100-YEAR
Depth (Inches)	0.54	0.93	1.19	1.52	1.83	2.12

B. General Location and Vicinity Description

The Town of Buena Vista is located in Chaffee County, Colorado, near the Upper Arkansas River at an elevation of 7,965 feet above sea level. The incorporated area of the town is approximately 3.5 square miles and contains a population of 2,617 people according to the 2010 census. Buena Vista is located in Section 22, Township 14S, and Range 78W.

A general vicinity map is shown in Appendix A.

Land use within the Town is shown in Appendix A.

Local NRCS Soils Classification: The soils consist primarily of Type A soils that consist of sandy loams with almost all of the study area comprised of an Isabel stony sand loam (SsC). The Type A soils encompasses approximately 99% of the site. The remaining one percent (1%) of the site is comprised of Type A soil of the Dominson gravelly sandy loam soil variety or Rock Outcrop (see Appendix A for Soils Map).

To illustrate the town's location with respect to the 100-year flood plain, a FIRM Map is included in Appendix A.

II. STUDY AREA AND DRAINAGE BASINS

A. Study Area

The study area for this Master Drainage Report is the portions of the Town of Buena Vista to the east of the Highway 24 and the railroad tracks that bisect the town from north to south. This study area is either tributary to the Arkansas River or Cottonwood Creek. The general flow pattern for the study area is from the northwest to the southeast. The area is partially developed with a mix of commercial development, business areas, and residential

development ranging from low-density to high-density. The remainder of the study area is undeveloped and primarily consists of natural vegetation and large residential lots, especially within the tributary areas within Chaffee County.

There are no previous master drainage reports for this area on record. The Arkansas River and Cottonwood Creek drainageways both have designated floodplains.

B. Drainage Basins – Historic

The historic Basin AR1 consists of 91.8 acres of mostly undeveloped land. The basin presently consists of the parking area near the baseball/outdoor sports field, recreational facilities near the Arkansas River, and the remainder is open space. The basin generally slopes from west to east toward the Arkansas River.

The historic Basin AR2 consists of 48.9 acres of partially developed land. The basin presently consists of the South Main Addition PUD, which is partially developed and provides for water quality and detention within the development. The remainder of the basin consists of sparse residential development and open space. The basin generally slopes from northwest to east toward the Arkansas River.

The historic Basin AR3 consists of 28.6 acres of partially developed land. The basin presently consists of a few larger lot residential homes, a few roadway, and the remainder is open space. The basin generally slopes from northwest to southeast toward the Arkansas River.

The historic Basin P consists of 129.1 acres of sparsely developed land. The basin presently consists of the baseball/outdoor sports field outdoor complex, large lot partially developed subdivision, and open space both within the town and the county. The basin generally slopes from northwest to southeast toward the low laying areas within the baseball/outdoor sports field outdoor complex and does not have an outfall.

The historic Basin P2 consists of 51.2 acres of mostly undeveloped land. The basin presently consists of some large lot industrial sites, large lot isolated homes, and open space both within the town and the county. The basin generally slopes from north to south toward Basin D, and from there to Basin AR2, and ultimately to the Arkansas River.

The historic Basin D consists of 56.4 acres of almost fully developed land. The basin is mainly business and commercial development along East Main Street, a school/campus site, and smaller lot residential development. The basin generally slopes from north to south along East Main Street and toward Basin AR2, and ultimately to the Arkansas River.

The historic Basin C2 consists of 16.2 acres of partially developed land. The basin is presently a mixture of business lots, residential lots, and undeveloped parcels. The basin generally slopes from north to south toward Basin AR3, and ultimately to the Arkansas River.

The historic Basin C1 consists of 6.7 acres of developed land. The basin is mainly developed residential lots with a few undeveloped parcels. The basin generally slopes from north to south toward Basin CC1, and ultimately to the Cottonwood Creek.

The historic Basin CC1 consists of 23.9 acres of partially developed land. The basin is mainly developed residential lots, undeveloped parcels and frontage to Cottonwood Creek. The basin generally slopes from north to south toward Cottonwood Creek.

The historic Basin CC2 consists of 37.0 acres of partially developed land. The basin is mainly developed residential lots, undeveloped parcels and frontage to Cottonwood Creek. The basin generally slopes from north to south toward Cottonwood Creek.

All other off-site areas not described herein flow away from the site and do not contribute any additional runoff to the site. This applies to both the historic and developed conditions.

Summary of Historic Flow Rates:

Design Point	Drain Basin	Area (acre)	10-Year Q cfs	100-Year Q cfs
Historic Basins				
1	H-AR1	91.8	14.3	67.0
2	H-AR2	48.9	36.0	96.3
3	H-AR3	28.6	9.5	26.8
4	H-P	129.1	15.4	57.6
4a	H-P2	51.2	13.5	40.2
5	H-D	56.4	64.5	154.5
6	H-C2	16.2	15.2	43.6
7	H-C1	6.7	8.2	22.3
8	H-CC1	23.9	18.3	53.0
9	H-CC2	37	19.6	55.3
Total		**490**	**214**	**617**

C. Drainage Basins – Proposed

The condition of the proposed basins is based upon the current zoning map for the Town of Buena Vista – see Appendix A. The rates are based upon each basin being fully developed and all recommended improvements in place.

The proposed Basin AR1 consists of 85.7 acres of completely developed land. The basin will consist of the parking area near the baseball/outdoor sports field, recreational facilities near the Arkansas River, large lot development in Chaffee County, and the remainder as open space. The basin generally slopes from west to east toward the Arkansas River.

The proposed Basin AR2 consists of 49.5 acres of completely developed land. The basin will consist of the South Main Addition PUD which provides for water quality and detention within the development. The remainder of the basin consists of residential development and open space. The basin generally slopes from northwest to east toward the Arkansas River.

The proposed Basin AR3 consists of 18.7 acres of completely developed land. The basin will consist of large lot residential homes and open space. The basin generally slopes from

northwest to southeast toward the Arkansas River.

The proposed Basin P consists of 129.1 acres of completely developed land. The basin will consist of the baseball/outdoor sports field outdoor complex, large lot development in the town and Chaffee County, and open space both within the town and the county. The basin generally slopes from northwest to southeast toward the low laying areas within the baseball/outdoor sports field outdoor complex and will outfall to the Arkansas River.

The proposed Basin P2 consists of 51.2 acres of completely developed land. The basin will consist of large lot industrial sites, large lot isolated homes, large lot development in Chaffee County and open space both within the town and the county. The basin generally slopes from north to south toward Basin D, from there to detention and water quality within baseball/outdoor sports field outdoor complex in Basin P and the Gold Street ROW detention and water quality facility in Basin AR2 and both ponds will outfall to the Arkansas River.

The proposed Basin D consists of 56.4 acres of completely developed land. The basin is business and commercial development along East Main Street, a school/campus site and smaller lot residential development. The basin generally slopes from north to south along East Main Street and toward the detention and water quality within baseball/outdoor sports field outdoor complex in Basin P and the Gold Street ROW detention and water quality facility in Basin AR2 and both ponds will outfall to the Arkansas River.

The proposed Basin C2 consists of 27.4 acres of completely developed land. The basin will be a mixture of business lots and residential lots. The basin generally slopes from north to south to the Gold Street ROW detention and water quality facility in Basin AR2 and will outfall to the Arkansas River.

The proposed Basin C1 consists of 7.4 acres of completely developed land. The basin will be residential lots. The basin generally slopes from north to south to the Gold Street ROW detention and water quality facility in Basin AR2 and will outfall to the Arkansas River.

The proposed Basin CC1 consists of 23.9 acres of completely developed land. The basin will consist of residential lots and frontage to Cottonwood Creek. The basin generally slopes from north to south toward Cottonwood Creek.

The proposed Basin CC2 consists of 40.6 acres of completely developed land. The basin will consist of residential lots and frontage to Cottonwood Creek. The basin generally slopes from north to south toward Cottonwood Creek.

All other off-site areas not described herein flow away from the site and do not contribute any additional runoff to the site. This applies to both the historic and developed conditions.

Summary of Proposed Flow Rates:

Design Point	Drain Basin	Area (acre)	10-Year Q cfs	100-Year Q cfs
Proposed Basins				
1	P-AR1	85.7	37.3	101.0
2	P-AR2	49.5	57.7	142.8
3	P-AR3	18.7	21.9	56.8
4	P-P	129.1	28.3	74.4
4a	P-P2	51.2	19.7	49.8
5	P-D	56.4	74.5	167.3
6	P-C2	27.4	35.3	82.7
7	P-C1	7.4	16.8	34.4
8	P-CC1	23.9	22.7	63.7
9	P-CC2	40.6	39.5	87.4
Total		**490**	**354**	**860**

III. EXISTING STORMWATER CONVEYANCE OR STORAGE FACILITIES

The only current stormwater facilities within this study area is in Basin AR2 and is associated with the South Main PUD development and only provides water quality and detention for that development. Incidental storage is provided in the baseball/outdoor sports field outdoor complex in Basin P, but only provides water quality and retention for that basin only. No other basins have substantial storage and the only storage is incidental to low-laying areas.

IV. DRAINAGE DESIGN CRITERIA

A. Regulations

Storm drainage analysis and design criteria are taken from the *Draft Town of Buena Vista Storm Drainage Design and Technical Criteria Manual*, November 2005, Reference 1, and additional standards and practices were taken from the Urban Storm Drainage Criteria Manual (USDCM), Reference 3.

There are not known master drainage studies for this study area.

B. Design Calculations

Design calculations for the detention and water quality ponds shown as a part of this study are included in Appendix A for the detention volume, water quality capture volume, and proposed developed flow rates.

C. Hydrologic Analysis and Hydraulic Analysis

The Rational Method of stormwater runoff calculation was used for all the basins in this study and the associated drainage facilities. The 10-year storm event is used for the initial storm

analysis, and the 100-year storm frequency for the major storm. Rainfall information used is the NOAA Atlas, 1973 edition.

D. Water Quality Enhancement

Water quality capture volume is based upon the *Draft Town of Buena Vista Storm Drainage Design and Technical Criteria Manual*, November 2005 and is to provide treatment for the first ½" of rainfall (also know as the first flush).

V. STORMWATER MANAGEMENT FACILITY DESIGN

A. Stormwater Conveyance Facilities

Stormwater will be conveyed via natural channel, overland, and curb and gutter throughout most of the study area. New storm sewer and inlets are proposed along East Main Street and Cedar Street and from the detention and water quality within baseball/outdoor sports field outdoor complex in Basin P and the Gold Street ROW detention and water quality facility in Basin AR2 and both ponds will outfall via storm sewer to the Arkansas River.

B. Stormwater Storage Facilities

The areas of this study that will have improvements are the proposed detention and water quality within baseball/outdoor sports field outdoor complex in Basin P and the Gold Street ROW detention and water quality facility in Basin AR2, and both ponds will outfall to the Arkansas River. Additionally, as the situation presents itself in the future, a detention and water quality pond in Basin P2 and water quality ponds in Basins AR2, CC1 and CC2.

Detention and Water Quality Needed:

Drain Basin	Area (acres)	WQCV (ac-ft)	100-year Volume (ac-ft)	Total Volume* Required (ac-ft)
P-AR1	85.7	0.47	1.68	1.92
P-AR2	49.5	1.15	4.42	4.99
(2.5 acre-feet provided within South Main PUD)				
P-AR3	18.7	0.39	1.50	1.70
P-P	129.1	0.86	3.15	3.58
P-P2	51.2	0.74	2.86	3.23
P-D	56.4	1.61	6.16	6.96
P-C2	27.4	0.74	2.84	3.21
P-C1	7.4	0.22	0.82	0.93
P-CC1	23.9	0.42	1.61	1.82
P-CC2	40.6	0.74	2.85	3.22
Total	**490**	**7.34**	**27.90**	**31.57**

Basin P-AR1 direct flow to Arkansas River
Basin P-AR2 planned as part of development PUD
Basin P-P provided in multi-use sports fields
Basin P-P2 should be provided as part of County Planning

Total Remaining Basins	**4.12**	**15.79**	**17.85**

*Total Volume = 100-year volume + 50% WQCV

C. Detention Pond at Baseball/Outdoor Sports Field Complex

The existing low area within the baseball/outdoor sports field outdoor complex can provide approximately 30 acre-feet of storage for water quality and detention. Over-detaining for other basins within the study area can be provided at this location. Infrastructure will need to be installed to direct storm flow to this facility and an outfall to the Arkansas River provided. See Maps section of schematic exhibit.

D. Detention Pond at Gold Street ROW

The Gold Street ROW between South Main Street and Beldan Street that can provide approximately 2.5 acre-feet of storage for water quality and detention. This will be primarily for the treatment of Basins C1 and C2. Infrastructure will need to be installed to direct storm flow to this facility and an outfall to the Arkansas River provided. See Maps section of schematic exhibit.

E. Detention Basin P2

Detention and water quality pond will need to be located within this basin to provide a total of 3.23 acre-feet. This basin is located within Chaffee County and will require a cooperative effort to get this implemented as planning/development occurs in this area.

F. Water Quality Ponds Basins AR3, CC1 and CC2

Ponds will need to be located within these basins to provide water quality for a total of 1.55 acre-feet. As development occurs or build out continues, the installation of these features will need to be part of such plans. Detention will be provided, in the form of over-detaining, at the baseball/outdoor sports field outdoor complex in Basin P.

G. Undetained Basins

Proposed basin AR1 will not be routed through any of the detention/water quality ponds and will continue to outfall directly to the Arkansas River.

VI. WATER QUALITY ENHANCEMENT BEST MANAGEMENT PRACTICES

A water quality capture pond has been designed in accordance with Urban Drainage and Flood Control District (UDFCD) requirements. The water quality capture volume is located within detention ponds.

VII. FLOODPLAIN

A. Major Drainageway Undesignated Floodplain

No floodplains or drainageways will be established or impacted as a part of this project.

VIII. CONCLUSIONS

A. Drainage Concept

The Master Plan for the Town of Buena Vista Areas East of Highway 24 provides water quality and detention for areas that have not been previously treated and can be provided with the use of the detention and water quality within the baseball/outdoor sports field outdoor complex in Basin P, the Gold Street ROW detention and water quality facility in Basin AR2, and the associated storm sewer system that outfall to the Arkansas River.

IX. REFERENCES

1. *Draft Town of Buena Vista Storm Drainage Design and Technical Criteria Manual*, November 2005.

2. *Final Drainage Report South Main Addition,* Swift and Associates, April 2005.

3. *Urban Storm Drainage Criteria Manual* (USDCM), Wright Water Engineers, Inc., June 2001.

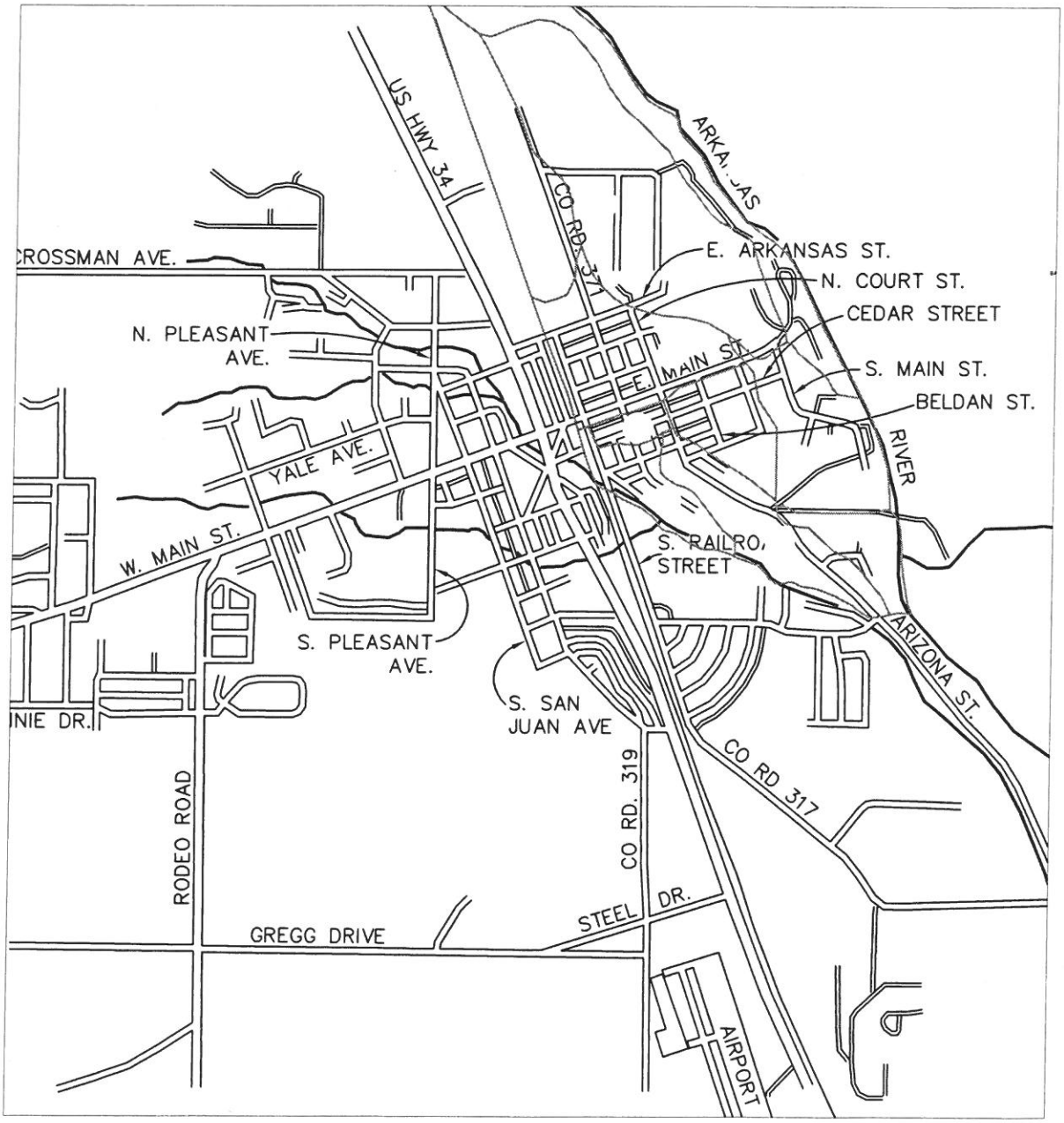
APPENDIX A

Technical Criteria and Calculations

MAPS

APPENDIX A
Technical Criteria and Calculations

SCALE: 1" = 2000'



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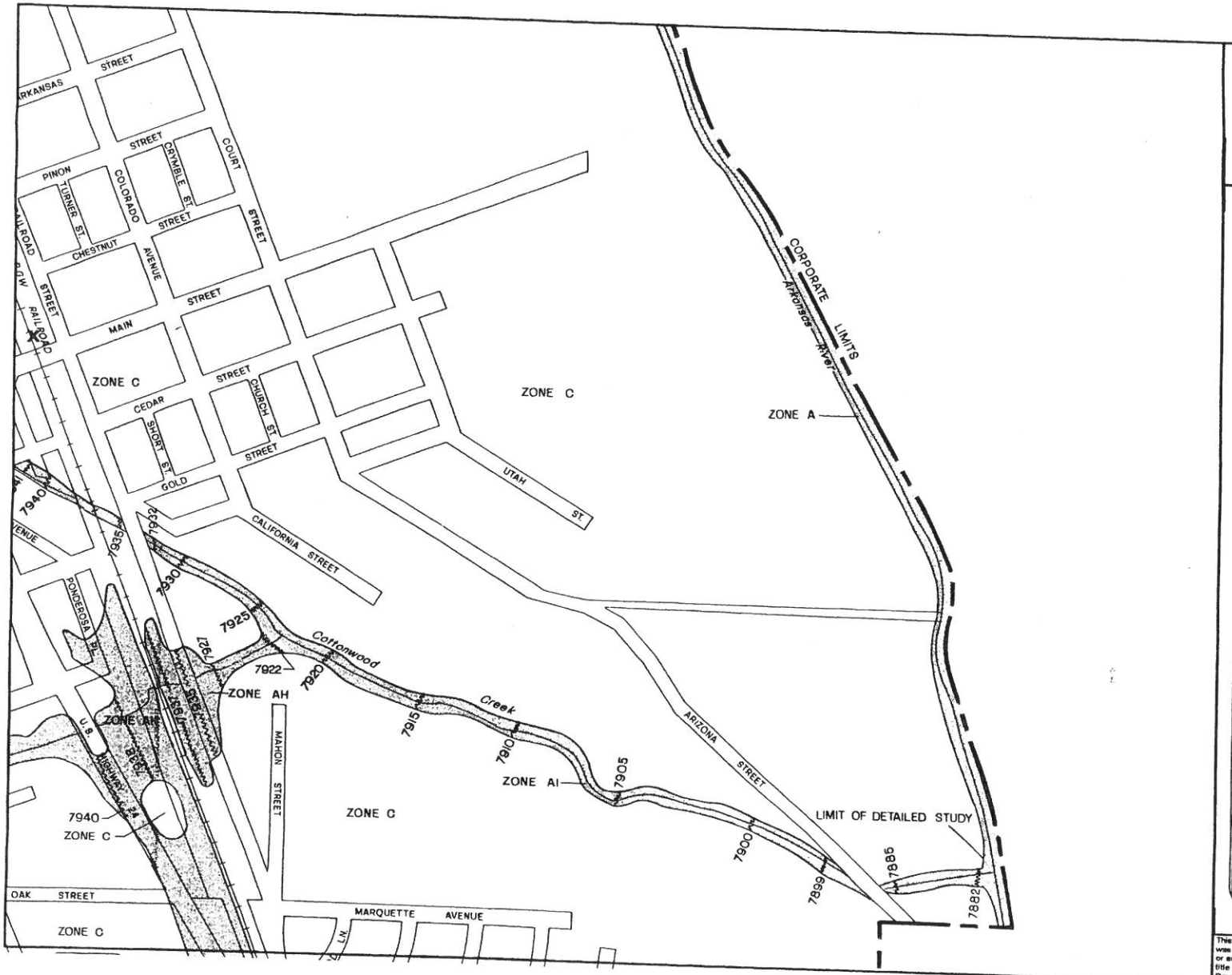


APPROXIMATE SCALE

400 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWN OF
BUENA VISTA,
COLORADO
CHAFFEE COUNTY

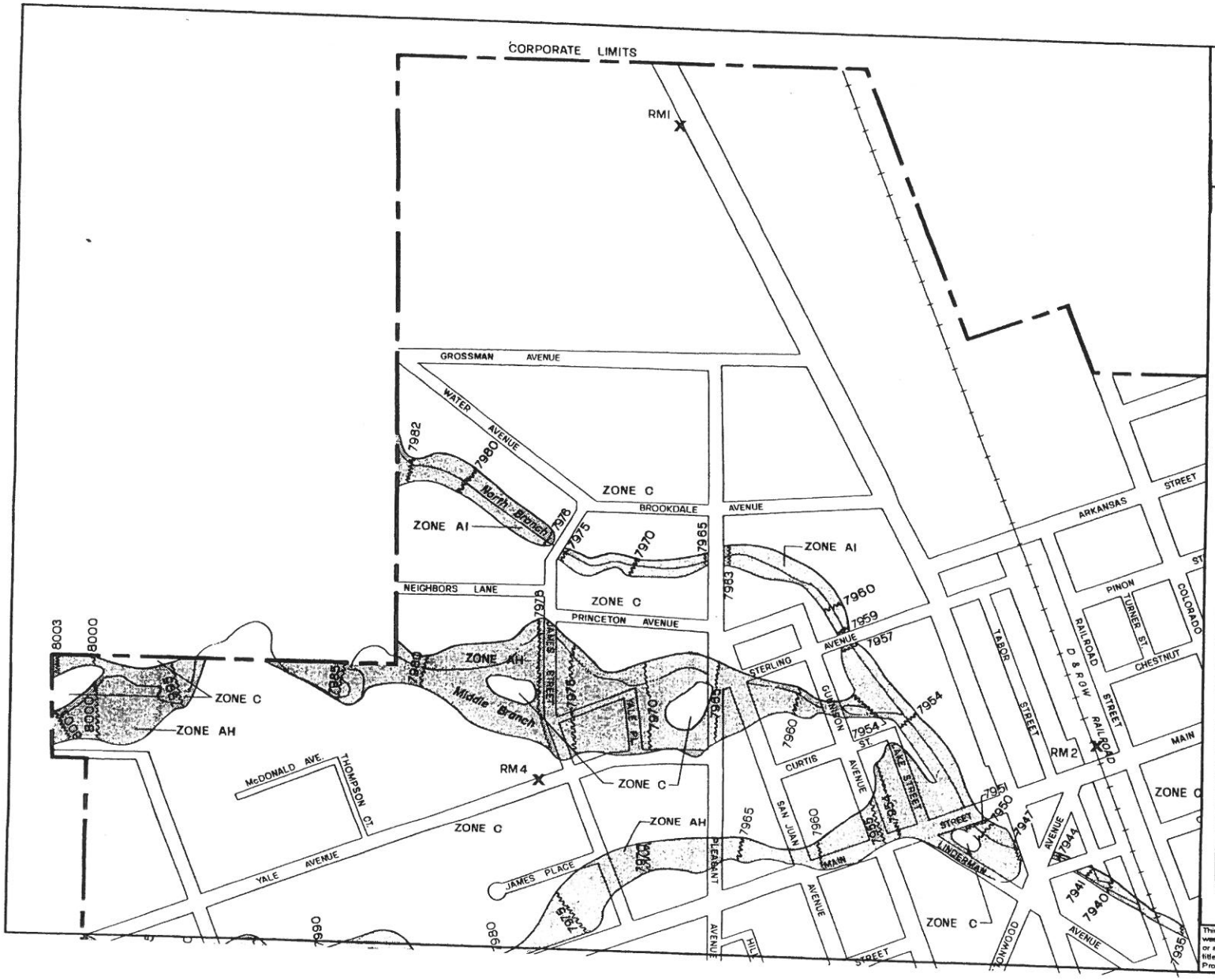
ONLY PANEL PRINTED

COMMUNITY-PANEL NUMBER
080030 0001 C

EFFECTIVE DATE:
SEPTEMBER 30, 1982

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



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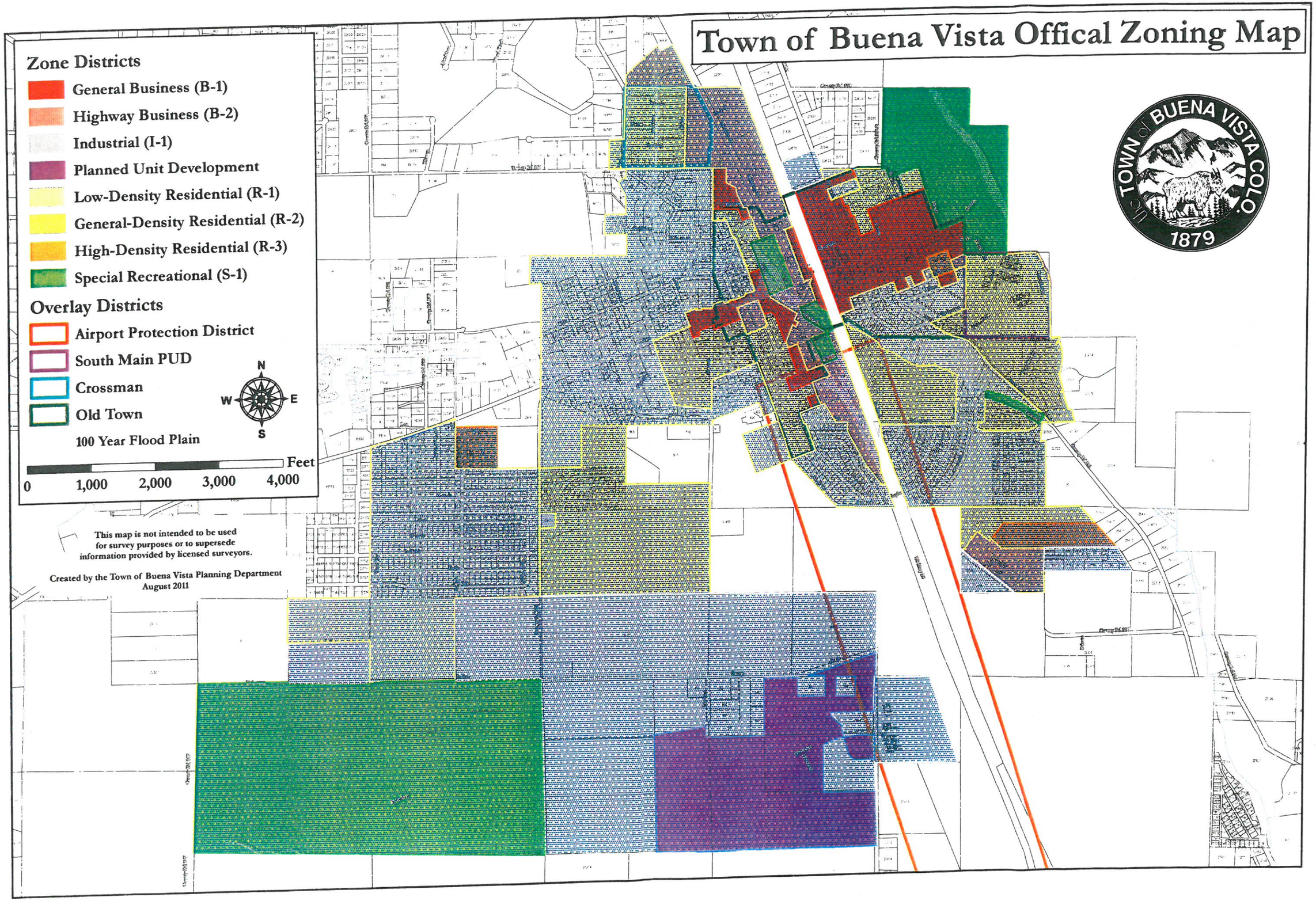
Town of Buena Vista Offical Zoning Map



RGA #1011.0004

Town of Buena Master Plan (East of Highway 24)

Runoff Calculations

Time of Concentration

7/25/2013 - 12:11 PM
Calculated by: GEW

Watercourse Coefficient

Forest & Meadow	0.40	Short Grass Pasture & Lawns	0.85
Fallow or Cultivation	0.65	Nearly Bare Ground	1.00
Grassed Waterway	1.18	Paved Area & Shallow Gutter	1.30

DESIGN POINT	SUB-BASIN DATA: DRAIN BASIN	AREA ac.	C(5)	INITIAL / OVERLAND TIME: Length ft.	Slope %	T(i) min	TRAVEL TIME T(t): Length ft.	Slope %	Coeff.	Velocity fps	T(t) min.	T(c) CHECK (URBANIZED BASINS): COMP. T(c)	TOTAL LENGTH	L/180+10	FINAL T(c) min.
Proposed Basins															
1	P-AR1	85.7	0.18	300	1.5	25.1	1070	6.6	0.85	1.8	9.9	35.0			35.0
2	P-AR2	49.5	0.54	30	2.0	4.3	2745	1.5	1.30	2.4	19.1	23.4	2775	25.4	23.4
3	P-AR3	18.7	0.50	100	2.0	8.6	1710	3.1	0.85	1.2	23.8	32.4	1810	20.1	20.1
4	P-P	129.1	0.21	300	1.2	26.1	5720	1.2	1.00	1.1	86.7	112.8			112.8
4a	P-P2	51.2	0.35	300	1.2	22.1	4100	1.2	1.00	1.1	62.1	84.2			84.2
5	P-D	56.4	0.64	50	1.2	5.5	2600	0.9	1.00	0.9	48.1	53.6	2650	24.7	24.7
6	P-C2	27.4	0.63	50	0.6	7.1	2290	0.6	1.30	1.5	25.4	32.5	2340	23.0	23.0
7	P-C1	7.4	0.65	30	0.8	4.8	550	0.8	1.30	1.8	5.1	9.9	580	13.2	9.9
8	P-CC1	23.9	0.43	40	0.8	8.2	1730	2.1	1.30	2.9	9.9	18.1	1770	19.8	18.1
9	P-CC2	40.6	0.45	40	0.8	7.9	3370	1.6	1.30	2.5	22.5	30.4	3410	28.9	28.9
Historic Basins															
1	H-AR1	91.8	0.05	300	1.5	28.6	1070	6.6	0.85	1.8	9.9	38.5			38.5
2	H-AR2	48.9	0.34	100	1.3	12.5	2430	1.3	1.30	2.3	17.6	30.1	2530	24.1	24.1
3	H-AR3	28.6	0.21	300	1.6	23.8	2420	1.6	1.00	1.3	31.0	54.8			54.8
4	H-P	129.1	0.11	300	1.2	29.0	5720	1.2	1.00	1.1	86.7	115.7			115.7
4a	H-P2	51.2	0.24	300	1.2	25.4	4100	1.2	1.00	1.1	62.1	87.5			87.5
5	H-D	56.4	0.53	50	1.2	6.8	2600	0.9	1.00	0.9	48.1	54.9	2650	24.7	24.7
6	H-C2	16.2	0.42	50	0.6	10.3	1380	0.7	1.30	1.7	13.5	23.8	1430	17.9	17.9
7	H-C1	6.7	0.52	40	0.7	7.4	765	0.7	1.30	1.7	7.5	14.9	805	14.5	14.5
8	H-CC1	23.9	0.34	40	0.8	9.3	1730	2.1	1.30	2.9	9.9	19.2	1770	19.8	19.2
9	H-CC2	37.0	0.24	20	1.0	6.9	3680	1.5	1.30	2.4	25.6	32.5	3700	30.6	30.6

RGA #1011.0004

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Calculated by: GEW

Town of Buena Master Plan (East of Highway 24)
Runoff Calculations

(Rational Method Procedure)

Design Storm *10-Year*

BASIN INFORMATION				DIRECT RUNOFF				TOTAL RUNOFF				
DESIGN POINT	DRAIN BASIN	AREA ac.	RUNOFF COEFF	T(c) min	C x A	I in/hr	Q cfs	T(c) min	SUM C x A	I in/hr	Q cfs	REMARKS
Proposed Basins												
1	P-AR1	85.7	0.25	35.0	21.19	1.76	37.3				37.3	
2	P-AR2	49.5	0.60	23.4	29.95	1.93	57.7				57.7	
3	P-AR3	18.7	0.60	20.1	11.22	1.96	21.9				21.9	
4	P-P	129.1	0.28	112.8	36.27	0.78	28.3				28.3	
4a	P-P2	51.2	0.40	84.2	20.50	0.96	19.7				19.7	
5	P-D	56.4	0.69	24.7	38.91	1.92	74.5				74.5	
6	P-C2	27.4	0.67	23.0	18.26	1.93	35.3				35.3	
7	P-C1	7.4	0.70	9.9	5.18	3.24	16.8				16.8	
8	P-CC1	23.9	0.48	18.1	11.52	1.97	22.7				22.7	
9	P-CC2	40.6	0.52	28.9	21.00	1.88	39.5				39.5	
Historic Basins												
1	H-AR1	91.8	0.09	38.5	8.51	1.68	14.3				14.3	
2	H-AR2	48.9	0.38	24.1	18.74	1.92	36.0				36.0	
3	H-AR3	28.6	0.25	54.8	7.24	1.32	9.5				9.5	
4	H-P	129.1	0.16	115.7	20.08	0.77	15.4				15.4	
4a	H-P2	51.2	0.28	87.5	14.46	0.94	13.5				13.5	
5	H-D	56.4	0.60	24.7	33.65	1.92	64.5				64.5	
6	H-C2	16.2	0.47	17.9	7.68	1.97	15.2				15.2	
7	H-C1	6.7	0.57	14.5	3.85	2.12	8.2				8.2	
8	H-CC1	23.9	0.39	19.2	9.30	1.96	18.3				18.3	
9	H-CC2	37.0	0.28	30.6	10.54	1.86	19.6				19.6	

RGA #1011.0004

7/25/2013 - 12:11 PM
Calculated by: GEW

Town of Buena Master Plan (East of Highway 24)
Runoff Calculations

(Rational Method Procedure)

Design Storm *100 Year*

BASIN INFORMATION				DIRECT RUNOFF				TOTAL RUNOFF				
DESIGN POINT	DRAIN BASIN	AREA ac.	RUNOFF COEFF	T(c) min	C x A	I in/hr	Q cfs	T(c) min	SUM C x A	I in/hr	Q cfs	REMARKS
Proposed Basins												
1	P-AR1	85.7	0.38	35.0	32.25	3.13	101.0				101.0	
2	P-AR2	49.5	0.72	23.4	35.88	3.98	142.8				142.8	
3	P-AR3	18.7	0.71	20.1	13.18	4.31	56.8				56.8	
4	P-P	129.1	0.41	112.8	53.50	1.39	74.4				74.4	
4a	P-P2	51.2	0.57	84.2	29.07	1.71	49.8				49.8	
5	P-D	56.4	0.77	24.7	43.43	3.85	167.3				167.3	
6	P-C2	27.4	0.75	23.0	20.57	4.02	82.7				82.7	
7	P-C1	7.4	0.81	9.9	5.96	5.77	34.4				34.4	
8	P-CC1	23.9	0.59	18.1	14.15	4.50	63.7				63.7	
9	P-CC2	40.6	0.63	28.9	25.42	3.44	87.4				87.4	
Historic Basins												
1	H-AR1	91.8	0.24	38.5	22.39	2.99	67.0				67.0	
2	H-AR2	48.9	0.50	24.1	24.60	3.91	96.3				96.3	
3	H-AR3	28.6	0.40	54.8	11.43	2.35	26.8				26.8	
4	H-P	129.1	0.33	115.7	42.22	1.37	57.6				57.6	
4a	H-P2	51.2	0.47	87.5	24.10	1.67	40.2				40.2	
5	H-D	56.4	0.71	24.7	40.10	3.85	154.5				154.5	
6	H-C2	16.2	0.59	17.9	9.63	4.52	43.6				43.6	
7	H-C1	6.7	0.68	14.5	4.55	4.90	22.3				22.3	
8	H-CC1	23.9	0.50	19.2	12.05	4.40	53.0				53.0	
9	H-CC2	37.0	0.45	30.6	16.71	3.31	55.3				55.3	

Town of Buena Vista (NOAA Calculated)
1973 Altas Data

TIME	2 YR	5 YR	10 YR	50 YR	100 YR
5	1.83	3.17	4.04	6.20	7.19
10	1.46	2.53	3.22	4.95	5.74
15	1.23	2.12	2.00	4.15	4.81
20	1.10	3.16	1.96	3.72	4.32
25	0.98	1.68	1.91	3.30	3.82
30	0.85	1.46	1.87	2.87	3.33
35	0.80	1.37	1.76	2.70	3.13
40	0.75	1.29	1.65	2.53	2.93
45	0.70	1.20	1.54	2.36	2.74
50	0.65	1.11	1.42	2.19	2.54
55	0.60	1.03	1.31	2.02	2.34
60	0.55	0.94	1.20	1.85	2.14
65	0.53	0.90	1.15	1.77	2.05
70	0.50	0.86	1.09	1.68	1.95
75	0.48	0.82	1.04	1.61	1.86
80	0.46	0.78	1.00	1.53	1.78
85	0.44	0.75	0.95	1.47	1.70
90	0.42	0.72	0.92	1.41	1.63
95	0.40	0.69	0.88	1.36	1.57
100	0.39	0.67	0.85	1.31	1.52
105	0.38	0.64	0.82	1.27	1.46
110	0.36	0.62	0.79	1.22	1.42
115	0.35	0.60	0.77	1.19	1.37
120	0.34	0.58	0.75	1.15	1.33
125	0.33	0.57	0.72	1.12	1.29
130	0.32	0.55	0.70	1.08	1.25
135	0.31	0.54	0.68	1.05	1.22
140	0.31	0.52	0.67	1.03	1.19
145	0.30	0.51	0.65	1.00	1.16
150	0.29	0.50	0.63	0.98	1.13

I = (28.5 * P1 / ((10 + Tc) ^ 0.786))
I = rainfall intensity (in/hr)
P1 = 1-hour rainfall depth (in)
Tc = time of concentration (min)

Calculation of C-values and % impervious

RGA Job	RGA #1011.0004	Area =	85.7 acres
Preparer	GEW	% IMP =	13.2
Date	Jul-2013	C2 =	0.12
Description:	Town of Buena Master Plan (East of Highway 24)	C5 =	0.18
		C10 =	0.25
P-AR1		C100 =	0.38
	Water Quality Capture Volume		20597 cu-ft
	Water Quality Capture Volume		0.47 ac-ft

	Area (each)	Land Use	Impervious (percent)	FREQUENCY 2	5	10	100
	***	**Business:**					
		Commercial Area	95	0.87	0.87	0.88	0.89
		Neighborhood Area	70	0.60	0.65	0.70	0.80
	***	**Residential:**	---	---	---	---	---
CALC		Single-Family	43	0.40	0.45	0.50	0.60
		Multi-Unit (detached)	50	0.45	0.50	0.60	0.70
		Multi-Unit (attached)	70	0.60	0.65	0.70	0.80
CALC		1/2 acre Lot or larger	35	0.30	0.35	0.40	0.60
		Apartments	70	0.65	0.70	0.70	0.80
	***		* See Figure 2-1 for percent imper				
	***	**Industrial:**	---	---	---	---	---
		Light Areas	80	0.71	0.72	0.76	0.82
		Heavy Areas	90	0.80	0.80	0.85	0.90
	19.6	**Parks, Cemetaries:**	7	0.10	0.18	0.25	0.45
		Playgrounds:	13	0.15	0.20	0.30	0.50
		Schools:	50	0.45	0.50	0.60	0.70
		Railroad Yards:	20	0.20	0.25	0.35	0.45
	***	**Undeveloped Areas:**	---	---	---	---	---
		Historic Flow Analysis	2		(see Lawns)		
	62.8	Offsite County Rural	15	0.12	0.18	0.25	0.35
	***	**Streets:**	---	---	---	---	---
	0.5	Paved	100	0.87	0.88	0.90	0.93
		Gravel (Packed)	40	0.40	0.45	0.50	0.60
		Drive and Walks:	96	0.87	0.87	0.88	0.89
		Roofs:	90	0.80	0.85	0.90	0.90
	2.8	**Lawns, Sandy Soil**	2	0.00	0.01	0.05	0.20
		Lawns, Clayey Soil	2	0.05	0.15	0.25	0.50
		Landscaped Areas	3	0.1			0.6
	***						
TOTAL	85.7	Average Values	13.24	0.12	0.18	0.25	0.38

Calculation of C-values and % impervious

RGA Job	RGA #1011.0004	Area =	49.5 acres
Preparer	GEW	% IMP =	55.6
Date	Jul-2013	C2 =	0.49
Description:	Town of Buena Master Plan (East of Highway 24)	C5 =	0.54
		C10 =	0.60
P-AR2		C100 =	0.72
		Water Quality Capture Volume	49994 cu-ft
		Water Quality Capture Volume	1.15 ac-ft

	Area (each)	Land Use	Impervious (percent)	FREQUENCY 2	5	10	100
	***	**Business:**					
	2.4	Commercial Area	95	0.87	0.87	0.88	0.89
		Neighborhood Area	70	0.60	0.65	0.70	0.80
	***	**Residential:**	---	---	---	---	---
CALC		Single-Family	43	0.40	0.45	0.50	0.60
	8.6	Multi-Unit (detached)	50	0.45	0.50	0.60	0.70
	29.0	Multi-Unit (attached)	70	0.60	0.65	0.70	0.80
CALC		1/2 acre Lot or larger	35	0.30	0.35	0.40	0.60
		Apartments	70	0.65	0.70	0.70	0.80
	***		* See Figure 2-1 for percent imper				
	***	**Industrial:**	---	---	---	---	---
		Light Areas	80	0.71	0.72	0.76	0.82
		Heavy Areas	90	0.80	0.80	0.85	0.90
	9.5	**Parks, Cemetaries:**	7	0.10	0.18	0.25	0.45
		Playgrounds:	13	0.15	0.20	0.30	0.50
		Schools:	50	0.45	0.50	0.60	0.70
		Railroad Yards:	20	0.20	0.25	0.35	0.45
	***	**Undeveloped Areas:**	---	---	---	---	---
		Historic Flow Analysis	2	(see Lawns)			
		Offsite (use undefined)	45	0.43	0.47	0.55	0.65
	***	**Streets:**	---	---	---	---	---
		Paved	100	0.87	0.88	0.90	0.93
		Gravel (Packed)	40	0.40	0.45	0.50	0.60
		Drive and Walks:	96	0.87	0.87	0.88	0.89
		Roofs:	90	0.80	0.85	0.90	0.90
		Lawns, Sandy Soil	2	0.00	0.01	0.05	0.20
		Lawns, Clayey Soil	2	0.05	0.15	0.25	0.50
		Landscaped Areas	3	0.1			0.6
	***						
TOTAL	49.5	Average Values	55.65	0.49	0.54	0.60	0.72

Calculation of C-values and % impervious

RGA Job	RGA #1011.0004	Area =	18.7 acres
Preparer	GEW	% IMP =	50.0
Date	Jul-2013	C2 =	0.45
Description:	Town of Buena Master Plan (East of Highway 24)	C5 =	0.50
		C10 =	0.60
P-AR3		C100 =	0.71
		Water Quality Capture Volume	16970 cu-ft
		Water Quality Capture Volume	0.39 ac-ft

	Area (each)	Land Use	Impervious (percent)	FREQUENCY 2	5	10	100
	***	**Business:**					
		Commercial Area	95	0.87	0.87	0.88	0.89
		Neighborhood Area	70	0.60	0.65	0.70	0.80
	***	**Residential:**	---	---	---	---	---
CALC		Single-Family	43	0.40	0.45	0.50	0.60
	18.7	Multi-Unit (detached)	50	0.45	0.50	0.60	0.70
		Multi-Unit (attached)	70	0.60	0.65	0.70	0.80
CALC		1/2 acre Lot or larger	35	0.30	0.35	0.40	0.60
		Apartments	70	0.65	0.70	0.70	0.80
	***		* See Figure 2-1 for percent imper				
	***	**Industrial:**	---	---	---	---	---
		Light Areas	80	0.71	0.72	0.76	0.82
		Heavy Areas	90	0.80	0.80	0.85	0.90
		Parks, Cemetaries:	7	0.10	0.18	0.25	0.45
		Playgrounds:	13	0.15	0.20	0.30	0.50
		Schools:	50	0.45	0.50	0.60	0.70
		Railroad Yards:	20	0.20	0.25	0.35	0.45
	***	**Undeveloped Areas:**	---	---	---	---	---
		Historic Flow Analysis	2	(see Lawns)			
		Offsite (use undefined)	45	0.43	0.47	0.55	0.65
	***	**Streets:**	---	---	---	---	---
		Paved	100	0.87	0.88	0.90	0.93
		Gravel (Packed)	40	0.40	0.45	0.50	0.60
		Drive and Walks:	96	0.87	0.87	0.88	0.89
		Roofs:	90	0.80	0.85	0.90	0.90
		Lawns, Sandy Soil	2	0.00	0.01	0.05	0.20
		Lawns, Clayey Soil	2	0.05	0.15	0.25	0.50
		Landscaped Areas	3	0.1			0.6
	***						
TOTAL	18.7	Average Values	50.00	0.45	0.50	0.60	0.71

Calculation of C-values and % impervious

RGA Job	RGA #1011.0004	Area =	7.4 acres
Preparer	GEW	% IMP =	70.0
Date	Jul-2013	C2 =	0.60
Description:	Town of Buena Master Plan (East of Highway 24)	C5 =	0.65
		C10 =	0.70
P-C1		C100 =	0.81
		Water Quality Capture Volume	9402 cu-ft
		Water Quality Capture Volume	0.22 ac-ft

	Area (each)	Land Use	Impervious (percent)	FREQUENCY 2	5	10	100
	***	**Business:**					
		Commercial Area	95	0.87	0.87	0.88	0.89
	7.4	Neighborhood Area	70	0.60	0.65	0.70	0.80
	***	**Residential:**	---	---	---	---	---
CALC		Single-Family	43	0.40	0.45	0.50	0.60
		Multi-Unit (detached)	50	0.45	0.50	0.60	0.70
		Multi-Unit (attached)	70	0.60	0.65	0.70	0.80
CALC		1/2 acre Lot or larger	35	0.30	0.35	0.40	0.60
		Apartments	70	0.65	0.70	0.70	0.80
	***		* See Figure 2-1 for percent imper				
	***	**Industrial:**	---	---	---	---	---
		Light Areas	80	0.71	0.72	0.76	0.82
		Heavy Areas	90	0.80	0.80	0.85	0.90
		Parks, Cemetaries:	7	0.10	0.18	0.25	0.45
		Playgrounds:	13	0.15	0.20	0.30	0.50
		Schools:	50	0.45	0.50	0.60	0.70
		Railroad Yards:	20	0.20	0.25	0.35	0.45
	***	**Undeveloped Areas:**	---	---	---	---	---
		Historic Flow Analysis	2	(see Lawns)			
		Offsite (use undefined)	45	0.43	0.47	0.55	0.65
	***	**Streets:**	---	---	---	---	---
		Paved	100	0.87	0.88	0.90	0.93
		Gravel (Packed)	40	0.40	0.45	0.50	0.60
		Drive and Walks:	96	0.87	0.87	0.88	0.89
		Roofs:	90	0.80	0.85	0.90	0.90
		Lawns, Sandy Soil	2	0.00	0.01	0.05	0.20
		Lawns, Clayey Soil	2	0.05	0.15	0.25	0.50
		Landscaped Areas	3	0.1			0.6
	***						
TOTAL	7.4	Average Values	70.00	0.60	0.65	0.70	0.81

Calculation of C-values and % impervious

RGA Job	RGA #1011.0004	Area =	27.4 acres
Preparer	GEW	% IMP =	65.1
Date	Jul-2013	C2 =	0.59
Description:	Town of Buena Master Plan (East of Highway 24)	C5 =	0.63
		C10 =	0.67
P-C2		C100 =	0.75
	Water Quality Capture Volume		32352 cu-ft
	Water Quality Capture Volume		0.74 ac-ft

	Area (each)	Land Use	Impervious (percent)	FREQUENCY 2	5	10	100
	***	**Business:**					
	6.3	Commercial Area	95	0.87	0.87	0.88	0.89
	6.9	Neighborhood Area	70	0.60	0.65	0.70	0.80
	***	**Residential:**	---	---	---	---	---
CALC	9.0	Single-Family	43	0.40	0.45	0.50	0.60
	2.5	Multi-Unit (detached)	50	0.45	0.50	0.60	0.70
		Multi-Unit (attached)	70	0.60	0.65	0.70	0.80
CALC		1/2 acre Lot or larger	35	0.30	0.35	0.40	0.60
	2.7	Apartments	70	0.65	0.70	0.70	0.80
	***		* See Figure 2-1 for percent imper				
	***	**Industrial:**	---	---	---	---	---
		Light Areas	80	0.71	0.72	0.76	0.82
		Heavy Areas	90	0.80	0.80	0.85	0.90
		Parks, Cemetaries:	7	0.10	0.18	0.25	0.45
		Playgrounds:	13	0.15	0.20	0.30	0.50
		Schools:	50	0.45	0.50	0.60	0.70
		Railroad Yards:	20	0.20	0.25	0.35	0.45
	***	**Undeveloped Areas:**	---	---	---	---	---
		Historic Flow Analysis	2	(see Lawns)			
		Offsite (use undefined)	45	0.43	0.47	0.55	0.65
	***	**Streets:**	---	---	---	---	---
		Paved	100	0.87	0.88	0.90	0.93
		Gravel (Packed)	40	0.40	0.45	0.50	0.60
		Drive and Walks:	96	0.87	0.87	0.88	0.89
		Roofs:	90	0.80	0.85	0.90	0.90
		Lawns, Sandy Soil	2	0.00	0.01	0.05	0.20
		Lawns, Clayey Soil	2	0.05	0.15	0.25	0.50
		Landscaped Areas	3	0.1			0.6
	***						
TOTAL	27.4	Average Values	65.05	0.59	0.63	0.67	0.75

Calculation of C-values and % impervious

RGA Job	RGA #1011.0004	Area =	23.9 acres
Preparer	GEW	% IMP =	41.8
Date	Jul-2013	C2 =	0.38
Description:	Town of Buena Master Plan (East of Highway 24)	C5 =	0.43
		C10 =	0.48
P-CC1		C100 =	0.59
		Water Quality Capture Volume	18141 cu-ft
		Water Quality Capture Volume	0.42 ac-ft

	Area (each)	Land Use	Impervious (percent)	FREQUENCY 2	5	10	100
	***	**Business:**					
		Commercial Area	95	0.87	0.87	0.88	0.89
	1.9	Neighborhood Area	70	0.60	0.65	0.70	0.80
	***	**Residential:**	---	---	---	---	---
CALC	16.9	Single-Family	43	0.40	0.45	0.50	0.60
	2.7	Multi-Unit (detached)	50	0.45	0.50	0.60	0.70
		Multi-Unit (attached)	70	0.60	0.65	0.70	0.80
CALC		1/2 acre Lot or larger	35	0.30	0.35	0.40	0.60
		Apartments	70	0.65	0.70	0.70	0.80
	***		* See Figure 2-1 for percent imper				
	***	**Industrial:**	---	---	---	---	---
		Light Areas	80	0.71	0.72	0.76	0.82
		Heavy Areas	90	0.80	0.80	0.85	0.90
		Parks, Cemetaries:	7	0.10	0.18	0.25	0.45
		Playgrounds:	13	0.15	0.20	0.30	0.50
		Schools:	50	0.45	0.50	0.60	0.70
		Railroad Yards:	20	0.20	0.25	0.35	0.45
	***	**Undeveloped Areas:**	---	---	---	---	---
		Historic Flow Analysis	2	(see Lawns)			
		Offsite (use undefined)	45	0.43	0.47	0.55	0.65
	***	**Streets:**	---	---	---	---	---
		Paved	100	0.87	0.88	0.90	0.93
		Gravel (Packed)	40	0.40	0.45	0.50	0.60
		Drive and Walks:	96	0.87	0.87	0.88	0.89
		Roofs:	90	0.80	0.85	0.90	0.90
	2.4	**Lawns, Sandy Soil**	2	0.00	0.01	0.05	0.20
		Lawns, Clayey Soil	2	0.05	0.15	0.25	0.50
		Landscaped Areas	3	0.1			0.6
	***						
TOTAL	23.9	Average Values	41.82	0.38	0.43	0.48	0.59

Calculation of C-values and % impervious

RGA Job	RGA #1011.0004	Area =	40.6 acres
Preparer	GEW	% IMP =	43.6
Date	Jul-2013	C2 =	0.40
Description:	Town of Buena Master Plan (East of Highway 24)	C5 =	0.45
		C10 =	0.52
P-CC2		C100 =	0.63
		Water Quality Capture Volume	32133 cu-ft
		Water Quality Capture Volume	0.74 ac-ft

	Area (each)	Land Use	Impervious (percent)	FREQUENCY 2	5	10	100
	***	**Business:**					
		Commercial Area	95	0.87	0.87	0.88	0.89
	0.4	Neighborhood Area	70	0.60	0.65	0.70	0.80
	***	**Residential:**	---	---	---	---	---
CALC	28.4	Single-Family	43	0.40	0.45	0.50	0.60
	10.2	Multi-Unit (detached)	50	0.45	0.50	0.60	0.70
		Multi-Unit (attached)	70	0.60	0.65	0.70	0.80
CALC		1/2 acre Lot or larger	35	0.30	0.35	0.40	0.60
		Apartments	70	0.65	0.70	0.70	0.80
	***		* See Figure 2-1 for percent imper				
	***	**Industrial:**	---	---	---	---	---
		Light Areas	80	0.71	0.72	0.76	0.82
		Heavy Areas	90	0.80	0.80	0.85	0.90
	1.6	**Parks, Cemetaries:**	7	0.10	0.18	0.25	0.45
		Playgrounds:	13	0.15	0.20	0.30	0.50
		Schools:	50	0.45	0.50	0.60	0.70
		Railroad Yards:	20	0.20	0.25	0.35	0.45
	***	**Undeveloped Areas:**	---	---	---	---	---
		Historic Flow Analysis	2	(see Lawns)			
		Offsite (use undefined)	45	0.43	0.47	0.55	0.65
	***	**Streets:**	---	---	---	---	---
		Paved	100	0.87	0.88	0.90	0.93
		Gravel (Packed)	40	0.40	0.45	0.50	0.60
		Drive and Walks:	96	0.87	0.87	0.88	0.89
		Roofs:	90	0.80	0.85	0.90	0.90
		Lawns, Sandy Soil	2	0.00	0.01	0.05	0.20
		Lawns, Clayey Soil	2	0.05	0.15	0.25	0.50
		Landscaped Areas	3	0.1			0.6
	***						
TOTAL	40.6	Average Values	43.61	0.40	0.45	0.52	0.63

Calculation of C-values and % impervious

RGA Job	RGA #1011.0004	Area =	129.1 acres
Preparer	GEW	% IMP =	16.0
Date	Jul-2013	C2 =	0.14
Description:	Town of Buena Master Plan (East of Highway 24)	C5 =	0.21
		C10 =	0.28
P-P		C100 =	0.41
		Water Quality Capture Volume	37442 cu-ft
		Water Quality Capture Volume	0.86 ac-ft

	Area (each)	Land Use	Impervious (percent)	FREQUENCY 2	5	10	100
	***	**Business:**					
		Commercial Area	95	0.87	0.87	0.88	0.89
	2.0	Neighborhood Area	70	0.60	0.65	0.70	0.80
	***	**Residential:**	---	---	---	---	---
CALC	0.6	Single-Family	43	0.40	0.45	0.50	0.60
	8.4	Multi-Unit (detached)	50	0.45	0.50	0.60	0.70
		Multi-Unit (attached)	70	0.60	0.65	0.70	0.80
CALC		1/2 acre Lot or larger	35	0.30	0.35	0.40	0.60
		Apartments	70	0.65	0.70	0.70	0.80
	***		* See Figure 2-1 for percent imper				
	***	**Industrial:**	---	---	---	---	---
		Light Areas	80	0.71	0.72	0.76	0.82
		Heavy Areas	90	0.80	0.80	0.85	0.90
	36.8	**Parks, Cemetaries:**	7	0.10	0.18	0.25	0.45
		Playgrounds:	13	0.15	0.20	0.30	0.50
		Schools:	50	0.45	0.50	0.60	0.70
		Railroad Yards:	20	0.20	0.25	0.35	0.45
	***	**Undeveloped Areas:**	---	---	---	---	---
		Historic Flow Analysis	2	(see Lawns)			
	81.3	Offsite County Rural	15	0.12	0.18	0.25	0.35
	***	**Streets:**	---	---	---	---	---
		Paved	100	0.87	0.88	0.90	0.93
		Gravel (Packed)	40	0.40	0.45	0.50	0.60
		Drive and Walks:	96	0.87	0.87	0.88	0.89
		Roofs:	90	0.80	0.85	0.90	0.90
		Lawns, Sandy Soil	2	0.00	0.01	0.05	0.20
		Lawns, Clayey Soil	2	0.05	0.15	0.25	0.50
		Landscaped Areas	3	0.1			0.6
	***						
TOTAL	129.1	Average Values	15.98	0.14	0.21	0.28	0.41

Calculation of C-values and % impervious

RGA Job	RGA #1011.0004	Area =	51.2 acres
Preparer	GEW	% IMP =	34.8
Date	Jul-2013	C2 =	0.30
Description:	Town of Buena Master Plan (East of Highway 24)	C5 =	0.35
		C10 =	0.40
P-P2		C100 =	0.57
		Water Quality Capture Volume	32298 cu-ft
		Water Quality Capture Volume	0.74 ac-ft

	Area (each)	Land Use	Impervious (percent)	FREQUENCY 2	5	10	100
	***	**Business:**					
		Commercial Area	95	0.87	0.87	0.88	0.89
		Neighborhood Area	70	0.60	0.65	0.70	0.80
	***	**Residential:**	---	---	---	---	---
CALC		Single-Family	43	0.40	0.45	0.50	0.60
		Multi-Unit (detached)	50	0.45	0.50	0.60	0.70
		Multi-Unit (attached)	70	0.60	0.65	0.70	0.80
CALC	34.0	1/2 acre Lot or larger	35	0.30	0.35	0.40	0.60
		Apartments	70	0.65	0.70	0.70	0.80
	***		* See Figure 2-1 for percent imper				
	***	**Industrial:**	---	---	---	---	---
	5.1	Light Areas	80	0.71	0.72	0.76	0.82
		Heavy Areas	90	0.80	0.80	0.85	0.90
		Parks, Cemetaries:	7	0.10	0.18	0.25	0.45
		Playgrounds:	13	0.15	0.20	0.30	0.50
		Schools:	50	0.45	0.50	0.60	0.70
		Railroad Yards:	20	0.20	0.25	0.35	0.45
	***	**Undeveloped Areas:**	---	---	---	---	---
		Historic Flow Analysis	2		(see Lawns)		
	12.1	Offsite County Rural	15	0.12	0.18	0.25	0.35
	***	**Streets:**	---	---	---	---	---
		Paved	100	0.87	0.88	0.90	0.93
		Gravel (Packed)	40	0.40	0.45	0.50	0.60
		Drive and Walks:	96	0.87	0.87	0.88	0.89
		Roofs:	90	0.80	0.85	0.90	0.90
		Lawns, Sandy Soil	2	0.00	0.01	0.05	0.20
		Lawns, Clayey Soil	2	0.05	0.15	0.25	0.50
		Landscaped Areas	3	0.1			0.6
	***						
TOTAL	51.2	Average Values	34.76	0.30	0.35	0.40	0.57

Calculation of C-values and % impervious

RGA Job	RGA #1011.0004	Area =	56.4 acres
Preparer	GEW	% IMP =	68.6
Date	Jul-2013	C2 =	0.61
Description:	Town of Buena Master Plan (East of Highway 24)	C5 =	0.64
		C10 =	0.69
P-D		C100 =	0.77
		Water Quality Capture Volume	70257 cu-ft
		Water Quality Capture Volume	1.61 ac-ft

	Area (each)	Land Use	Impervious (percent)	FREQUENCY 2	5	10	100
	***	**Business:**					
	15.0	Commercial Area	95	0.87	0.87	0.88	0.89
	26.7	Neighborhood Area	70	0.60	0.65	0.70	0.80
	***	**Residential:**	---	---	---	---	---
CALC	2.3	Single-Family	43	0.40	0.45	0.50	0.60
	6.3	Multi-Unit (detached)	50	0.45	0.50	0.60	0.70
		Multi-Unit (attached)	70	0.60	0.65	0.70	0.80
CALC		1/2 acre Lot or larger	35	0.30	0.35	0.40	0.60
		Apartments	70	0.65	0.70	0.70	0.80
	***		* See Figure 2-1 for percent imper				
	***	**Industrial:**	---	---	---	---	---
	1.1	Light Areas	80	0.71	0.72	0.76	0.82
		Heavy Areas	90	0.80	0.80	0.85	0.90
		Parks, Cemetaries:	7	0.10	0.18	0.25	0.45
		Playgrounds:	13	0.15	0.20	0.30	0.50
		Schools:	50	0.45	0.50	0.60	0.70
		Railroad Yards:	20	0.20	0.25	0.35	0.45
	***	**Undeveloped Areas:**	---	---	---	---	---
		Historic Flow Analysis	2		(see Lawns)		
	5.0	Offsite County Rural	15	0.12	0.18	0.25	0.35
	***	**Streets:**	---	---	---	---	---
		Paved	100	0.87	0.88	0.90	0.93
		Gravel (Packed)	40	0.40	0.45	0.50	0.60
		Drive and Walks:	96	0.87	0.87	0.88	0.89
		Roofs:	90	0.80	0.85	0.90	0.90
		Lawns, Sandy Soil	2	0.00	0.01	0.05	0.20
		Lawns, Clayey Soil	2	0.05	0.15	0.25	0.50
		Landscaped Areas	3	0.1			0.6
	***						
TOTAL	56.4	Average Values	68.63	0.61	0.64	0.69	0.77

Calculation of C-values and % impervious

RGA Job	RGA #1011.0004	Area =	91.8 acres
Preparer	GEW	% IMP =	5.6
Date	Jul-2013	C2 =	0.04
Description:	Town of Buena Master Plan (East of Highway 24)	C5 =	0.05
		C10 =	0.09
H-AR1		C100 =	0.24
	Water Quality Capture Volume		9280 cu-ft
	Water Quality Capture Volume		0.21 ac-ft

	Area (each)	Land Use	Impervious (percent)	FREQUENCY 2	5	10	100
	***	**Business:**					
		Commercial Area	95	0.87	0.87	0.88	0.89
		Neighborhood Area	70	0.60	0.65	0.70	0.80
	***	**Residential:**	---	---	---	---	---
CALC		Single-Family	43	0.40	0.45	0.50	0.60
		Multi-Unit (detached)	50	0.45	0.50	0.60	0.70
		Multi-Unit (attached)	70	0.60	0.65	0.70	0.80
CALC		1/2 acre Lot or larger	35	0.30	0.35	0.40	0.60
		Apartments	70	0.65	0.70	0.70	0.80
	***		* See Figure 2-1 for percent imper				
	***	**Industrial:**	---	---	---	---	---
		Light Areas	80	0.71	0.72	0.76	0.82
		Heavy Areas	90	0.80	0.80	0.85	0.90
	1.4	**Parks, Cemetaries:**	7	0.10	0.18	0.25	0.45
		Playgrounds:	13	0.15	0.20	0.30	0.50
		Schools:	50	0.45	0.50	0.60	0.70
		Railroad Yards:	20	0.20	0.25	0.35	0.45
	***	**Undeveloped Areas:**	---	---	---	---	---
		Historic Flow Analysis	2	(see Lawns)			
		Offsite (use undefined)	45	0.43	0.47	0.55	0.65
	***	**Streets:**	---	---	---	---	---
	0.5	Paved	100	0.87	0.88	0.90	0.93
	7.2	Gravel (Packed)	40	0.40	0.45	0.50	0.60
		Drive and Walks:	96	0.87	0.87	0.88	0.89
		Roofs:	90	0.80	0.85	0.90	0.90
	82.8	**Lawns, Sandy Soil**	2	0.00	0.01	0.05	0.20
		Lawns, Clayey Soil	2	0.05	0.15	0.25	0.50
		Landscaped Areas	3	0.1			0.6
	***						
TOTAL	91.8	Average Values	5.57	0.04	0.05	0.09	0.24

Calculation of C-values and % impervious

RGA Job	RGA #1011.0004	Area =	48.9 acres
Preparer	GEW	% IMP =	37.6
Date	Jul-2013	C2 =	0.32
Description:	Town of Buena Master Plan (East of Highway 24)	C5 =	0.34
		C10 =	0.38
H-AR2		C100 =	0.50
		Water Quality Capture Volume	33378 cu-ft
		Water Quality Capture Volume	0.77 ac-ft

	Area (each)	Land Use	Impervious (percent)	FREQUENCY 2	5	10	100
	***	**Business:**					
	6.0	Commercial Area	95	0.87	0.87	0.88	0.89
	5.4	Neighborhood Area	70	0.60	0.65	0.70	0.80
	***	**Residential:**	---	---	---	---	---
CALC		Single-Family	43	0.40	0.45	0.50	0.60
		Multi-Unit (detached)	50	0.45	0.50	0.60	0.70
	12.0	Multi-Unit (attached)	70	0.60	0.65	0.70	0.80
CALC		1/2 acre Lot or larger	35	0.30	0.35	0.40	0.60
		Apartments	70	0.65	0.70	0.70	0.80
	***		* See Figure 2-1 for percent imper				
	***	**Industrial:**	---	---	---	---	---
		Light Areas	80	0.71	0.72	0.76	0.82
		Heavy Areas	90	0.80	0.80	0.85	0.90
		Parks, Cemetaries:	7	0.10	0.18	0.25	0.45
		Playgrounds:	13	0.15	0.20	0.30	0.50
		Schools:	50	0.45	0.50	0.60	0.70
		Railroad Yards:	20	0.20	0.25	0.35	0.45
	***	**Undeveloped Areas:**	---	---	---	---	---
		Historic Flow Analysis	2	(see Lawns)			
		Offsite (use undefined)	45	0.43	0.47	0.55	0.65
	***	**Streets:**	---	---	---	---	---
		Paved	100	0.87	0.88	0.90	0.93
		Gravel (Packed)	40	0.40	0.45	0.50	0.60
		Drive and Walks:	96	0.87	0.87	0.88	0.89
		Roofs:	90	0.80	0.85	0.90	0.90
	25.5	**Lawns, Sandy Soil**	2	0.00	0.01	0.05	0.20
		Lawns, Clayey Soil	2	0.05	0.15	0.25	0.50
		Landscaped Areas	3	0.1			0.6
	***						
TOTAL	48.9	Average Values	37.61	0.32	0.34	0.38	0.50

Calculation of C-values and % impervious

RGA Job	RGA #1011.0004	Area =	28.6 acres
Preparer	GEW	% IMP =	18.7
Date	Jul-2013	C2 =	0.17
Description:	Town of Buena Master Plan (East of Highway 24)	C5 =	0.21
		C10 =	0.25
H-AR3		C100 =	0.40
		Water Quality Capture Volume	9708 cu-ft
		Water Quality Capture Volume	0.22 ac-ft

	Area (each)	Land Use	Impervious (percent)	FREQUENCY 2	5	10	100
	***	**Business:**					
	1.2	Commercial Area	95	0.87	0.87	0.88	0.89
		Neighborhood Area	70	0.60	0.65	0.70	0.80
	***	**Residential:**	---	---	---	---	---
CALC	6.2	Single-Family	43	0.40	0.45	0.50	0.60
		Multi-Unit (detached)	50	0.45	0.50	0.60	0.70
		Multi-Unit (attached)	70	0.60	0.65	0.70	0.80
CALC		1/2 acre Lot or larger	35	0.30	0.35	0.40	0.60
		Apartments	70	0.65	0.70	0.70	0.80
	***		* See Figure 2-1 for percent imper				
	***	**Industrial:**	---	---	---	---	---
		Light Areas	80	0.71	0.72	0.76	0.82
		Heavy Areas	90	0.80	0.80	0.85	0.90
	6.7	**Parks, Cemetaries:**	7	0.10	0.18	0.25	0.45
		Playgrounds:	13	0.15	0.20	0.30	0.50
		Schools:	50	0.45	0.50	0.60	0.70
		Railroad Yards:	20	0.20	0.25	0.35	0.45
	***	**Undeveloped Areas:**	---	---	---	---	---
		Historic Flow Analysis	2	(see Lawns)			
		Offsite (use undefined)	45	0.43	0.47	0.55	0.65
	***	**Streets:**	---	---	---	---	---
	0.8	Paved	100	0.87	0.88	0.90	0.93
		Gravel (Packed)	40	0.40	0.45	0.50	0.60
		Drive and Walks:	96	0.87	0.87	0.88	0.89
		Roofs:	90	0.80	0.85	0.90	0.90
	13.7	**Lawns, Sandy Soil**	2	0.00	0.01	0.05	0.20
		Lawns, Clayey Soil	2	0.05	0.15	0.25	0.50
		Landscaped Areas	3	0.1			0.6
	***						
TOTAL	28.6	Average Values	18.70	0.17	0.21	0.25	0.40

Calculation of C-values and % impervious

RGA Job	RGA #1011.0004	Area =	6.7 acres
Preparer	GEW	% IMP =	53.1
Date	Jul-2013	C2 =	0.47
Description:	Town of Buena Master Plan (East of Highway 24)	C5 =	0.52
		C10 =	0.57
H-C1		C100 =	0.68
		Water Quality Capture Volume	6454 cu-ft
		Water Quality Capture Volume	0.15 ac-ft

	Area (each)	Land Use	Impervious (percent)	FREQUENCY 2	5	10	100
	***	**Business:**					
		Commercial Area	95	0.87	0.87	0.88	0.89
	2.5	Neighborhood Area	70	0.60	0.65	0.70	0.80
	***	**Residential:**	---	---	---	---	---
CALC	4.2	Single-Family	43	0.40	0.45	0.50	0.60
		Multi-Unit (detached)	50	0.45	0.50	0.60	0.70
		Multi-Unit (attached)	70	0.60	0.65	0.70	0.80
CALC		1/2 acre Lot or larger	35	0.30	0.35	0.40	0.60
		Apartments	70	0.65	0.70	0.70	0.80
	***		* See Figure 2-1 for percent imper				
	***	**Industrial:**	---	---	---	---	---
		Light Areas	80	0.71	0.72	0.76	0.82
		Heavy Areas	90	0.80	0.80	0.85	0.90
		Parks, Cemetaries:	7	0.10	0.18	0.25	0.45
		Playgrounds:	13	0.15	0.20	0.30	0.50
		Schools:	50	0.45	0.50	0.60	0.70
		Railroad Yards:	20	0.20	0.25	0.35	0.45
	***	**Undeveloped Areas:**	---	---	---	---	---
		Historic Flow Analysis	2	(see Lawns)			
		Offsite (use undefined)	45	0.43	0.47	0.55	0.65
	***	**Streets:**	---	---	---	---	---
		Paved	100	0.87	0.88	0.90	0.93
		Gravel (Packed)	40	0.40	0.45	0.50	0.60
		Drive and Walks:	96	0.87	0.87	0.88	0.89
		Roofs:	90	0.80	0.85	0.90	0.90
		Lawns, Sandy Soil	2	0.00	0.01	0.05	0.20
		Lawns, Clayey Soil	2	0.05	0.15	0.25	0.50
		Landscaped Areas	3	0.1			0.6
	***						
TOTAL	6.7	Average Values	53.07	0.47	0.52	0.57	0.68

Calculation of C-values and % impervious

RGA Job	RGA #1011.0004	Area =	16.2 acres
Preparer	GEW	% IMP =	44.3
Date	Jul-2013	C2 =	0.38
Description:	Town of Buena Master Plan (East of Highway 24)	C5 =	0.42
		C10 =	0.47
H-C2		C100 =	0.59
	Water Quality Capture Volume		13017 cu-ft
	Water Quality Capture Volume		0.30 ac-ft

	Area (each)	Land Use	Impervious (percent)	FREQUENCY 2	5	10	100
	***	**Business:**					
		Commercial Area	95	0.87	0.87	0.88	0.89
	7.6	Neighborhood Area	70	0.60	0.65	0.70	0.80
	***	**Residential:**	---	---	---	---	---
CALC		Single-Family	43	0.40	0.45	0.50	0.60
	3.5	Multi-Unit (detached)	50	0.45	0.50	0.60	0.70
		Multi-Unit (attached)	70	0.60	0.65	0.70	0.80
CALC		1/2 acre Lot or larger	35	0.30	0.35	0.40	0.60
		Apartments	70	0.65	0.70	0.70	0.80
	***		* See Figure 2-1 for percent imper				
	***	**Industrial:**	---	---	---	---	---
		Light Areas	80	0.71	0.72	0.76	0.82
		Heavy Areas	90	0.80	0.80	0.85	0.90
		Parks, Cemetaries:	7	0.10	0.18	0.25	0.45
		Playgrounds:	13	0.15	0.20	0.30	0.50
		Schools:	50	0.45	0.50	0.60	0.70
		Railroad Yards:	20	0.20	0.25	0.35	0.45
	***	**Undeveloped Areas:**	---	---	---	---	---
		Historic Flow Analysis	2	(see Lawns)			
		Offsite (use undefined)	45	0.43	0.47	0.55	0.65
	***	**Streets:**	---	---	---	---	---
		Paved	100	0.87	0.88	0.90	0.93
		Gravel (Packed)	40	0.40	0.45	0.50	0.60
		Drive and Walks:	96	0.87	0.87	0.88	0.89
		Roofs:	90	0.80	0.85	0.90	0.90
	5.1	**Lawns, Sandy Soil**	2	0.00	0.01	0.05	0.20
		Lawns, Clayey Soil	2	0.05	0.15	0.25	0.50
		Landscaped Areas	3	0.1			0.6
	***						
TOTAL	16.2	Average Values	44.27	0.38	0.42	0.47	0.59

Calculation of C-values and % impervious

RGA Job	RGA #1011.0004	Area =	23.9 acres
Preparer	GEW	% IMP =	34.4
Date	Jul-2013	C2 =	0.31
Description:	Town of Buena Master Plan (East of Highway 24)	C5 =	0.34
		C10 =	0.39
H-CC1		C100 =	0.50
	Water Quality Capture Volume		14934 cu-ft
	Water Quality Capture Volume		0.34 ac-ft

	Area (each)	Land Use	Impervious (percent)	FREQUENCY 2	5	10	100
	***	**Business:**					
		Commercial Area	95	0.87	0.87	0.88	0.89
		Neighborhood Area	70	0.60	0.65	0.70	0.80
	***	**Residential:**	---	---	---	---	---
CALC	14.6	Single-Family	43	0.40	0.45	0.50	0.60
		Multi-Unit (detached)	50	0.45	0.50	0.60	0.70
		Multi-Unit (attached)	70	0.60	0.65	0.70	0.80
CALC		1/2 acre Lot or larger	35	0.30	0.35	0.40	0.60
		Apartments	70	0.65	0.70	0.70	0.80
	***		* See Figure 2-1 for percent imper				
	***	**Industrial:**	---	---	---	---	---
		Light Areas	80	0.71	0.72	0.76	0.82
		Heavy Areas	90	0.80	0.80	0.85	0.90
		Parks, Cemetaries:	7	0.10	0.18	0.25	0.45
		Playgrounds:	13	0.15	0.20	0.30	0.50
		Schools:	50	0.45	0.50	0.60	0.70
		Railroad Yards:	20	0.20	0.25	0.35	0.45
	***	**Undeveloped Areas:**	---	---	---	---	---
		Historic Flow Analysis	2	(see Lawns)			
		Offsite (use undefined)	45	0.43	0.47	0.55	0.65
	***	**Streets:**	---	---	---	---	---
	1.8	Paved	100	0.87	0.88	0.90	0.93
		Gravel (Packed)	40	0.40	0.45	0.50	0.60
		Drive and Walks:	96	0.87	0.87	0.88	0.89
		Roofs:	90	0.80	0.85	0.90	0.90
	7.5	**Lawns, Sandy Soil**	2	0.00	0.01	0.05	0.20
		Lawns, Clayey Soil	2	0.05	0.15	0.25	0.50
		Landscaped Areas	3	0.1			0.6
	***						
TOTAL	23.9	Average Values	34.43	0.31	0.34	0.39	0.50

Calculation of C-values and % impervious

RGA Job	RGA #1011.0004	Area =	37.0 acres
Preparer	GEW	% IMP =	24.8
Date	Jul-2013	C2 =	0.21
Description:	Town of Buena Master Plan (East of Highway 24)	C5 =	0.24
		C10 =	0.28
H-CC2		C100 =	0.45
		Water Quality Capture Volume	16644 cu-ft
		Water Quality Capture Volume	0.38 ac-ft

	Area (each)	Land Use	Impervious (percent)	FREQUENCY 2	5	10	100
	***	**Business:**					
		Commercial Area	95	0.87	0.87	0.88	0.89
	1.4	Neighborhood Area	70	0.60	0.65	0.70	0.80
	***	**Residential:**	---	---	---	---	---
CALC		Single-Family	43	0.40	0.45	0.50	0.60
	2.2	Multi-Unit (detached)	50	0.45	0.50	0.60	0.70
		Multi-Unit (attached)	70	0.60	0.65	0.70	0.80
CALC	15.6	1/2 acre Lot or larger	35	0.30	0.35	0.40	0.60
		Apartments	70	0.65	0.70	0.70	0.80
	***		* See Figure 2-1 for percent imper				
	***	**Industrial:**	---	---	---	---	---
		Light Areas	80	0.71	0.72	0.76	0.82
		Heavy Areas	90	0.80	0.80	0.85	0.90
		Parks, Cemetaries:	7	0.10	0.18	0.25	0.45
		Playgrounds:	13	0.15	0.20	0.30	0.50
		Schools:	50	0.45	0.50	0.60	0.70
		Railroad Yards:	20	0.20	0.25	0.35	0.45
	***	**Undeveloped Areas:**	---	---	---	---	---
		Historic Flow Analysis	2	(see Lawns)			
		Offsite (use undefined)	45	0.43	0.47	0.55	0.65
	***	**Streets:**	---	---	---	---	---
	1.3	Paved	100	0.87	0.88	0.90	0.93
		Gravel (Packed)	40	0.40	0.45	0.50	0.60
		Drive and Walks:	96	0.87	0.87	0.88	0.89
		Roofs:	90	0.80	0.85	0.90	0.90
	16.5	**Lawns, Sandy Soil**	2	0.00	0.01	0.05	0.20
		Lawns, Clayey Soil	2	0.05	0.15	0.25	0.50
		Landscaped Areas	3	0.1			0.6
	***						
TOTAL	37.0	Average Values	24.78	0.21	0.24	0.28	0.45

Calculation of C-values and % impervious

RGA Job	RGA #1011.0004	Area =	129.1 acres
Preparer	GEW	% IMP =	11.0
Date	Jul-2013	C2 =	0.09
Description:	Town of Buena Master Plan (East of Highway 24)	C5 =	0.11
		C10 =	0.16
H-P		C100 =	0.33
		Water Quality Capture Volume	25831 cu-ft
		Water Quality Capture Volume	0.59 ac-ft

	Area (each)	Land Use	Impervious (percent)	FREQUENCY 2	5	10	100
	***	**Business:**					
		Commercial Area	95	0.87	0.87	0.88	0.89
		Neighborhood Area	70	0.60	0.65	0.70	0.80
	***	**Residential:**	---	---	---	---	---
CALC		Single-Family	43	0.40	0.45	0.50	0.60
		Multi-Unit (detached)	50	0.45	0.50	0.60	0.70
		Multi-Unit (attached)	70	0.60	0.65	0.70	0.80
CALC	34.0	1/2 acre Lot or larger	35	0.30	0.35	0.40	0.60
		Apartments	70	0.65	0.70	0.70	0.80
	***		* See Figure 2-1 for percent imper				
	***	**Industrial:**	---	---	---	---	---
		Light Areas	80	0.71	0.72	0.76	0.82
		Heavy Areas	90	0.80	0.80	0.85	0.90
	8.6	**Parks, Cemetaries:**	7	0.10	0.18	0.25	0.45
		Playgrounds:	13	0.15	0.20	0.30	0.50
		Schools:	50	0.45	0.50	0.60	0.70
		Railroad Yards:	20	0.20	0.25	0.35	0.45
	***	**Undeveloped Areas:**	---	---	---	---	---
		Historic Flow Analysis	2	(see Lawns)			
		Offsite (use undefined)	45	0.43	0.47	0.55	0.65
	***	**Streets:**	---	---	---	---	---
		Paved	100	0.87	0.88	0.90	0.93
		Gravel (Packed)	40	0.40	0.45	0.50	0.60
		Drive and Walks:	96	0.87	0.87	0.88	0.89
		Roofs:	90	0.80	0.85	0.90	0.90
	86.5	**Lawns, Sandy Soil**	2	0.00	0.01	0.05	0.20
		Lawns, Clayey Soil	2	0.05	0.15	0.25	0.50
		Landscaped Areas	3	0.1			0.6
	***						
TOTAL	129.1	Average Values	11.02	0.09	0.11	0.16	0.33

Calculation of C-values and % impervious

RGA Job	RGA #1011.0004	Area =	51.2	acres
Preparer	GEW	% IMP =	23.9	
Date	Jul-2013	C2 =	0.20	
Description:	Town of Buena Master Plan (East of Highway 24)	C5 =	0.24	
		C10 =	0.28	
H-P2		C100 =	0.47	
		Water Quality Capture Volume	22223	cu-ft
		Water Quality Capture Volume	0.51	ac-ft

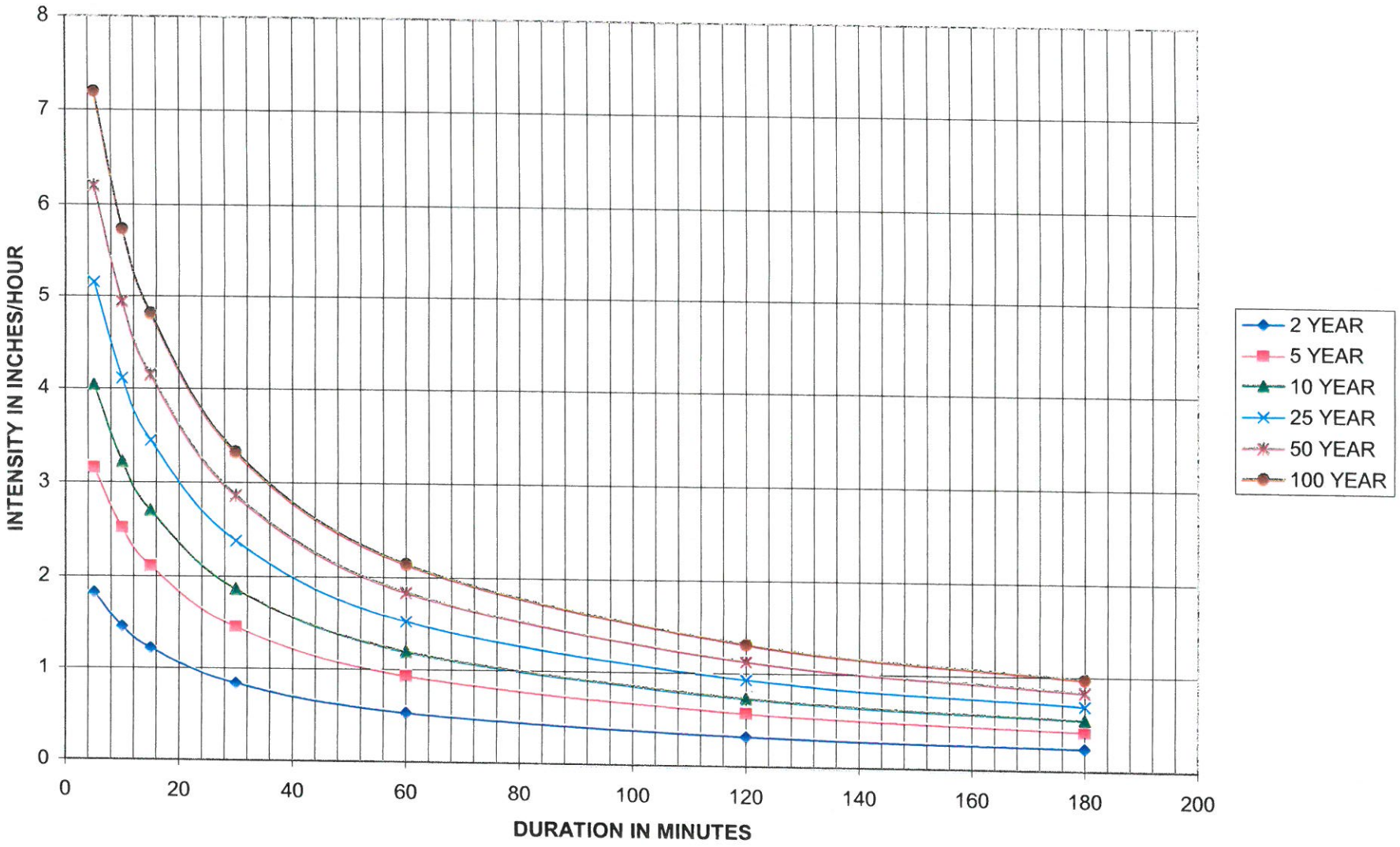
	Area (each)	Land Use	Impervious (percent)	FREQUENCY 2	5	10	100
	***	**Business:**					
		Commercial Area	95	0.87	0.87	0.88	0.89
		Neighborhood Area	70	0.60	0.65	0.70	0.80
	***	**Residential:**	---	---	---	---	---
CALC		Single-Family	43	0.40	0.45	0.50	0.60
		Multi-Unit (detached)	50	0.45	0.50	0.60	0.70
		Multi-Unit (attached)	70	0.60	0.65	0.70	0.80
CALC	34.0	1/2 acre Lot or larger	35	0.30	0.35	0.40	0.60
		Apartments	70	0.65	0.70	0.70	0.80
	***		* See Figure 2-1 for percent imper				
	***	**Industrial:**	---	---	---	---	---
		Light Areas	80	0.71	0.72	0.76	0.82
		Heavy Areas	90	0.80	0.80	0.85	0.90
		Parks, Cemetaries:	7	0.10	0.18	0.25	0.45
		Playgrounds:	13	0.15	0.20	0.30	0.50
		Schools:	50	0.45	0.50	0.60	0.70
		Railroad Yards:	20	0.20	0.25	0.35	0.45
	***	**Undeveloped Areas:**	---	---	---	---	---
		Historic Flow Analysis	2	(see Lawns)			
		Offsite (use undefined)	45	0.43	0.47	0.55	0.65
	***	**Streets:**	---	---	---	---	---
		Paved	100	0.87	0.88	0.90	0.93
		Gravel (Packed)	40	0.40	0.45	0.50	0.60
		Drive and Walks:	96	0.87	0.87	0.88	0.89
		Roofs:	90	0.80	0.85	0.90	0.90
	17.2	**Lawns, Sandy Soil**	2	0.00	0.01	0.05	0.20
		Lawns, Clayey Soil	2	0.05	0.15	0.25	0.50
		Landscaped Areas	3	0.1			0.6
	***						
TOTAL	51.2	Average Values	23.91	0.20	0.24	0.28	0.47

Calculation of C-values and % impervious

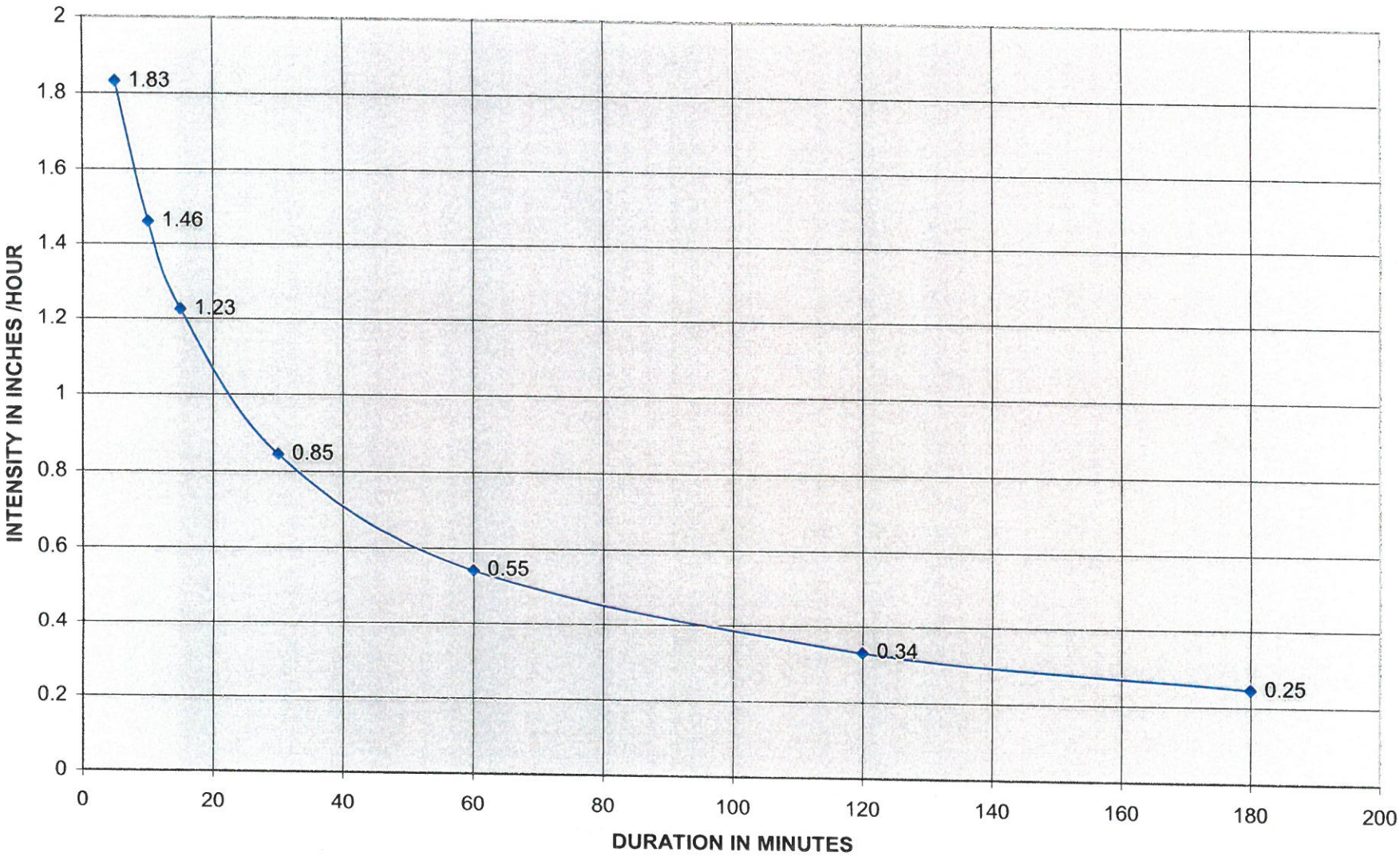
RGA Job	RGA #1011.0004	Area =	56.4 acres
Preparer	GEW	% IMP =	56.0
Date	Jul-2013	C2 =	0.50
Description:	Town of Buena Master Plan (East of Highway 24)	C5 =	0.53
		C10 =	0.60
H-D		C100 =	0.71
		Water Quality Capture Volume	57305 cu-ft
		Water Quality Capture Volume	1.32 ac-ft

	Area (each)	Land Use	Impervious (percent)	FREQUENCY 2	5	10	100
	***	**Business:**					
	7.4	Commercial Area	95	0.87	0.87	0.88	0.89
	8.0	Neighborhood Area	70	0.60	0.65	0.70	0.80
	***	**Residential:**	---	---	---	---	---
CALC		Single-Family	43	0.40	0.45	0.50	0.60
	7.9	Multi-Unit (detached)	50	0.45	0.50	0.60	0.70
		Multi-Unit (attached)	70	0.60	0.65	0.70	0.80
CALC	12.7	1/2 acre Lot or larger	35	0.30	0.35	0.40	0.60
		Apartments	70	0.65	0.70	0.70	0.80
	***		* See Figure 2-1 for percent imper				
	***	**Industrial:**	---	---	---	---	---
	5.0	Light Areas	80	0.71	0.72	0.76	0.82
		Heavy Areas	90	0.80	0.80	0.85	0.90
		Parks, Cemetaries:	7	0.10	0.18	0.25	0.45
		Playgrounds:	13	0.15	0.20	0.30	0.50
	13.0	**Schools:**	50	0.45	0.50	0.60	0.70
		Railroad Yards:	20	0.20	0.25	0.35	0.45
	***	**Undeveloped Areas:**	---	---	---	---	---
		Historic Flow Analysis	2	(see Lawns)			
		Offsite (use undefined)	45	0.43	0.47	0.55	0.65
	***	**Streets:**	---	---	---	---	---
		Paved	100	0.87	0.88	0.90	0.93
		Gravel (Packed)	40	0.40	0.45	0.50	0.60
		Drive and Walks:	96	0.87	0.87	0.88	0.89
		Roofs:	90	0.80	0.85	0.90	0.90
	2.4	**Lawns, Sandy Soil**	2	0.00	0.01	0.05	0.20
		Lawns, Clayey Soil	2	0.05	0.15	0.25	0.50
		Landscaped Areas	3	0.1			0.6
	***						
TOTAL	56.4	Average Values	55.98	0.50	0.53	0.60	0.71

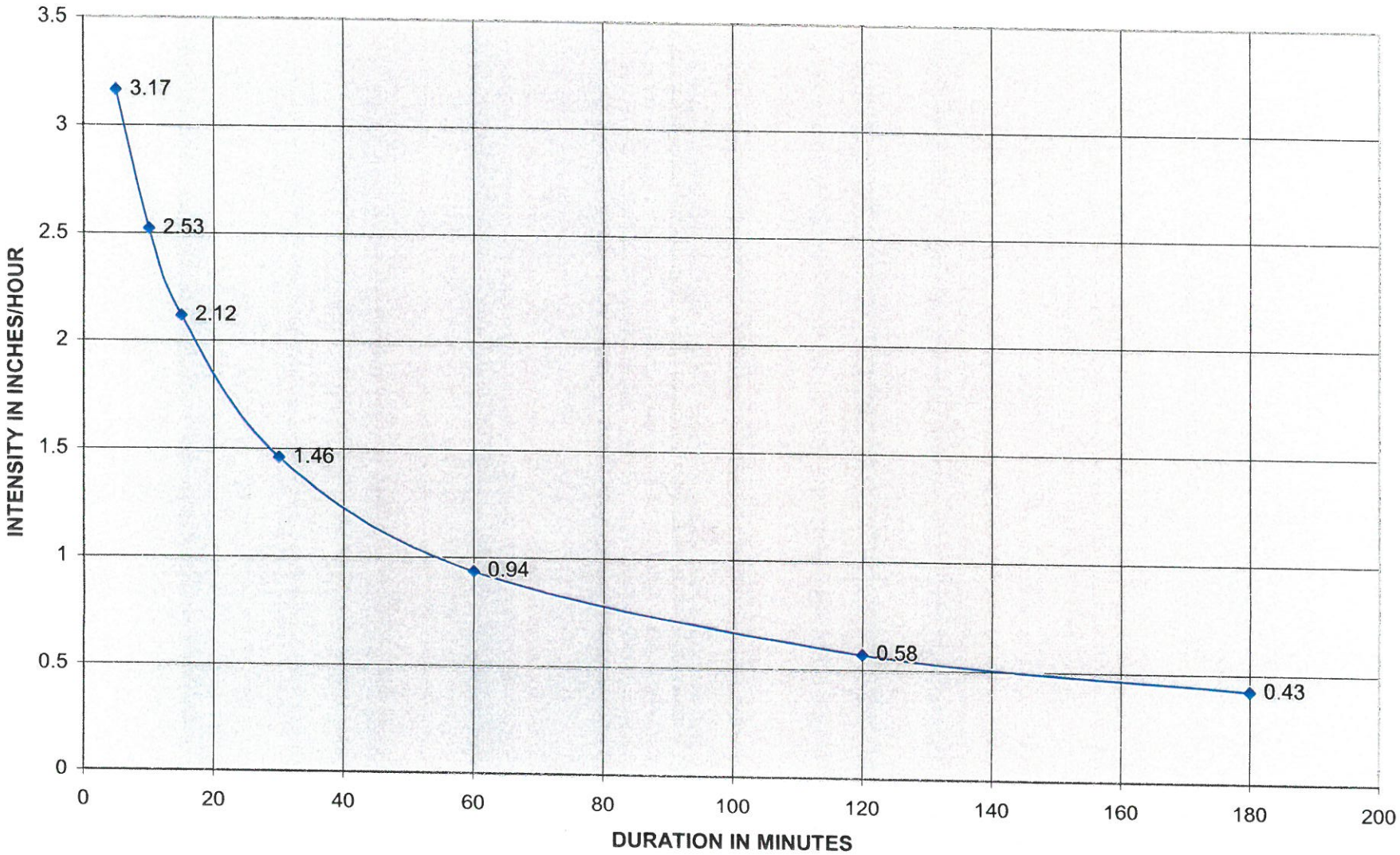
RAINFALL INTENSITY-DURATION-FREQUENCY CURVE



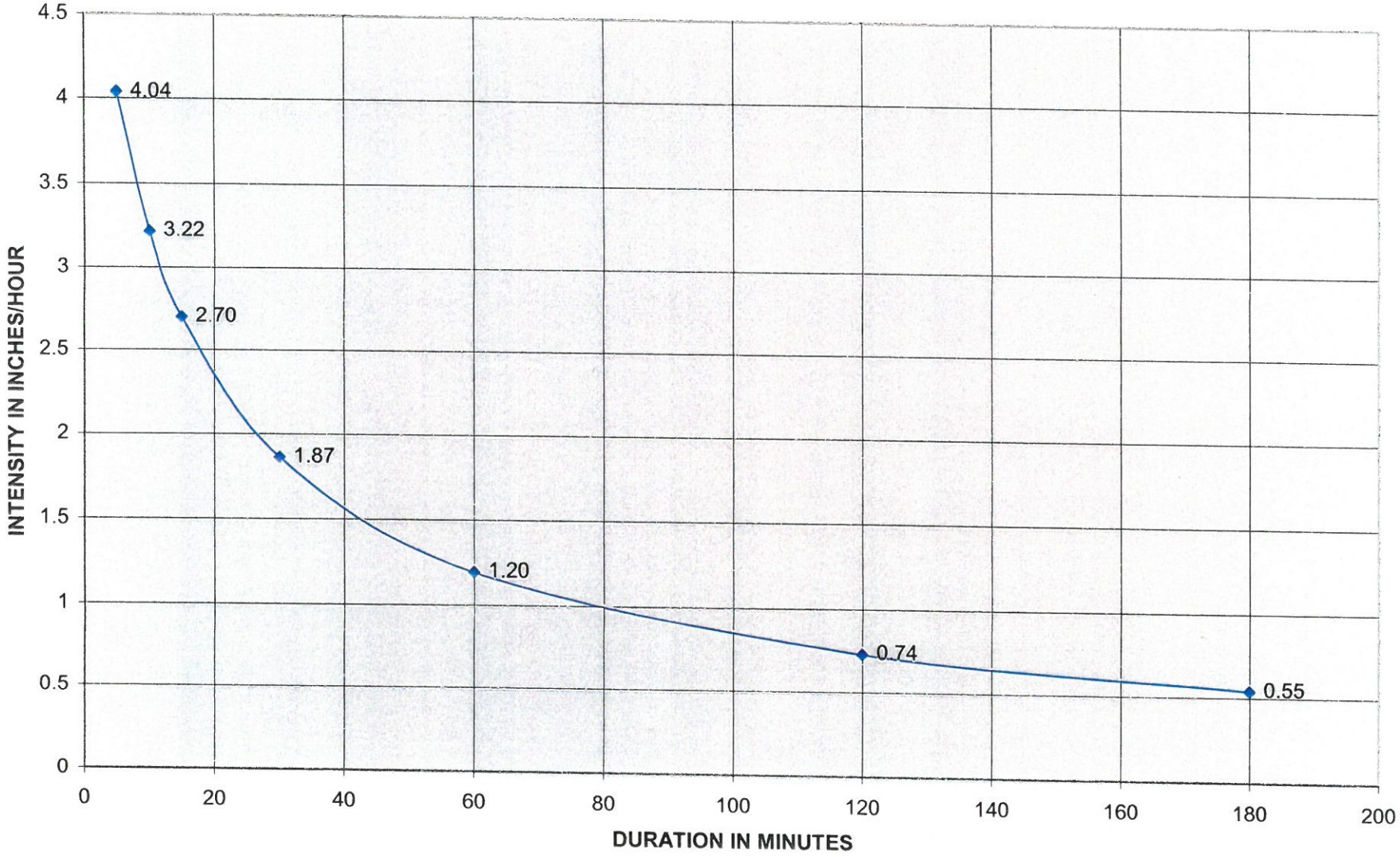
2 YEAR RAINFALL INTENSITY-DURATION CURVE



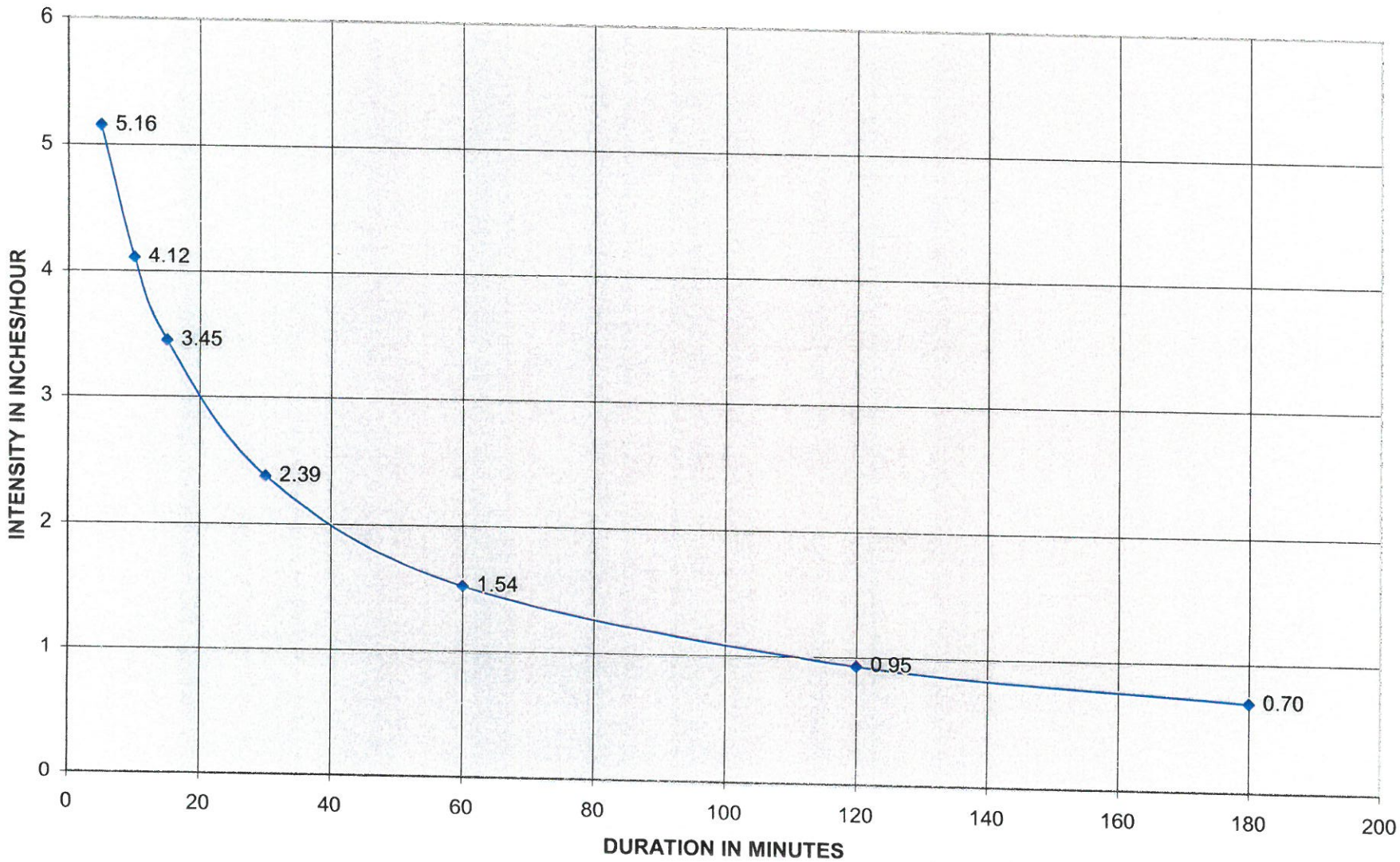
5 YEAR RAINFALL INTENSITY-DURATION CURVE



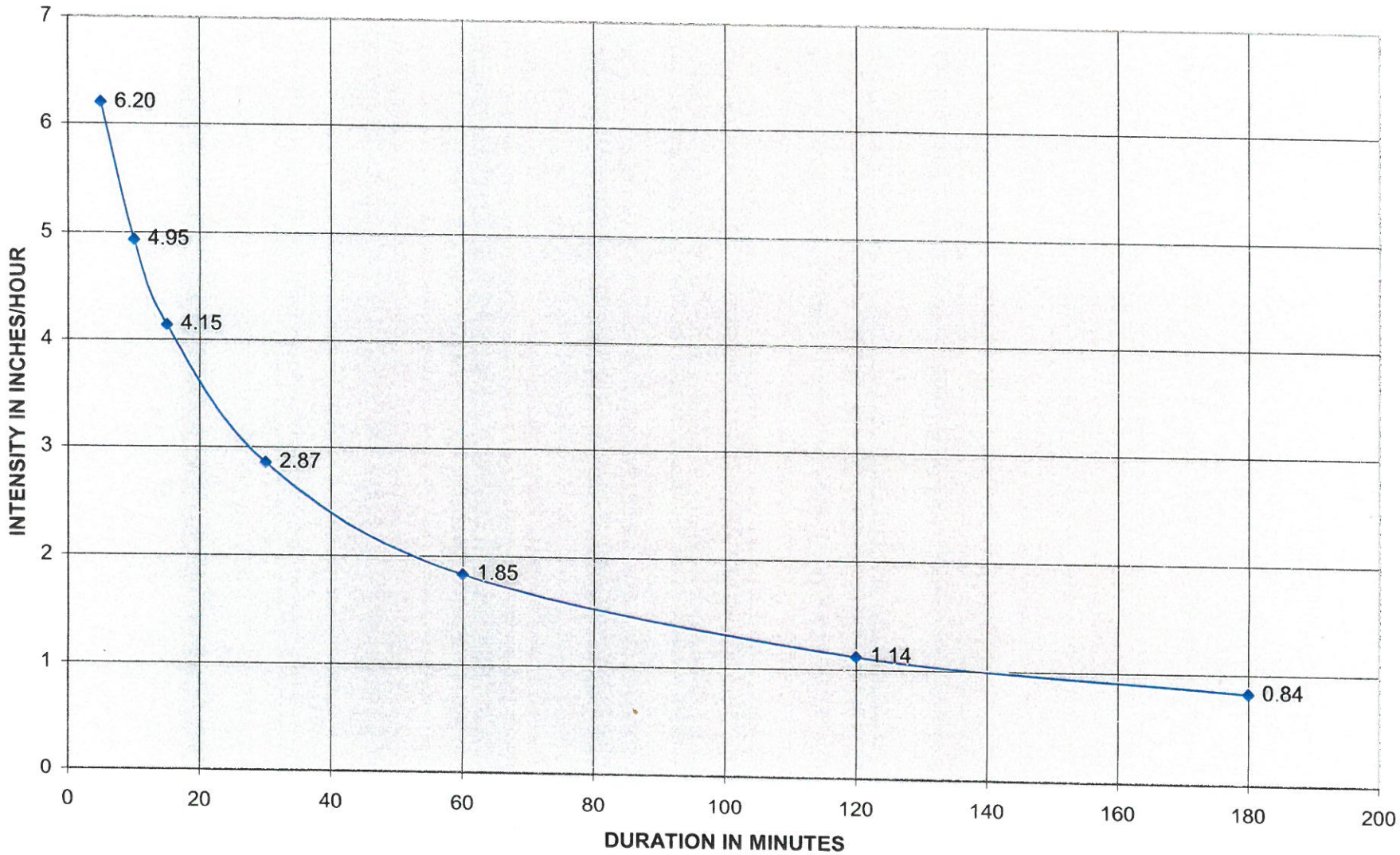
10 YEAR RAINFALL INTENSITY-DURATION CURVE



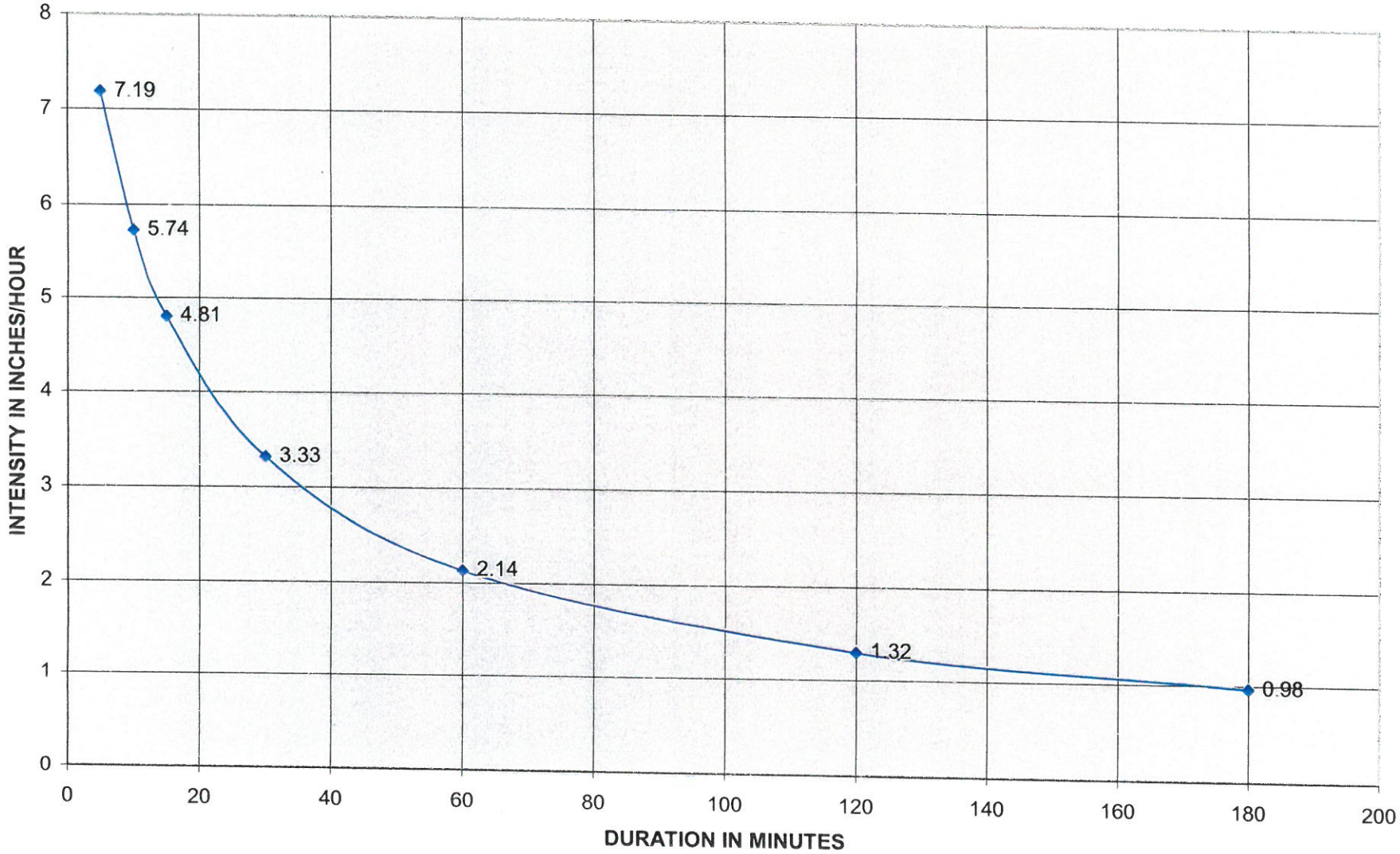
25 YEAR RAINFALL INTENSITY-DURATION CURVE



50 YEAR RAINFALL INTENSITY-DURATION CURVE



100 YEAR RAINFALL INTENSITY-DURATION CURVE



URBAN DRAINAGE DETENTION FORMULA

RGA Job Number: **RGA #1011.0004** *Prepared by :* GEW

Description : **Town of Buena Master Plan (East of Highway 24)**

Notes: **P-AR1**

I=	(percent)	13.24154	0.132415
A=	(acres)	85.7	
SCS=	(group)	A	

V = Ki A

K5 = (36.57 I + 0.008 / I - 78.58) / 43560

K10 = (0.95 I - 1.90) / 1000

K100 = (1.78 I - 0.002 I^2 - 3.56) / 1000

K5 =	0.0093
K10 =	0.0107
K100 =	0.0197

V5 =	0.798	(AC FT)
V10 =	0.915	(AC FT)
V100 =	1.685	(AC FT)

V5 =	34765	(cu-ft)
V10 =	39867	(cu-ft)
V100 =	73390	(cu-ft)

Allowable Release Rates (cfs/acre)

	SCS Soil Group		
Frequency	A	B	C
2-YEAR	0.02	0.04	0.06
5-YEAR	0.07	0.13	0.17
10-YEAR	0.13	0.23	0.30
25-YEAR	0.24	0.41	0.52
100-YEAR	0.50	0.85	1.00

5-year release rate	0.07
10-year release rate	0.13
100-year release rate	0.50

Allowable Detention Pond Release Rate

Q5 =	6.00	(cfs)
Q10 =	11.14	(cfs)
Q100 =	42.85	(cfs)

URBAN DRAINAGE DETENTION FORMULA

RGA Job Number: **RGA #1011.0004** *Prepared by :* GEW

Description : **Town of Buena Master Plan (East of Highway 24)**

Notes: **P-AR2**

I=	(percent)	55.64646	0.556465
A=	(acres)	49.5	
SCS=	(group)	A	

V = Ki A

K5 = (36.57 I + 0.008 / I - 78.58) / 43560

K10 = (0.95 I - 1.90) / 1000

K100 = (1.78 I - 0.002 I^2 - 3.56) / 1000

K5 =	0.0449	
K10 =	0.0510	
K100 =	0.0893	
V5 =	2.223	(AC FT)
V10 =	2.523	(AC FT)
V100 =	4.420	(AC FT)
V5 =	96842	(cu-ft)
V10 =	109890	(cu-ft)
V100 =	192545	(cu-ft)

Allowable Release Rates (cfs/acre)

	SCS Soil Group		
Frequency	A	B	C
2-YEAR	0.02	0.04	0.06
5-YEAR	0.07	0.13	0.17
10-YEAR	0.13	0.23	0.30
25-YEAR	0.24	0.41	0.52
100-YEAR	0.50	0.85	1.00

5-year release rate	0.07
10-year release rate	0.13
100-year release rate	0.50

Allowable Detention Pond Release Rate

Q5 =	3.47	(cfs)
Q10 =	6.44	(cfs)
Q100 =	24.75	(cfs)

URBAN DRAINAGE DETENTION FORMULA

RGA Job Number: **RGA #1011.0004** *Prepared by :* GEW

Description : **Town of Buena Master Plan (East of Highway 24)**

Notes: **P-AR3**

I=	(percent)	50	0.5
A=	(acres)	18.7	
SCS=	(group)	A	

V = Ki A

K5 = (36.57 I + 0.008 / I - 78.58) / 43560

K10 = (0.95 I - 1.90) / 1000

K100 = (1.78 I - 0.002 I^2 - 3.56) / 1000

K5 =	0.0402
K10 =	0.0456
K100 =	0.0804

V5 =	0.751	(AC FT)
V10 =	0.853	(AC FT)
V100 =	1.504	(AC FT)

V5 =	32724	(cu-ft)
V10 =	37144	(cu-ft)
V100 =	65524	(cu-ft)

Allowable Release Rates (cfs/acre)

	SCS Soil Group		
Frequency	A	B	C
2-YEAR	0.02	0.04	0.06
5-YEAR	0.07	0.13	0.17
10-YEAR	0.13	0.23	0.30
25-YEAR	0.24	0.41	0.52
100-YEAR	0.50	0.85	1.00

5-year release rate	0.07
10-year release rate	0.13
100-year release rate	0.50

Allowable Detention Pond Release Rate

Q5 =	1.31	(cfs)
Q10 =	2.43	(cfs)
Q100 =	9.35	(cfs)

URBAN DRAINAGE DETENTION FORMULA

RGA Job Number: **RGA #1011.0004** *Prepared by :* GEW

Description : **Town of Buena Master Plan (East of Highway 24)**

Notes: **P-C1**

I=	(percent)	70	0.7
A=	(acres)	7.4	
SCS=	(group)	A	

V = Ki A

K5 = (36.57 I + 0.008 / I - 78.58) / 43560

K10 = (0.95 I - 1.90) / 1000

K100 = (1.78 I - 0.002 I^2 - 3.56) / 1000

K5 =	0.0570
K10 =	0.0646
K100 =	0.1112

V5 =	0.422	(AC FT)
V10 =	0.478	(AC FT)
V100 =	0.823	(AC FT)

V5 =	18362	(cu-ft)
V10 =	20823	(cu-ft)
V100 =	35858	(cu-ft)

Allowable Release Rates (cfs/acre)

	SCS Soil Group		
Frequency	A	B	C
2-YEAR	0.02	0.04	0.06
5-YEAR	0.07	0.13	0.17
10-YEAR	0.13	0.23	0.30
25-YEAR	0.24	0.41	0.52
100-YEAR	0.50	0.85	1.00

5-year release rate	0.07
10-year release rate	0.13
100-year release rate	0.50

Allowable Detention Pond Release Rate

Q5 =	0.52	(cfs)
Q10 =	0.96	(cfs)
Q100 =	3.70	(cfs)

URBAN DRAINAGE DETENTION FORMULA

RGA Job Number: **RGA #1011.0004** *Prepared by :* GEW

Description : **Town of Buena Master Plan (East of Highway 24)**

Notes: **P-C2**

I=	(percent)	65.05474	0.650547
A=	(acres)	27.4	
SCS=	(group)	A	

V = Ki A

K5 = (36.57 I + 0.008 / I - 78.58) / 43560

K10 = (0.95 I - 1.90) / 1000

K100 = (1.78 I - 0.002 I^2 - 3.56) / 1000

K5 =	0.0528
K10 =	0.0599
K100 =	0.1038

V5 =	1.447	(AC FT)
V10 =	1.641	(AC FT)
V100 =	2.843	(AC FT)

V5 =	63033	(cu-ft)
V10 =	71496	(cu-ft)
V100 =	123858	(cu-ft)

Allowable Release Rates (cfs/acre)

	SCS Soil Group		
Frequency	A	B	C
2-YEAR	0.02	0.04	0.06
5-YEAR	0.07	0.13	0.17
10-YEAR	0.13	0.23	0.30
25-YEAR	0.24	0.41	0.52
100-YEAR	0.50	0.85	1.00

5-year release rate	0.07
10-year release rate	0.13
100-year release rate	0.50

Allowable Detention Pond Release Rate

Q5 =	1.92	(cfs)
Q10 =	3.56	(cfs)
Q100 =	13.70	(cfs)

URBAN DRAINAGE DETENTION FORMULA

RGA Job Number: **RGA #1011.0004** *Prepared by :* GEW

Description : **Town of Buena Master Plan (East of Highway 24)**

Notes: **P-CC1**

I=	(percent)	41.82008	0.418201
A=	(acres)	23.9	
SCS=	(group)	A	

V = Ki A

K5 = (36.57 I + 0.008 / I - 78.58) / 43560

K10 = (0.95 I - 1.90) / 1000

K100 = (1.78 I - 0.002 I^2 - 3.56) / 1000

K5 =	0.0333
K10 =	0.0378
K100 =	0.0674

V5 =	0.796	(AC FT)
V10 =	0.904	(AC FT)
V100 =	1.610	(AC FT)

V5 =	34674	(cu-ft)
V10 =	39383	(cu-ft)
V100 =	70150	(cu-ft)

Allowable Release Rates (cfs/acre)

	SCS Soil Group		
Frequency	A	B	C
2-YEAR	0.02	0.04	0.06
5-YEAR	0.07	0.13	0.17
10-YEAR	0.13	0.23	0.30
25-YEAR	0.24	0.41	0.52
100-YEAR	0.50	0.85	1.00

5-year release rate	0.07
10-year release rate	0.13
100-year release rate	0.50

Allowable Detention Pond Release Rate

Q5 =	1.67	(cfs)
Q10 =	3.11	(cfs)
Q100 =	11.95	(cfs)

URBAN DRAINAGE DETENTION FORMULA

RGA Job Number: **RGA #1011.0004** *Prepared by :* GEW

Description : **Town of Buena Master Plan (East of Highway 24)**

Notes: **P-CC2**

I=	(percent)	43.60591	0.436059
A=	(acres)	40.6	
SCS=	(group)	A	

V = Ki A

K5 = (36.57 I + 0.008 / I - 78.58) / 43560

K10 = (0.95 I - 1.90) / 1000

K100 = (1.78 I - 0.002 I^2 - 3.56) / 1000

K5 =	0.0348
K10 =	0.0395
K100 =	0.0703

V5 =	1.413	(AC FT)
V10 =	1.605	(AC FT)
V100 =	2.852	(AC FT)

V5 =	61553	(cu-ft)
V10 =	69902	(cu-ft)
V100 =	124250	(cu-ft)

Allowable Release Rates (cfs/acre)

	SCS Soil Group		
Frequency	A	B	C
2-YEAR	0.02	0.04	0.06
5-YEAR	0.07	0.13	0.17
10-YEAR	0.13	0.23	0.30
25-YEAR	0.24	0.41	0.52
100-YEAR	0.50	0.85	1.00

5-year release rate	0.07
10-year release rate	0.13
100-year release rate	0.50

Allowable Detention Pond Release Rate

Q5 =	2.84	(cfs)
Q10 =	5.28	(cfs)
Q100 =	20.30	(cfs)

URBAN DRAINAGE DETENTION FORMULA

RGA Job Number: **RGA #1011.0004** *Prepared by :* GEW

Description : **Town of Buena Master Plan (East of Highway 24)**

Notes: **P-P**

I=	(percent)	15.97909	0.159791
A=	(acres)	129.1	
SCS=	(group)	A	

V = Ki A

K5 = (36.57 I + 0.008 / I - 78.58) / 43560

K10 = (0.95 I - 1.90) / 1000

K100 = (1.78 I - 0.002 I^2 - 3.56) / 1000

K5 =	0.0116	
K10 =	0.0133	
K100 =	0.0244	

V5 =	1.499	(AC FT)
V10 =	1.714	(AC FT)
V100 =	3.146	(AC FT)

V5 =	65296	(cu-ft)
V10 =	74682	(cu-ft)
V100 =	137059	(cu-ft)

Allowable Release Rates (cfs/acre)

	SCS Soil Group		
Frequency	A	B	C
2-YEAR	0.02	0.04	0.06
5-YEAR	0.07	0.13	0.17
10-YEAR	0.13	0.23	0.30
25-YEAR	0.24	0.41	0.52
100-YEAR	0.50	0.85	1.00

5-year release rate	0.07
10-year release rate	0.13
100-year release rate	0.50

Allowable Detention Pond Release Rate

Q5 =	9.04	(cfs)
Q10 =	16.78	(cfs)
Q100 =	64.55	(cfs)

URBAN DRAINAGE DETENTION FORMULA

RGA Job Number: **RGA #1011.0004** *Prepared by :* GEW

Description : **Town of Buena Master Plan (East of Highway 24)**

Notes: **P-P**

I=	(percent)	34.75586	0.347559
A=	(acres)	51.2	
SCS=	(group)	B	

V = Ki A

K5 = (36.57 I + 0.008 / I - 78.58) / 43560

K10 = (0.95 I - 1.90) / 1000

K100 = (1.78 I - 0.002 I^2 - 3.56) / 1000

K5 =	0.0274
K10 =	0.0311
K100 =	0.0559

V5 =	1.402	(AC FT)
V10 =	1.593	(AC FT)
V100 =	2.862	(AC FT)

V5 =	61053	(cu-ft)
V10 =	69402	(cu-ft)
V100 =	124649	(cu-ft)

Allowable Release Rates (cfs/acre)

	SCS Soil Group		
Frequency	A	B	C
2-YEAR	0.02	0.04	0.06
5-YEAR	0.07	0.13	0.17
10-YEAR	0.13	0.23	0.30
25-YEAR	0.24	0.41	0.52
100-YEAR	0.50	0.85	1.00

5-year release rate	0.13
10-year release rate	0.23
100-year release rate	0.85

Allowable Detention Pond Release Rate

Q5 =	6.66	(cfs)
Q10 =	11.78	(cfs)
Q100 =	43.52	(cfs)

URBAN DRAINAGE DETENTION FORMULA

RGA Job Number: **RGA #1011.0004** *Prepared by :* GEW

Description : **Town of Buena Master Plan (East of Highway 24)**

Notes: **P-D**

I=	(percent)	68.63298	0.68633
A=	(acres)	56.4	
SCS=	(group)	A	

V = Ki A

K5 = (36.57 I + 0.008 / I - 78.58) / 43560

K10 = (0.95 I - 1.90) / 1000

K100 = (1.78 I - 0.002 I^2 - 3.56) / 1000

K5 =	0.0558
K10 =	0.0633
K100 =	0.1092

V5 =	3.148	(AC FT)
V10 =	3.570	(AC FT)
V100 =	6.158	(AC FT)

V5 =	137127	(cu-ft)
V10 =	155518	(cu-ft)
V100 =	268246	(cu-ft)

Allowable Release Rates (cfs/acre)

	SCS Soil Group		
Frequency	A	B	C
2-YEAR	0.02	0.04	0.06
5-YEAR	0.07	0.13	0.17
10-YEAR	0.13	0.23	0.30
25-YEAR	0.24	0.41	0.52
100-YEAR	0.50	0.85	1.00

5-year release rate	0.07
10-year release rate	0.13
100-year release rate	0.50

Allowable Detention Pond Release Rate

Q5 =	3.95	(cfs)
Q10 =	7.33	(cfs)
Q100 =	28.20	(cfs)

PONDING VOLUME
(AT ELEVATION)

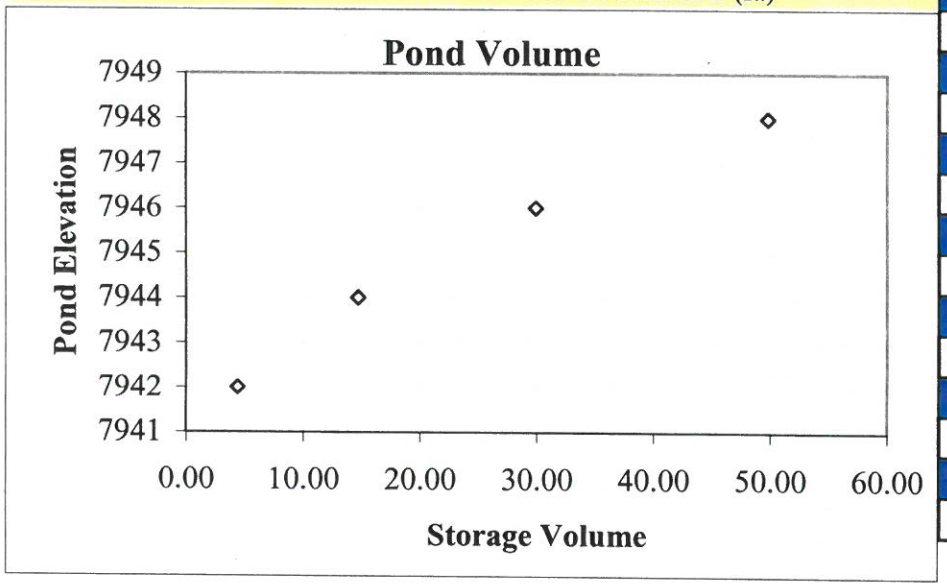
RGCE JOB NO.: RGA #1011.0004
DESCRIPTION: Town of Buena Master Plan (East of Highway 2
PREPARED BY: GEW
DATE: July 25, 2013

Based upon existing contours

DETENTION POND VOLUME CALCULATIONS
(USING AREAS (contour intervals) TO OBTAIN VOLUME)

PONDING VOLUME =(A + B +(Square Root of (A * B))) * (0.333 * D)

A = AREA OF CONTOUR AT FIRST ELEVATION (sq. ft.)
B = AREA OF CONTOUR AT SECOND ELEVATION (sq. ft.)
D = ELEVATION DIFFERENCE BETWEEN CONTOUR A & B (ft.)



PONDING VOLUME				
ELEVATION (@ bottom)	AREA (acres)	DEPTH (ft)	VOLUME (ac. ft.)	CUMULATIVE VOLUME
7940	0.98			
		2	4.40	4.40
7942	3.72			
		2	10.30	14.70
7944	6.74			
		2	15.22	29.92
7946	8.53			
		2	19.85	49.77
7948	11.41			
		0	0	0.00
		0	0	0
		0	0	0
		0	0	0
		0	0	0
		0	0	0
		0	0	0

POND VOLUME = 49.77 (ac-ft)

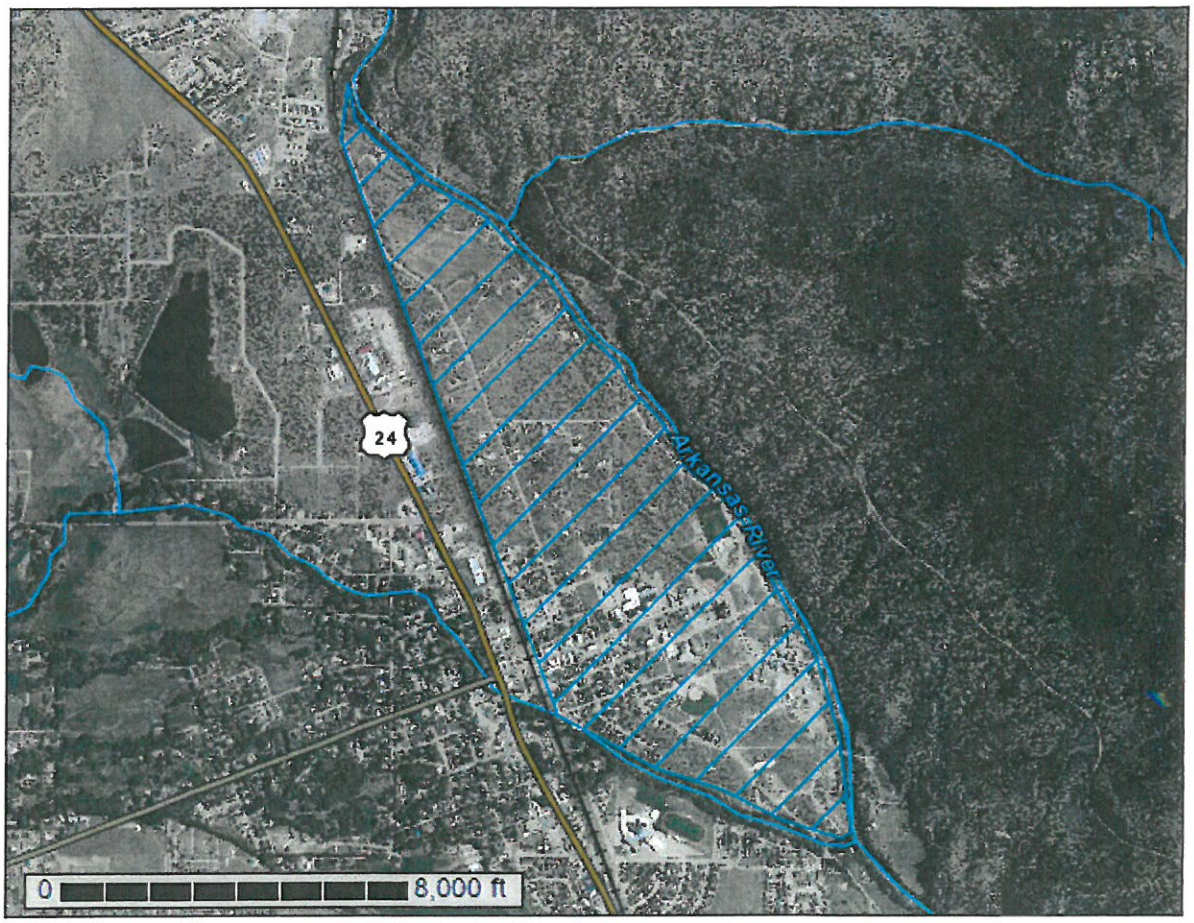
United States Department of Agriculture

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Chaffee-Lake Area, Colorado, Parts of Chaffee and Lake Counties

Master Plan East of Highway 24



July 25, 2013

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

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Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Chaffee-Lake Area, Colorado, Parts of Chaffee and Lake Counties
Survey Area Data: Version 7, Feb 23, 2010

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 21, 2010—Nov 18, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Chaffee-Lake Area, Colorado, Parts of Chaffee and Lake Counties (CO658)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
DoF	Dominson gravelly sandy loam, 9 to 45 percent slopes	3.2	0.7%
Ro	Rock outcrop	0.1	0.0%
SsC	San Isabel stony sandy loam, 1 to 5 percent slopes	441.8	98.7%
W	Water	1.8	0.4%
Wa	Wet alluvial land	0.7	0.2%
Totals for Area of Interest		**447.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic

classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Chaffee-Lake Area, Colorado, Parts of Chaffee and Lake Counties

DoF—Dominson gravelly sandy loam, 9 to 45 percent slopes

Map Unit Setting

Elevation: 7,200 to 8,800 feet
Mean annual precipitation: 11 to 16 inches
Frost-free period: 75 to 100 days

Map Unit Composition

Dominson and similar soils: 100 percent

Description of Dominson

Setting

Landform: Fan terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and/or moderately coarse-textured gravelly outwash

Properties and qualities

Slope: 9 to 45 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water capacity: Low (about 4.9 inches)

Interpretive groups

Farmland classification: Not prime farmland
Land capability (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: Dry Mountain Outwash (R048AY316CO)

Typical profile

0 to 9 inches: Gravelly sandy loam
9 to 60 inches: Very gravelly loamy sand, very gravelly sand

Ro—Rock outcrop

Map Unit Composition

Rock outcrop: 100 percent

Description of Rock Outcrop

Setting

Landform: Rock pediments
Down-slope shape: Convex
Across-slope shape: Convex

Properties and qualities

Slope: 0 to 75 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Available water capacity: Very low (about 0.0 inches)

Interpretive groups

Farmland classification: Not prime farmland
Land capability (nonirrigated): 8s
Hydrologic Soil Group: D

Typical profile

0 to 60 inches: Unweathered bedrock

SsC—San Isabel stony sandy loam, 1 to 5 percent slopes

Map Unit Setting

Elevation: 7,200 to 8,800 feet
Mean annual precipitation: 11 to 16 inches
Frost-free period: 75 to 100 days

Map Unit Composition

San isabel and similar soils: 100 percent

Description of San Isabel

Setting

Landform: Fan terraces, alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Moderately coarse-textured gravelly alluvium and/or moderately coarse-textured gravelly outwash

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.6 inches)

Interpretive groups

Farmland classification: Not prime farmland
Land capability (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: Boulder Flats (R049AY282CO)

Typical profile

0 to 5 inches: Stony sandy loam
5 to 19 inches: Very gravelly sandy loam
19 to 60 inches: Very gravelly sand, very cobbly sand

W—Water

Map Unit Composition

Water: 99 percent
Minor components: 1 percent

Description of Water

Setting

Landform: Stream terraces, flood plains
Down-slope shape: Linear
Across-slope shape: Linear

Minor Components

Marsh

Percent of map unit: 1 percent
Landform: Marshes

Wa—Wet alluvial land

Map Unit Setting

Elevation: 7,500 to 9,000 feet
Mean annual precipitation: 11 to 15 inches
Frost-free period: 60 to 85 days

Map Unit Composition

Wet alluvial land and similar soils: 40 percent
Wet alluvial land: 30 percent
Wet alluvial land: 25 percent
Minor components: 5 percent

Description of Wet Alluvial Land

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified, medium-textured to coarse-textured alluvium

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: About 12 to 42 inches

Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.7 inches)

Interpretive groups
Farmland classification: Not prime farmland
Land capability (nonirrigated): 7w
Hydrologic Soil Group: D

Typical profile
0 to 10 inches: Variable
10 to 60 inches: Stratified very gravelly sand to sandy loam

Description of Wet Alluvial Land

Setting
Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear

Properties and qualities
Slope: 0 to 3 percent
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: About 0 to 18 inches
Available water capacity: Very low (about 0.7 inches)

Interpretive groups
Farmland classification: Not prime farmland
Land capability (nonirrigated): 6w
Hydrologic Soil Group: D

Typical profile
0 to 3 inches: Peat
3 to 60 inches: Variable

Description of Wet Alluvial Land

Setting
Landform: Stream terraces
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Linear
Across-slope shape: Linear

Properties and qualities
Slope: 0 to 1 percent
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 0 to 24 inches
Available water capacity: Very low (about 1.8 inches)

Interpretive groups
Farmland classification: Not prime farmland
Land capability (nonirrigated): 8w
Hydrologic Soil Group: D

Typical profile
0 to 6 inches: Very gravelly sand

6 to 60 inches: Stratified extremely gravelly coarse sand to gravelly sand

Minor Components

Marsh

Percent of map unit: 5 percent
Landform: Marshes

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group (Master Plan East of Highway 24)

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

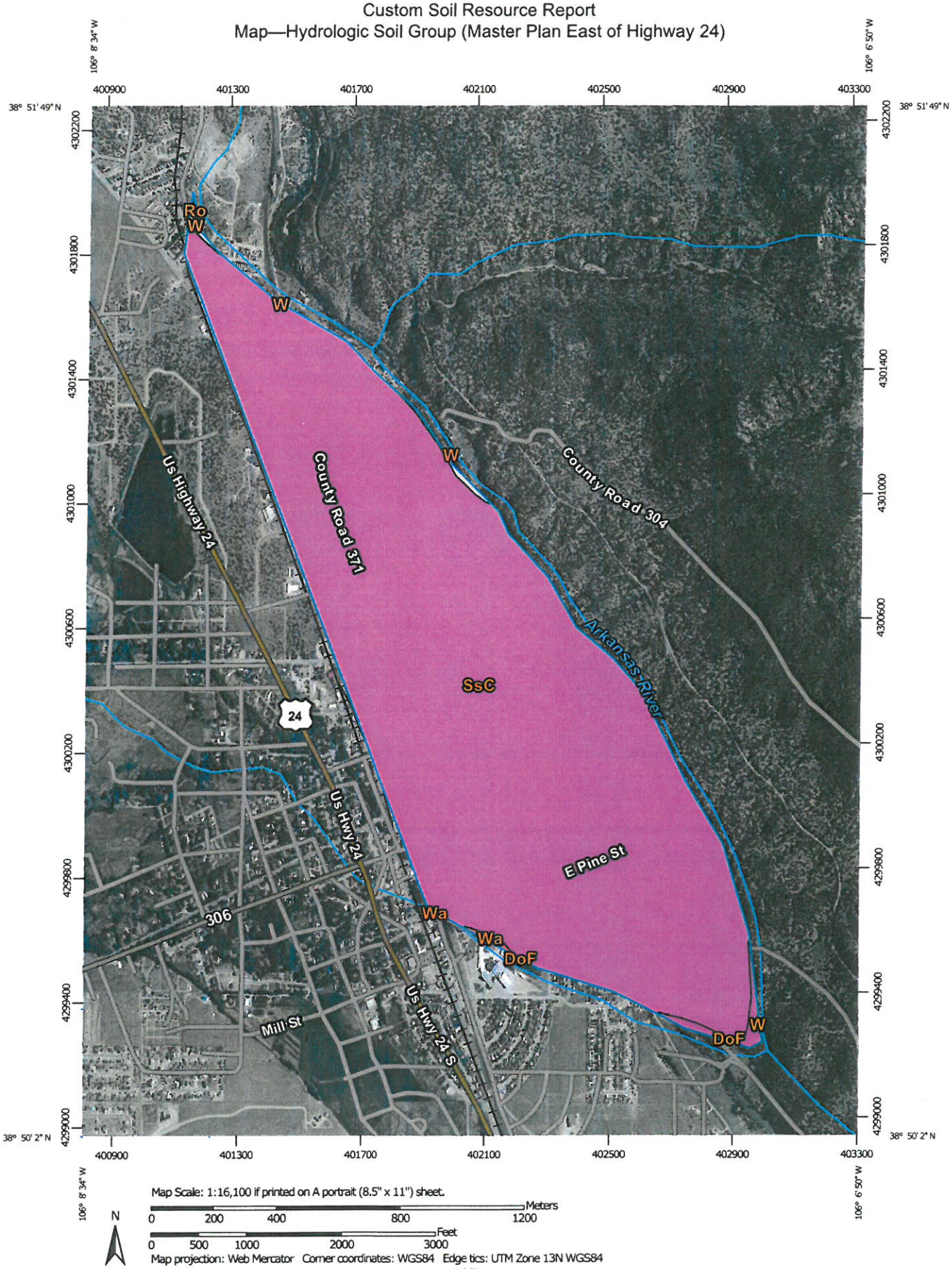
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report
Map—Hydrologic Soil Group (Master Plan East of Highway 24)



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

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This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Chaffee-Lake Area, Colorado, Parts of Chaffee and Lake Counties
Survey Area Data: Version 7, Feb 23, 2010

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 21, 2010—Nov 18, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group (Master Plan East of Highway 24)

Hydrologic Soil Group— Summary by Map Unit — Chaffee-Lake Area, Colorado, Parts of Chaffee and Lake Counties (CO658)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
DoF	Dominson gravelly sandy loam, 9 to 45 percent slopes	A	3.2	0.7%
Ro	Rock outcrop	D	0.1	0.0%
SsC	San Isabel stony sandy loam, 1 to 5 percent slopes	A	441.8	98.7%
W	Water		1.8	0.4%
Wa	Wet alluvial land	D	0.7	0.2%
Totals for Area of Interest			**447.6**	**100.0%**

Rating Options—Hydrologic Soil Group (Master Plan East of Highway 24)

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

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MAPS

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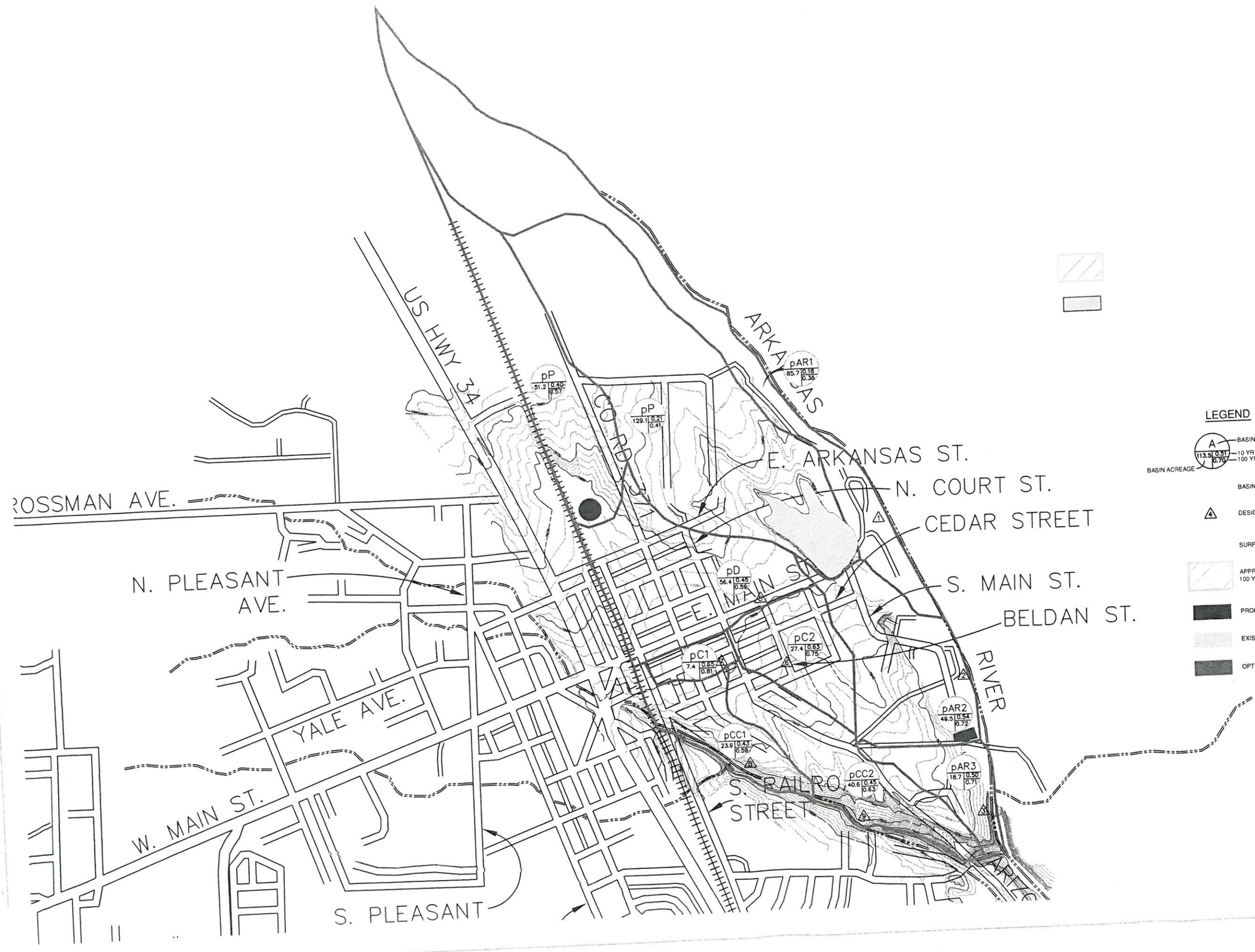

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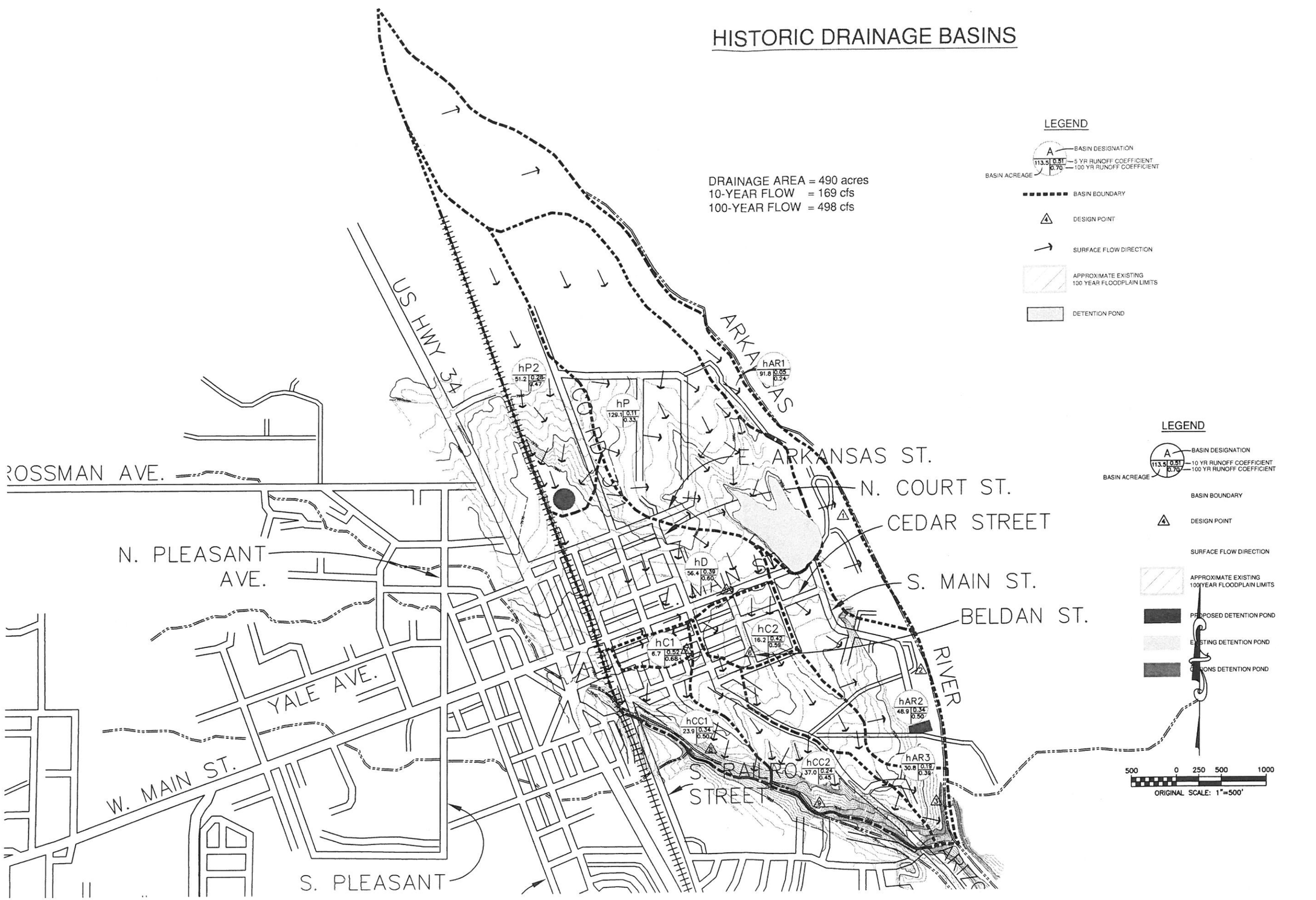
description
BUENA VISTA MASTER PLAN
(East of Highway 24)
PROPOSED DRAINAGE PLAN
prepared for

DRAWN BY: PM
DESIGNED BY: GEW
JOB NUMBER: 1101.0004
DATE: May 2013
SCALE: 1"=500'
DRAWING NAME:
SHEET NO: of

HISTORIC DRAINAGE BASINS

DRAINAGE AREA = 490 acres
10-YEAR FLOW = 169 cfs
100-YEAR FLOW = 498 cfs



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