CITY OF ALBUQUERQUE

September 28, 2009

Brooke Garcia, PE
HDR Engineering, Inc
2155 Louisiana Blvd, NE, Ste. 9500
Albuquerque, NM 87110

please include in file

Re: Seville Park Drainage Report

Engineer Stamp not provided (A10/~~D2A~~) D2C1

Dear Ms. Garcia,

Based upon information provided in your submittal dated 8-26-09 and AMAFCA's concurrence, the above referenced report and addendums is approved for Work Order. Any minor comments can be addressed at DRC. In the future, please stamp, sign and date your engineering submittals and provide a filled-out Drainage and Transportation Information Sheet in order to allow us to track the project properly.

If you have any questions, you can contact me at 924-3986.

Sincerely,

Bradley L. Bingham

Bradley L. Bingham, PE
Principal Engineer, Planning Dept.
Development and Building Services

C: file

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

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Memo

To:	Greg Miller, Morrow Reardon Wilkinson Miller, Ltd.		
From:	Brooke Garcia, P.E., HDR Engineering, Inc.	Project:	Seville Park
CC:	Brad Bingham, City of Albuquerque Hydrology, and Lynn Mazur, AMAFCA		
Date:	August, 2009	Job No:	115503

RE: Hydrology & Hydraulics – Seville Park

The purpose of this memo is to document the hydrologic and hydraulic analyses for the construction of Seville Park, located at the intersection of Kayenta Blvd. NW and Burgos Ave. NW in Albuquerque, NM. The proposed park will include drainage improvements and mitigation of historic and non-historic runoff resulting from park construction. The improvements will include site grading and installation of storm drain infrastructure, which will tie into existing infrastructure. The vicinity of the proposed park is shown in Attachment A. The FEMA floodplain map for the project location was evaluated for potential boundary conflicts. The proposed improvements will not impact the existing floodplain. Floodplain information is included in Attachment A for reference.

Project Information, Location, and Background

Key information regarding location, the nature of the proposed work, FEMA floodplain mapping, and hydraulic modeling are shown in Table 1.

Table 1 – Key Project and Stream Information

Stream Information	
Stream/Canal:	Calabacillas Arroyo
Description of Proposed Work:	Construct Swale and Storm Drain Infrastructure
FEMA	
Community Name and Number:	Albuquerque, City of, #350002
Flood Insurance Study and Date:	Bernalillo County, New Mexico and Incorporated Areas – Revised September 26, 2008
FIRM Panel and Effective Date:	35001C0103G, Revised September 26, 2008
Flood Zones in Project Reach:	Zone A
Hydraulic Modeling	
Model and Version	Bentley StormCAD V8 XM / Bentley FlowMaster
Model Filename	Seville_SD_Prop.stm / Seville_Park.fm8
Model Vertical Datum	NAVD 88

RECEIVED
AUG 26 2009
HYDROLOGY SECTION

Design Criteria and Permitting

Due to the fact that the proposed improvements will not encroach on the established FEMA floodplain limits, and access to the Calabacillas Arroyo will not be required, no permitting coordination will be initiated with either the US Army Corp of Engineers or FEMA.

Floodplain Permitting Requirements.

The minimum federal regulatory requirement pertaining to encroachments into the floodway is defined by 44 CFR 60.3 (c) (10):

> *(3) Prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge;*

This regulation only applies to encroachments into the floodway. In this instance, the proposed improvements will not encroach on the established FEMA floodplain limits, therefore no permitting is required. Figure A-1 in Attachment A includes an overall site layout map including the FEMA floodplain boundary.

Hydrology

Guidelines set in Section 22.2 of the Albuquerque Development Process Manual (DPM) were used in the determination of 100-year runoff values for both existing and proposed conditions.

Existing Conditions

Existing topography of the Seville Park site was provided by Rio Grande Surveying Co. of Albuquerque, NM. The elevation data provided in the survey is based on the NAVD 88 vertical datum. Existing conditions watershed delineation yielded three basins (See Attachment B). The Land Treatment for all existing conditions basins was classified as: *Treatment A – Soil uncompacted by human activity with 0 to 10 percent slopes*. (For full Land Treatment description, please refer to Attachment B). See Table 2 below for a summary of the existing conditions hydrology.

Proposed Conditions

Proposed contours of the Seville Park site were provided by Morrow Reardon Wilkinson Miller, Ltd. of Albuquerque, NM. The elevation data provided in the survey is based on the NAVD 88 vertical datum. Proposed conditions watershed delineation yielded three basins (See Appendix A). The Land Treatment for proposed conditions basins were classified as follows (see Appendix A for full Land Treatment descriptions of each):

- Basin 100 – *Treatment B – Irrigated lawns, parks, and golf courses with 0 to 10 percent slopes*,
- Basin 200 – 40% *Treatment B – Irrigated lawns, parks, and golf courses with 0 to 10 percent slopes*, 60% *Treatment D – Impervious areas, pavement, and roofs*,
- Basin 300 – *Treatment B – Irrigated lawns, parks, and golf courses with 0 to 10 percent slopes*.

See Table 2 below for a summary of the proposed conditions hydrology. Proposed conditions hydrology was used in the design and analysis of Seville Park storm water runoff mitigation (discussed in Hydraulics section on Page 3).

Table 2 – Existing and Proposed Conditions Hydrology

Existing Conditions		
Basin ID	**Area (ac)**	**100-yr Flow Rate (cfs)**
BASIN 10	2.23	2.87
BASIN 20	1.67	2.16
BASIN 30	1.51	1.95
Proposed Conditions		
Basin ID	**Area (ac)**	**100-yr Flow Rate (cfs)**
BASIN 100	2.70	5.49
BASIN 200	0.67	2.31
BASIN 300	1.16	2.35

Hydraulics

Bentley StormCAD V8 XM and Bentley FlowMaster were used to perform hydraulic modeling for the proposed storm drain infrastructure and park valley gutter, respectively. In this section, existing and proposed model development and results are discussed.

Storm Drain Infrastructure Design & Analysis

Existing Conditions. The existing storm drain infrastructure includes a 42" RCP that runs along the eastern edge of the Seville Park lot. Attachment C includes a plan view layout and configuration of the existing storm drain. This storm drain conveys runoff from Burgos Ave. and the existing Seville Park lot. The flow is directed toward the Calabacillas Arroyo, where it discharges through the concrete wingwall of the arch culvert under Kayenta Boulevard. Near the southeastern corner of Seville Park, a 36" CMP standpipe ties into the existing 42" RCP. This standpipe directs runoff from the existing Seville Park lot to the underlying 42" RCP, and will provide runoff conveyance of proposed conditions flows.

An existing conditions model was developed by HDR using Bentley StormCAD V8 XM. Flow rates used in hydraulic analysis were obtained from As-Built drawings provided by the City of Albuquerque (COA). A results summary of the existing model is provided in Table 3 below. Attachment C contains raw data and model output of the existing conditions model.

Proposed Conditions. The proposed Seville Park will include a paved parking area enclosed by a curb. The parking lot grading directs the on-site runoff to a low point along the eastern curb, where a storm drain inlet will be installed. This inlet will connect to the existing 42" RCP at the location of the 36" CMP standpipe via a 24" RCP. Refer to Attachment C for the proposed conditions storm drain inlet and pipe layout.

A proposed conditions model was developed by HDR using Bentley StormCAD V8 XM. According to our analysis, the proposed configuration is sufficient, with both the hydraulic grade and energy grade lines well beneath the ground level (see Figure 1 below). A comparison of the existing versus proposed model results is provided in Table 3 below. Attachment C contains raw data and detailed model output of the proposed conditions model.

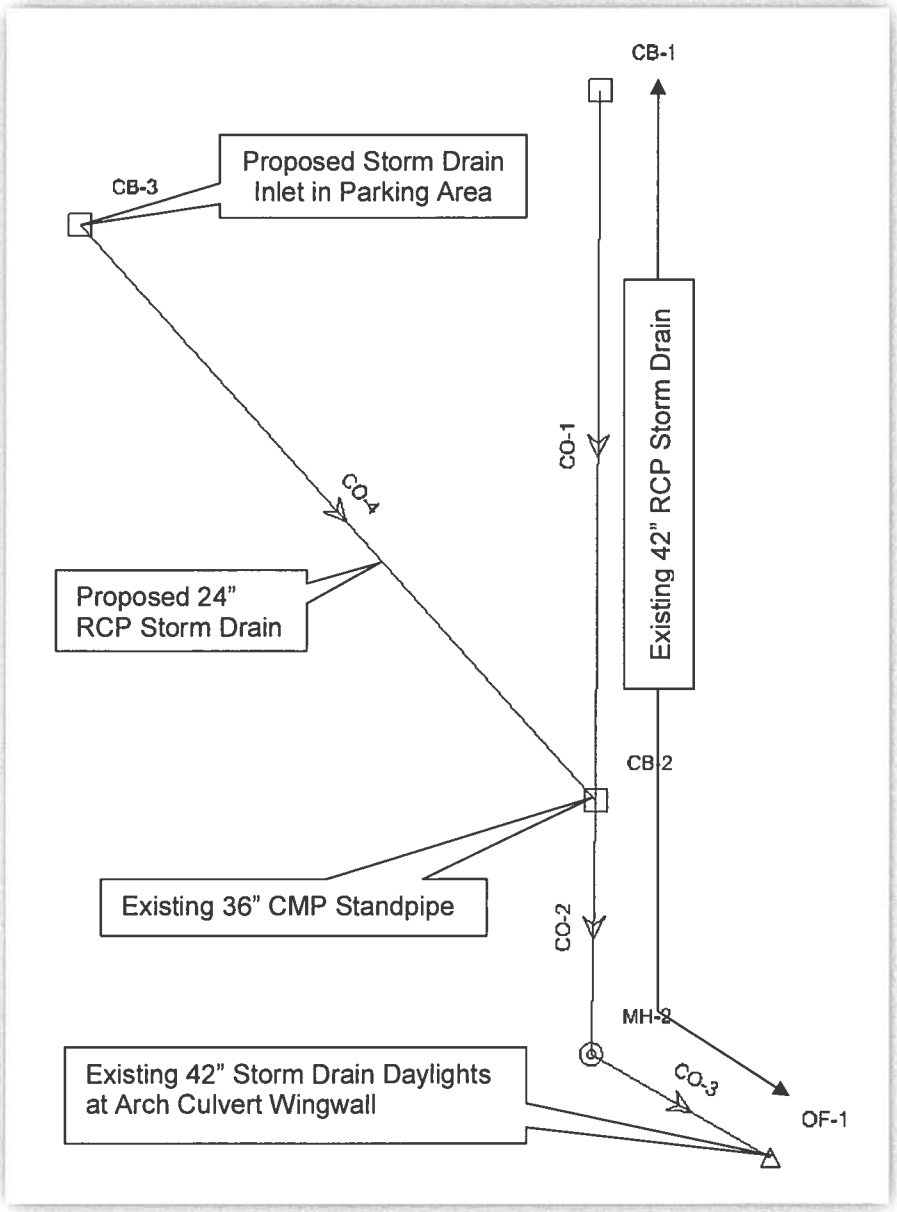

Figure 1 - StormCAD Hydraulic Model Schematic

Model Assumptions. Limitations of the project scope required some assumptions to be made in order to conduct a reasonable proposed conditions storm drain model. These assumptions were as follows:

- Modeling of the existing 36" standpipe assumed the structure to be a catch basin with 100% collection of the 100-yr event. This method was considered conservative given the actual standpipe extends approximately 3 feet above the ground level and has drilled holes which control flow intake and create ponding around the standpipe until overtopping occurs. At the point of overtopping, the standpipe would behave as a weir. In essence, the total contributing 100-yr runoff is added at this node as opposed to a lower, attenuated flow rate. See Attachment C for site photos of existing 36" standpipe.
- The junction of the existing 42" RCP, 36" CMP standpipe, and the proposed 24" RCP was modeled as a manhole. Manhole size at this junction was assumed to be 8 feet in diameter. This dimension was not provided in the survey and the 8 foot diameter assumption was determined reasonable based on information collected during a site visit.

Table 3 – Results of Existing and Proposed Storm Drain Hydraulic Analysis

Existing Conditions					
Label	**Node - Upstream/ Downstream**	**Diameter (in)**	**Flow (ft³/s)**	**HGL - Upstream/ Downstream**	**EGL - Upstream/ Downstream**
CO-1	CB-1 CB-2	42	99.74	5,359.77 5,356.71	5,361.70 5,357.06
CO-2	CB-2 MH-2	42	102.61	5,355.30 5,354.31	5,358.48 5,355.11
CO-3	MH-2 OF-1	42	102.61	5,353.10 5,349.96	5,356.32 (N/A)
Proposed Conditions					
Label	**Node - Upstream/ Downstream**	**Diameter (in)**	**Flow (ft³/s)**	**HGL - Upstream/ Downstream**	**EGL - Upstream/ Downstream**
CO-1	CB-1 CB-2	42	99.74	5,359.77 5,357.27	5,361.70 5,357.67
CO-2	CB-2 MH-2	42	109.84	5,355.64 5,354.51	5,359.29 5,355.41
CO-3	MH-2 OF-1	42	109.84	5,353.17 5,350.06	5,356.75 (N/A)
CO-4	CB-3 CB-2	24	2.31	5,365.90 5,357.27	5,366.09 5,357.67

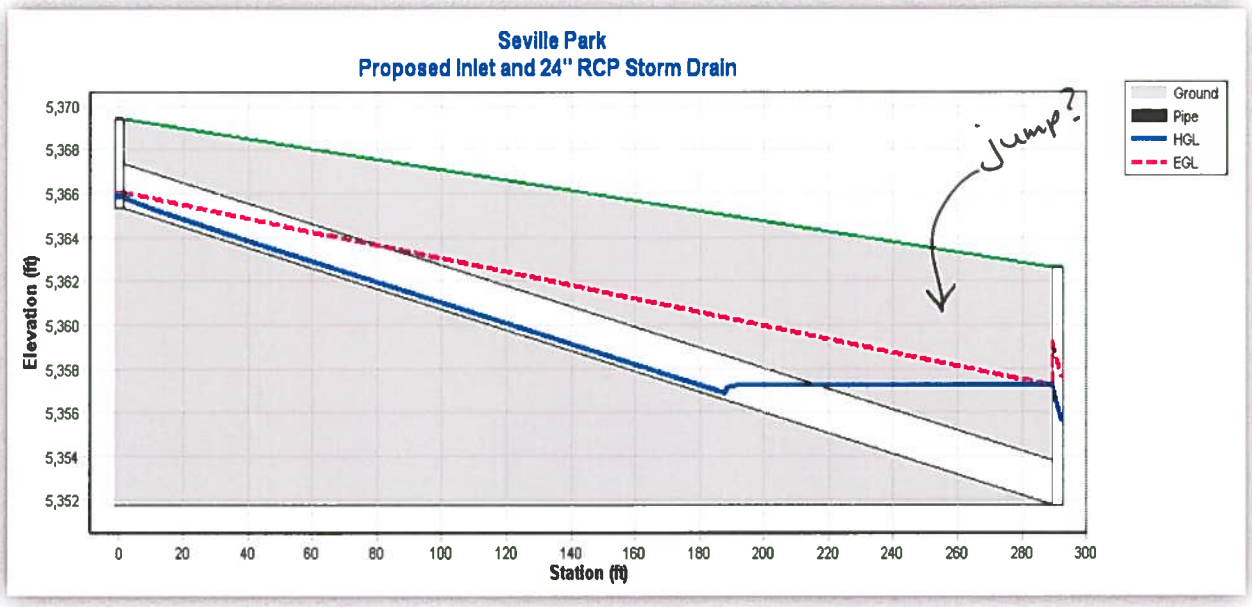

Figure 2 - Proposed 24" RCP Storm Drain Profile

Valley Gutter Design & Analysis

Existing Site Flow Patterns. In determining existing conditions flow patterns, streamlines, banklines, and flowlines were examined during site visits as well as electronically using aerial photography and existing contour information in AutoCAD. The existing topography of the Seville Park lot generally directs runoff from

north to south until it reaches the Calabacillas Arroyo. Three main swale-like conveyances were identified and were the basis for the site's existing conditions basin delineation (see Attachment B). No issues with regard to scour or sediment transport were identified during project development.

Proposed Conditions. The proposed park design includes a mow curb and sidewalk along the site perimeter (see plan view in Attachment C). The proposed grading allows site runoff to be directed toward the existing 36" CMP standpipe via a valley gutter and curb configuration. This configuration is desirable because it prevents additional runoff produced by site development from running down the banks of the Calabacillas Arroyo, which would likely result in bank erosion. As shown in Attachment C, Figure C-2, two valley gutter sections were designed for storm water conveyance, Sections A & B. Curb and gutter geometry used in the hydraulic analysis was based on Drawings 2420 and 2421 of the COA's Standard Drawings.

The proposed valley gutter Section A will run along the north side of the proposed sidewalk and a 4-inch curb will be placed along the south side of the sidewalk, resulting in the configuration shown in Figure 3. The proposed valley gutter will be bound by turf on its northern edge. Section B begins where Section A crosses under the proposed sidewalk (See Attachment C, Figure C-2). Gutter Section B includes a 4" curb with a valley gutter section and is bound by turf on its northern edge (See Figure 3).

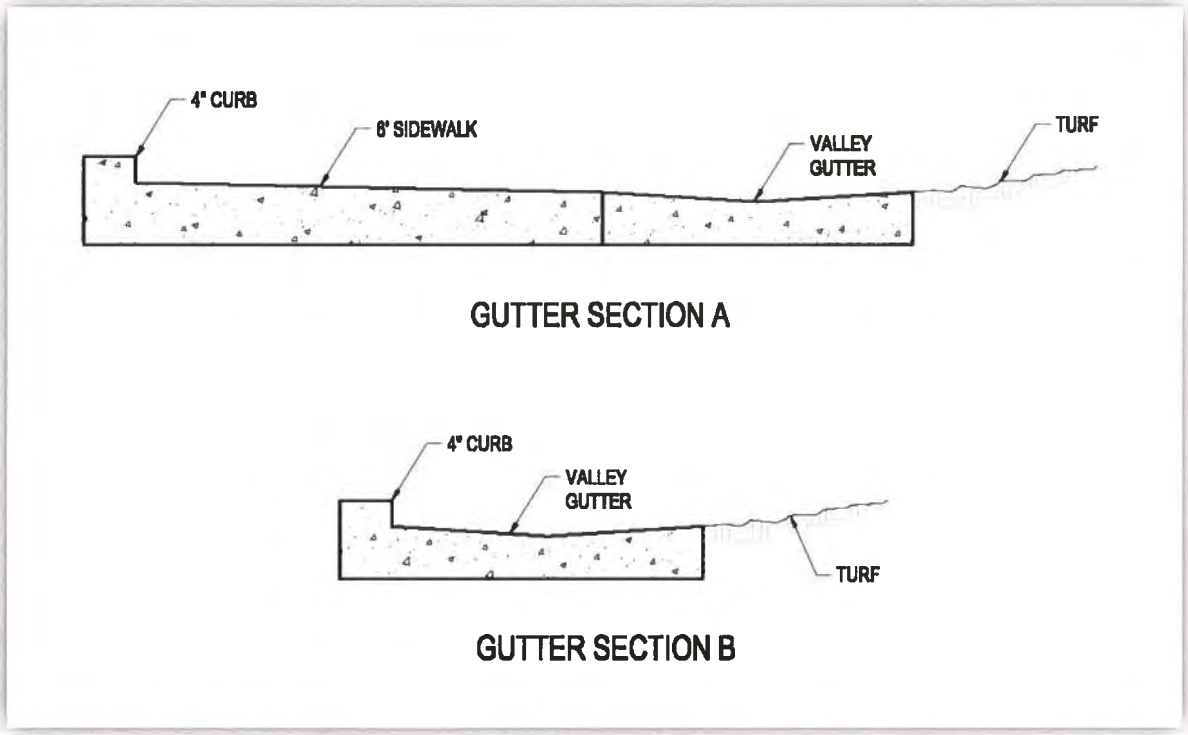

Figure 3 - Proposed Valley Gutter Sections

Roughness values associated with the proposed design were determined using Bentley FlowMaster's Material Library. Flow rates used in this analysis are provided in the Hydrology Section of this report. Table 4 provides a summary of the hydraulic analysis of the three valley gutter typical sections used in the Seville Park final design.

Table 4 – Hydraulic Analysis Results for Proposed Valley Gutter Sections

	Flow Rate (cfs)	Channel Slope (ft/ft)	Normal Depth (in)	Velocity (ft/s)
Section A	2.35	0.011	3.0	1.81
Section B	4.18	0.025	3.7	3.36

Discussion of Results

Construction of the proposed park will result in slightly larger runoff compared to existing conditions. The grading plan for Seville Park has been designed to minimize impacts to the Calabacillas Arroyo by capturing storm water runoff using existing and new infrastructure. The storm water will be released into the Calabacillas Arroyo through the concrete-lined existing storm drain outfall. No work will be performed in area(s) that may be classified as jurisdictional to the US Army Corps of Engineers. There will be no impact to the FEMA-designated floodplain.

Scour and Scour Countermeasures

A detailed scour analysis and scour countermeasure design was not conducted as part of this project. The park will be stabilized with turf and pathways. The outlet into the Calabacillas Arroyo is concrete lined.

Statement of Limitations

The results of this study should not be relied upon for any other purpose than that which is explicitly stated in this report.

References

COA 1997 — City of Albuquerque. 1997. *Development Process Manual.*

FEMA 2008 — Federal Emergency Management Agency. 2008. *Flood Insurance Rate Map – Bernalillo County, New Mexico and Incorporated Areas – Map Number 35001C0103G*. Map Revised 26 September 2008.

Wilson & Co. 2002 — Wilson & Company, Engineers & Architects. 2002. *Drainage Report for Seville Subdivision Unit 4*. February 2002.

Seville Park Hydrology
Based on City of Albuquerque DPM

Existing Conditions:

BASIN 10		
Area	**96934**	ft^2
	2.23	acre
Zone	**1**	
Land Treatment	**A**	
100-yr Q	1.29	cfs/acre
Site Runoff	***2.87***	cfs

BASIN 20		
Area	**72920**	ft^2
	1.67	acre
Zone	**1**	
Land Treatment	**A**	
100-yr Q	1.29	cfs/acre
Site Runoff	***2.16***	cfs

BASIN 30		
Area	**65847**	ft^2
	1.51	acre
Zone	**1**	
Land Treatment	**A**	
100-yr Q	1.29	cfs/acre
Site Runoff	***1.95***	cfs

Proposed Conditions:

BASIN 100		
Area	**117821**	ft^2
	2.70	acre
Zone	**1**	
Land Treatment	**B**	
100-yr Q	2.03	cfs/acre
Site Runoff	***5.49***	cfs

BASIN 200a			BASIN 200b		
Area	**17598**	ft^2	Area	**11732**	ft^2
	0.40	acre		0.27	acre
Zone	**1**		Zone	**1**	
Land Treatment	**D**		Land Treatment	**B**	
100-yr Q	4.37	cfs/acre	100-yr Q	2.03	cfs/acre
Site Runoff	***1.77***	cfs	Site Runoff	***0.55***	cfs
Basin 200 Total Flow=	***2.31***				

BASIN 300		
Area	**50516**	ft^2
	1.16	acre
Zone	**1**	
Land Treatment	**B**	
100-yr Q	2.03	cfs/acre
Site Runoff	***2.35***	cfs

N

ADJACENT PROPERTY BOUNDARY

Burgos Avenue N.W.

Kayenta Boulevard N.W.

BASIN 10
A = 2.23 AC
Q_{100} = 2.87 CFS

BASIN 20
A = 1.67 AC
Q_{100} = 2.16 CFS

BASIN 30
A = 1.51 AC
Q_{100} = 1.95 CFS

EXISTING
STORM DRAIN

BASIN BOUNDARY

Arroyo

Calabacillas

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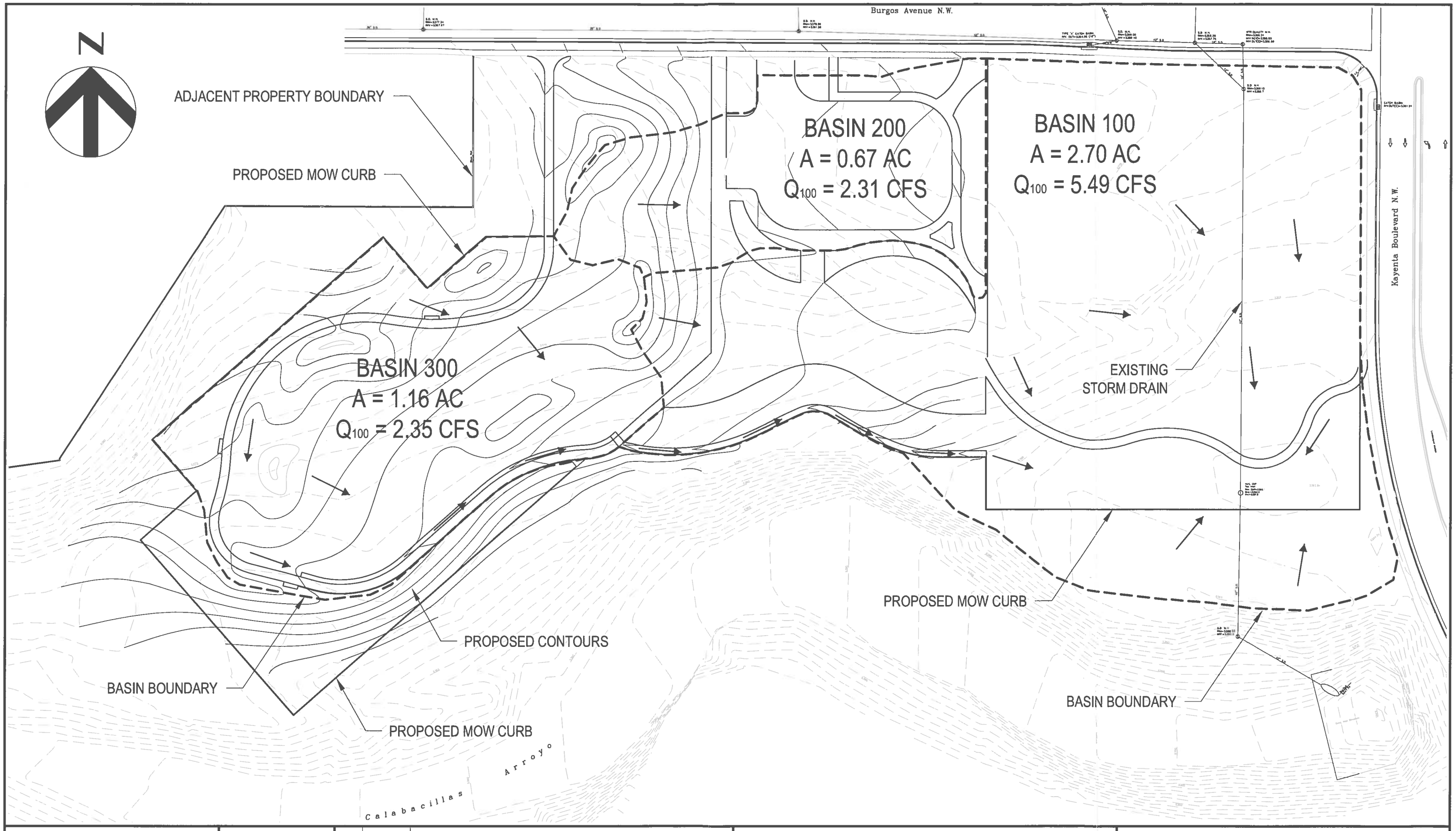
SEVILLE PARK IMPROVEMENTS

FIGURE B-1
EXISTING CONDITIONS HYDROLOGY

0 30' 60'

SCALE: 1" = 60'
COA PROJECT NUMBER: 787493

SHEET
B-1



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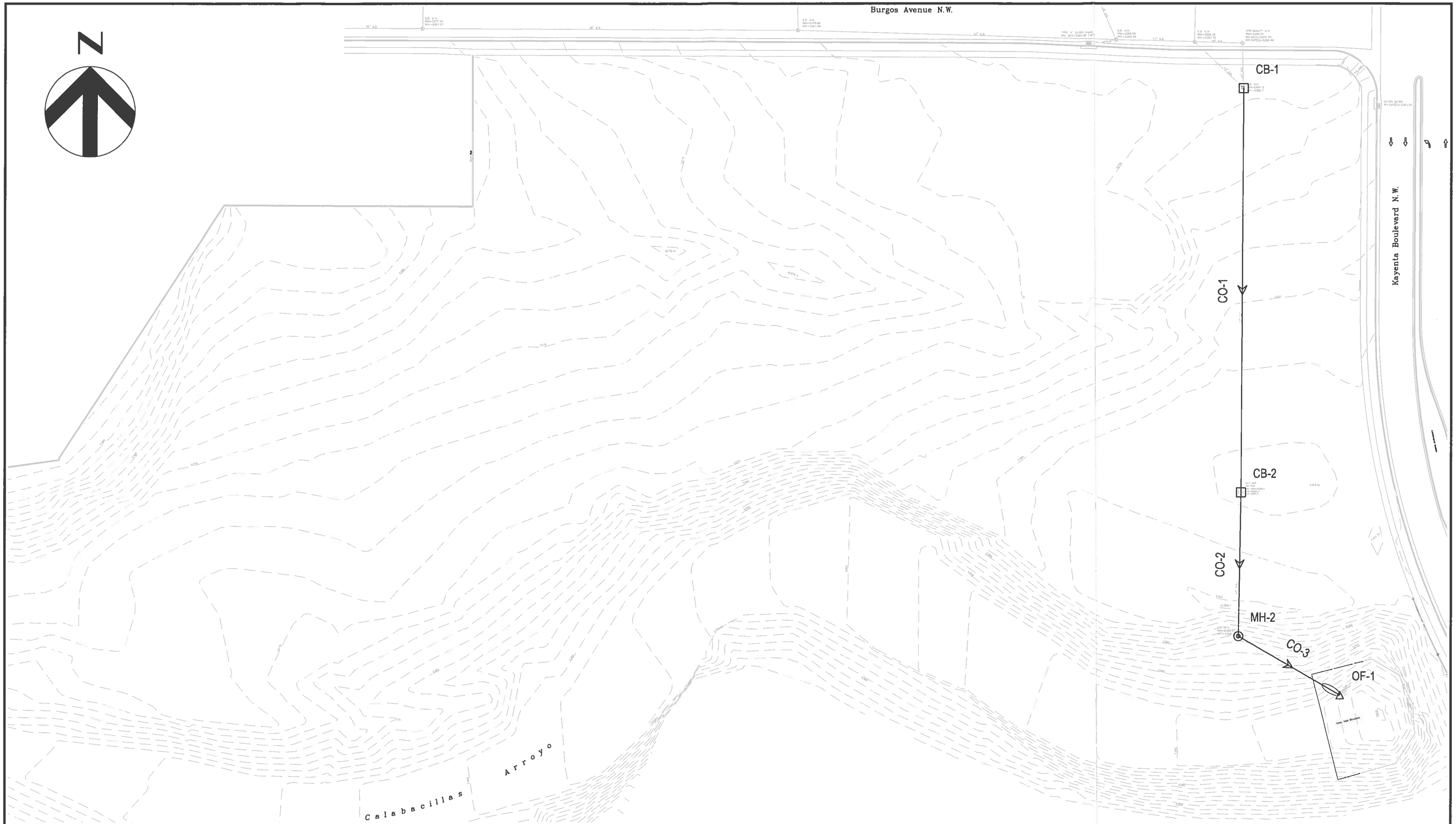
SEVILLE PARK IMPROVEMENTS

FIGURE B-2
PROPOSED CONDITIONS HYDROLOGY

0 30' 60'

SCALE: 1" = 60'
COA PROJECT NUMBER: 787493

SHEET B-2



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DEPARTMENT OF MUNICIPAL DEVELOPMENT

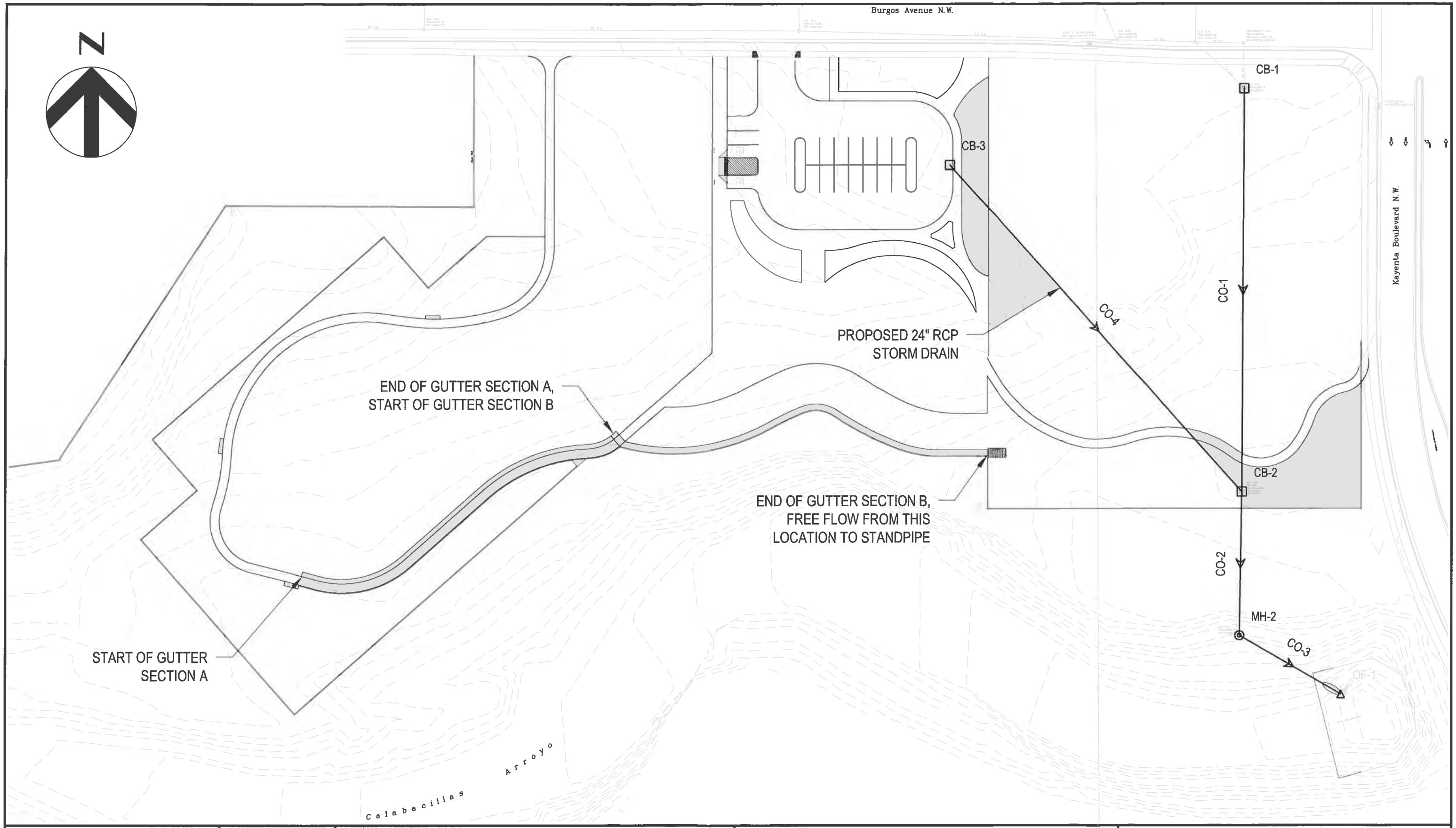
SEVILLE PARK IMPROVEMENTS

FIGURE C-1
EXISTING CONDITIONS
STORMCAD LAYOUT

0 30' 60'

SCALE: 1" = 60'
COA PROJECT NUMBER: 787493

SHEET
C-1



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DEPARTMENT OF MUNICIPAL DEVELOPMENT

SEVILLE PARK IMPROVEMENTS

FIGURE C-2
PROPOSED CONDITIONS
GUTTER & STORMCAD LAYOUT

0 30' 60'

SCALE: 1" = 60'
COA PROJECT NUMBER: 787493

SHEET
C-2

StormCAD Output for Exisitng and Proposed Conditions

Existing Conditions

Label	-Node- Upstream Downstream	Invert Upstream (ft)	Invert Downstream (ft)	Length (ft)	Slope (Calculated) (ft/ft)	Diameter (in)	Material	Manning's n	Flow (ft^3/s)	-HGL- Upstream Downstream (ft)	-EGL- Upstream Downstream (ft)	Velocity (Out) (ft/s)	Headloss (ft)	Section Discharge Capacity (ft^3/s)
CO-1	CB-1	5356.7	5351.8	267	0.018	42	Concrete	0.013	99.74	5359.77	5361.7	10.37	3.32	99.74
	CB-2									5356.71	5357.06			136.29
CO-2	CB-2	5351.8	5350	95	0.019	42	Concrete	0.013	102.61	5355.3	5358.48	10.66	0.99	102.61
	MH-2									5354.31	5355.11			138.48
CO-3	MH-2	5350	5347.74	78	0.029	42	Concrete	0.013	102.61	5353.1	5356.32	15.95	1.2	102.61
	OF-1									5349.96	(N/A)			171.25

Proposed Conditions

Label	-Node- Upstream Downstream	Invert Upstream (ft)	Invert Downstream (ft)	Length (ft)	Slope (Calculated) (ft/ft)	Diameter (in)	Material	Manning's n	Flow (ft^3/s)	-HGL- Upstream Downstream (ft)	-EGL- Upstream Downstream (ft)	Velocity (Out) (ft/s)	Headloss (ft)	Section Discharge Capacity (ft^3/s)
CO-1	CB-1	5356.7	5351.8	267	0.018	42	Concrete	0.013	99.74	5359.77	5361.7	10.37	2.77	99.74
	CB-2									5357.27	5357.67			136.29
CO-2	CB-2	5351.8	5350	95	0.019	42	Concrete	0.013	109.88	5355.64	5359.29	11.42	1.13	109.88
	MH-2									5354.51	5355.41			138.48
CO-3	MH-2	5350	5347.74	78	0.029	42	Concrete	0.013	109.88	5353.17	5356.75	16.25	1.24	109.88
	OF-1									5350.06	(N/A)			171.25
CO-4	CB-3	5365.37	5351.8	291	0.047	24	Concrete	0.013	2.35	5365.9	5366.09	0.75	8.82	2.35
	CB-2									5357.27	5357.67			48.85

Worksheet for Sidewalk/Gutter Section A

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01100	ft/ft
Discharge	2.35	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.92
0+00	0.25
0+06	0.13
0+08	0.00
0+10	0.13
0+30	0.92

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.92)	(0+10, 0.13)	0.013
(0+10, 0.13)	(0+30, 0.92)	0.030

Results

Normal Depth		0.25	ft
Elevation Range	0.00 to 0.92 ft		
Flow Area		1.30	ft²
Wetted Perimeter		13.06	ft
Top Width		13.05	ft
Normal Depth		0.25	ft
Critical Depth		0.25	ft
Critical Slope		0.01069	ft/ft
Velocity		1.81	ft/s
Velocity Head		0.05	ft
Specific Energy		0.30	ft

Worksheet for Sidewalk/Gutter Section A

Results

Froude Number	1.01	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.25	ft
Critical Depth	0.25	ft
Channel Slope	0.01100	ft/ft
Critical Slope	0.01069	ft/ft

Cross Section for Sidewalk/Gutter Section A

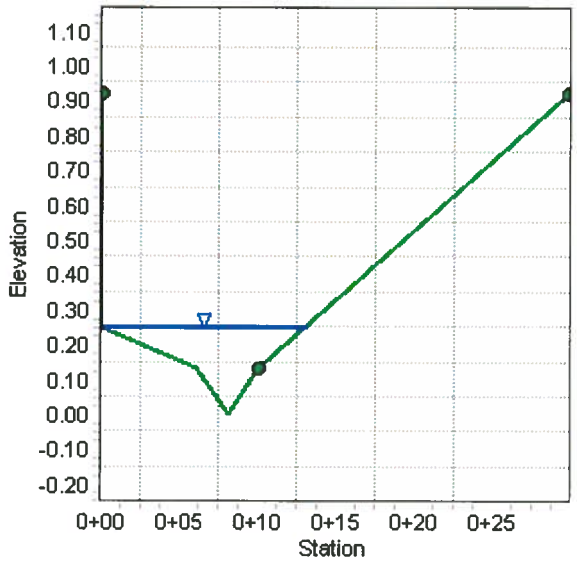
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01100	ft/ft
Normal Depth	0.25	ft
Discharge	2.35	ft^3/s

Cross Section Image



Worksheet for Curb/Gutter Section B

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02500	ft/ft
Discharge	4.18	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.80
0+00	0.13
0+02	0.00
0+04	0.13
0+15	0.80

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.80)	(0+04, 0.13)	0.013
(0+04, 0.13)	(0+15, 0.80)	0.030

Results

Normal Depth		0.31	ft
Elevation Range	0.00 to 0.80 ft		
Flow Area		1.25	ft²
Wetted Perimeter		7.19	ft
Top Width		7.00	ft
Normal Depth		0.31	ft
Critical Depth		0.36	ft
Critical Slope		0.01217	ft/ft
Velocity		3.36	ft/s
Velocity Head		0.18	ft
Specific Energy		0.48	ft
Froude Number		1.40	

Worksheet for Curb/Gutter Section B

Results

Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.31	ft
Critical Depth	0.36	ft
Channel Slope	0.02500	ft/ft
Critical Slope	0.01217	ft/ft

Messages

Notes	Additional flow includes 1/3 of Basin 100

Cross Section for Curb/Gutter Section B

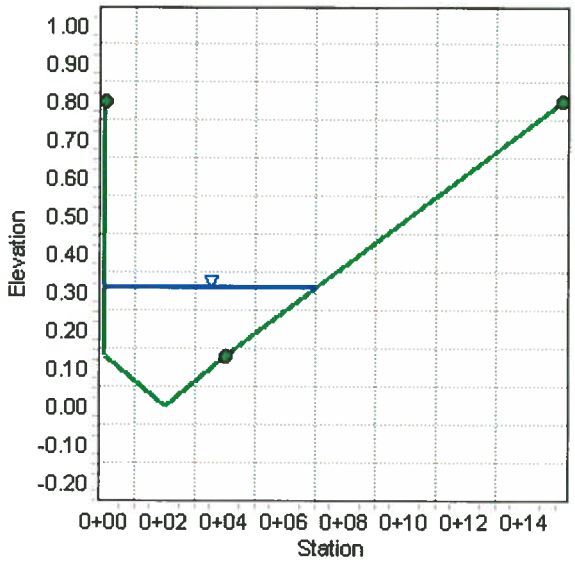
Project Description

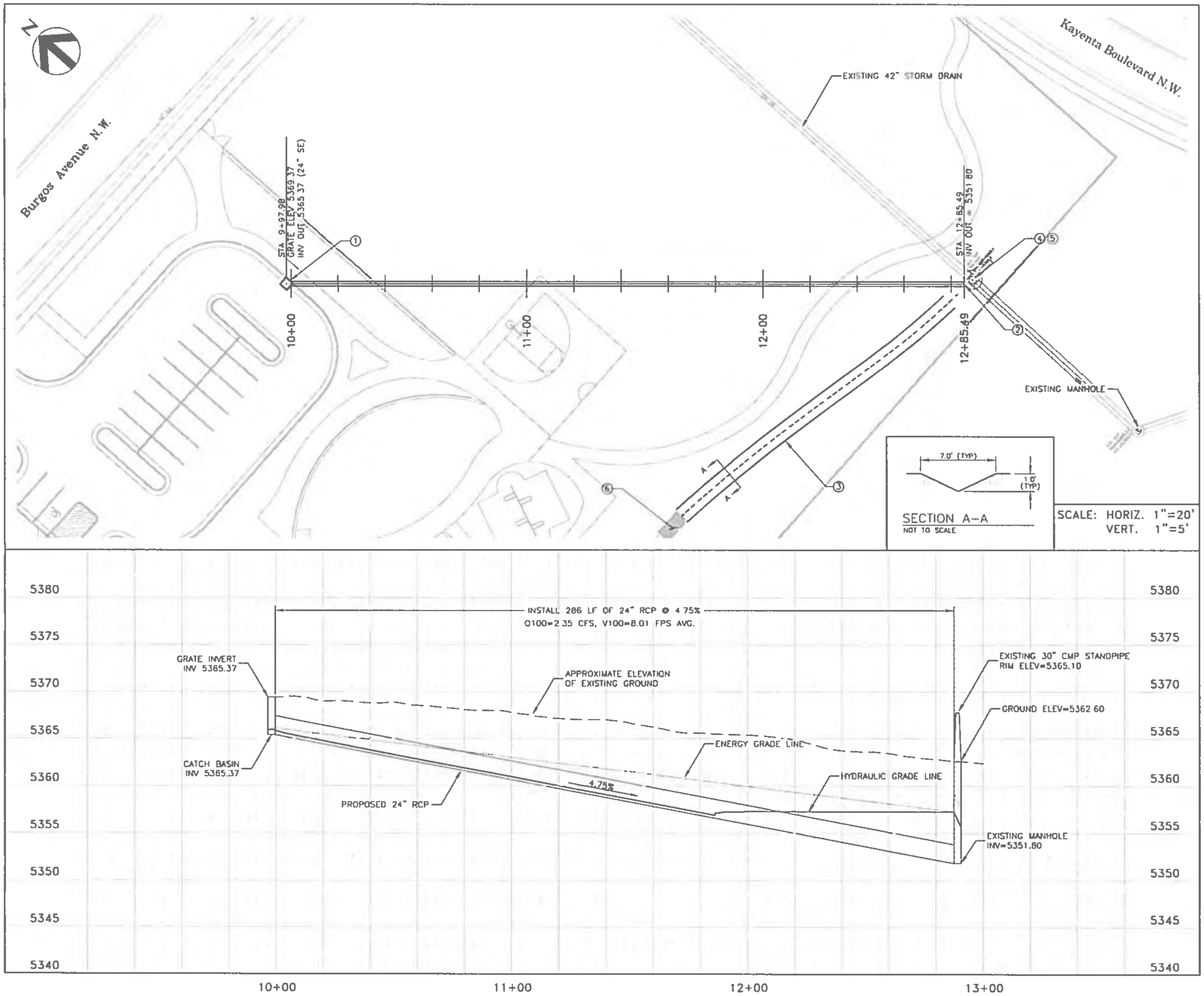
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02500	ft/ft
Normal Depth	0.31	ft
Discharge	4.18	ft³/s

Cross Section Image





KEYED NOTES:

1. INSTALL TYPE C STORM INLET PER COA STANDARD DRAWING 2205
2. CONNECT 24" RCP TO EXISTING MANHOLE. CORE DRILL INTO SIDE OF MANHOLE AND SEAL WITH NON-SHRINK, NON-METALLIC GROUT
3. GRADE EARTHEN SWALE TO DRAIN TOWARD EXISTING STANDPIPE
4. IF SWALE FLOWLINE DOES NOT TERMINATE AT EXISTING HOLE IN STANDPIPE, DRILL OR CUT OUT NEW HOLE TO ELIMINATE PONDING
5. INSTALL MESH SCREEN WITH 1"-2" GRID OPENING AROUND INSIDE OF STANDPIPE TO PREVENT DEBRIS FROM PASSING THROUGH
6. TRANSITION FROM RIPRAP TO EARTHEN SWALE TYPICAL SECTION OVER 10'

QUANTITIES:

COA Item No.	Description	Unit	Quantity
915.05	Catch Basin, Type "D", Single Grate	EA	1.0
910.009	24" Reinforced Concrete Pipe, Class III	LF	286.0
	Mesh Screen, 1"-2" Grid Opening	SY	6.5

0 10' 20' 40' 60'
SCALE: 1" = 20'

HDR
HDR Engineering, Inc.

MORROW REARDON WILKINSON MILLER, LTD.
LANDSCAPE ARCHITECTS

CITY OF ALBUQUERQUE
CAPITAL IMPLEMENTATION PROGRAM
DEPARTMENT OF MUNICIPAL DEVELOPMENT

SEVILLE PARK IMPROVEMENTS
STORM DRAIN PLAN & PROFILE SHEET

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr	Mo./Day/Yr

City Project No.	Zone Map No.	Sheet
787493	A-10	19 OF 22

REVISIONS

NO.	DATE	REMARKS	BY

		DATE	
DESIGNED BY	AES	DATE	AUG 2009
DRAWN BY	AES	DATE	AUG 2009
CHECKED BY	BMG	DATE	AUG 2009

ENGINEER SEAL

BROOKE MARSHALL GARCIA, NEW MEXICO, 17621, LICENSED PROFESSIONAL ENGINEER

SURVEY INFORMATION
FIELD NOTES

NO.	BY	DATE

BENCH MARKS

AS-BUILT INFORMATION

MICRO-FILM INFORMATION