



CITY OF BOULDER
Facilities and Asset Management

Municipal Building and Senior Center

Structural Flood Assessment

April 22, 2013

COB P0 07007

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1.0 EXECUTIVE SUMMARY

We have assessed the ability of the Municipal Building and Senior Center to resist loading and water infiltration for the 100-year flood event, and what improvements would be required to bring the structures into compliance with current structural codes. We have also investigated the impact of scour on the building foundations. The design criteria was based on the more stringent of the newly adopted 2012 Boulder Creek floodplain study and the preceding 1994 Boulder Creek floodplain study, and in the case of the Senior Center, the 2010 Gregory Creek floodplain study. The velocities utilized in the analysis range from 7.4 feet per second with a flood protection elevation of 2.61 feet above grade for the Municipal Building, to 5.43 feet per second with a flood protection elevation of 2.50 feet above grade for the Senior Center. Scour against the building foundations is not expected to reach below the foundation elements for either structure. In general, our solution involves installing new concrete flood walls and passive flood gates. Our solutions are described in more detail within the body of this report.

After conducting our assessment, we have concluded that the buildings as constructed are not able to withstand the 100-year flood event. However, the measures that would be required to floodproof and reinforce the existing Senior Center and Municipal Building are relatively straightforward and inexpensive. The estimated cost of the required structural improvements alone is \$68,000 for the Municipal Building (including the new entrance flood gate), and \$291,240 for the Senior Center. As mentioned elsewhere in the report, there would be costs incurred in addition to the required structural improvements.

2.0 INTRODUCTION

2.1 SCOPE OF SERVICES

The scope of structural services is to provide a report summarizing the results of our structural analysis of the Municipal Building and West Senior Center for flood loading as they exist, what improvements would need to be made to floodproof the buildings, and the approximate cost associated with improving the buildings. Floodproofing of architectural elements such as door gaskets and waterproof membranes are not included in this report. Site and utility improvements are also not included in this report.

2.2 ASSUMPTIONS AND BASIS OF ANALYSIS

Our assumptions for the analysis of the Municipal Building and West Senior Center are as follows:

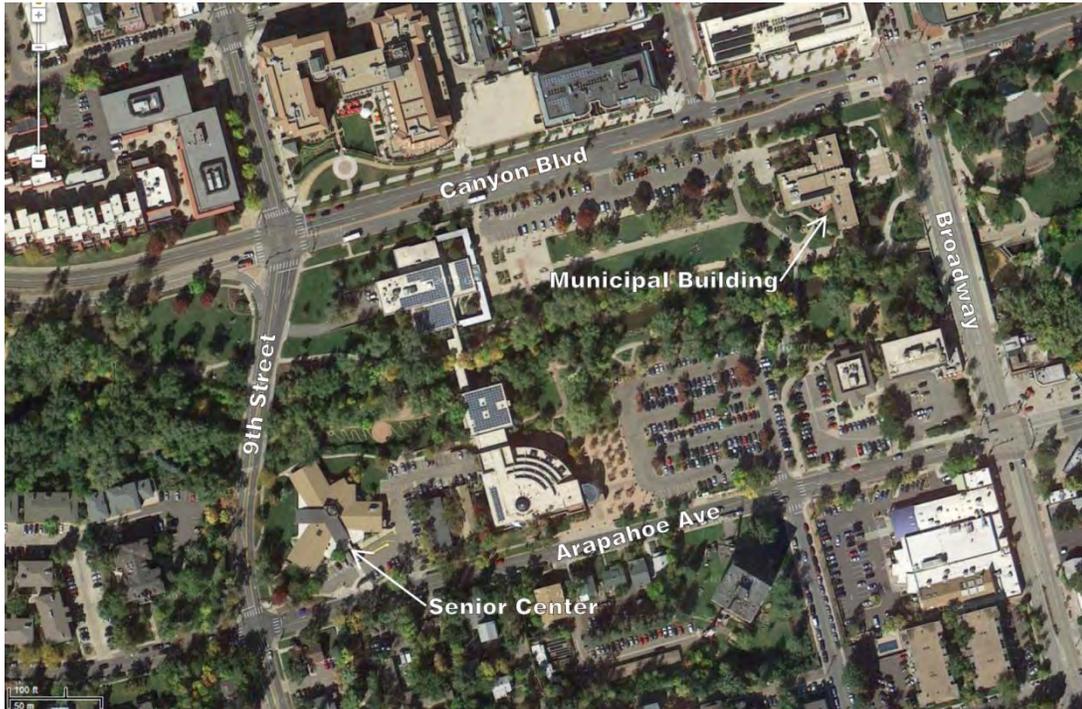
- The soils underlying each building are similar to those encountered in a test pit excavated by Anthem, LLC northeast of the West Senior Center
- The water surface elevations are linearly interpolated between cross-sections
- The non-observable elements of the each building are as described in Item 6.0

The analysis is based on the information provided by the City of Boulder indicated in Item 4.0, including drawings of both buildings, floodplain data from both the newly adopted 2012 Boulder Creek floodplain study and the preceding 1994 Boulder Creek floodplain study, and floodplain data from the 2010 Gregory Creek floodplain study. Additionally, our analysis was based on our investigation of existing conditions outlined in Section 5.0.

2.3 LIMITATIONS AND EXCEPTIONS

Our analysis is limited to the information provided, and the observable elements of the structures. Alternate methods of addressing scour, such as armoring, have not been investigated.

3.0 SITE LOCATION AND CHARACTERISTICS



Site Location; accessed online 01/25/13 at <https://maps.google.com/maps?ll=40.0146,-105.280&z=18>

3.1 LOCATION AND LEGAL DESCRIPTION

The City of Boulder Municipal Building at 1777 Broadway is southwest of the intersection of Canyon Blvd. and Broadway. Boulder Creek and open space lie to the south and west. A city employee parking lot is adjacent to Canyon Blvd on the west as well. To the east across Broadway is Boulder's Central Park and Bandshell. Commercial office buildings and the downtown business area are to the north. The West Senior Center at 909 Arapahoe Ave. is located northeast of the intersection of Arapahoe Ave. and 9th St. near downtown Boulder, Colorado. The Boulder Public Library Main Branch lies to the east with a small parking lot in between the two structures. To the south is a residential neighborhood. Boulder Creek and open space are north of the site and Gregory Creek is to the west. See the map above for a general overview of the area.

The legal descriptions for the two properties are:

Municipal Building: BLKS 11 & 12 & TRACK ADJACENT TO BLK 11 ON THE WEST - BOULDER O T & PT LOT 9 SMITHS ADDITION TO BOULDER & VAC RIVERSIDE ST & 10TH ST & 11TH ST

West Senior Center: TRACT 479 36-1N-71 AS DESC REC NO 247490 10/19/77 BCR and TR 476 TR 476A TR 477 TR 478 TR 478A TR 480 TR 481 TR 482 TR 482A TR 482A-1 36-1N71

3.2 SITE CHARACTERISTICS

The Municipal Building is located on fairly level ground that slopes gently to the southeast. Areas of grass and mature trees surround the structure with a stone and concrete public terrace on the east portion of the site. Along the north edge of the site, west of the building, is asphalt paved parking. The West Senior Center site slopes moderately to the northeast towards Boulder Creek. Asphalt parking is located to the south and east of the structure. Between the building and Boulder Creek to the north is an open grass area with a decorative dirt path. The small setback between the building and 9th street to the west is more grass lawn.

The City of Boulder has recently adopted a new floodplain study for Boulder Creek, which will hereon be referred to as the 2012 Study. At this time, the study has not yet been approved by the Federal Emergency Management Agency (FEMA). Until the new study is adopted by FEMA, both the 2012 Study and the previous floodplain study, hereon referred to as the 1994 Study must be considered to determine the flooding conditions for the site. The results of the 2010 Gregory Creek floodplain study must also be included for the West Senior Center Site. Both Boulder Creek floodplain models indicate that the Municipal Building site is located within the 100-year floodplain and conveyance zone, but just outside of the high hazard flood zone. While not in the Boulder Creek floodplain, the West Senior Center lies in the Gregory Creek 100-year floodplain. The 100-year flood water depths around the buildings are generally around 3 feet, with velocities ranging from approximately 5 feet per second to 8 feet per second. Floodplain maps and cross section information is included in Appendix A.

3.3 CURRENT USE OF PROPERTY

Both the Municipal Building and the West Senior Center are owned, managed and used by the City of Boulder. The Municipal Building currently houses city offices and the City Council chambers. The West Senior Center is used for various senior programs and also has

spaces available for public rental. Although both properties are zoned Public and allows these current uses, if the structures were substantially damaged by a 100-year flood event, they could not be rebuilt because they are located in the high hazard flood zone where structures intended for human occupancy are not allowed.

4.0 INFORMATION PROVIDED BY THE CITY OF BOULDER

4.1 DRAWINGS

- Architectural drawings of the Municipal Building dated July 16, 1951
- Structural and architectural drawings of the Municipal Building addition dated October 10, 1962
- Structural and architectural drawings of the West Senior Center dated February 6, 1978

4.2 FLOOD INFORMATION

- 1994 Boulder Creek Flood Study maps and data
- 2012 Boulder Creek Flood Study maps and data
- 2010 Boulder Creek Flood Study maps and data

5.0 INVESTIGATION OF EXISTING CONDITIONS

5.1 METHODOLOGY AND LIMITING CONDITIONS

The original construction drawings that were provided by the City of Boulder were reviewed to determine the existing structural configuration of the Municipal Building and West Senior Center. Limited field investigation was performed to verify the configuration of the structural systems. Additionally, a test pit was excavated northeast of the West Senior Center to determine soil properties at the site. Observations were limited to visible components. No destructive investigation was performed. There were no available soils reports for the site.

6.0 BUILDING DESCRIPTIONS

6.1 DESCRIPTION OF MUNICIPAL BUILDING

The Municipal Building is a 2-story concrete structure originally constructed in 1951 with an



addition added to the west side in 1962.

The original building was constructed with precast concrete roof and second floor panels supported on perimeter cast-in-place concrete spandrel beams and interior steel beams. The main floor is a concrete slab-

on-grade. The foundation consists of unreinforced concrete spread footings bearing approximately 10'-0" below the main floor elevation. The addition consists of 2-way cast-in-place concrete slabs on concrete columns supported by drilled piers and a perimeter grade beam. The bottom of grade beam is 3'-0" below the main floor elevation.

6.2 DESCRIPTION OF WEST SENIOR CENTER

Drawings for the West Senior Center were provided by the City of Boulder. The structure is a 2-story wood, steel, and concrete structure consisting of a concrete slab-on-grade lower

level, post-tensioned concrete upper level floor slab, and wood truss roof framing. Post-tensioned concrete beams and precast concrete columns support the upper level post-tensioned



slab. Roof framing is supported on steel beams and columns. The concrete columns are founded on concrete spread footings. Based on the drawings, the footings bearing elevation is 3'-0" below the lower level elevation. Not shown on the drawings, the south and west sides of the lower level were closed off with precast concrete panels to bring grade up to the upper level. The northeast side has been enclosed with a wood fence to create a storage area.

7.0 FINDINGS AND REQUIRED IMPROVEMENTS

7.1 FINDINGS

The flood studies were reviewed to determine flood water elevations and velocities. This information was used to determine the flood loads for the buildings. A preliminary scour analysis based on the available soils information was performed in order to determine the impacts of scouring on the existing foundation systems. The existing structures were then analyzed for flood conditions and improvements to the buildings were designed that would resist the flood conditions. Complete structural calculations are contained in Appendix B. The following are summaries of our analysis results:

TABLE 7.1 - SUMMARY OF RELEVANT ELEVATIONS

Building	FFE	WSE	FPE	Δ	BOF	DOS	Δ Ftg
	[Ft]	[Ft]	[Ft]	[Ft]	[Ft]	[Ft]	[Ft]
Municipal Building	5349.47	5350.08	5352.08	2.61	5338.47	5346.35	-7.88
Senior Center	5368.33	5368.83	5370.83	2.50	5365.33	5366.66	-1.33

Elevations are expressed in NAVD88 Datum. Abbreviations: FFE = Finished Floor Elevation, WSE = Water Surface Elevation (aka Base Flood Elevation), FPE = Flood Protection Elevation, BOF = Bottom of Footing Elevation, DOS = Depth of Scour elevation.

The forces used for our analysis are based on the more restrictive of the newly adopted 2012 Boulder Creek floodplain study and the preceding 1994 Boulder Creek floodplain study. Calculations used to determine these forces are contained in Appendix B. The following is a summary of the forces to the structure:

TABLE 7.2 - SUMMARY OF FORCES TO STRUCTURE

Building	Hydrostatic	Buoyant	Hydrodynamic	Debris Impact	Special Impact
	[PLF]	[PSF]	[PLF]	[#]	[#]
Municipal Building	213	163	173	2,298	100
Senior Center	195	156	116	1,686	100

7.2 MUNICIPAL BUILDING

7.2.1. Foundation Improvements

The original 1951 building is founded on spread footings approximately 10'-0" below the first floor elevation, and the 1962 addition is founded on grade beams spanning to drilled piers, with the bottom of grade beam 3'-0" below the finished floor. As indicated in Table 7.1, the depth of scour is above the top of footing elevation, but slightly below the grade beam elevation. If the soil at the grade beam scours below the grade beams, the structure is designed to clear span from drilled pier to drilled pier, and therefore, no foundation improvements would be required.

7.2.2. Superstructure Improvements

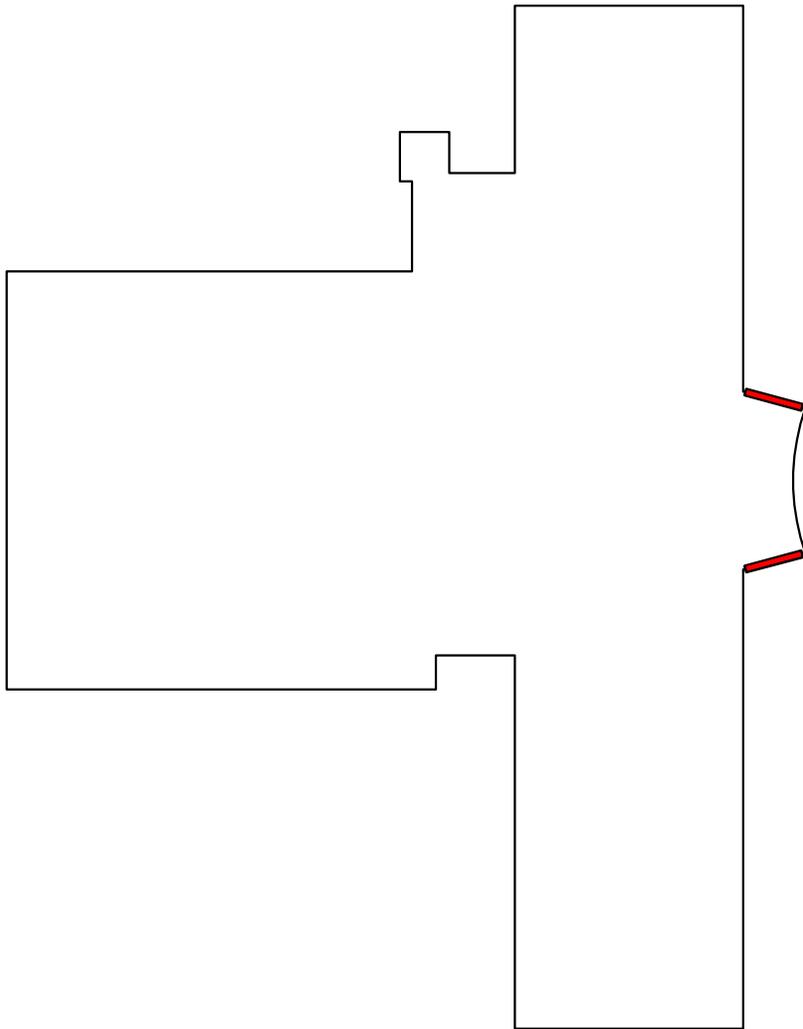
As indicated in table 7.1, the flood protection elevation is 2.61 feet above the first floor elevation of the Municipal building. Presently, the entrances are protected by a flood wall/passive flood gate system, which is above the flood protection elevation based on the 2012 Boulder Creek floodplain study. This system is adequate to protect the entrances from the flood loads. However, there is glazing extending to the floor elevation on the central portion of the east façade. The glazing will need to be protected by the addition of a concrete flood wall that extends to the flood protection elevation.

The City of Boulder is considering adding an entrance to the east wall of the original 1951 building. The proposed entrance can be protected from flood loads in a similar manner to the existing entrances by providing a flood wall extending out in front of the doors with a passive floodgate.

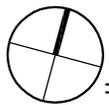
7.2.3. Opinion of Probable Cost for Structural Improvements

We estimate that the cost to floodproof the structural elements of the Municipal Building to be approximately **\$2790**. If the City decides to install new doors at the east wall, a passive flood gate would need to be installed as well. The additional cost would be approximately **\$65,000**. This cost does not include architectural elements (such as door gaskets, membranes, elevator float switches), utility relocation, parking slabs, relocation of employees during construction, etc.

The value of the Municipal Building is \$3,163,947 based on the current insured value reported by the City of Boulder. Since the costs for the required structural improvements are less than 50% of the market value of the structure, the improvements are not considered to be ‘substantial improvements’ as defined in 9-16-1 of the City of Boulder Revised Code.



LEGEND	
	STOREFRONT INFILL/DOOR FLOODPROOFING



TRUE NORTH 1" = 30'

MUNICIPAL BUILDING IMPROVEMENTS



7.3 WEST SENIOR CENTER

7.3.1. Foundation Improvements

As indicated in Table 7.1, during a 100-year flood event, the scour would not undermine the existing foundations; therefore, no improvements are recommended.

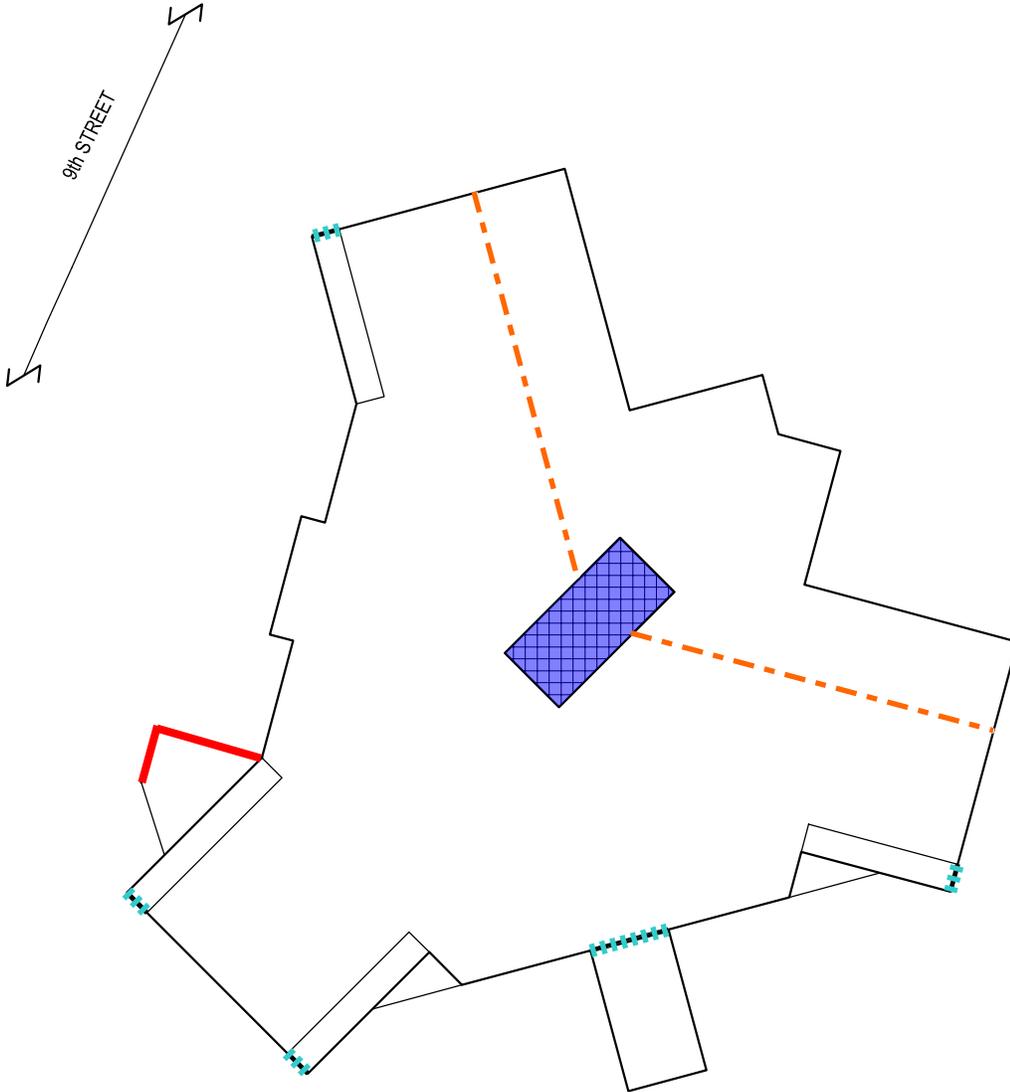
7.3.2. Superstructure Improvements

As indicated in Table 7.1, the flood protection elevation is 2.50 feet above the upper level finished floor elevation, and 2.50 feet above the lower level finished floor elevation. The structure is located in a shallow flood zone with a base flood elevation defined as being 0.5 feet above grade. Much of the structure is protected to this elevation by the existing stud wall/brick veneer system. There are some lengths of wall, as well as the entrances, that would need to be protected. The entrances can be protected from flood loads by providing a flood wall extending out in front of the doors with a passive floodgate. The segments of wall which are wood-clad and not flood resistant can be infilled with masonry, or brick with wood stud back-up to match the existing brick. The storage area at the lower level would either need to be floodproofed, or abandoned. The doors to the mechanical core would need to be replaced with floodproof doors, and the precast concrete panel joints would need to be caulked to prevent water infiltration.

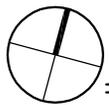
7.3.3. Opinion of Probable Cost for Structural Improvements

We estimate that the cost to floodproof the structural elements of the West Senior Center to be approximately **\$291,240**. This cost does not include architectural elements (such as door gaskets, membranes, elevator float switches), utility relocation or retrofitting, parking slabs, relocation of employees during construction, etc.

The market value of the West Senior Center is \$839,700 based on the current Boulder County Assessment Report for the property. Since the costs for the required structural improvements are less than 50% of the market value of the structure, the improvements are not considered to be 'substantial improvements' as defined in 9-16-1 of the City of Boulder Revised Code.



LEGEND	
	NEW FLOODWALL
	NEW PASSIVE FLOODGATE
	JOINT SEALING & DOOR FLOODPROOFING
	CORE FLOODPROOFING



SENIOR CENTER IMPROVEMENTS

1" = 40'



8.0 CONCLUSIONS

After conducting our assessment, we have concluded that the buildings as constructed are not able to withstand the 100-year flood event. However, the measures that would be required to floodproof and reinforce the existing Senior Center and Municipal Building are relatively straightforward and inexpensive. The estimated cost of the required structural improvements alone is \$68,000 for the Municipal Building (including the new entrance flood gate), and \$291,240 for the Senior Center. As mentioned elsewhere in the report, there would be costs incurred in addition to the required structural improvements.

9.0 REFERENCES

The following published references were used in the preparation of this report:

Federal Emergency Management Agency: *Technical Bulletin 3: Non-Residential Floodproofing-Requirements and Certification for Buildings Located in Special Flood Hazard Area*, 1993

Federal Emergency Management Agency: *FEMA-102: Floodproofing Non-Residential Structures*, May 1986.

Federal Emergency Management Agency: *FEMA-114: Design Manual for Retrofitting Flood-Prone Residential Structures*, September 1986.

Federal Emergency Management Agency: *FIA-TB-4: Elevator Installation for Buildings Located in Special Flood Hazard Areas*

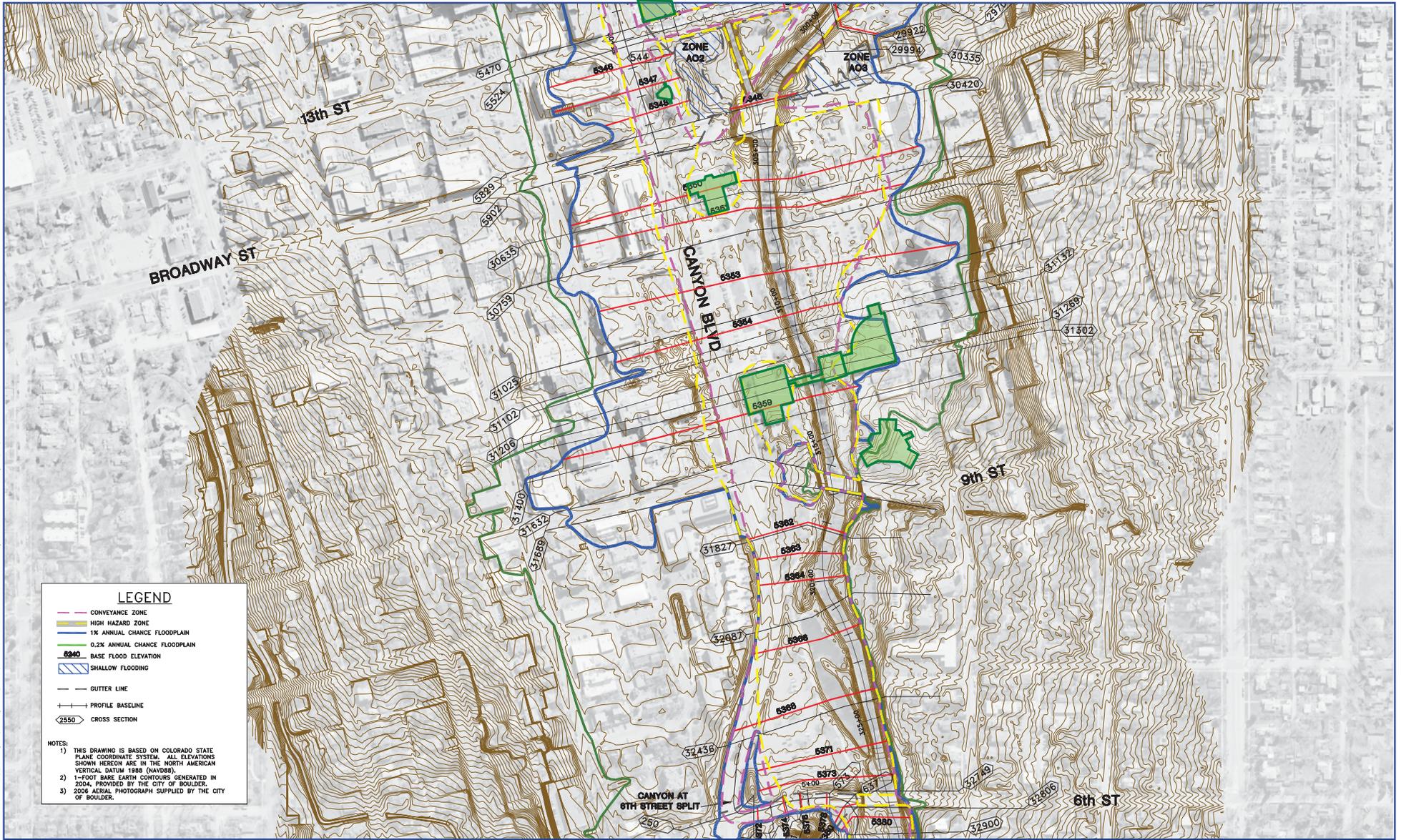
Colorado State University: *Colorado State University Pier Scour Equation (modified from Richardson and others)*, 1993.



Appendix A

Flood Study Information

K:\COBLDR02\Boulder Creek FP 2\Working\Topo July07\11\Local\BOULDER CREEK FP WORKMAPS August 2012\Altwater.dwg 10/31/2012 8:00 AM



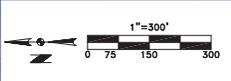
LEGEND

- CONVEYANCE ZONE
- HIGH HAZARD ZONE
- 1% ANNUAL CHANCE FLOODPLAIN
- 0.2% ANNUAL CHANCE FLOODPLAIN
- BASE FLOOD ELEVATION
- SHALLOW FLOODING
- GUTTER LINE
- PROFILE BASELINE
- 2550 CROSS SECTION

NOTES:

- 1) THIS DRAWING IS BASED ON COLORADO STATE PLANE COORDINATE SYSTEM. ALL ELEVATIONS SHOWN HEREON ARE IN THE NORTH AMERICAN VERTICAL DATUM 1985 (NAVD83).
- 2) 1-FOOT BARE EARTH CONTOURS GENERATED IN 2004, PROVIDED BY THE CITY OF BOULDER.
- 3) 2006 AERIAL PHOTOGRAPH SUPPLIED BY THE CITY OF BOULDER.

REVISIONS
REV1
REV2
REV3
REV4
REV5
REV6



PROJECT NUMBER: COBLDR02	DRAWN BY: MRC
ACAD FILE: BlDr Ck FP Alt	DESIGNED BY: JMA
DATE: 10/31/2012	CHECKED BY: GJK

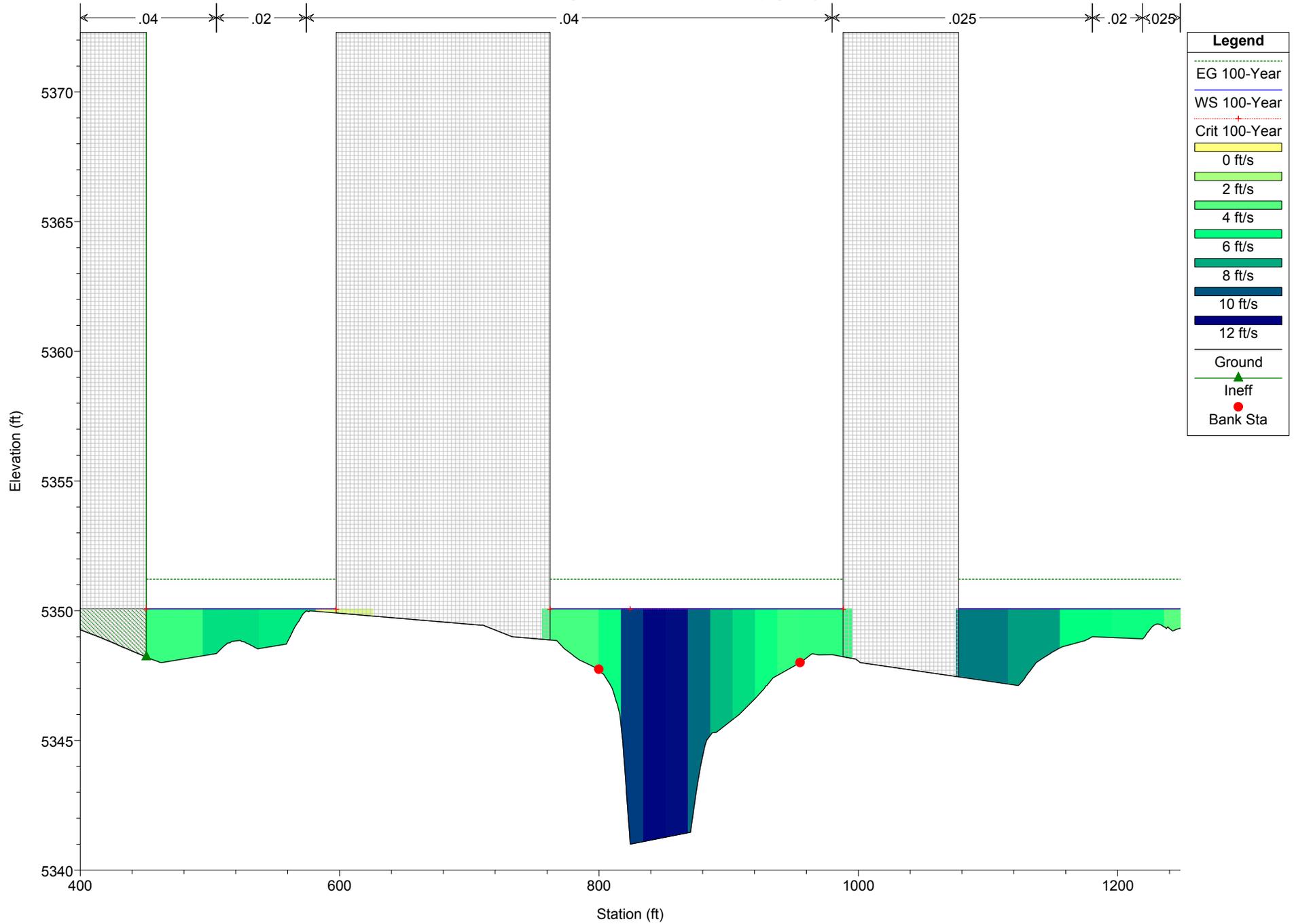
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 www.andersonce.com

CITY OF BOULDER
BOULDER CREEK FLOODPLAIN STUDY

BOULDER CREEK
FLOOD HAZARD WORKMAP

SHEET
2

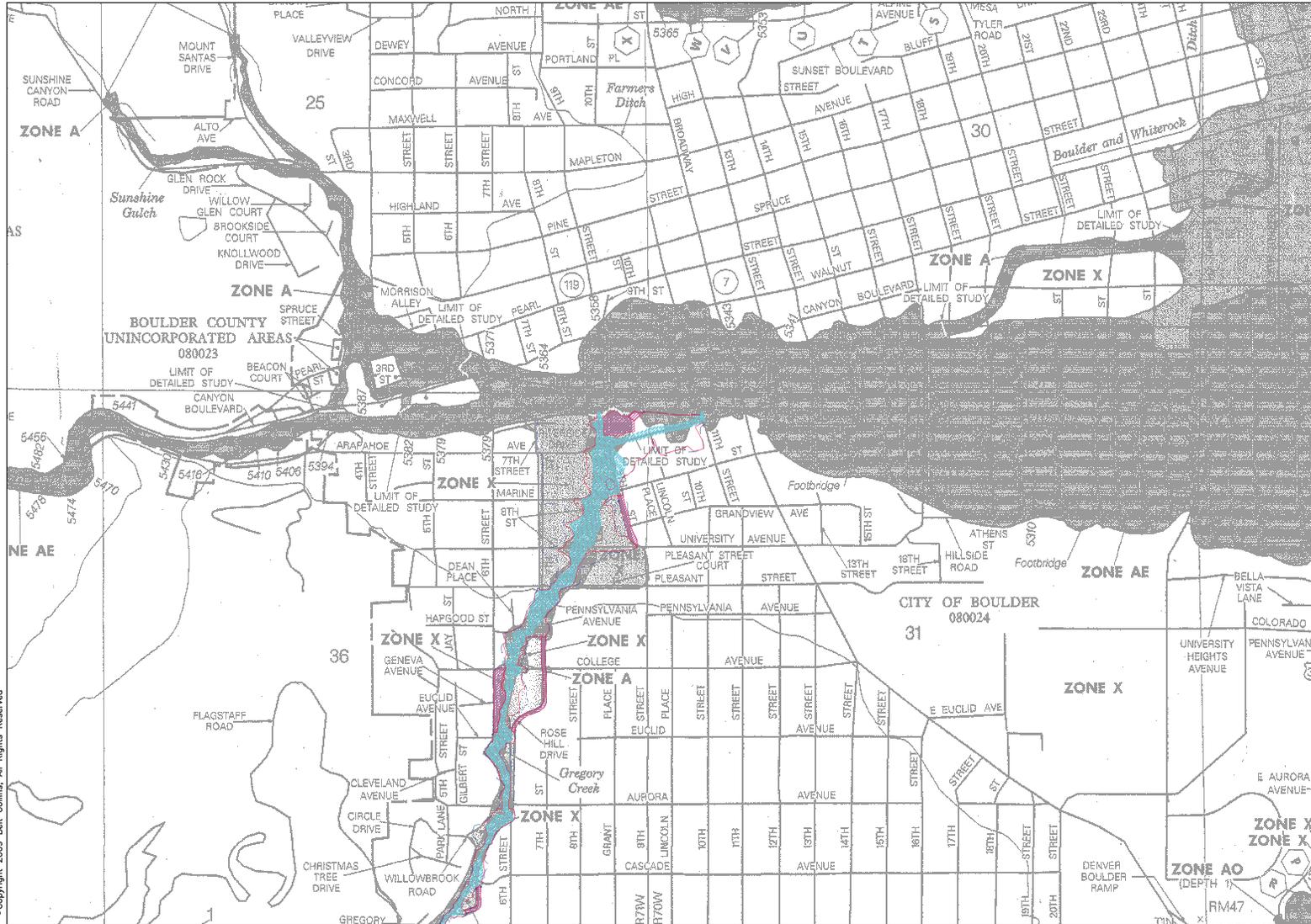
COBLDR02 Plan: 100-yr w/o Roche (Oct 2012) 10/25/2012
 Xsec cut using HecGeoRAS from 1-foot Topography



1 in Horiz. = 100 ft 1 in Vert. = 5 ft

Plan: 100-yr Boulder Creek 6th-Broadway RS: 30635 Profile: 100-Year

E.G. Elev (ft)	5351.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.14	Wt. n-Val.	0.031	0.040	0.026
W.S. Elev (ft)	5350.08	Reach Len. (ft)			
Crit W.S. (ft)	5350.06	Flow Area (sq ft)	259.19	845.31	373.19
E.G. Slope (ft/ft)	0.006854	Area (sq ft)	259.19	845.31	373.19
Q Total (cfs)	12000.00	Flow (cfs)	1388.65	7973.83	2637.52
Top Width (ft)	569.27	Top Width (ft)	183.94	155.18	230.15
Vel Total (ft/s)	8.12	Avg. Vel. (ft/s)	5.36	9.43	7.07
Max Chl Dpth (ft)	9.08	Hydr. Depth (ft)	1.41	5.45	1.62
Conv. Total (cfs)	144950.6	Conv. (cfs)	16773.9	96317.6	31859.1
Length Wtd. (ft)		Wetted Per. (ft)	187.26	157.35	235.36
Min Ch El (ft)	5341.00	Shear (lb/sq ft)	0.59	2.30	0.68
Alpha	1.11	Stream Power (lb/ft s)	3.17	21.68	4.79
Frctn Loss (ft)	0.69	Cum Volume (acre-ft)	0.64	3.99	1.74
C & E Loss (ft)	0.33	Cum SA (acres)			



NATIONAL FLOOD INSURANCE PROGRAM

**FIRM
 FLOOD INSURANCE RATE MAP**

**BOULDER COUNTY,
 COLORADO AND
 INCORPORATED AREAS**

PANEL 395 OF 595
 (SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
BOULDER COUNTY, UNINCORPORATED AREAS	080023	0396	F
BOULDER, CITY OF	080024	0396	F

- 500 YEAR FLOODPLAIN
- 100 YEAR FLOODPLAIN
- FLOODWAY
- SHALLOW FLOOD ZONE

**MAP NUMBER
 08013C0395 F**

**EFFECTIVE DATE:
 JUNE 2, 1995**



Federal Emergency Management Agency

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 LANDSCAPE ARCHITECTURE
 ENVIRONMENTAL CONSULTING**
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 Fax: (303) 786-8026



**ANNOTATED FIRM
 08013C0395F**
 GREGORY CANYON CREEK
 CITY OF BOULDER
 MAR 16, 2010

Appendix B

Structural Calculations

Senior Center - Scour Analysis

Based on 0.5 Ft Above Grade (AO Zone)

Maryland Abutment Scour Equation:

$$d_{sc} = d - y$$

$d_{sc} =$	1.66	Feet	Depth of Scour
$y_1 =$	2.5	Feet	Upstream Flow Depth
$V_e =$	5.43	Ft/sec	Average Velocity of Flow
$D_{50} =$	0.013	Feet	Diameter of Particles for which 50% are Smaller in the Bed Material
$q =$	13.58	cfs/ft	Unit-Width Flow
$V_{c50} =$	3.06	Ft/sec	Critical Velocity for D_{50} Bed Material Size
$K_u =$	11.17		
$d =$	3.68	Feet	Total Flow Depth in Contraction
$x =$	0.77		Exponent in Computing d
$FS =$	1.4		Factor of Safety (Between 1.2 & 1.4)

Municipal Building - Scour Analysis

Based on Cross Section 30635

Maryland Abutment Scour Equation:

$$d_{sc} = d - y$$

$d_{sc} =$	3.12	Feet	Depth of Scour
$y_1 =$	2.61	Feet	Upstream Flow Depth
$V_e =$	7.4	Ft/sec	Average Velocity of Flow
$D_{50} =$	0.013	Feet	Diameter of Particles for which 50% are Smaller in the Bed Material
$q =$	19.31	cfs/ft	Unit-Width Flow
$V_{c50} =$	3.08	Ft/sec	Critical Velocity for D_{50} Bed Material Size
$K_u =$	11.17		
$d =$	4.84	Feet	Total Flow Depth in Contraction
$x =$	0.77		Exponent in Computing d
$FS =$	1.4		Factor of Safety (Between 1.2 & 1.4)

Senior Center - Flood Analysis

Design Criteria (FEMA FIA-TB-3):

General:

Velocity of Water (V) =	5.43	ft/s
Specific Weight of Water (w) =	62.4	pcf
Mass Density of Water (m) =	1.94	slugs/ft ³
Equiv. Fluid Weight of Saturated Soil (S) =	0	pcf
Acceleration Due to Gravity (g) =	32.2	ft/s ²

Resultant Lateral Force Due to Hydrostatic Pressure From Freestanding Water:

Height of Freestanding Water (H) =	2.50	ft
Depth of Saturated Soil (D) =	0.0	ft

$$F_h = 1/2wH^2 = \underline{195} \#$$

$$F_{sat} = 1/2SD^2 + F_h = \underline{195} \#$$

Buoyancy Force:

Area of Horizontal Surface (A _h) =	1.00	ft ²
Depth of Building Below Flood Protection Elevation (H) =	2.50	ft

$$F_h = wA_hH = \underline{156} \#$$

Hydrodynamic Force:

Drag Coefficient (C _d) =	1.25	
Area of Vertical Surface (A _v) =	3.24	ft ²

$$F_d = C_d m 1/2V^2 A_v = \underline{116} \#$$

Debris (Normal) Impact Force:

Weight of Object (W) =	5000	#
Duration of Impact (t) =	0.5	sec

$$F_i = WV/(gt) = \underline{1686} \#$$

Special Impact Force:

$$F_{is} = \underline{100} \text{ plf}$$

Municipal Building - Flood Analysis

Design Criteria (FEMA FIA-TB-3):

General:	
Velocity of Water (V) =	7.40 ft/s
Specific Weight of Water (w) =	62.4 pcf
Mass Density of Water (m) =	1.94 slugs/ft ³
Equiv. Fluid Weight of Saturated Soil (S) =	0 pcf
Acceleration Due to Gravity (g) =	32.2 ft/s ²
Resultant Lateral Force Due to Hydrostatic Pressure From Freestanding Water:	
Height of Freestanding Water (H) =	2.61 ft
Depth of Saturated Soil (D) =	0.0 ft
$F_h = 1/2wH^2 =$	<u>213</u> #
$F_{sat} = 1/2SD^2 + F_h =$	<u>213</u> #
Buoyancy Force:	
Area of Horizontal Surface (A _h) =	1.00 ft ²
Depth of Building Below Flood Protection Elevation (H) =	2.61 ft
$F_h = wA_hH =$	<u>163</u> #
Hydrodynamic Force:	
Drag Coefficient (C _d) =	1.25
Area of Vertical Surface (A _v) =	2.61 ft ²
$F_d = C_d m 1/2V^2 A_v =$	<u>173</u> #
Debris (Normal) Impact Force:	
Weight of Object (W) =	5000 #
Duration of Impact (t) =	0.5 sec
$F_i = WV/(gt) =$	<u>2298</u> #
Special Impact Force:	
$F_{is} =$	<u>100</u> plf

Appendix C

Opinion of Probable Cost

City of Boulder
 1777 Broadway
 Boulder, Colorado, 80302
 Date: 01-Feb-13

**Municipal Building
 Year 2013
 Unit Summary Report**

**Prepared By:
 Daniel Knapp
 Anthem, LLC**

Division Description		Total
Division 03	Concrete	\$1,851.55
Division 31	Earthwork	\$149.28
Subtotal		\$2,000.83
General Contractor's Markup on Subs		10.00% \$200.08
Subtotal		\$2,200.91
General Conditions		10.00% \$220.09
Subtotal		\$2,421.00
General Contractor's Overhead and Profit		15.00% \$363.15
Grand Total		\$2,784.15

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Unit Detail Report

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LineNumber			Description	Quantity	Unit	Total Incl. O&P	Ext. Total Incl. O&P
Division 03 Concrete							
031113500020		✘	C.I.P. concrete forms, grade beam, plywood, 1 use, includes erecting, bracing, stripping and cleaning	108.00	SFCA	\$7.25	\$783.00
032110600700	🍃	✘	Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	0.44	Ton	\$1,696.13	\$746.30
032110600700	🍃	✘	Reinforcing Steel, in place, under 10 ton job, #3 to #7, add	1.00		\$342.02	\$150.49
033105350150		✘	Structural concrete, ready mix, normal weight, 3000 psi, includes local aggregate, sand, Portland cement (Type I) and water, delivered, excludes all additives and treatments	1.34	C.Y.	\$109.46	\$146.68
033105703250		✘	Structural concrete, placing, grade beam, pumped, includes leveling (strike off) & consolidation, excludes material	1.34	C.Y.	\$18.72	\$25.08
Division 03 Concrete Subtotal							\$1,851.55
Division 31 Earthwork							
312316130060		✘	Excavating, trench or continuous footing, common earth, 1/2 C.Y. excavator, 1' to 4' deep, excludes sheeting or dewatering	4.00	B.C.Y.	\$6.13	\$24.52
312323130015		✘	Backfill, light soil, by hand, no compaction	4.00	L.C.Y.	\$24.78	\$99.12
312323130600		✘	Backfill and compact, by hand, 6" layers, compaction in layers, vibrating plate, add to above	4.00	E.C.Y.	\$6.41	\$25.64
Division 31 Earthwork Subtotal							\$149.28

City of Boulder
909 Arapahoe Ave
Boulder, Colorado, 80302
Date: 01-Feb-13

Senior Center
Year 2013
Unit Summary Report

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Division Description	Total
Division 03 Concrete	\$17,155.16
Division 07 Thermal and Moisture Protection	\$488.00
Division 08 Openings	\$210,000.00
Division 31 Earthwork	\$746.40
Subtotal	\$228,389.56
General Contractor's Markup on Subs	10.00% \$1,838.96
Subtotal	\$230,228.52
General Conditions	10.00% \$23,022.85
Subtotal	\$253,251.37
General Contractor's Overhead and Profit	15.00% \$37,987.71
Grand Total	\$291,239.08

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Senior Center
Year 2013
Unit Detail Report

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LineNumber				Description	Quantity	Unit	Total Incl. O&P	Ext. Total Incl. O&P
Division 03 Concrete								
031113500020			<input checked="" type="checkbox"/>	C.I.P. concrete forms, grade beam, plywood, 1 use, includes erecting, bracing, stripping and cleaning	1,000.00	SFCA	\$7.25	\$7,250.00
032110600700			<input checked="" type="checkbox"/>	Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	4.08	Ton	\$1,696.13	\$6,920.21
032110600700			<input checked="" type="checkbox"/>	Reinforcing Steel, in place, under 10 ton job, #3 to #7, add	1.00		\$342.04	\$1,395.52
033105350150			<input checked="" type="checkbox"/>	Structural concrete, ready mix, normal weight, 3000 psi, includes local aggregate, sand, Portland cement (Type I) and water, delivered, excludes all additives and treatments	12.40	C.Y.	\$109.46	\$1,357.30
033105703250			<input checked="" type="checkbox"/>	Structural concrete, placing, grade beam, pumped, includes leveling (strike off) & consolidation, excludes material	12.40	C.Y.	\$18.72	\$232.13
Division 03 Concrete Subtotal								\$17,155.16
Division 07 Thermal and Moisture Protection								
079213200800			<input checked="" type="checkbox"/>	Joint sealants, caulking and sealants, acylic latex, cartridges, 3/4" x 3/4", in place	200.00	L.F.	\$2.44	\$488.00
Division 07 Thermal and Moisture Protection Subtotal								\$488.00
Division 08 Openings								
083456100010		<input type="checkbox"/>		Passive Floodgate, 4' wide, 4' high	4.00	Ea.	\$40,000.00	\$160,000.00
083456100010		<input type="checkbox"/>		Passive Floodgate, 8' wide, 4' high	1.00	Ea.	\$50,000.00	\$50,000.00
Division 08 Openings Subtotal								\$210,000.00
Division 31 Earthwork								
312316130060			<input checked="" type="checkbox"/>	Excavating, trench or continuous footing, common earth, 1/2 C.Y. excavator, 1' to 4' deep, excludes sheeting or dewatering	20.00	B.C.Y.	\$6.13	\$122.60
312323130015			<input checked="" type="checkbox"/>	Backfill, light soil, by hand, no compaction	20.00	L.C.Y.	\$24.78	\$495.60
312323130600			<input checked="" type="checkbox"/>	Backfill and compact, by hand, 6" layers, compaction in layers, vibrating plate, add to above	20.00	E.C.Y.	\$6.41	\$128.20
Division 31 Earthwork Subtotal								\$746.40