CITY OF ALBUQUERQUE

Planning Department
David Campbell, Director

Mayor Timothy M. Keller

May 7, 2019

Scott Eddings, P.E.
Huitt-Zollars
333 Rio Rancho Blvd., Suite 101
Rio Rancho, NM, 87124

RE: **Winrock Road Town Center**
2100 Louisiana Blvd NE
Drainage Master Plan- Drainage Implementation Plan
Engineer's Stamp Date: 4/29/19
Hydrology File: J19D058

Dear Mr. Eddings:

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

Based on submittal received on 4/29/19, the Drainage Implementation Plan cannot be approved for Site Plan for Building Permit until the following are corrected:

1. Under *Qualifications & Disclaimers* remove or revise the statement that the 2015 DMP governs. Once approved, this DIP will be the governing document. Errors uncovered in the 2015 report (incorrect HGL computations) mean the hydraulic calculations can no longer be used and this DIP will need to be used as the best available information.

2. Hydraulic calculations need to be made along the Energy Grade Line (EGL) per the DPM, using Bernoulli's Equation. In several locations in your pipe network, the EGL increases in the downstream direction (notably at junctions), indicating that energy losses are not applied correctly. Programs proven to use Bernoulli's Equation, the momentum equation for junction losses, manhole losses, contraction losses, expansion losses, and bend losses per the DPM include, WSPGW - Water Surface Pressure Gradient by CivilDesign, HydroCad, and Stormwater Studio. The HEC-22 3rd Edition calculations agree with the DPM but the earlier editions do not use Bernoulli's correctly and that may be the problem here.

3. Exhibits 2-7 minor remarks:
   a. Please label the Manholes in plain view and label the pipes in profile view.
   b. On exhibit 2, pipe 2 appears to be mislabeled in plain view.
   c. Exhibit 4, the profile for AP-B 400 is cropped.
   d. Storm drain profiles/model for AP-A are missing

4. In the output tables, relabel the "Flow" column as "Allowable Flow" or similar. Or remove the "Capacity" column. It needs to be clear that the allowable flow to each pipe is established by the hydraulic model (not Manning's).

5. Include Exhibit 1 in the DRB Master Site Plan. Please check that the phases match the Architect's phases. The remaining exhibits (2-7) can remain in the DIP, so long as the master summary table is provided on Exhibit 1.

6. Site Hydrology needs to reference the 2015 DMP, as this DIP is accepting it as-is.

7. Only one paper copy of the submittal is required.

8. Prior to Work Order for each phase, a detailed drainage report will be required to detail many of the hydraulics shown in the DIP as well as address all grading and drainage criteria per the DPM, such as storm water quality and surface flow hydraulics.

If you have any questions, please contact me at 924-3695 or dpeterson@cabq.gov.

Sincerely,

Dana Peterson, P.E.
Senior Engineer, Planning Dept.
Development Review Services

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 6/2018)

Winrock Town Center - DMP

Project Title: Drainage Improvement Plan Building Permit #: _____ Hydrology File #: J19D058G

DRB#: 2018-001579 EPC#: _____ Work Order#: 4553.90

Legal Description: A-1-A-1-A-1 Winrock Town Center

City Address: 2100 Louisiana Blvd NE

Applicant: Winrock Partners LLC Contact: Darin Sand

Address: 100 Sun Avenue

Phone#: 505-881-0100 Fax#: _____ E-mail: seddings@huitt-zollars.com

Other Contact: Huitt-Zollars, Inc. Contact: Scott Eddings

Address: 333 Rio Rancho Blvd, Rio Rancho, NM 87124

Phone#: 505-235-7211 Fax#: _____ E-mail: seddings@huitt-zollars.com

TYPE OF DEVELOPMENT: _____ PLAT (# of lots) _____ RESIDENCE X DRB SITE ___ ADMIN SITE

IS THIS A RESUBMITTAL? X Yes _____ No

DEPARTMENT _____ TRANSPORTATION X HYDROLOGY/DRAINAGE

Check all that Apply:

TYPE OF SUBMITTAL:

____ ENGINEER/ARCHITECT CERTIFICATION
____ PAD CERTIFICATION
____ CONCEPTUAL G & D PLAN
____ GRADING PLAN
X DRAINAGE REPORT
____ DRAINAGE MASTER PLAN
____ FLOODPLAIN DEVELOPMENT PERMIT APPLIC
____ ELEVATION CERTIFICATE
____ CLOMR/LOMR
____ TRAFFIC CIRCULATION LAYOUT (TCL)
____ TRAFFIC IMPACT STUDY (TIS)
____ STREET LIGHT LAYOUT
____ OTHER (SPECIFY) _____
____ PRE-DESIGN MEETING?

TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

____ BUILDING PERMIT APPROVAL
____ CERTIFICATE OF OCCUPANCY

____ PRELIMINARY PLAT APPROVAL
X SITE PLAN FOR SUB'D APPROVAL
____ SITE PLAN FOR BLDG. PERMIT APPROVAL
____ FINAL PLAT APPROVAL

____ SIA/ RELEASE OF FINANCIAL GUARANTEE
____ FOUNDATION PERMIT APPROVAL
____ GRADING PERMIT APPROVAL
____ SO-19 APPROVAL
____ PAVING PERMIT APPROVAL
____ GRADING/ PAD CERTIFICATION
____ WORK ORDER APPROVAL
____ CLOMR/LOMR
____ FLOODPLAIN DEVELOPMENT PERMIT
____ OTHER (SPECIFY) _____

DATE SUBMITTED: April 29, 2019 By: Scott Eddings

COA STAFF: ELECTRONIC SUBMITTAL RECEIVED: _____

FEE PAID: _____

WINROCK TOWN CENTER DRAINAGE IMPLEMENTATION PLAN

Prepared For

Project Location:
Albuquerque, NM

APRIL 2019

Prepared By

HUITT-ZOLLARS
ENGINEERING ARCHITECTURE CONSTRUCTION MANAGEMENT SURVEY
333 Rio Rancho Blvd. NE, Suite 101
Rio Rancho, NM 87124
(505) 892-5141, Fax (505) 892-3259
www.huitt-zollars.com

WINROCK TOWN CENTER
DRAINAGE IMPLEMENTATION PLAN

CITY OF ALBUQUERQUE
PROJECT NO. 4553.90

PREPARED FOR:

PREPARED BY:

HUITT-ZOLLARS
333 RIO RANCHO BLVD., SUITE 101
RIO RANCHO, NEW MEXICO 87124

APRIL 2019

HZI Project No. R303699.04

WINROCK TOWN CENTER
DRAINAGE IMPLEMENTATION PLAN

I, Scott A. Eddings, being first duly sworn upon my oath, state that I am a registered professional engineer, qualified in civil engineering and that the accompanying report was prepared by me or under my supervision and is true and correct to the best of my knowledge and belief.

EXHIBITS

PURPOSE

The purpose of this Drainage Implementation Plan is to: 1) Provide an overall map of the proposed drainage improvements for Winrock Town Center, 2) Identify the specific components of the drainage improvements, 3) Relate individual development tracts to associated drainage improvements, and 4) Identify the proposed drainage flows at major analysis points.

This Drainage Implementation Plan presents a summary for the "Drainage Master Plan for Winrock Town Center" to facilitate planning and implementation of required storm drainage infrastructure for the development of this project.

This Drainage Implementation Plan is intended to define the overall plan for construction and implementation of drainage improvements, while the "Drainage Master Plan for Winrock Town Center" provides the design requirements for those improvements.

EXECUTIVE SUMMARY

The "Drainage Master Plan for Winrock Town Center" was completed by Isaacson & Arfman, PA with a final revision date of June 26, 2015. The purpose of the Drainage Master Plan was to provide analysis and a drainage framework for Winrock Town Center. All hydrology calculations were completed for the 100-year, 6-hour storm. The Drainage Master Plan defines allowable peak flowrates at major analysis points.

QUALIFICATION & DISCLAIMERS

The calculations and designs in the Drainage Master Plan provides adequate detail to ensure that the overall drainage system is sufficient to safely convey the 100-year storm event. Design of these drainage systems should be considered 50% complete for construction purposes, however, the detail required for construction is not presented in the Drainage Master Plan. Final hydraulic design calculations must be provided for all storm drainage improvements at the time of final engineering design.

If any conflict arises between this Drainage Implementation Plan and the Drainage Master Plan, the Drainage Master Plan shall govern. Hydrologic information provided in the Drainage Master Plan are of sufficient accuracy for design of internal tracts. The release rates at analysis points presented on Exhibit 1 are "permissible" release rates.

SPECIAL CONDITIONS

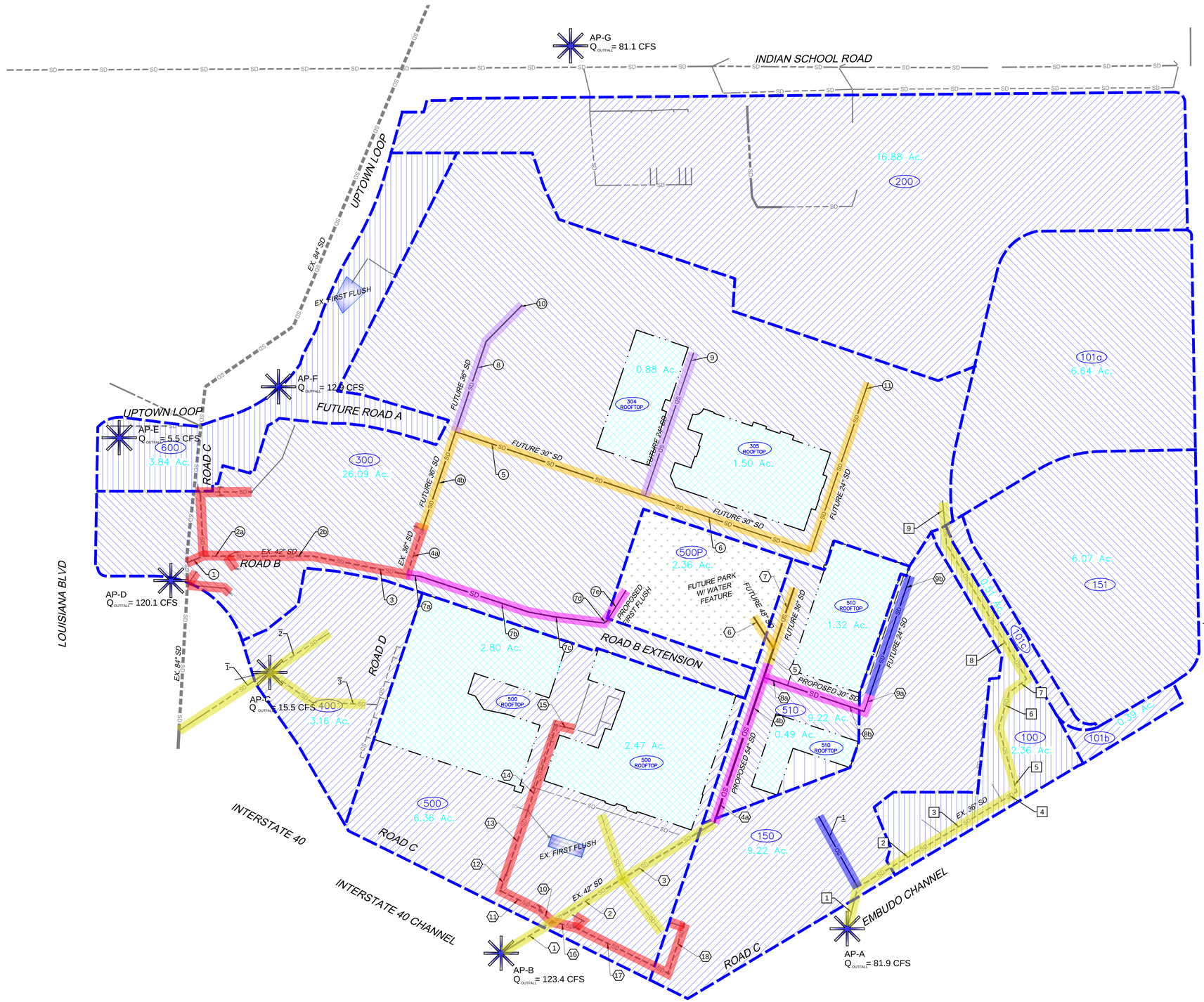
Portions of the storm drain network have changed since the Drainage Master Plan was completed. The proposed changes will be implemented without altering the peak flowrates at the major analysis points. Please refer to Exhibit 2 through Exhibit 7 for detailed information regarding the updated storm drain network.

INFRASTRUCTURE REQUIREMENTS BY PHASE

The storm drain systems presented in the Drainage Master Plan are intended to provide overall site storm water management and storm water quality control. The development of each phase will require final design of the onsite drainage system to convey flows to major analysis points. Please refer to Exhibit 1 for phasing of the proposed storm drain network.

OWNERSHIP & MAINTENANCE RESPONSIBILITIES

This drainage system, in its entirety, shall be dedicated to the City of Albuquerque. Maintenance of the system will be the responsibility of the developer as part of the TIDD agreement and defined by the TIDD infrastructure MOU.



BASIN	STORM DRAIN NO.	PIPE DIAMETER (in)	FLOW RATE (cfs)	CONSTRUCTION PHASE
150	1	24	10	E
100	1	36	82	PRE- DMP
100	2	36	71	PRE- DMP
100	3	36	71	PRE- DMP
100	4	36	51	PRE- DMP
100	5	36	51	PRE- DMP
100	6	36	51	PRE- DMP
100	7	36	51	PRE- DMP
100	8	36	49	PRE- DMP
100	9	24	30	PRE- DMP
300	1	42	120	A
300	2	42	113	A
300	3	42	94	A
300	4 a-b	36	70	A
300	5	30	28	C
300	6	24	14	C
300	7 a-e	30	24	B
300	8	30	42	C
300	9	24	14	D
300	10	24	18	D
300	11	24	14	D
400	1	24	15	PRE- DMP
400	2	18	7	PRE- DMP
400	3	18	8	PRE- DMP
500	1	42	123	PRE- DMP
500	2	42	86	PRE- DMP
500	3	42	75	PRE- DMP
500	4 a-b	54	75	B
500	5	54	58	B
500	6	48	51	C
500	7	30	8	C
500	8 a-b	30	17	B
500	9 a-b	24	10	B/E
500	10	36	24	A
500	11	36	22	A
500	12	(2) 24	22	A
500	13	36	22	A
500	14	36	22	A
500	15	36	22	A
500	16	36	22	A
500	17	36	10	A
500	18	24	10	A

STORM DRAIN PHASING

PHASE	DESIGNATION
PRE-DMP	
A	
B	
C	
D	
E	

LEGEND

- DRAINAGE BASIN BOUNDARY PER DMP
- DRAINAGE BASIN BOUNDARY PER DMP
- EXISTING STORM DRAIN LINE - PUBLIC
- EXISTING STORM DRAIN LINE - PRIVATE
- PROPOSED STORM DRAIN LINE - PUBLIC
- PROPOSED STORM DRAIN LINE - PRIVATE
- FUTURE STORM DRAIN LINE - PUBLIC
- FUTURE STORM DRAIN LINE - PRIVATE
- REMOVE STORM DRAIN LINE - PRIVATE
- REMOVE STORM DRAIN LINE - PRIVATE (FUTURE PHASE)
- PHASE B LIMITS
- EXISTING FIRST FLUSH FACILITY

AP-# ANALYSIS POINT PER WINROCK TOWN CENTER DMP PREPARED BY ISAACSON&ARFMAN DATED 6/26/15

SCALE: NTS

AS BUILT INFORMATION
CONTRACTOR DATE
WORK STAKED BY DATE
INSPECTIONS BY DATE
FIELD VERIFICATION BY DATE
DRAWINGS CORRECTED BY DATE

BENCH MARKS
FOUND MONUMENT "20_H18"
STANDARD 3 1/4" ALUMINUM DISC (FOUND IN PLACE)
NEW MEXICO STATE PLANE COORDINATES (CENTRAL ZONE-N.A.D. 1983)
N=1,493,154.978
E=1,545,048.210
PUBLISHED EL=5283.22 (NAVD 1988)

MICRO-FILM INFORMATION
RECORDED BY DATE
NO.

SURVEY INFORMATION
FIELD NOTES
DATE BY NO.

ENGINEER'S SEAL
STATE OF NEW MEXICO 12856 REGISTERED PROFESSIONAL ENGINEER
4/29/19

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	
DESIGNED BY: LRT		DATE: APR. 18, 2019	
DRAWN BY: VKL		DATE: APR. 18, 2019	
DWG NAME: DRAINAGE EXHIBIT 1.dwg		PROJ #: R2036990.04	
CHECKED BY: SAE		DATE: APR. 18, 2019	

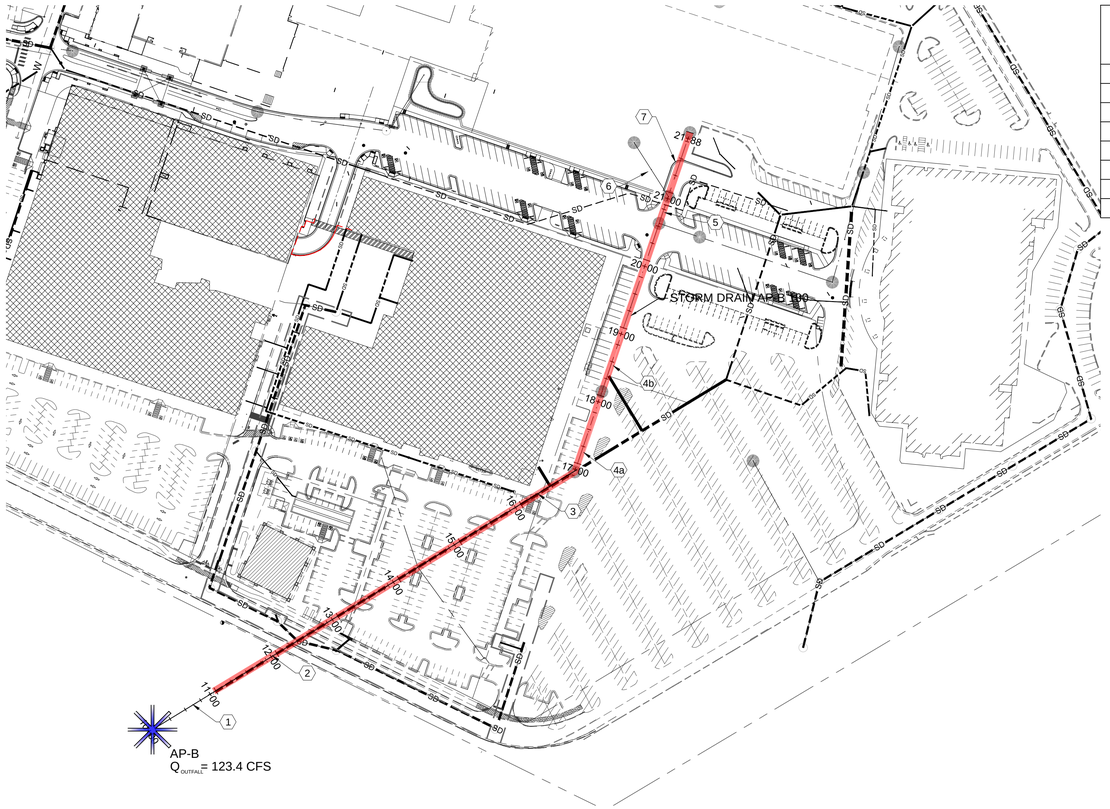
Designed By:
HUITT-ZOLLARS
Huitt-Zollars, Inc. Rio Rancho
333 Rio Rancho Drive NE, Suite 101
Rio Rancho, New Mexico 87124
Phone (505) 892-5141 Fax (505) 892-3259

WINROCK TOWN CENTER DRAINAGE IMPLEMENTATION PLAN

TITLE: BASIN MAP AND ULTIMATE STORM DRAIN NETWORK

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

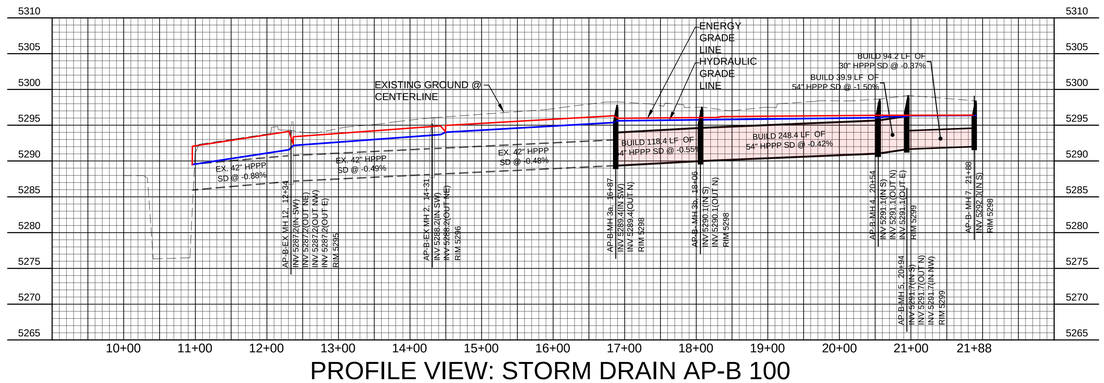
City Project No. 4553.90 | Zone Map No. J-19-Z | Sheet EXHIBIT 1 Of



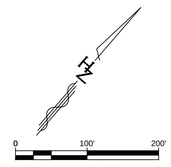
STORM DRAIN AP-B 100

STORM CAD OUTPUT

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Flow (cfs)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
LINE 1	MH 12	AP-B	42.0	138.0	123.4	94.6	12.83	5,287.22	5,286.00	5,295.61	5,286.00	5,291.58	5,289.50	5,294.13	5,292.06
LINE 2	MH 2	MH 12	42.0	212.3	85.1	67.7	8.85	5,288.18	5,287.22	5,296.00	5,295.61	5,293.70	5,292.18	5,294.91	5,293.39
LINE 3	MH 3	MH 2	42.0	241.4	75.1	71.8	7.81	5,289.41	5,288.18	5,298.20	5,296.00	5,295.37	5,294.03	5,296.32	5,294.97
LINE 4A	MH 4B	MH 3	54.0	144.1	75.1	172.3	4.72	5,290.06	5,289.41	5,298.32	5,298.20	5,295.75	5,295.63	5,296.10	5,295.97
LINE 4B	MH 4	MH 4B	54.0	227.7	75.1	172.3	4.72	5,291.10	5,290.06	5,298.50	5,298.32	5,296.05	5,295.85	5,296.40	5,296.20
LINE 5	MH 5	MH 4	54.0	34.9	58.1	335.3	3.65	5,291.70	5,291.10	5,298.50	5,298.50	5,296.21	5,296.20	5,296.42	5,296.40
LINE 6	MH 6	MH 5	48.0	88.8	50.6	134.4	4.03	5,292.16	5,291.70	5,298.00	5,298.50	5,296.41	5,296.35	5,296.66	5,296.60
LINE 7	MH 7	MH 5	30.0	94.1	7.5	32.5	1.53	5,292.05	5,291.70	5,298.50	5,298.50	5,296.37	5,296.35	5,296.40	5,296.38



PROFILE VIEW: STORM DRAIN AP-B 100



AS BUILT INFORMATION
CONTRACTOR
WORK STAKED BY: DATE
AS-BUILTS BY: DATE
FIELD VERIFICATION BY: DATE
DRAWINGS CORRECTED BY: DATE
MICRO-FILM INFORMATION
RECORDED BY: DATE
NO.

BENCH MARKS
FOUND MONUMENT "2G_H18"
STANDARD 3 1/4" ALUMINUM DISC (FOUND IN PLACE)
NEW MEXICO STATE PLANE COORDINATES (CENTRAL ZONE-NAD. 1983)
N=1,493,154.978
E=1,545,048.210
PUBLISHED EL=5283.22 (NAVD 1988)
GROUND TO GRID FACTOR=0.999861580
DELTA ALPHA ANGLE=-0°11'00.11"

SURVEY INFORMATION
FIELD NOTES
NO. | BY | DATE

ENGINEER'S SEAL
STATE OF NEW MEXICO
12856
REGISTERED PROFESSIONAL ENGINEER
4/29/19

NO.	BY	REMARKS	DATE
		REVISIONS	
		DESIGN	DATE: APR. 18, 2019
		DESIGNED BY: LRT	DATE: APR. 18, 2019
		DRAWN BY: VKL	PROJ #: R2041101.01
		DWG NAME: DRAINAGE EXHIBIT 2-9.dwg	DATE: APR. 18, 2019
		CHECKED BY: SAE	

Designed By:
HUITT-ZOLLARS
Huitt-Zollars, Inc. Rio Rancho
333 Rio Rancho Drive NE, Suite 101
Rio Rancho, New Mexico 87124
Phone (505) 892-5141 Fax (505) 892-3259

WINROCK TOWN CENTER
PHASE B INFRASTRUCTURE IMPROVEMENTS

TITLE:
STORM DRAIN AP-B 100

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

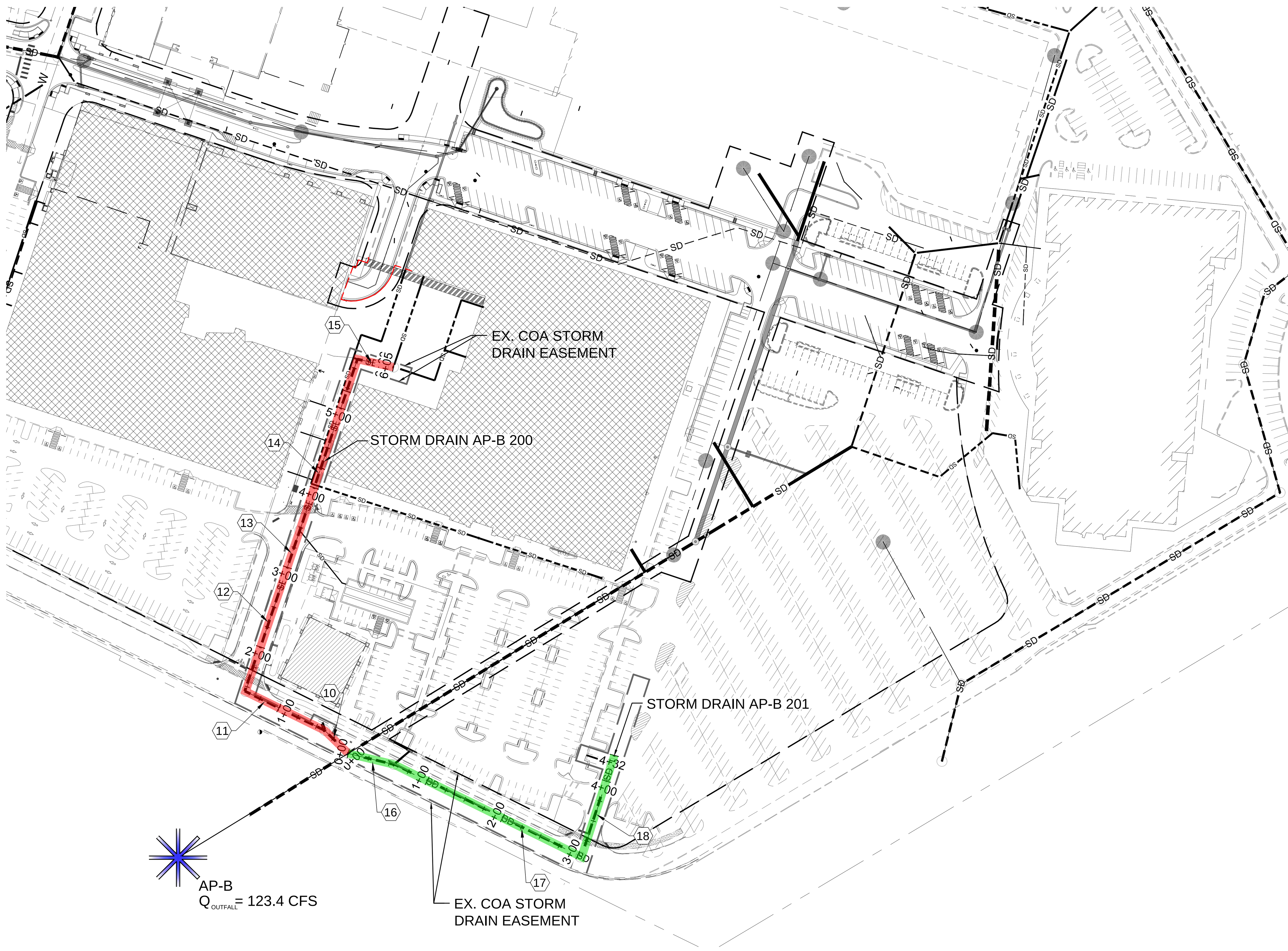
City Project No.	Zone Map No.	Sheet	Of
4553.90	J-19-Z	EXHIBIT 2	

Plotted: 4/29/2019 2:24:09 PM, By:Eddings, Scott
N:\Projects\4553.90 - Winrock Blvd Extension TIDG\05 Design\05.12 Drainage\Exhibits\DRAINAGE EXHIBIT 2-9.dwg
Last Saved 4/29/2019 2:23:27 PM, seddings

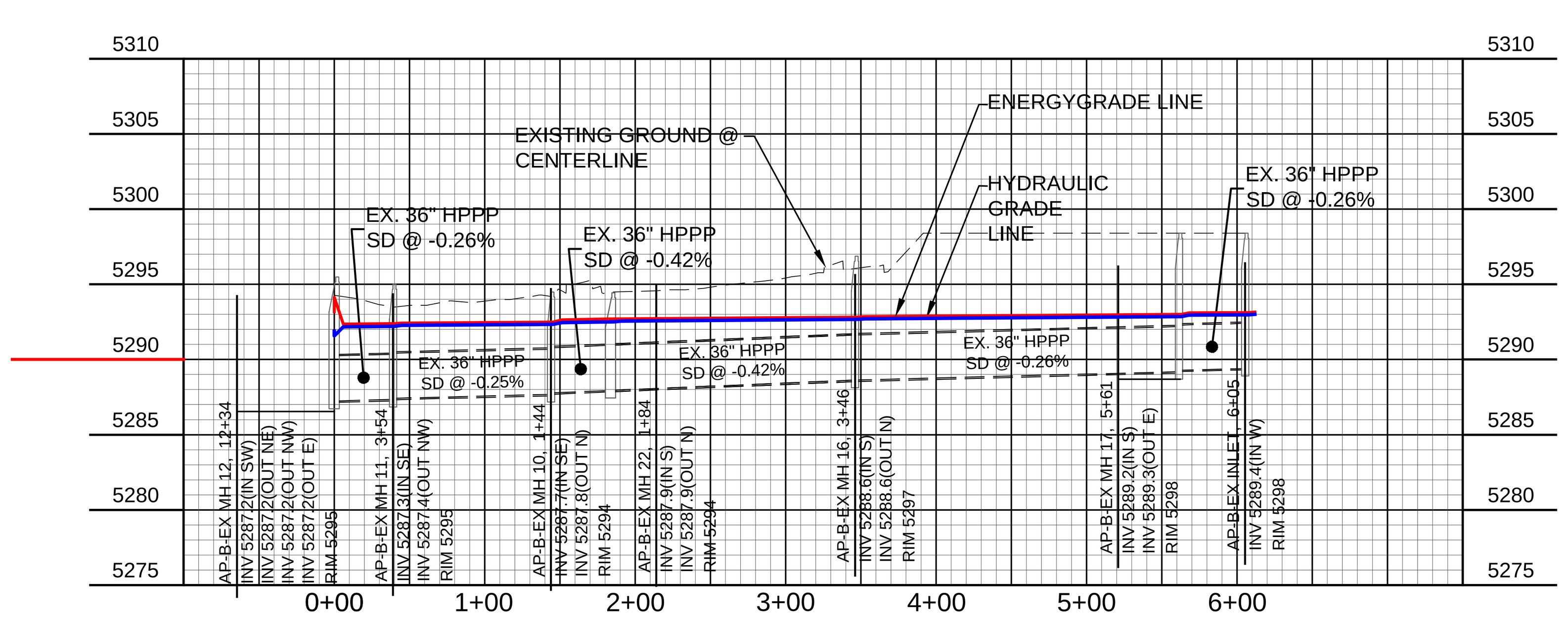
STORM CAD OUTPUT

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Flow (cfs)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
LINE 10	MH 11	MH 12	36.0	39.3	24.0	58.6	3.40	5,287.40	5,287.22	5,295.02	5,295.61	5,292.21	5,292.18	5,292.39	5,292.36
LINE 11	MH 10	MH 11	36.0	106.0	22.0	44.6	3.11	5,287.68	5,287.40	5,294.68	5,295.02	5,292.34	5,292.27	5,292.49	5,292.42
LINE 12	MH 22	MH 10	24.0	40.0	22.0	43.6	3.50	5,287.90	5,287.68	5,294.70	5,294.68	5,292.51	5,292.46	5,292.70	5,292.65
LINE 13	MH 16	MH 22	36.0	162.0	22.0	42.5	3.11	5,288.29	5,287.90	5,297.58	5,294.70	5,292.67	5,292.56	5,292.82	5,292.71
LINE 14	MH 17	MH 16	36.0	215.3	22.0	47.3	3.11	5,288.93	5,288.29	5,295.17	5,297.58	5,292.85	5,292.71	5,293.00	5,292.86
LINE 15	INLET	MH 17	36.0	44.2	22.0	58.3	3.11	5,289.13	5,288.93	5,293.56	5,295.17	5,292.98	5,292.95	5,293.13	5,293.10

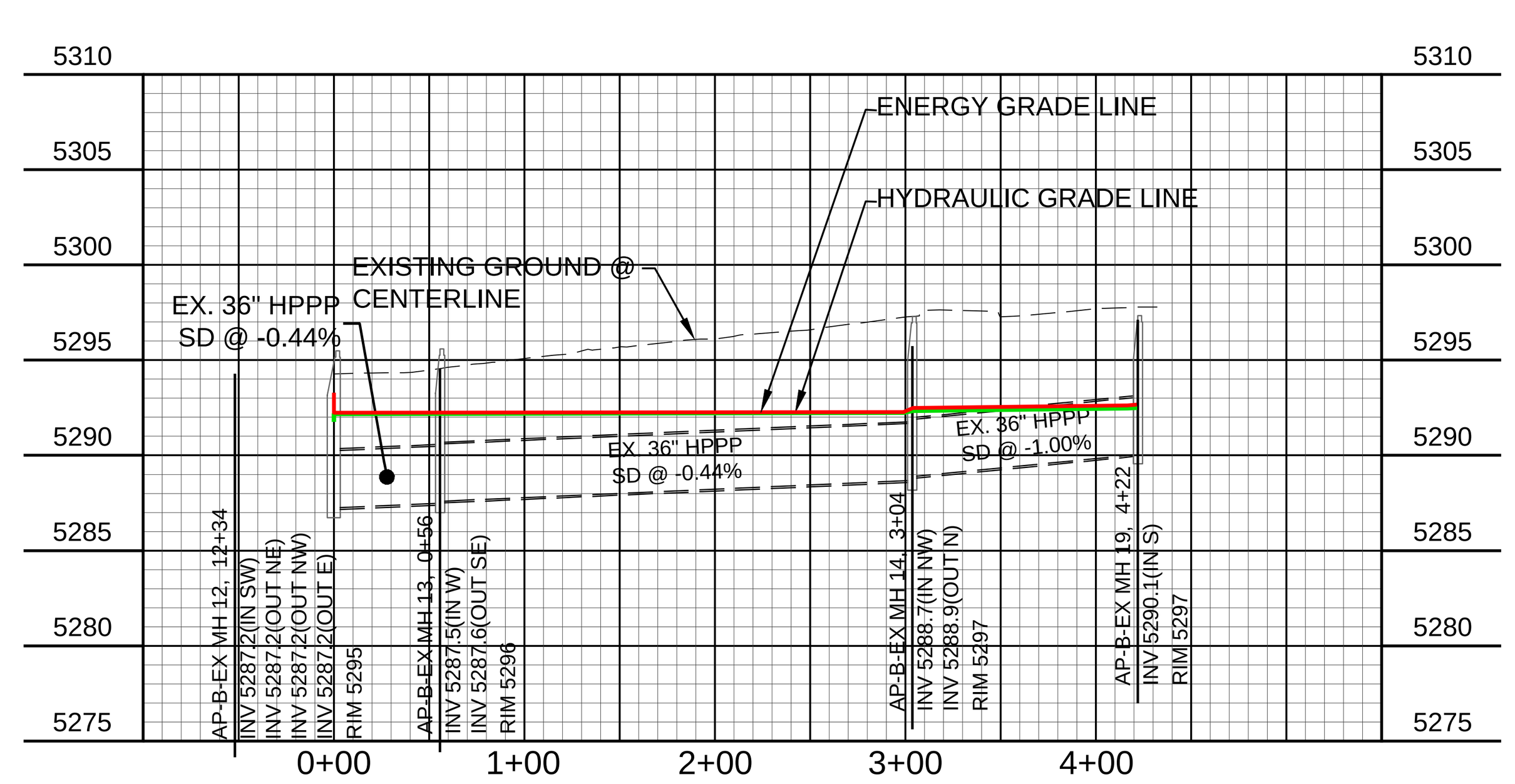
Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Flow (cfs)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
LINE 16	MH 13	MH 12	36.0	57.8	14.3	60.3	2.02	5,287.50	5,287.22	5,295.78	5,295.61	5,292.19	5,292.18	5,292.26	5,292.24
LINE 17	MH 14	MH 13	36.0	246.7	10.0	62.9	1.41	5,288.80	5,287.50	5,297.81	5,295.78	5,292.25	5,292.21	5,292.28	5,292.24
LINE 18	MH 19	MH 14	24.0	117.0	10.0	18.4	3.18	5,289.26	5,288.80	5,297.92	5,297.81	5,292.47	5,292.33	5,292.63	5,292.49



STORM DRAIN AP-B 200 & 201



PROFILE VIEW: STORM DRAIN AP-B 200



PROFILE VIEW: STORM DRAIN AP-B 201

SCALE: 1" = 100'

AS BUILT INFORMATION

BENCH MARKS

FOUND MONUMENT "20_H18"
STANDARD 3 1/4" ALUMINUM DISC (FOUND IN PLACE)
NEW MEXICO STATE PLANE COORDINATES (CENTRAL ZONE—N.A.D. 1983)
N=1,493,154.978
E=1,545,048.210
PUBLISHED EL=5283.22 (NAVD 1988)
GROUND TO GRID FACTOR=0.999661580
DELTA ALPHA ANGLE=-0°11'00.11"

SURVEY INFORMATION

ENGINEER'S SEAL

4/29/19

Designed By:
HUITT-ZOLLARS
Huitt-Zollars, Inc. Rio Rancho
333 Rio Rancho Drive NE, Suite 101
Rio Rancho, New Mexico 87124
Phone (505) 892-5141 Fax (505) 892-3259

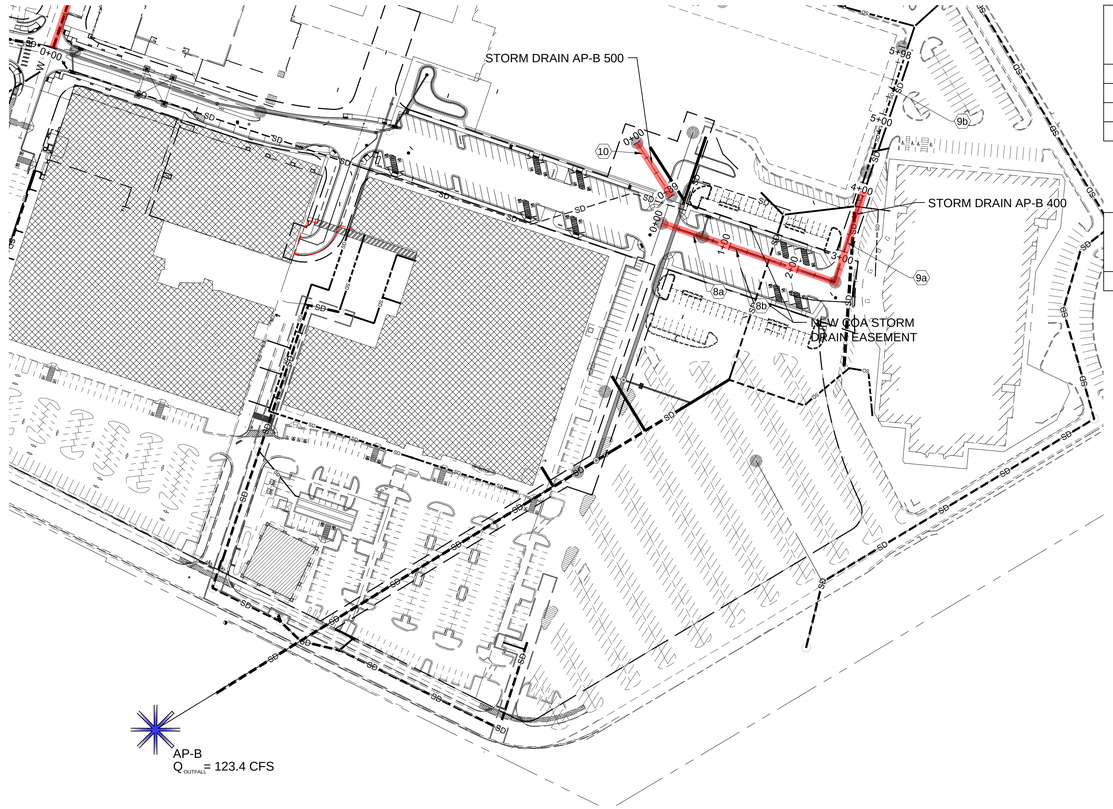
DESIGNED BY: LRT DATE: APR. 18, 2019
DRAWN BY: VKL DATE: APR. 18, 2019
DWG NAME: DRAINAGE EXHIBIT 2-9.dwg PROJ #: R304101.01
CHECKED BY: SAE DATE: APR. 18, 2019

WINROCK TOWN CENTER
PHASE B INFRASTRUCTURE IMPROVEMENTS

TITLE: STORM DRAIN AP-B 200 & 201

City Project No. 4553.90 | Zone Map No. J-19-Z | Sheet EXHIBIT 3

Plotted: 4/29/2019 1:41:02 PM, By:Eddings, Scott
Last Saved:4/29/2019 1:31:20 PM, seddings

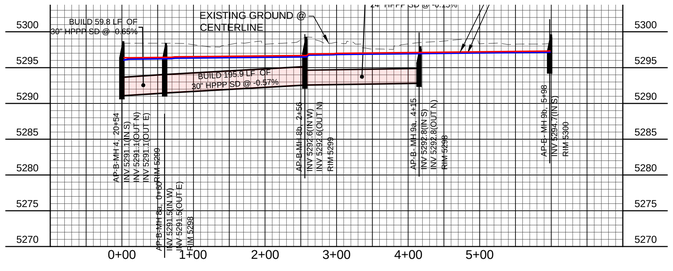


STORM DRAIN AP-B 400 & 500

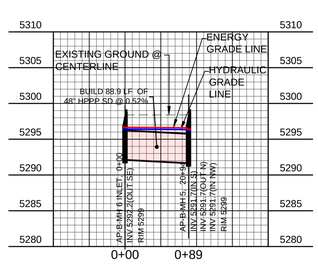
STORM CAD OUTPUT

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Flow (cfs)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
LINE 8A	MH 8A	MH 4	30.0	65.4	17.0	41.0	3.46	5,291.49	5,291.10	5,298.68	5,298.50	5,296.26	5,296.20	5,296.45	5,296.38
LINE 8B	MH 8B	MH 8A	30.0	187.9	17.0	41.0	3.46	5,292.60	5,291.49	5,299.20	5,298.68	5,296.51	5,296.32	5,296.70	5,296.50
LINE 9A	MH 9A	MH 8B	24.0	38.2	9.5	23.2	3.02	5,292.84	5,292.60	5,299.18	5,299.20	5,296.80	5,296.76	5,296.95	5,296.91
LINE 9B	MH 9B	MH 9A	24.0	298.3	9.5	23.2	3.02	5,294.70	5,292.84	5,299.00	5,299.18	5,297.16	5,296.85	5,297.30	5,296.99

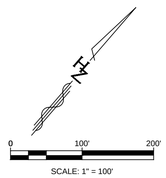
Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Flow (cfs)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
LINE 10	MH 11	MH 12	36.0	39.3	24.0	58.6	3.40	5,287.40	5,287.22	5,295.02	5,295.61	5,292.21	5,292.18	5,292.39	5,292.36



PROFILE VIEW: STORM DRAIN AP-B 400



PROFILE VIEW: STORM DRAIN AP-B 500



SCALE: 1" = 100'

AS BUILT INFORMATION
CONTRACTOR
WORK STAKED BY: DATE
AS-BUILTS BY: DATE
FIELD VERIFICATION BY: DATE
DRAWINGS CORRECTED BY: DATE
MICRO-FILM INFORMATION
RECORDED BY: DATE
NO.

BENCH MARKS
FOUND MONUMENT "20_H18"
STANDARD 3 1/4" ALUMINUM DISC (FOUND IN PLACE)
NEW MEXICO STATE PLANE COORDINATES (CENTRAL ZONE-N.A.D. 1983)
N=1,493,154.978
E=1,545,048.210
PUBLISHED EL=5283.22 (NAVD 1988)
GROUND TO GRID FACTOR=0.999861580
DELTA ALPHA ANGLE=-0°11'00.11"

SURVEY INFORMATION
FIELD NOTES
NO. BY DATE

ENGINEER'S SEAL
STATE OF NEW MEXICO
12856
REGISTERED PROFESSIONAL ENGINEER
4/29/19

NO.	REMARKS	BY	DATE
	DESIGN		APR. 18, 2019
	REVISIONS		

DESIGNED BY: LRT DATE: APR. 18, 2019
DRAWN BY: VKL DATE: APR. 18, 2019
DWG NAME: DRAINAGE EXHIBIT 2-9.dwg PROJ #: R2041101.01
CHECKED BY: SAE DATE: APR. 18, 2019

Designed By:
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Huitt-Zollars, Inc. Rio Rancho
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WINROCK TOWN CENTER
PHASE B INFRASTRUCTURE IMPROVEMENTS

TITLE:
STORM DRAIN AP-B 400 & 500

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

City Project No. 4553.90 | Zone Map No. J-19-Z | Sheet Of EXHIBIT 4

Plotted: 4/29/2019 1:40:35 PM, By:Eddings, Scott
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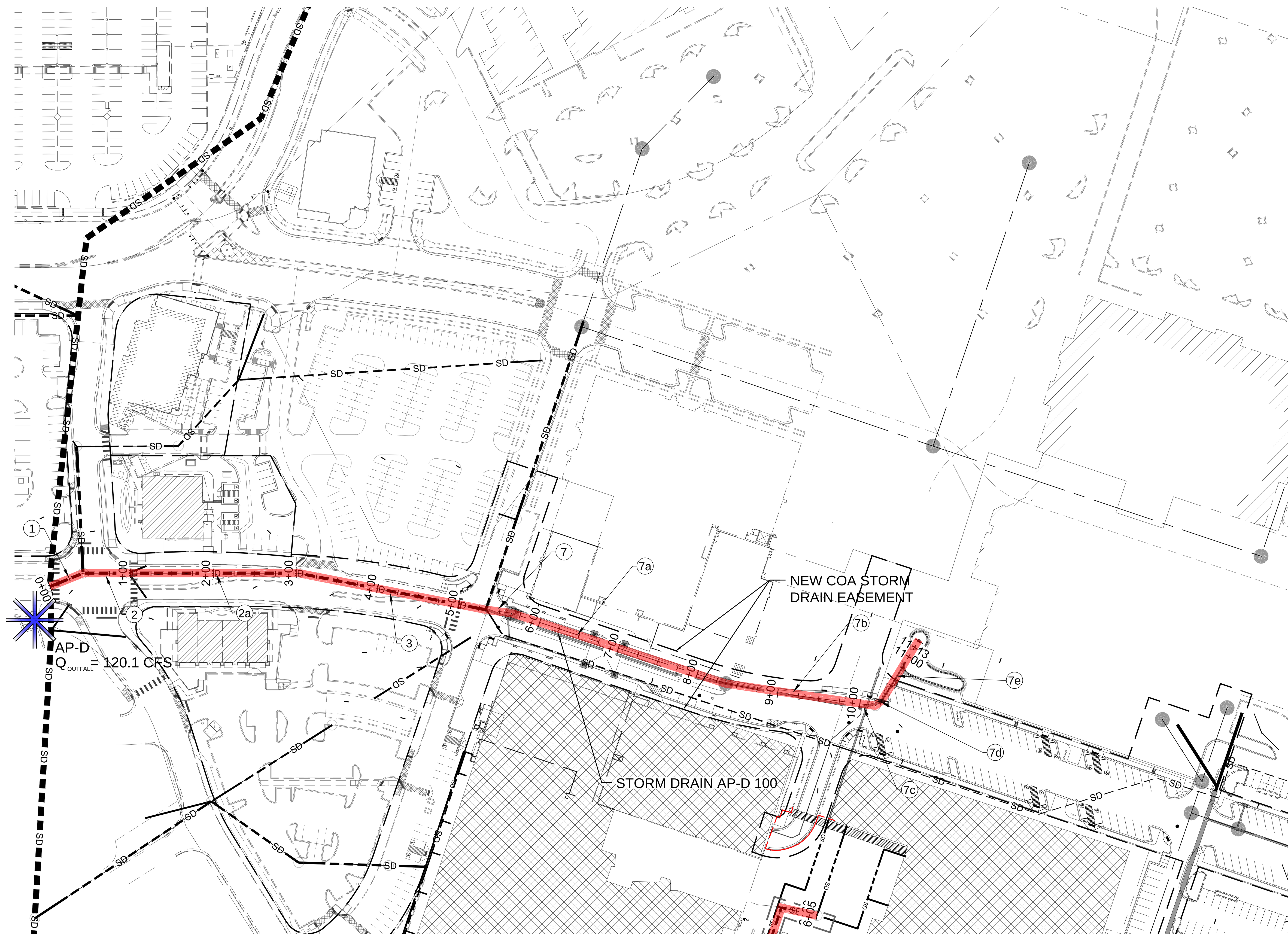
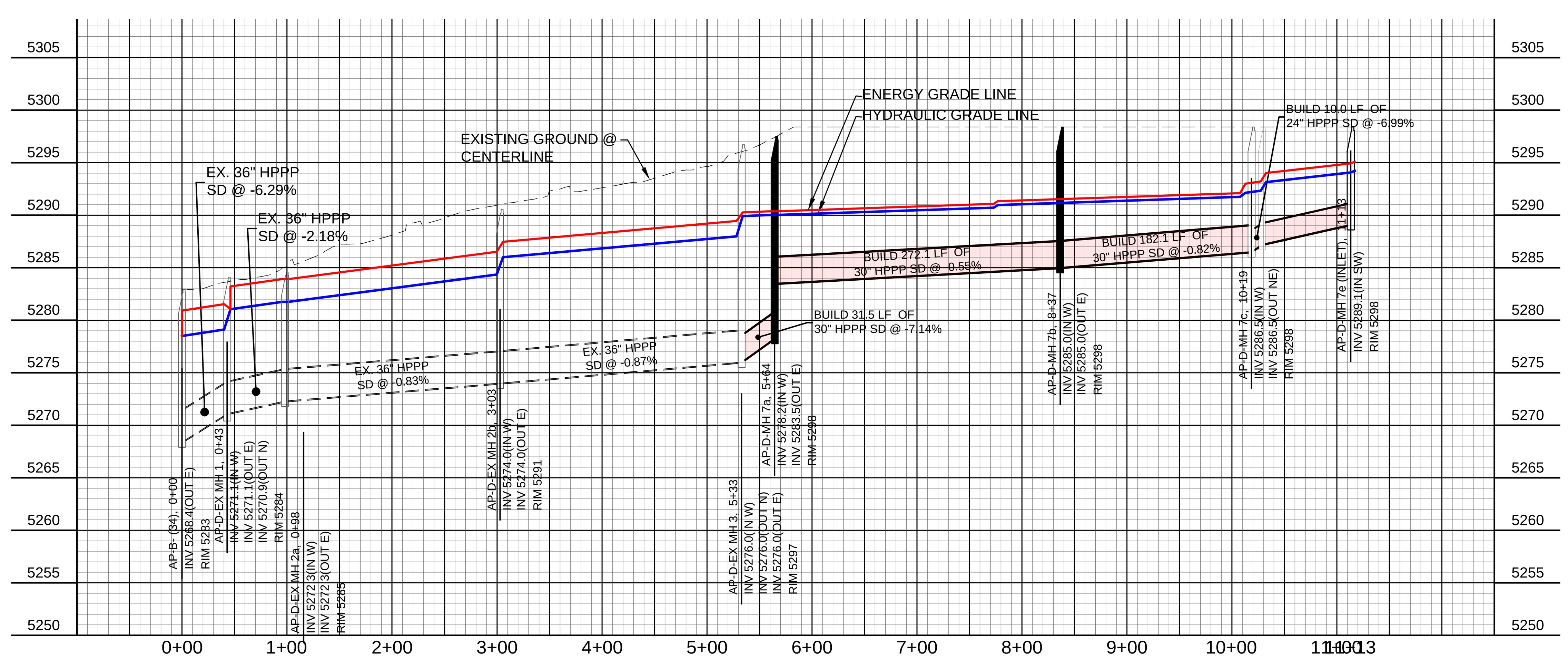
Last Saved 4/29/2019 1:31:20 PM, seddings

STORM CAD OUTPUT

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Flow (cfs)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
LINE 1	MH 1	AP-D	42.0	43.0	120.1	252.0	12.48	5,271.10	5,268.40	5,284.10	5,282.94	5,279.11	5,278.50	5,281.54	5,280.92
LINE 2A	MH 2A	MH 1	42.0	55.4	113.4	148.1	11.79	5,272.30	5,271.10	5,284.59	5,284.10	5,281.75	5,281.05	5,283.91	5,283.21
LINE 2B	MH 2	MH 2A	42.0	204.4	113.4	91.8	11.79	5,274.00	5,272.30	5,290.53	5,284.59	5,284.35	5,281.75	5,286.51	5,283.91
LINE 3	MH 3	MH 2	42.0	228.2	93.8	94.2	9.75	5,276.00	5,274.00	5,296.69	5,290.53	5,287.98	5,285.99	5,289.45	5,287.47
LINE 7A	MH 7A	MH 3	30.0	30.4	23.5	111.5	4.79	5,278.25	5,276.00	5,297.22	5,296.69	5,290.01	5,289.91	5,290.37	5,290.27
LINE 7B	MH 7B	MH 7A	30.0	213.6	23.5	34.4	4.79	5,285.00	5,283.50	5,297.26	5,297.22	5,290.71	5,290.01	5,291.07	5,290.37
LINE 7C	MH 7C	MH 7B	30.0	235.3	23.5	32.7	4.79	5,286.50	5,285.00	5,296.00	5,297.26	5,291.74	5,290.97	5,292.09	5,291.32
LINE 7D	MH 7D	MH 7C	24.0	19.7	23.5	42.7	7.48	5,287.20	5,286.50	5,296.87	5,296.00	5,292.34	5,292.12	5,293.21	5,292.99
LINE 7E	INLET	MH 7D	24.0	85.0	23.5	33.8	7.48	5,289.10	5,287.20	5,294.52	5,296.87	5,294.06	5,293.14	5,294.93	5,294.01



STORM DRAIN AP-D 100



PROFILE VIEW: STORM DRAIN AP-D 100

SCALE: 1" = 100'

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WINROCK TOWN CENTER
PHASE B INFRASTRUCTURE IMPROVEMENTS

TITLE:
STORM DRAIN AP-D 100

Design Review Committee	City Engineer	Mo./Day/Yr.	Mo./Day/Yr.

Last Update

City Project No. 4553.90 | Zone Map No. J-19-Z | Sheet Of EXHIBIT 5

AS BUILT INFORMATION
CONTRACTOR DATE
WORK STAKED BY DATE
INSPECTOR'S ACCEPTANCE BY DATE
FIELD VERIFICATION BY DATE
DRAWINGS CORRECTED BY DATE
MICRO-FILM INFORMATION
RECORDED BY DATE
NO.

BENCH MARKS
FOUND MONUMENT "20_H18"
STANDARD 3 1/4" ALUMINUM DISC (FOUND IN PLACE)
NEW MEXICO STATE PLANE COORDINATES (CENTRAL ZONE–N.A.D. 1983)
N=1,493,154.978
E=1,545,048.210
PUBLISHED EL=5283.22 (NAVD 1988)
GROUND TO GRID FACTOR=0.999661580
DELTA ALPHA ANGLE=-0°11'00.11"

SURVEY INFORMATION
FIELD NOTES
NO. BY DATE

ENGINEER'S SEAL
12856
4/29/19

REVISIONS
NO. DATE REMARKS BY

DESIGN
DESIGNED BY: LRT DATE: APR. 18, 2019
DRAWN BY: VKL DATE: APR. 18, 2019
DWG NAME: DRAINAGE EXHIBIT 2-9.dwg PROJ #: R304101.01
CHECKED BY: SAE DATE: APR. 18, 2019

Plotted: 4/29/2019 1:28:29 PM, By:Eddings, Scott
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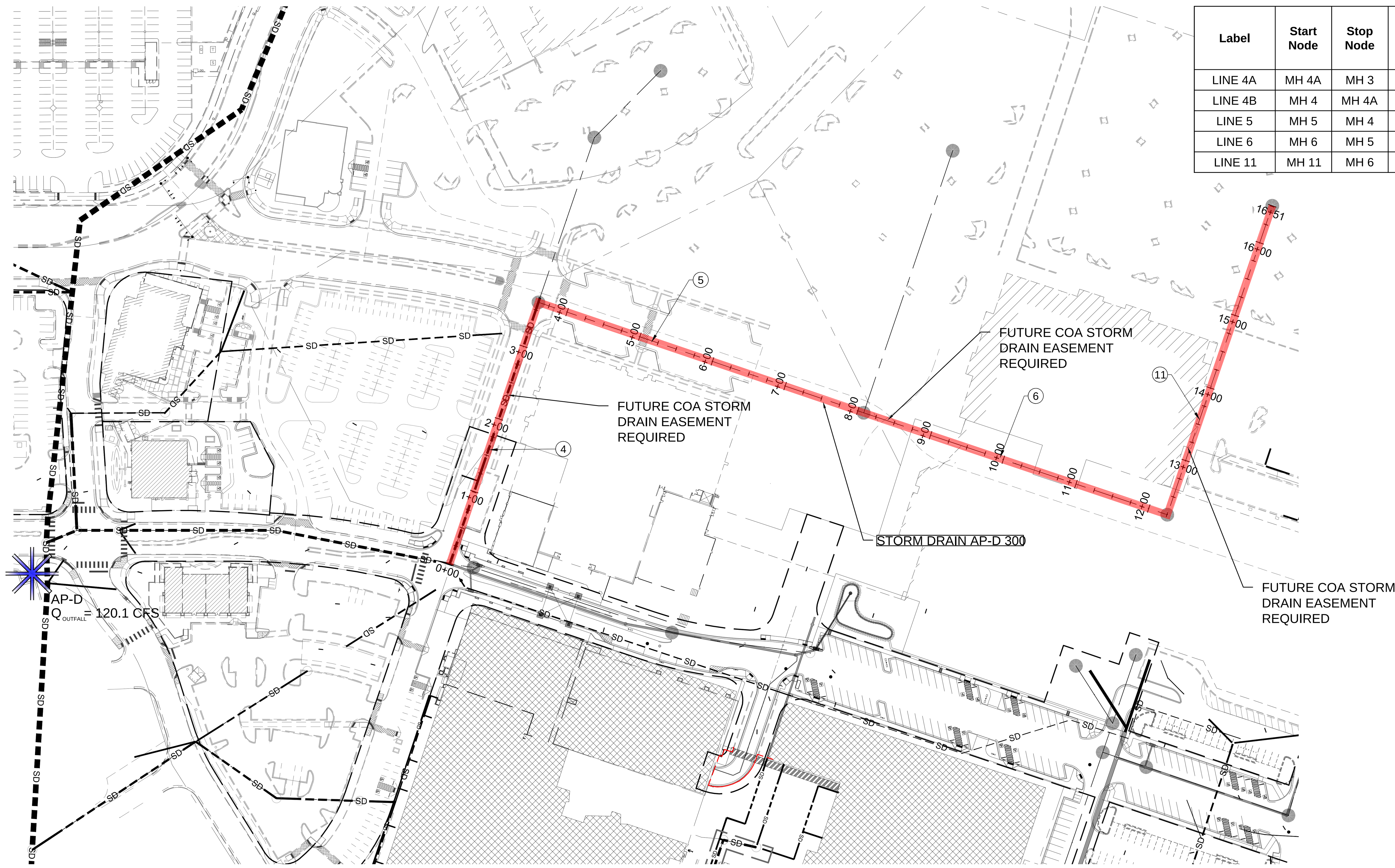
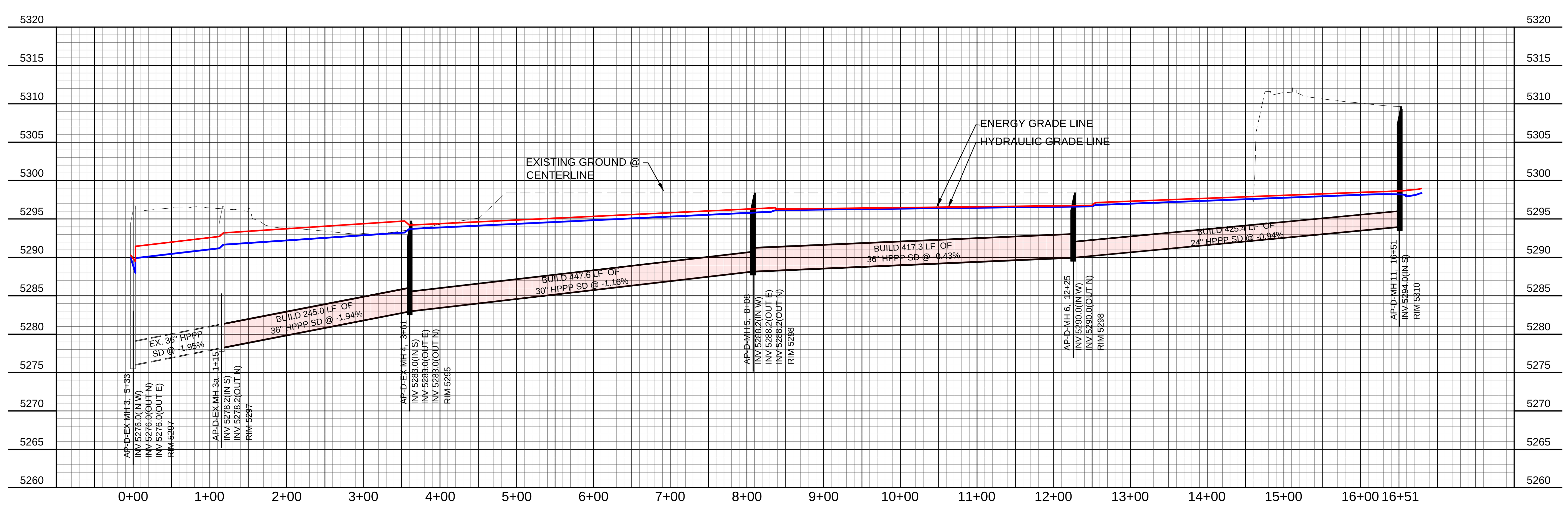
Last Saved:4/29/2019 1:27:38 PM, seddings

STORM CAD OUTPUT

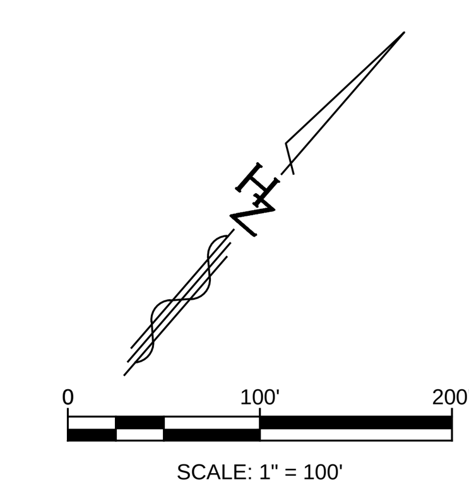
Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Flow (cfs)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
LINE 4A	MH 4A	MH 3	36.0	115.0	70.3	93.4	9.95	5,278.25	5,276.00	5,296.06	5,296.69	5,291.19	5,289.91	5,292.73	5,291.45
LINE 4B	MH 4	MH 4A	36.0	242.0	70.3	121.4	9.95	5,283.00	5,278.25	5,294.74	5,296.06	5,293.24	5,291.65	5,294.78	5,293.19
LINE 5	MH 5	MH 4	30.0	477.5	28.0	42.8	5.70	5,288.20	5,283.00	5,298.00	5,294.74	5,295.94	5,293.71	5,296.44	5,294.22
LINE 6	MH 6	MH 5	30.0	417.5	14.0	41.6	2.85	5,292.50	5,288.20	5,298.40	5,298.00	5,296.65	5,296.16	5,296.77	5,296.29
LINE 11	MH 11	MH 6	24.0	425.2	14.0	23.1	7.69	5,296.92	5,292.50	5,303.80	5,298.40	5,298.27	5,296.82	5,298.87	5,297.13



STORM DRAIN AP-D 300



PROFILE VIEW: STORM DRAIN AP-D 300



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Rio Rancho, New Mexico 87124
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WINROCK TOWN CENTER
PHASE B INFRASTRUCTURE IMPROVEMENTS

TITLE: STORM DRAIN AP-D 300

Design Review Committee	City Engineer	Mo./Day/Yr.	Mo./Day/Yr.

City Project No. 4553.90 | Zone Map No. J-19-Z | Sheet EXHIBIT 6

DESIGNED BY: LRT DATE: APR. 18, 2019
DRAWN BY: VKL DATE: APR. 18, 2019
DWG NAME: DRAINAGE EXHIBIT 2-9.dwg PROJ #: R303699.04
CHECKED BY: SAE DATE: APR. 18, 2019

AS BUILT INFORMATION: CONTRACTOR; WORK STAKED BY; INSPECTOR'S ACCEPTANCE BY; FIELD VERIFICATION BY; DRAWINGS CORRECTED BY; MICRO-FILM INFORMATION; RECORDED BY; NO.

BENCH MARKS: FOUND MONUMENT "20_H18" STANDARD 3 1/4" ALUMINUM DISC (FOUND IN PLACE) NEW MEXICO STATE PLANE COORDINATES (CENTRAL ZONE–N.A.D. 1983) N=1,493,154.978 E=1,545,048.210 PUBLISHED EL=5283.22 (NAVD 1988) GROUND TO GRID FACTOR=0.999661580 DELTA ALPHA ANGLE=-0°11'00.11"

SURVEY INFORMATION: FIELD NOTES NO. BY DATE

ENGINEER'S SEAL: 4/29/19

REVISIONS: NO. DATE REMARKS BY

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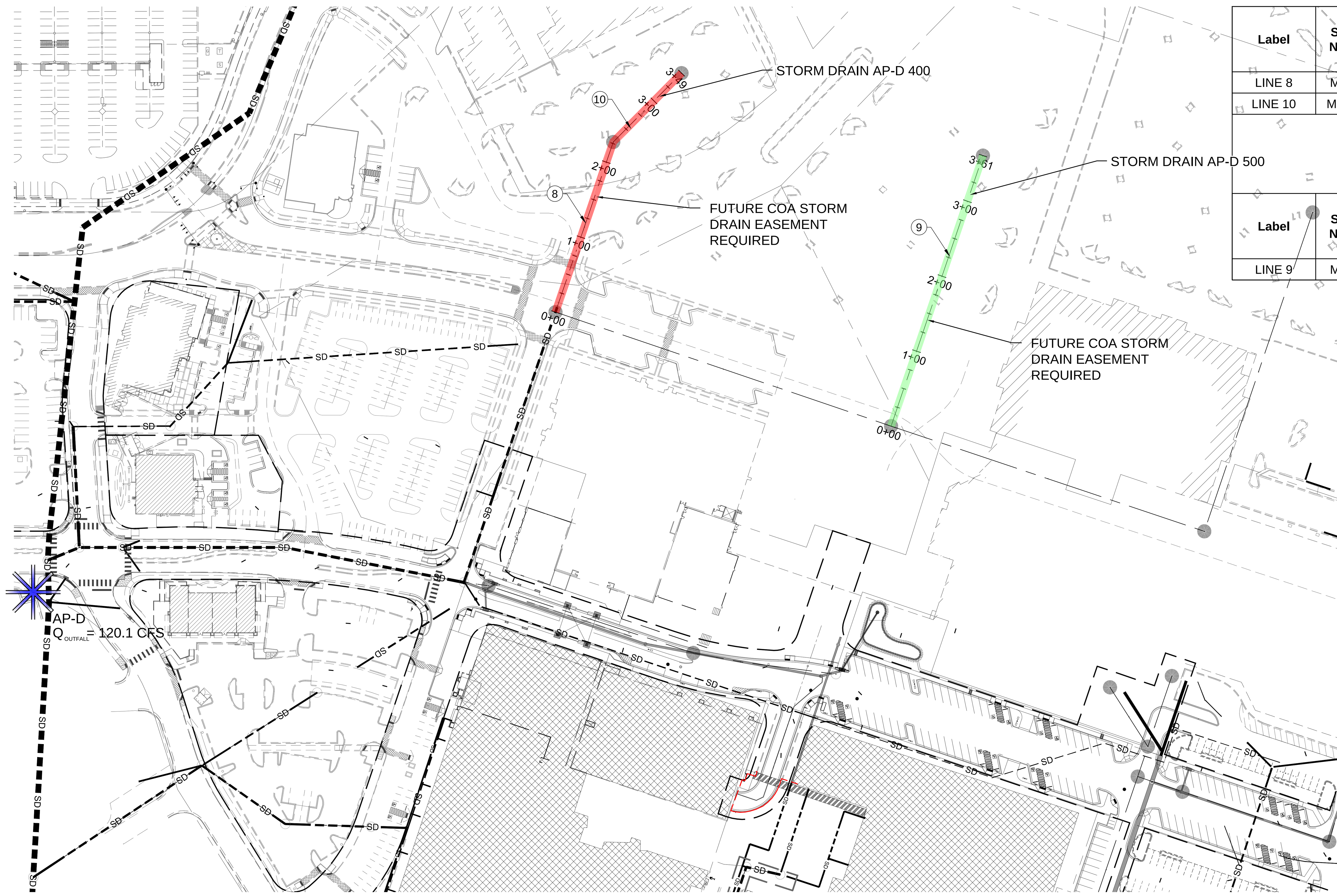
Last Saved:4/29/2019 1:31:20 PM, seddings

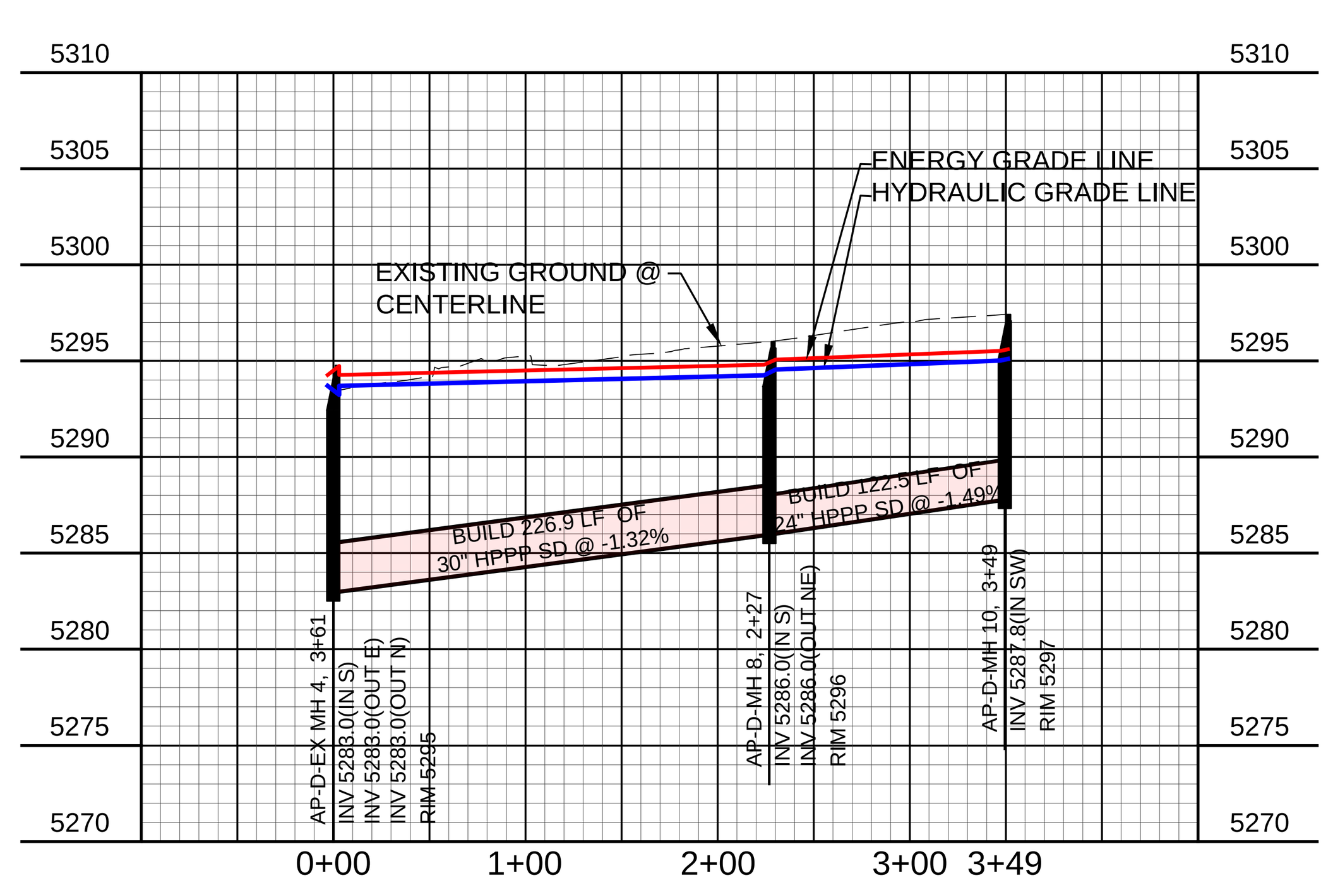
STORM CAD OUTPUT

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Flow (cfs)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
LINE 8	MH 8	MH 4	36.0	227.2	42.3	99.6	5.98	5,286.00	5,283.00	5,296.00	5,294.74	5,294.25	5,293.71	5,294.81	5,294.27
LINE 10	MH 10	MH 8	24.0	121.8	18.0	35.9	5.73	5,287.82	5,286.00	5,297.00	5,296.00	5,295.01	5,294.56	5,295.52	5,295.07

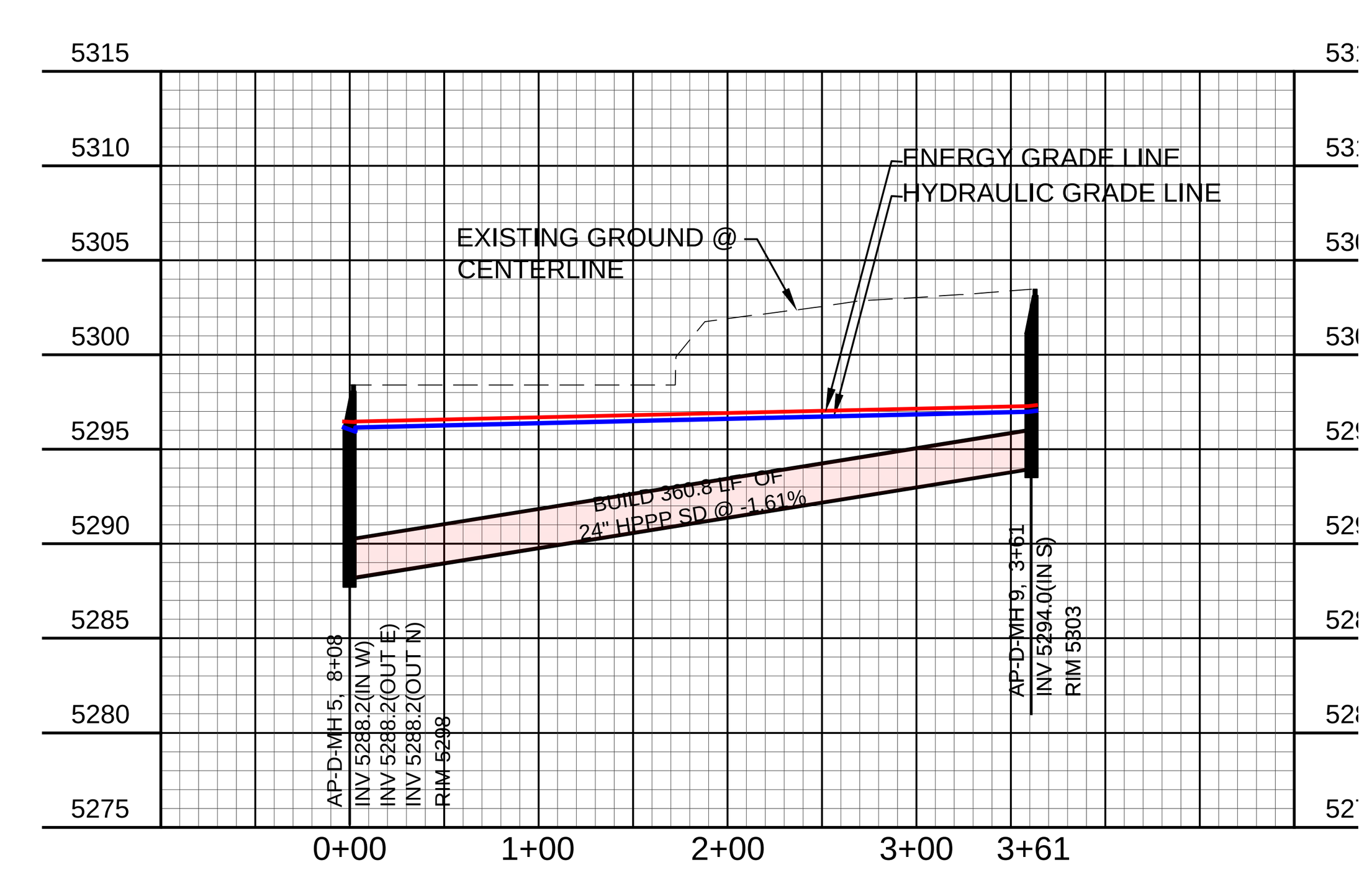
Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Flow (cfs)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
LINE 9	MH 9	MH 5	24.0	361.4	14.0	37.3	4.46	5,294.00	5,288.20	5,303.00	5,298.00	5,296.98	5,296.16	5,297.29	5,296.47



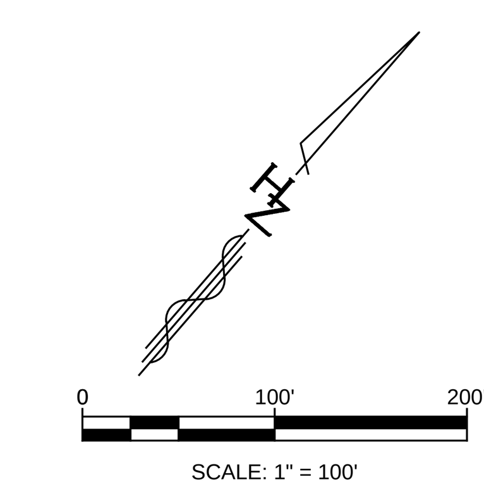
STORM DRAIN AP-D 400 & 500



PROFILE VIEW: STORM DRAIN AP-D 400



PROFILE VIEW: STORM DRAIN AP-D 500



AS BUILT INFORMATION
CONTRACTOR / WORK STAKED BY / INSPECTOR'S ACCEPTANCE BY / FIELD VERIFICATION BY / DRAWINGS CORRECTED BY — DATE

MICRO-FILM INFORMATION
RECORDED BY — DATE

BENCH MARKS
FOUND MONUMENT "20_H18"
STANDARD 3 1/4" ALUMINUM DISC (FOUND IN PLACE)
NEW MEXICO STATE PLANE COORDINATES (CENTRAL ZONE—N.A.D. 1983)
N=1,493,154.978
E=1,545,048.210
PUBLISHED EL=5283.22 (NAVD 1988)
GROUND TO GRID FACTOR=0.999661580
DELTA ALPHA ANGLE=-0°11'00.11"

SURVEY INFORMATION
FIELD NOTES
NO. / BY / DATE

ENGINEER'S SEAL

4/29/19

REVISIONS
NO. / DATE / REMARKS / BY

DESIGN
DESIGNED BY: LRT DATE: APR. 18, 2019
DRAWN BY: VKL DATE: APR. 18, 2019
DWG NAME: DRAINAGE EXHIBIT 2-9.dwg PROJ #: R303699.04
CHECKED BY: SAE DATE: APR. 18, 2019

Designed By:
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Huitt-Zollars, Inc. Rio Rancho
333 Rio Rancho Drive NE, Suite 101
Rio Rancho, New Mexico 87124
Phone (505) 892-5141 Fax (505) 892-3259

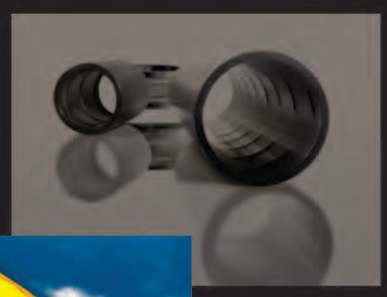
WINROCK TOWN CENTER
PHASE B INFRASTRUCTURE IMPROVEMENTS

TITLE:
STORM DRAIN AP-D 400 & 500

Design Review Committee	City Engineer	Mo./Day/Yr.	Mo./Day/Yr.

Last Update

City Project No.	Zone Map No.	Sheet	Of
4553.90	J-19-Z	EXHIBIT 7	



Office Locations

Albuquerque, New Mexico (505) 883-8114

Austin, Texas (512) 237-1129

Dallas, Texas (214) 871-3311

Denver, Colorado (303) 740-7325

El Paso, Texas (915) 587-4339

Fort Worth, Texas (817) 335-3000

Glendale, California (818-456-1833

Houston (Downtown), Texas (713) 622-1180

Houston (West), Texas (281) 496-0066

Irvine, California (949) 988-5815

Los Angeles, California (310) 820-4600

Oklahoma City, Oklahoma (405) 842-0363

Ontario, California (909) 941-7799

Orlando , Florida (407) 839-0414

Phoenix, Arizona (602) 952-9123

Rio Rancho, New Mexico (505) 892-5141

Seattle, Washington (206) 324-5500

Tacoma, Washington (253) 627-9131

Thousand Oaks, California (805) 418-1802

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