



CITY OF BOULDER
Facilities and Asset Management

Atrium Building and Band Shell

Structural Flood Assessment

April 22, 2013

COB P0 07005

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1.0 EXECUTIVE SUMMARY

We have assessed the ability of the Atrium building and Central Park Bandshell to resist loading and water infiltration for a 100-year flood event, and what improvements would be required to bring the structures into compliance with current structural codes. We have also investigated what improvements would be required to support the structures in the event that the existing foundations are undermined due to scour. 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. The velocities utilized in the analysis range from 7.99 feet per second to 7.38 feet per second with flood protection elevations of 5.00 feet and 4.00 feet above grade for the Atrium and Bandshell respectively. Scour is not expected to occur at the Atrium while at the Bandshell scour is expected to extend 1.13 feet below the footings. In general, our solutions involve installing new flood walls and flood gates at the Atrium and adding riprap to the Bandshell foundation. 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. Based on the flood and soil parameters for the site, the foundations of the Bandshell would be undermined due to scour, which could result in the collapse of the structure. However, the measures that would be required to floodproof and reinforce the two buildings are fairly straightforward and relatively inexpensive. The structural improvements alone are estimated to be \$187,130 for the Atrium and \$9,050 for the Bandshell. Though somewhat restricted by the mature trees around each structure, access is generally good. 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 Central Park Bandshell (Bandshell) and Atrium buildings 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 Bandshell and Atrium buildings are as follows:

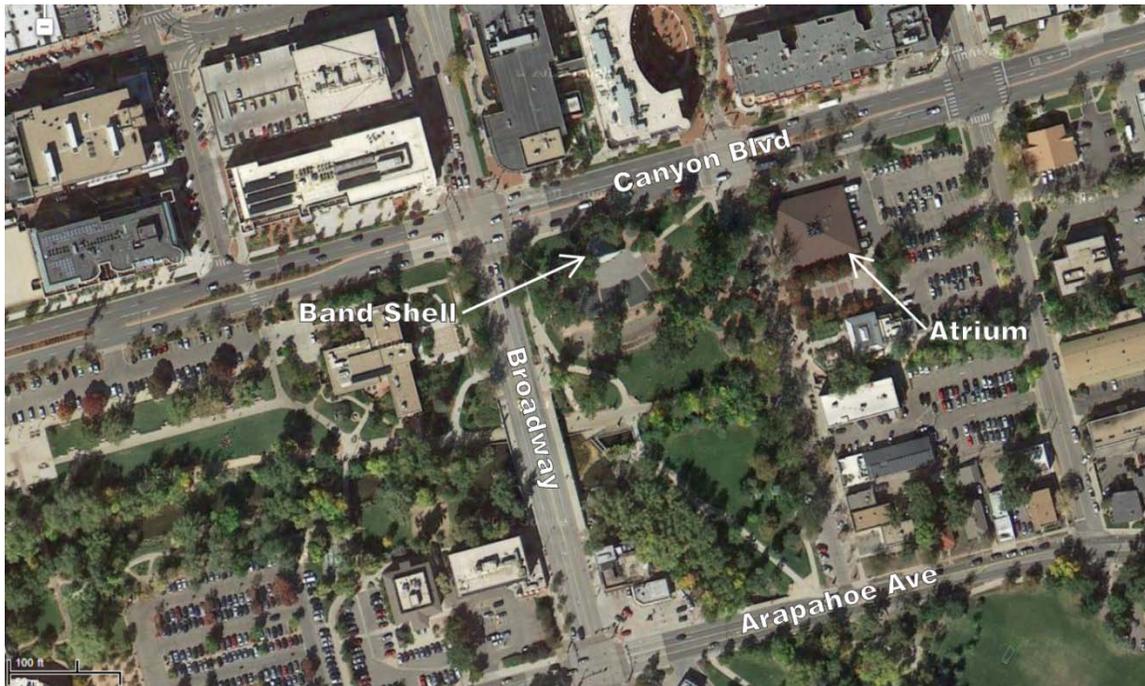
- The soils underlying each building are similar to those encountered in a test pit excavated by Anthem, LLC near Boulder Creek west of Boulder Public Library
- The water surface elevations are linearly interpolated between cross-sections
- The non-observable elements of the New Britain building are as described in Item 6

The analysis is based on the information provided by the City of Boulder indicated in Item 4.0, including drawings of the Atrium building and floodplain data from both the newly adopted 2012 Boulder Creek floodplain study and the preceding 1994 Boulder 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=40.0153,-105.277&z=18>

3.1 LOCATION AND LEGAL DESCRIPTION

The Atrium building at 1300 Canyon Blvd. and the Bandshell at 1236 Canyon Blvd. are both on the south side of Canyon Blvd. just east of Broadway as shown above. 13th St. runs north between the two buildings to One Boulder Plaza across Canyon Blvd. East of the Atrium is a parking lot and Wells Fargo Bank. Immediately south of the Atrium is the Boulder Dushanbe Tea House and the Boulder Museum of Contemporary Art. A small berm for seating lies south of the Bandshell with the remainder of Central Park beyond. Boulder Creek turns to the south in the southern half of the park. Across Broadway to the west is the City of Boulder Municipal Building.

The legal descriptions for the two properties are:

Atrium: LOTS 4-5-6 & 1/2 VAC ALLEY BLK 14 BOULDER O T

Bandshell: BLOCK 13 BOULDER O T

3.2 SITE CHARACTERISTICS

The Atrium is located on fairly level ground that gently slopes to the east. Asphalt paved parking is adjacent to the building on the north and east sides. Concrete paved 13th St. and its sidewalk are to the west and a concrete and brick paver terrace are to the south. The Bandshell site generally slopes to the south with a large berm for seating in the center of the site. The site is covered in grass and mature trees except for the seating area and an open gravel covered space between the seating and the Bandshell.

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. While both floodplain models indicate the Atrium is in the 100-year floodplain, it does not lie in the conveyance zone or high hazard zone. Both floodplain models indicate that the Bandshell site is located within the 100-year floodplain, conveyance zone and high hazard flood zone. 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 Atrium building and the Bandshell are owned, managed and used by the City of Boulder. Within the Atrium are various City of Boulder offices. The Bandshell is used for community concerts and events and is available for members of the public to rent. Although the Bandshell property is zoned Public and allows these current uses, if the structure was substantially damaged by a 100-year flood event, it could not be rebuilt because it is located in the high hazard flood zone where structures intended for human occupancy are not allowed. While in a shallow flood zone, the Atrium is not located in a high hazard zone and could be reconstructed in the event of substantial damage.

4.0 INFORMATION PROVIDED BY THE CITY OF BOULDER

4.1 DRAWINGS

- Structural drawings of the Atrium building dated January 24, 1968

4.2 FLOOD INFORMATION

- 1994 Boulder Creek Flood Study maps and data
- 2012 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 Atrium building. Original construction drawings were not available for the Bandshell, so a field investigation was performed to determine the sizes and configuration of foundation elements and structural systems. Observations were limited to visible components. No destructive investigation or soils testing were performed. There were no available soils reports for the site.

Additional information about the foundation elements was provided by city personnel who had experience with the construction of the buildings.

6.0 BUILDING DESCRIPTIONS

6.1 DESCRIPTION OF ATRIUM BUILDING

Drawings provided by the City of Boulder show the Atrium building is a single story office building which was constructed over an existing asphalt parking lot. The structure consists



of wood glulam rafters and with tongue and groove wood decking. The beams are supported on steel columns founded on spread footings bearing approximately 6'-0" below the finished floor elevation. A second story balcony lies at the center of the structure and is constructed with glulam beams and tongue and groove decking. The first floor consists of a concrete slab-on-grade.

6.2 DESCRIPTION OF BANDSHELL

Originally constructed in 1938, no drawings are available for the Bandshell. Based on visual observations and descriptions by city staff, the structure consists of a wood framed platform over crawl space. The superstructure is clad with plywood paneling - however, the underlying support members are unclear. Perimeter concrete stem walls bear on



footings which have been assumed to bear 2'-0" below the adjacent grade. The top of the platform varies from 2'-6" to 3'-0" above the gravel surface along the south side.

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]
Atrium Building	5343.50	5346.50	5348.50	5.00	5337.00	-	-
Band Shell	5348.50	5347.63	5349.63	1.13	5343.00	5341.88	1.12

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]	[#]	[#]
Atrium Building	780	312	387	2,481	100
Band Shell	669	289	306	2,292	100

7.2 ATRIUM

7.2.1. Foundation Improvements

The Atrium building is located in a shallow flood zone – AO3, with a water surface elevation 3'-0" above grade and a flood protection elevation 5'-0" above grade as indicated in Table 7.1. The structure is surrounded by impermeable surfaces, which would resist scour. Additionally, the foundations are deep, so even if the impermeable surfaces were removed, the depth of scour would be above the foundation elevation. No foundation improvements are required.

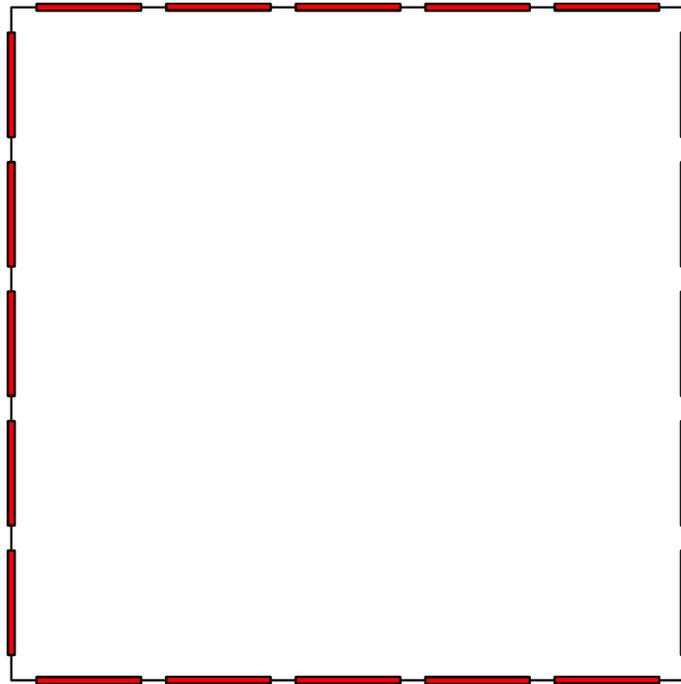
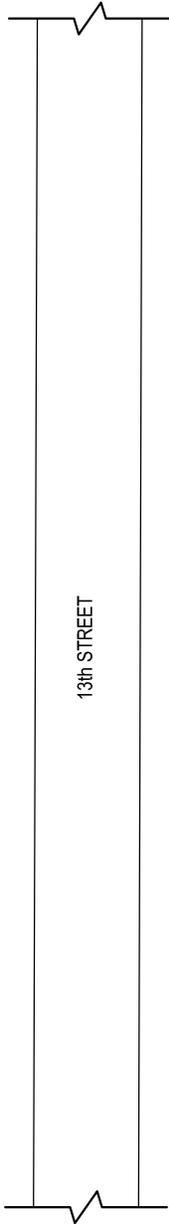
7.2.2. Superstructure Improvements

As indicated in table 7.1, the flood protection elevation is 5'-0" above the first floor elevation of the Atrium building. The storefront between the vertical brick bands would need to be replaced with 8" concrete infill walls to the flood protection elevation. The existing first floor is a concrete slab-on-grade, and would not be effective at resisting 312 psf buoyant forces. A dewatering system would need to be installed to continuously pump flood water to a level below the floor elevation. Additionally, passive flood gates would need to be installed at all of the entrances.

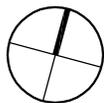
7.2.3. Opinion of Probable Cost for Structural Improvements

We estimate that the cost to floodproof the structural elements of the Atrium building to be approximately **\$187,130**. 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 market value of the Atrium building structure is \$1,100,000 based on an assumed value of \$120 per square foot. 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. As the structure does not lie in a high hazard zone and the improvements are not substantial, these modifications and continued use are permitted.



LEGEND	
	STOREFRONT INFILL/DOOR FLOODPROOFING



TRUE NORTH 1" = 30'

ATRIUM BUILDING IMPROVEMENTS



7.3 BANDSHELL

7.3.1. Foundation Improvements

As indicated in Table 7.1, during a 100-year flood event, scouring would cause the existing footings to be undermined by 1.12 feet, thereby compromising the supporting foundations of the superstructure. One method to protect the foundation from scour is to provide riprap protection extending below the bottom of footing approximately 2'-0".

7.3.2. Superstructure Improvements

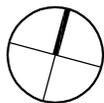
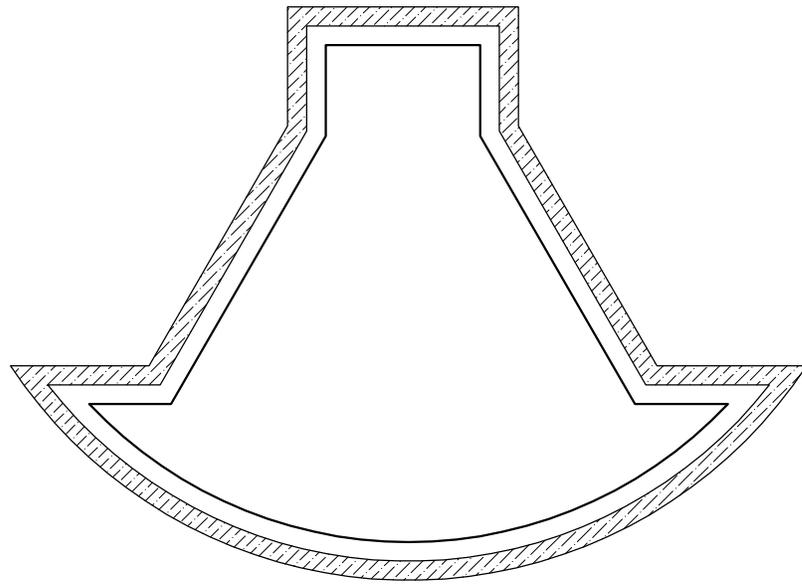
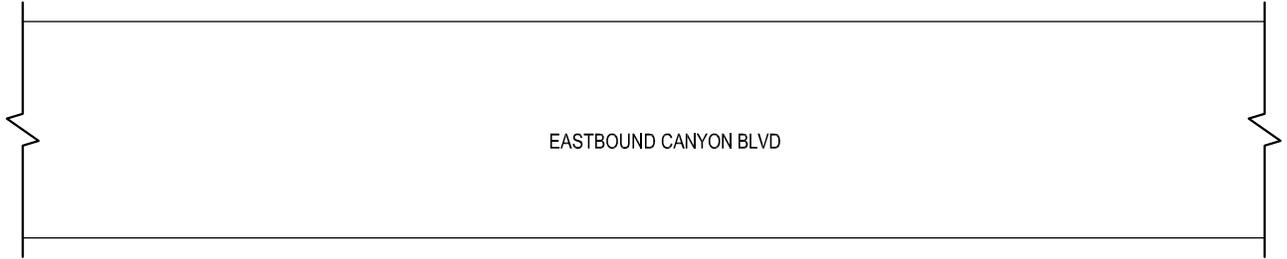
The superstructure above the concrete stem wall is constructed of plywood sheathing with unknown backup framing. The flood protection elevation extends approximately 2.38 feet above the concrete stem wall. Although it is unclear how the shell is framed, the loads are minimal above the stemwall, and the shell back-up framing would likely not require reinforcing. As indicated in Table 7.1, the flood protection elevation is approximately 1.17 feet above the stage elevation. Due to the fact that the floor is not fully enclosed, it is impractical to floodproof the structure without either raising the floor elevation, or providing a flood wall along the front of the stage extending above the flood protection elevation. During a 100-year flood event the stage floor would be submerged, and potentially water-damaged depending on the duration of the flood event.

7.3.3. Opinion of Probable Cost for Structural Improvements

We estimate that the cost to floodproof the foundation elements of the Bandshell building to be approximately **\$9,050**. This cost does not include any work to floodproof the superstructure elements due to the impracticalities involved. This cost also does not include architectural elements (such as door gaskets, membranes, elevator float switches), utility relocation or retrofitting, loss of use during construction, etc.

The market value of the Bandshell structure is \$259,759 based on the current insured value provided by City of Boulder staff. 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. Additionally, the structure is located in the high hazard zone

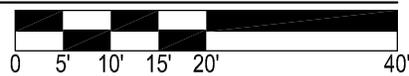
based on both the 1994 study and the 2012 study, and is therefore prohibited from being reconstructed in the event of substantial damage in accordance with 9-3-5(d)(2) of the City of Boulder Revised Code.



PLAN NORTH

BANDSHELL IMPROVEMENTS

1" = 20'



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. Based on the flood and soil parameters for the two sites, the flooding would submerge the main level of the Atrium and scour would undermine the Bandshell footings. While catastrophic structural damage to the Atrium building is minimal, partial collapse of the Bandshell is likely. However, the cost to provide additional protection is relatively low. The needed structural improvements are estimated to be \$187,130 for the Atrium and \$9,050 for the Bandshell. Though somewhat restricted by the mature trees around each structure, access is generally good. As mentioned elsewhere in the report, additional costs would be 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*

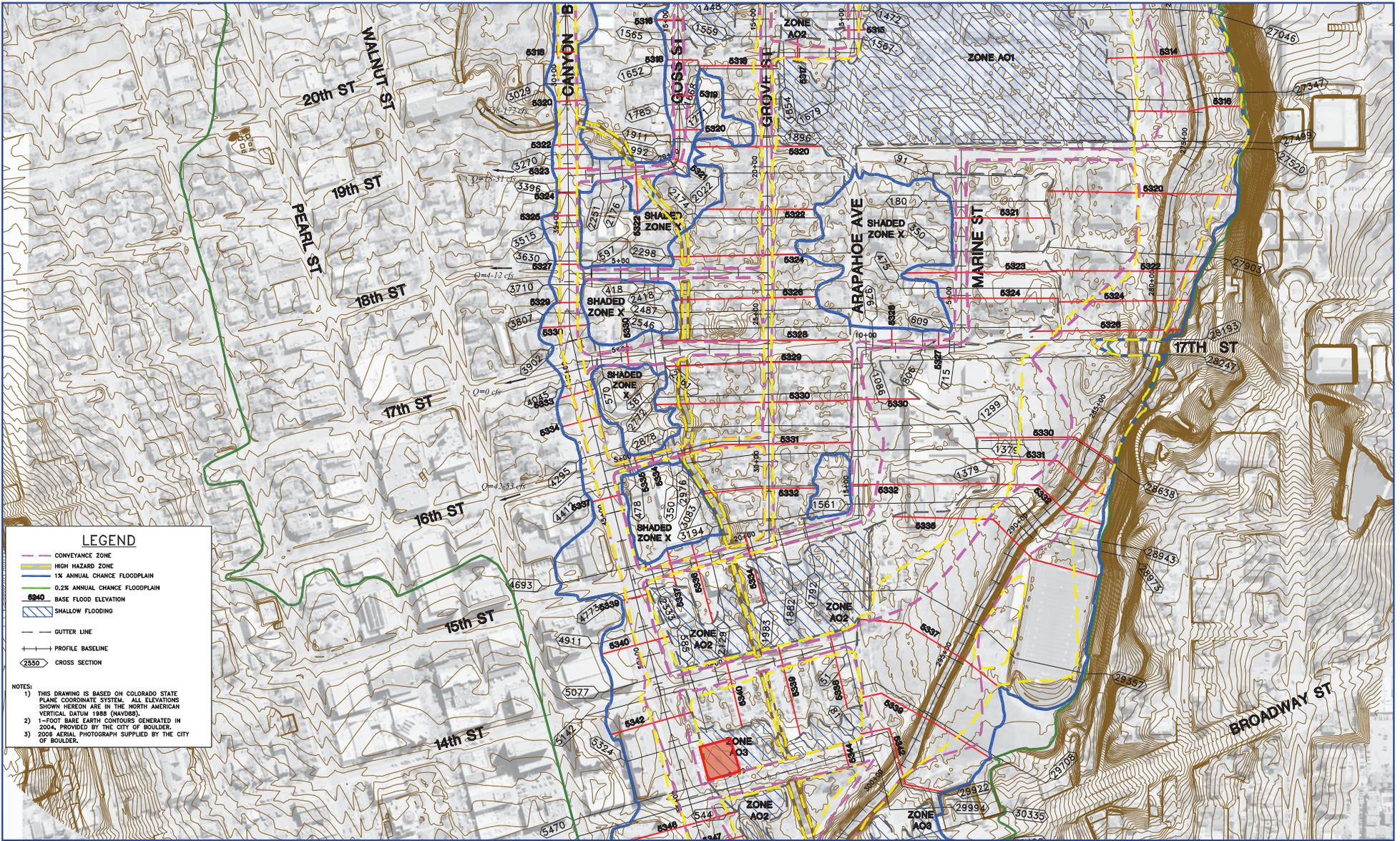
Colorado State University: *Colorado State University Pier Scour Equation (modified from Richardson and others)*, 1993.



Appendix A

Flood Study Information

A: COBLDR02 Boulder Creek Pk 2 (Upgrading Topo July0711) Local BOULDER CREEK FPD WORKMAPS August 2012 Altitude.dwg 10/31/2012 8:00 AM



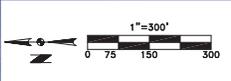
LEGEND

- 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:

- THIS DRAWING IS BASED ON COLORADO STATE PLANE COORDINATE SYSTEM. ALL ELEVATIONS SHOWN HEREON ARE IN THE NORTH AMERICAN VERTICAL DATUM IN 1988 (NAVD83).
- 1-FOOT BARE EARTH CONTOURS GENERATED IN 2004, PROVIDED BY THE CITY OF BOULDER.
- 2005 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 All	DESIGNED BY:	JMA
DATE:	10/31/2012	CHECKED BY:	GJK

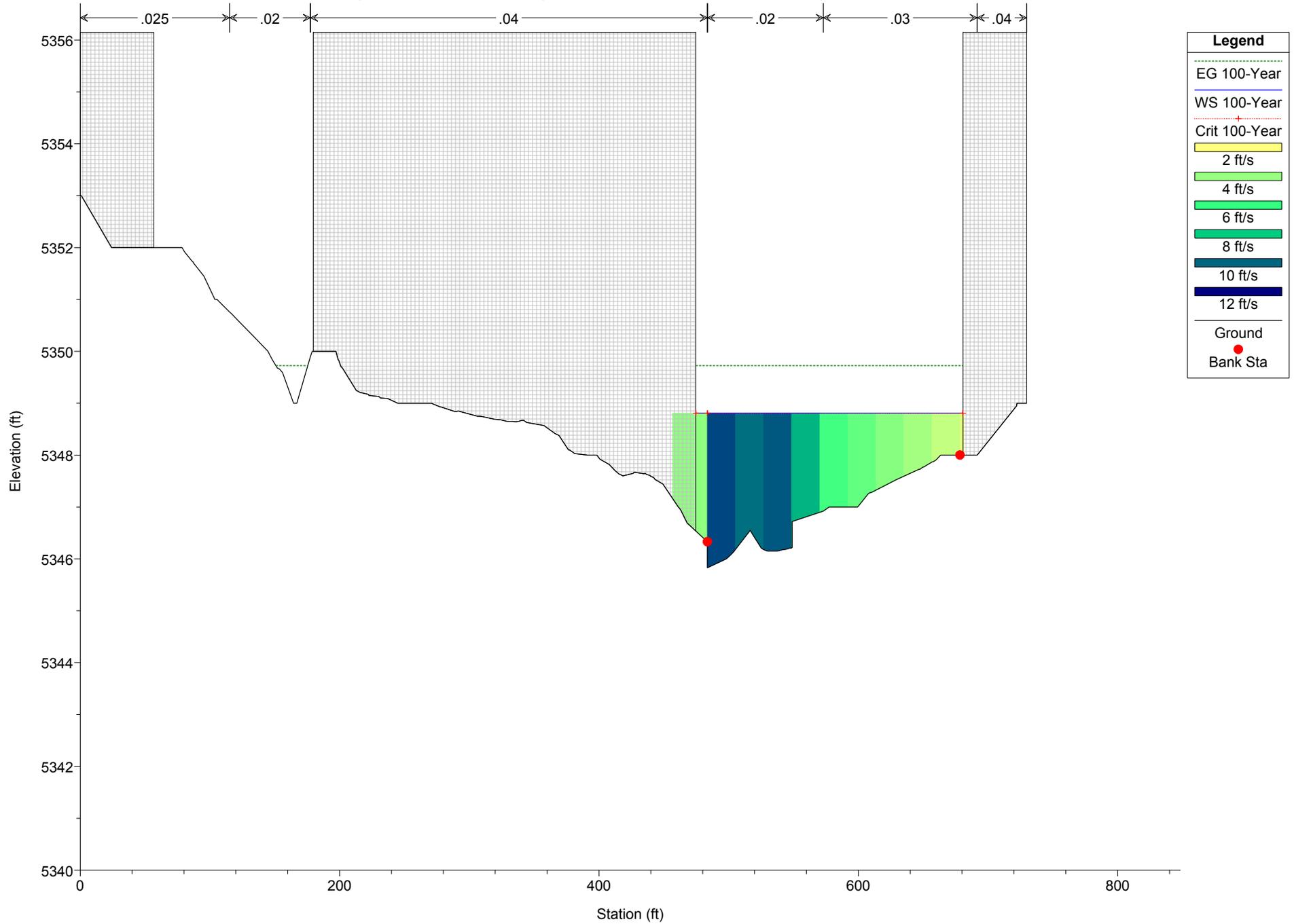
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 www.andersonce.com

CITY OF BOULDER
BOULDER CREEK FLOODPLAIN STUDY

BOULDER CREEK
FLOOD HAZARD WORKMAP

COBLDR02 Plan: 100-yr w/o Roche (Oct 2012) 10/25/2012

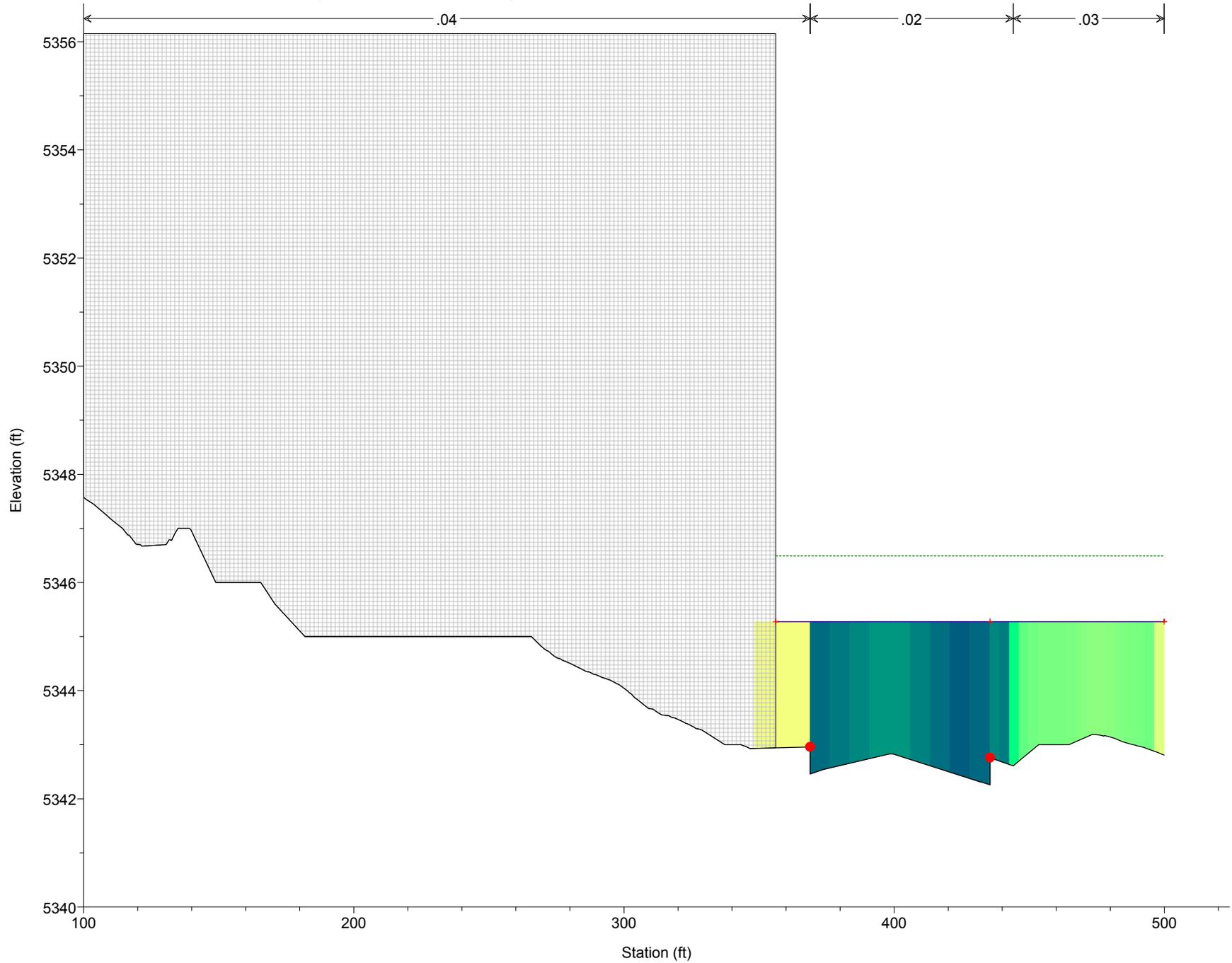
River = Canyon Blvd Reach = Broadway-13th RS = 5829 DS side of Broadway, main channel station 30335.



1 in Horiz. = 100 ft 1 in Vert. = 2.5 ft

Plan: 100-yr Canyon Blvd Broadway-13th RS: 5829 Profile: 100-Year

E.G. Elev (ft)	5349.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.92	Wt. n-Val.	0.040	0.022	0.030
W.S. Elev (ft)	5348.81	Reach Len. (ft)	305.00	305.00	305.00
Crit W.S. (ft)	5348.81	Flow Area (sq ft)	21.54	361.35	1.69
E.G. Slope (ft/ft)	0.005436	Area (sq ft)	21.54	361.35	1.69
Q Total (cfs)	2904.88	Flow (cfs)	90.43	2810.13	4.32
Top Width (ft)	206.00	Top Width (ft)	9.08	194.82	2.10
Vel Total (ft/s)	7.55	Avg. Vel. (ft/s)	4.20	7.78	2.55
Max Chl Dpth (ft)	2.98	Hydr. Depth (ft)	2.37	1.85	0.81
Conv. Total (cfs)	39400.4	Conv. (cfs)	1226.6	38115.3	58.5
Length Wtd. (ft)	305.00	Wetted Per. (ft)	11.35	195.83	2.91
Min Ch El (ft)	5345.83	Shear (lb/sq ft)	0.64	0.63	0.20
Alpha	1.04	Stream Power (lb/ft s)	2.70	4.87	0.50
Frctn Loss (ft)	1.61	Cum Volume (acre-ft)	0.23	2.25	0.72
C & E Loss (ft)	0.03	Cum SA (acres)	0.08	0.92	0.23



Legend	
EG 100-Year	(Dotted Green Line)
WS 100-Year	(Solid Blue Line)
Crit 100-Year	(Solid Black Line with Red Cross)
4 ft/s	(Yellow)
6 ft/s	(Light Green)
8 ft/s	(Medium Green)
10 ft/s	(Dark Green)
12 ft/s	(Dark Blue)
Ground	(Solid Black Line)
Bank Sta	(Red Dot)

1 in Horiz. = 50 ft 1 in Vert. = 2.5 ft

Plan: 100-yr Canyon Blvd Broadway-13th RS: 5524 Profile: 100-Year

E.G. Elev (ft)	5346.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.22	Wt. n-Val.	0.040	0.020	0.028
W.S. Elev (ft)	5345.27	Reach Len. (ft)			
Crit W.S. (ft)	5345.27	Flow Area (sq ft)	29.58	178.32	149.41
E.G. Slope (ft/ft)	0.005149	Area (sq ft)	29.58	178.32	149.41
Q Total (cfs)	2904.88	Flow (cfs)	123.62	1798.08	983.18
Top Width (ft)	143.79	Top Width (ft)	12.74	66.65	64.40
Vel Total (ft/s)	8.13	Avg. Vel. (ft/s)	4.18	10.08	6.58
Max Chl Dpth (ft)	3.01	Hydr. Depth (ft)	2.32	2.68	2.32
Conv. Total (cfs)	40482.9	Conv. (cfs)	1722.8	25058.3	13701.8
Length Wtd. (ft)		Wetted Per. (ft)	15.07	67.64	66.88
Min Ch El (ft)	5342.26	Shear (lb/sq ft)	0.63	0.85	0.72
Alpha	1.19	Stream Power (lb/ft s)	2.64	8.55	4.73
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	0.05	0.36	0.19
C & E Loss (ft)	0.08	Cum SA (acres)			

Appendix B

Structural Calculations

Band Shell - Scour Analysis

Based on Cross Section 5829/5524

Maryland Abutment Scour Equation:

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

$d_{sc} =$	3.12	Feet	Depth of Scour
$y_1 =$	2.63	Feet	Upstream Flow Depth
$V_e =$	7.38	Ft/sec	Average Velocity of Flow
$D_{50} =$	0.013	Feet	Diameter of Particles for which 50% are Smaller in the Bed Material
$q =$	19.41	cfs/ft	Unit-Width Flow
$V_{c50} =$	3.09	Ft/sec	Critical Velocity for D_{50} Bed Material Size
$K_u =$	11.17		
$d =$	4.86	Feet	Total Flow Depth in Contraction
$x =$	0.77		Exponent in Computing d
$FS =$	1.4		Factor of Safety (Between 1.2 & 1.4)

Atrium Building - Scour Analysis

Based on 0.5 Ft Above Grade (AO Zone)

Maryland Abutment Scour Equation:

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

$d_{sc} =$	3.80	Feet	Depth of Scour
$y_1 =$	3	Feet	Upstream Flow Depth
$V_e =$	7.99	Ft/sec	Average Velocity of Flow
$D_{50} =$	0.013	Feet	Diameter of Particles for which 50% are Smaller in the Bed Material
$q =$	23.97	cfs/ft	Unit-Width Flow
$V_{c50} =$	3.15	Ft/sec	Critical Velocity for D_{50} Bed Material Size
$K_u =$	11.17		
$d =$	5.72	Feet	Total Flow Depth in Contraction
$x =$	0.77		Exponent in Computing d
$FS =$	1.4		Factor of Safety (Between 1.2 & 1.4)

Band Shell - Flood Analysis

Design Criteria (FEMA FIA-TB-3):

General:	
Velocity of Water (V) =	7.38 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) =	4.63 ft
Depth of Saturated Soil (D) =	0.0 ft
$F_h = 1/2wH^2 =$	<u>669</u> #
$F_{sat} = 1/2SD^2 + F_h =$	<u>669</u> #
Buoyancy Force:	
Area of Horizontal Surface (A _h) =	1.00 ft ²
Depth of Building Below Flood Protection Elevation (H) =	4.63 ft
$F_h = wA_hH =$	<u>289</u> #
Hydrodynamic Force:	
Drag Coefficient (C _d) =	1.25
Area of Vertical Surface (A _v) =	4.63 ft ²
$F_d = C_d m 1/2V^2 A_v =$	<u>306</u> #
Debris (Normal) Impact Force:	
Weight of Object (W) =	5000 #
Duration of Impact (t) =	0.5 sec
$F_i = WV/(gt) =$	<u>2292</u> #
Special Impact Force:	
$F_{is} =$	<u>100</u> plf

Atrium - Flood Analysis

Design Criteria (FEMA FIA-TB-3):

General:	
Velocity of Water (V) =	7.99 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) =	5.00 ft
Depth of Saturated Soil (D) =	0.0 ft
$F_h = 1/2wH^2 =$	<u>780</u> #
$F_{sat} = 1/2SD^2 + F_h =$	<u>780</u> #
Buoyancy Force:	
Area of Horizontal Surface (A _h) =	1.00 ft ²
Depth of Building Below Flood Protection Elevation (H) =	5.00 ft
$F_h = wA_hH =$	<u>312</u> #
Hydrodynamic Force:	
Drag Coefficient (C _d) =	1.25
Area of Vertical Surface (A _v) =	5.00 ft ²
$F_d = C_d m 1/2 V^2 A_v =$	<u>387</u> #
Debris (Normal) Impact Force:	
Weight of Object (W) =	5000 #
Duration of Impact (t) =	0.5 sec
$F_i = WV/(gt) =$	<u>2481</u> #
Special Impact Force:	
$F_{is} =$	<u>100</u> plf

Appendix C

Opinion of Probable Cost

City of Boulder
1300 Canyon Blvd
Boulder, Colorado, 80302
Date: 01-Feb-13

Atrium Building
Year 2013
Unit Summary Report

Prepared By:
Daniel Knapp
Anthem, LLC

Division Description	Total
Division 03 Concrete	\$61,752.26
Division 08 Openings	\$80,000.00
Subtotal	\$141,752.26
General Contractor's Markup on Subs	10.00% \$6,175.23
Subtotal	\$147,927.49
General Conditions	10.00% \$14,792.75
Subtotal	\$162,720.24
General Contractor's Overhead and Profit	15.00% \$24,408.04
Grand Total	\$187,128.27

City of Boulder
1300 Canyon Blvd
Boulder, Colorado, 80302
Date: 01-Feb-13

Atrium Building
Year 2013
Unit Detail Report

Prepared By:
Daniel Knapp
Anthem, LLC

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	3,600.00	SFCA	\$7.25	\$26,100.00
032110600700		<input checked="" type="checkbox"/>	Reinforcing Steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	14.70	Ton	\$1,696.13	\$24,933.11
032110600700		<input checked="" type="checkbox"/>	Reinforcing Steel, in place, under 10 ton job, #3 to #7, add	1.00		\$342.04	\$5,027.96
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	44.40	C.Y.	\$109.46	\$4,860.02
033105703250		<input checked="" type="checkbox"/>	Structural concrete, placing, grade beam, pumped, includes leveling (strike off) & consolidation, excludes material	44.40	C.Y.	\$18.72	\$831.17
Division 03 Concrete Subtotal							\$61,752.26
Division 08 Openings							
083456100010		<input type="checkbox"/>	Floodgate 4' wide, 4' high	2.00	Ea.	\$40,000.00	\$80,000.00
Division 08 Openings Subtotal							\$80,000.00

City of Boulder
 1236 Canyon Blvd
 Boulder, Colorado, 80302
 Date: 01-Feb-13

Central Park Bandshell - Riprap
Year 2013
Unit Summary Report

Prepared By:
Daniel Knapp
Anthem, LLC

Division Description	Total
Division 31 Earthwork	\$6,497.40
Subtotal	\$6,497.40
General Contractor's Markup on Subs	10.00% \$649.74
Subtotal	\$7,147.14
General Conditions	10.00% \$714.71
Subtotal	\$7,861.85
General Contractor's Overhead and Profit	15.00% \$1,179.28
Grand Total	\$9,041.13

City of Boulder
1236 Canyon Blvd
Boulder, Colorado, 80302
Date: 01-Feb-13

Central Park Bandshell - Riprap
Year 2013
Unit Detail Report

Prepared By:
Daniel Knapp
Anthem, LLC

LineNumber	  	Description	Quantity	Unit	Total Incl. O&P	Ext. Total Incl. O&P
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	100.00	B.C.Y.	\$6.13	\$613.00
312323130015	<input checked="" type="checkbox"/>	Backfill, light soil, by hand, no compaction	40.00	L.C.Y.	\$24.78	\$991.20
312323130600	<input checked="" type="checkbox"/>	Backfill and compact, by hand, 6" layers, compaction in layers, vibrating plate, add to above	40.00	E.C.Y.	\$6.41	\$256.40
313713100200	<input checked="" type="checkbox"/>	Rip-rap and rock lining, random, broken stone, 18" minimum thickness, machine placed for slope protection, not grouted	60.00	S.Y.	\$77.28	\$4,636.80
Division 31 Earthwork Subtotal						\$6,497.40