CITY OF ALBUQUERQUE

Planning Department
Brennon Williams, Director

Mayor Timothy M. Keller

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

December 1, 2022

Scott Eddings, PE
Huitt-Zollers Inc.
6561 Americas Parkway NE
Albuquerque, NM 87110

RE: MDS - Montage Subdivision Unit 7 on Bobby Foster
Grading and Drainage Submittal for Preliminary Plat and Grading Permit
Grading Plan Engineer's Stamp Date: 7/13/22
Drainage Report Engineer's Stamp Date: missing
Hydrology File: R16D100A

Dear Mr. Eddings,

Based upon the information provided in your submittal received 11/15/22, the application can't be approved for Preliminary Plat or Grading Permit until the following comments are addressed.

General Summary

An effort was made in this application to improve the drainage capacity of the alleys by adding 4" curb to the typical alley section and to distribute runoff to three locations instead of one along Newhall Dr., but the capacity of the north alley is still exceeded. The grading plan was submitted for the first time but doesn't provide sufficient detail of the drainage structures to verify compliance with the DPM and the City Standard Specifications. It is unclear if houses will face the perimeter streets and how much drainage from the lots can drain directly to the perimeter streets instead of to the interior alleys. Discharge to Newhall Dr. is through an unknown number and size of sidewalk culverts clustered at two of the alley stubs where more detail and drainage calculations are needed. The third discharge is through a box culvert and channel in parcels G and J which also need sections, details, and calculation. Typical sections of drainage structures are represented only by x and y coordinates, 'n' values, and longitudinal slopes in the calculations, without any material specifications needed to verify compliance with City Standard Specifications. It isn't clear which drainage structures will be maintained by the City and which by the HOA if any. The vague descriptions of the channel and box culvert suggest that the intended materials won't meet minimum standards for city maintenance, and deviations from the alley section (DWG 2411) may not meet Transportation requirements.

The drainage management plan for this site should be *"free discharge of the 100 year stormwater runoff"* without any retention for first flush SWQ volume because the surrounding subdivision, Bobby Foster Subdivision, should have provided retention ponds sized for the 100 year 10 day storm. The Bobby Foster drainage report should also have included detailed hydraulic analysis of the streets, inlets, and storm drains so that Montage Unit 7 would just need to demonstrate conformance to that analysis to demonstrate adequate downstream capacity. However the 2020 Bobby Foster Drainage Report included detention ponds instead of retention

ponds, and it didn't include any hydraulic analysis of the streets or inlets; therefore Montage Unit 7 cannot demonstrate adequate downstream capacity per ordinance § 14-5-2-12(G) until the Bobby Foster Drainage Report, Infrastructure List, and Work Order Plans are revised to meet the minimum requirements of the Drainage Ordinance, the DPM, and the City Standard Specifications.

Grading Plan Comments

1. The Grading Plan that was missing from the first submittal was provided with this second submittal, but it is still missing typical sections of streets, alleys, retaining walls, and other details on the Grading Plan Checklist, DPM 6-14(C). The new plan raises these additional concerns.
    a. Please provide the Benchmark information (location, description and elevation) for the survey contour information provided.
    b. Please provide the FIRM Map number in a flood plain note with effective date.
    c. Please provide a legal Description of the property.
    d. Show both existing and proposed storm pipes and inlets with sizes.
    e. Show sidewalk culverts in Parcels A & K, box culvert in Parcel G, and drainage channel in Parcel J labeling the number, size, and type of each. Add details of connection to streets at both ends of each.
    f. Provide typical sections of drainage structures thru Parcels A, G, J, and K with material specifications, lot lines, and dimensions.
    g. Add valley gutters through the alley intersections. Provide valley gutters at each of the four alley intersections in accordance with the Intersection standard DWG 2401 and Concrete Valley Gutter standard DWG 2420.
    h. The highest point at entrance 2 is at the valley gutter for Alley D; so, Alley D will drain out the entrance to Sagan Loop contrary to the drainage Basin Map. Instead provide a water block farther to the east in entrance 2 to and adjust the Basin Map accordingly.
    i. Add a typical lot grading detail with typical section through the side yards at the front corner of the houses. The plan should clearly indicate which portions of each lot drains to the alley and to the street.
    j. Add typical sections from the house pads to the existing adjacent street showing the maximum grade change between pad and street. Show how that grade change is to be accomplished on the private property, while maintaining the required typical sections within the public right of way per COA DWG 2414. Correct the grades shown on the sidewalk around the perimeter to agree with the projected 2% grade shown on the detail.
    k. Identify Landscape Buffer Swales per COA DWG 2414 along all of the adjacent public streets with a hatch pattern in the legend and in the plan view.
    l. Identify all right-of-ways and drainage easements.
    m. The layout and sections of the streets, alleys, and sidewalks as shown on the Grading Plan must match the Traffic Circulation Layout, but a traffic plan hasn't been submitted yet. So, a condition of approval will be that the sections match and the G&D Plan will have to be revised if they don't.

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Drainage Report Comments

2. Neither this report nor the 2020 Bobby Foster Drainage Report has demonstrated adequate downstream capacity. Ponds 1 and 2A must be redesigned to retain the 100-year 10-day volume in accordance with the Montage Unit 3 & 4 Drainage Report with engineer's stamp date 1/18/2019. The 2020 Bobby Foster report and the 2011 Montage Units 1 & 2 Drainage Reports both undersized the ponds by designing them as detention ponds rather than retention ponds. Additionally the Bobby Foster Report:
    a. Must be signed and dated by a PE
    b. Must include street and inlet hydraulic calculations per DPM 6-9(A) and DPM 6-9(F). The WO plans show storm pipes with size, slope, Q and V; however, supporting info on where the stormwater gets into the pipes is missing so Q and V may have to be revised.
    c. Must account for drainage patterns in the both north and south halves of Bobby Foster Rd and at the intersection of University Blvd. Additional storm sewer may be needed to serve the north half of the roadway. Additional inlets are needed at the University Intersection.
    d. Must be submitted to Hydrology for review and approval for Work Order.

   The Bobby Foster Report, Infrastructure List, and Work Order Plans must be revised to correct these deficiencies as a prerequisite to approval of this Montage Unit 7 G&D Plan for Preliminary Plat. Both Montage Unit 7 and Bobby Foster Subdivisions must demonstrate adequate downstream capacity per § 14-5-2-12(G) of the Albuquerque Code of Ordinances.

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3. Table 3 on page 3 of this Montage Unit 7 report overestimated the capacity of the Alleys and of Newhall Dr.

Table 3
Proposed Flow Capacity

Street Section	Allowable Street Capacity Q (CFS)	Actual Max Q (CFS)
Alley A, B, C, D	14.3	11.4
Parcel J	10.9	6.6
NewHall Dr.	48.7	26.5

    a. The city doesn't allow 100 year flow depth over the top of the curb, so the alley capacity of 14.7 cfs is overestimated since the flow depth 4.7" in the calculations exceeds the 4" curb height.
    b. Similarly the Newhall Dr. Street capacity of 48.75 cfs is overestimated since the flow depth 8"in the calculations exceeds the 6" curb height.

   The Newhall Dr. surface capacity is about 25 cfs for 6" deep flow at 0.5% slope, and the alley capacity at 4" deep flow in a (normal crown 24' FF) at 0.5% longitudinal slope is about 8 cfs.
   You may want to considerer draining some of the lots to the adjacent streets to reduce drainage to the alleys, but none of the lots are allowed to drain to arterial or collector streets. If some of the drainage from Bobby Foster no longer drains to Sagan Loop then some of the lots can drain to Sagan Loop instead.
   Provide surface drainage analysis demonstrating that the 100-year HGL remains at/below top of curb, and the 100-year EGL remains within the ROW for the onsite streets and alleys and the adjacent streets that receive drainage from this site per DPM 6-9(A).

4. Add hydraulic calculations for the drainage structures through Parcels A, G, J, and, K. Sidewalk culvers calculations should be per DWG 2236 and include both normal depth and weir calculations. This version of the report vaguely describes drainage through Parcels J and G in a channel and box culvert respectively. Neither appears to meet City Standard Specifications and probably won't be allowed. The Channel should be per DWG 2260 with freeboard per DPM 6-8(D)(8). Provide plan view details, typical sections, and material specifications for further consideration. Calculations and a profile for the box culvert appear to be missing and are required.
5. A narrative explanation of the orientation of the lots is required on the Grading Plan and in the Drainage Report. Describe where the front sides of the houses face, the interior streets/alleys or the existing perimeter streets. The narrative description should address whether a perimeter block wall will be constructed adjacent to the existing public streets or not.
6. The signature and date were missing from the report again. All engineering calculations must be stamped signed and dated by a NMPE. As a reminder, the engineer's stamp must also be updated after each revision with a new signature and date.
7. StormCAD is used in the Montage Unit 7 Report but insufficient information has been provided to show that it meets DPM requirements. Hydraulic calculations must be performed along the Energy Grade Line using the Bernoulli Equation, per the DPM. The calculations presented in HEC-22, 3rd Edition agree with the DPM but the earlier editions (1st and 2nd) do not use Bernoulli's correctly. The City of Albuquerque-Hydrology Section accepts the manhole loss methodology presented in HEC-22, 3rd Edition, section 7.1.6.7 and rejects the two methods prescribed in HEC-22, 1st Edition and 2nd Edition. StormCAD v8i SELECTseries5 (build 08.11.05.58) and later, by Bentley, is acceptable provided that the calculations are performed using HEC-22, 3rd Edition and the user selects the "Energy Grade" option for losses. Provide detailed input and output files to demonstrate compliance with the DPM.
   The flow rates in the pipes must be supported by inlet interception rates which are based on 100-year flow depths and velocities in the streets per DPM procedures for inlets on grade. Hydraulic grade line calculations and pipe profiles will be required prior to drainage report approval for (WO).
8. An Engineer's Certification of the compacted pad and grading (Pad Certification), per the DPM Chapter 22.7: *Engineer's Certification Checklist for Non-Subdivision*, is required prior to issuing Building Permit (BP).

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9. As a reminder, if the project total area of disturbance (including the staging area and any work within the adjacent Right-of-Way) is 1 acre or more, then an Erosion and Sediment Control (ESC) Plan and Owner's certified Notice of Intent (NOI) is required to be submitted to the Stormwater Quality Engineer (Doug Hughes, PE, CPESC, jhughes@cabq.gov , 924-3420) 14 days prior to any earth disturbance.

If you have any questions, please contact me at 924-3420 or jhughes@cabq.gov.

Sincerely,

James D. Hughes

James D. Hughes, P.E.
Principal Engineer, Planning Dept.
Development and Review Services

C: file

PO Box 1293

Albuquerque

NM 87103

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MONTAGE 7 SUBDIVISION AT MESA DEL SOL
DRAINAGE STUDY

CITY OF ALBUQUERQUE

PREPARED FOR:

PREPARED BY:

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

OCTOBER 2022

HZI Project No. R315530.01

Montage 7 – Mesa Del Sol
Drainage Study

I, Nina Leung-Villa, 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.

TABLE OF CONTENTS

EXHIBITS

APPENDICES

INTRODUCTION

This drainage report addresses the proposed infrastructure required to convey the storm water runoff from the proposed subdivision in Mesa Del Sol. Existing and proposed conditions have been analyzed to determine infrastructure requirements for the proposed development. This report will also demonstrate that the development of this project complies with the City of Albuquerque ordinances and policies.

PROJECT LOCATION

Montage 7 is proposed to be a residential subdivision within the Mesa Del Sol development in Albuquerque. It is located on Bobby Foster Rd. between Newhall Dr. and Sagan Loop. The project site will house 57 residential detached units on 7.5 acres of land.

FLOOD HAZARD ZONE

The proposed site does not lie within a flood zone as shown on Flood Insurance Rate Map Number 35001C0555H, effective date August 16, 2012. See **Appendix A** for the FEMA Flood Insurance Rate Map.

RELATED REPORTS

This report references the Drainage Study for Bobby Foster Rd. and University Blvd. by Huitt-Zollars, Inc., dated November 2020. That report provided analysis for this project site and the surrounding area. All hydrology calculations were completed for the 100-year, 6-hour storm.

JURISDICTIONS OF PUBLIC AGENCIES

This project is located entirely within the City of Albuquerque (CoA) Municipal Limits and is therefore within their jurisdiction and must comply with the City's development requirements.

METHODOLOGY

This drainage report follows procedures outlined in the CoA Development Process Manual (DPM). This report will utilize AHYMO for hydrology modeling to match methodology used in the Bobby Foster Rd. and University Blvd. drainage report. AHYMO is utilized in this study to determine peak flow rates and volumes for Montage 7 subdivision. See **Appendix C** for the AHYMO input and output.

PRECIPITATION

The 100-yr, 24-hr design storm was used for this analysis. For these storms, the AHYMO Computer program requires the 1, 6, and 24-hr precipitation values. These values were obtained from the NOAA Atlas and are shown on **Table 1**. These precipitation values are consistent with current data obtained from NOAA Atlas 14 Precipitation Frequency Data Server. See **Appendix B** for site specific "Point Precipitation Frequency Estimates".

Table 1
Precipitation Values

Return Period (yrs)	24 hr Rainfall (in)	6 hr Rainfall (in)	1 hr Rainfall (in)
100	2.63	2.29	1.83

LAND TREATMENTS

The land treatments used in the AHYMO Computer model are as described by the CoA DPM, and are summarized in **Table 2**.

Table 2
Land Treatment Classifications

Treatment	Land Condition
A	Soil uncompacted by human activity with 0 to 10% slopes. Native grasses, weeds, and shrubs in typical densities with minimal disturbance to grading, ground cover, and infiltration capacity.
B	Irrigated lawns, parks and golf courses with 0 to 10% slopes. Native grasses, weeds and shrubs, and soil uncompacted by human activity with slopes greater than 10% and less than 20%.
C	Soil compacted by human activity. Minimal vegetation. Unpaved parking, roads, trails. Most vacant lots. Gravel or rock (desert landscaping). Irrigated lawns and parks with slopes greater than 10%. Native grasses, weeds and shrubs, and soil uncompacted by human activity with slopes at 20%or greater. Native grass, weed and shrub areas with clay or clay loam soils, and other soils of very low permeability as classified by SCS Hydrologic Soil Group D.
D	Impervious areas, pavement, and roofs. Ponds, channels, and wetlands, even if seasonally dry

Since this project site is comprised of Single-Family Detached Units, the corresponding Percent of Treatment D is determined by the equation: $7 * ((N * N) + (5 * N))$^0.5 where N = units/acre. The remaining percentage points are to be split between treatments B and C. “N” for Mountain Hawk Tract 3B Subdivision is calculated to be 7.5 units/acre. Please refer to **Exhibit 1** for specific basin land treatments.

EXISTING CONDITIONS

The project site is currently undeveloped and generally slopes from north to south towards an existing Pond. Due to the existing roads, there is currently no offsite flow that reaches the site. A detention pond exists south of Montage 7 and is designed to accommodate the runoff from the subdivision.

PROPOSED CONDITIONS

The project site is proposed for development of detached residential units. Please refer to the Basin Map in **Exhibit 1** for basin characteristics including area, peak flow amounts, and land type. Montage 7 exists as Basin W-3 as established with the Bobby Foster and University Blvd Basin Map. As previously studied in the master drainage report, Pond 1 will serve as the ponding facility which will provide adequate volume to house runoff from this project. Newhall Dr. surface flow from Bobby Foster will equate to 5.2 cfs and will see an additional 21.4 cfs from the proposed subdivision. See **Appendix E** for hydraulic analysis data.

Refer to **Table 3** below for a flowrate comparison of each proposed or utilized street section. All onsite sections do not exceed the allowable street capacity and will utilize the proposed street surface to drain site runoff to Newhall Dr. See **Appendix D** for the full surface flow capacity analysis.

Parcel J is the route that runoff from basin 400 will navigate through, runoff will then utilize a box culvert and Parcel G to extend to Newhall Dr. Basins 100, 200, 300, and 400 will surface drain to Newhall Dr. and discharge in an existing inlet with an outfall at Pond 1. See **Exhibit 1** for the pipe network layout.

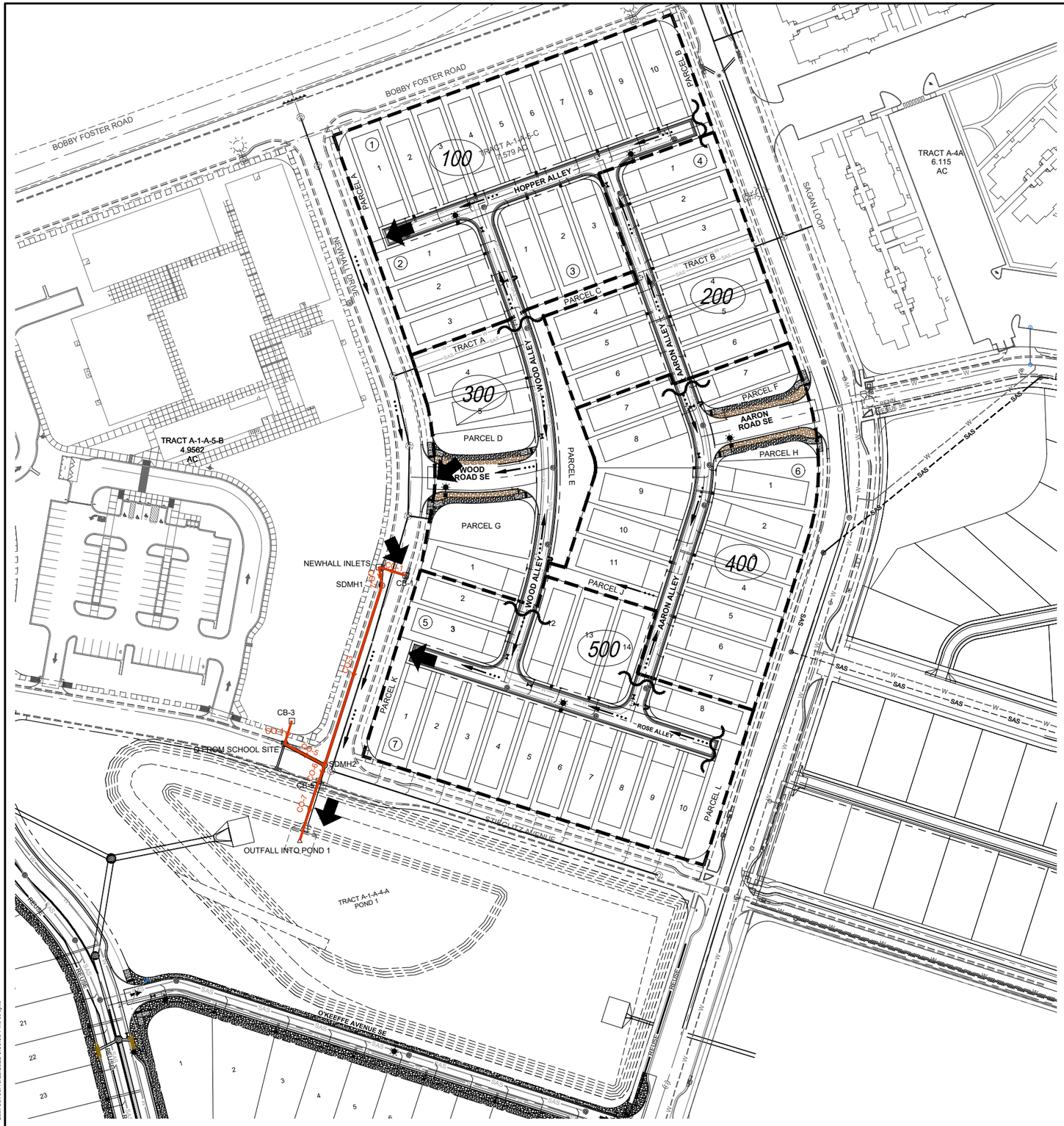
Table 3
Proposed Flow Capacity

Street Section	Allowable Street Capacity Q (CFS)	Actual Max Q (CFS)
Alley A, B, C, D	14.3	11.4
Parcel J	10.9	6.6
NewHall Dr.	48.7	26.5

Basin Montage 7, formerly named W-3 is part of a master plan and will share Pond 1 with Basins Park, T, U, V, W-1, and W-2. (Refer to Drainage study for Bobby Foster Rd. and University Blvd.) The development type for this project corresponds with the master plan, allowing Pond 1 to maintain sufficient sizing for this project. Pond 1 will outfall to Pond 2A. For a hydrological summary of the project site, refer to **Appendix C** and **Exhibit 1**.

CONCLUSION

The proposed buildout of Montage 7 Subdivision will not exceed the capacity of the existing storm drain system in Newhall Dr. and will discharge to Pond 1. Allowable discharge to Pond 1 is 32.4 cfs and Montage 7 Subdivision will generate 28.9 cfs. This confirms the design is suitable for the existing storm drain system. This drainage study substantially complies with the “Mesa Del Sol Master Plan” and the drainage study for “Bobby Foster Rd. and University Blvd.”



LEGEND

- DRAINAGE BASIN BOUNDARY
- DISCHARGE LOCATION
- 100 — DRAINAGE BASIN NUMBER
- DRAINAGE HIGH POINT
- FLOW PATH

Onsite Basin Summary - Developed Conditions For Residential Detached Units
Basins Drain Into Pond 1 located south of Montage 7

Basin	Area (Acre)	Area (SQ MI)	Number of Lots	N (units/acre)	%A	%B	%C	%D	100-Year Q (CFS)
100	1.87	0.0029	16	8.6	0	13	13	75	7.4
200	0.99	0.0015	9	9.1	0	11	11	79	4.0
300	1.05	0.0016	3	2.9	0	34	34	33	3.4
400	1.70	0.0027	13	7.6	0	19	19	69	6.6
500	1.86	0.0029	16	8.6	0	12	12	76	7.5
Total	7.5	0.0117	57	7.6	0	15	15	70	28.9

0 60' 120'
SCALE: 1" = 60'

nm811 Know what's below. Call before you dig.
TWO WORKING DAYS BEFORE YOU DIG CALL 811 OR 260-1990

AS BUILT INFORMATION
CONTRACTOR — DATE
SURVEY BY — DATE
INSPECTOR'S NOTES AS STAKED BY — DATE
FIELD DRAWINGS BY — DATE
CORRECTED BY — DATE
MICRO-FILM INFORMATION
RECORDED BY — DATE
NO.

SURVEY INFORMATION
FIELD NOTES
NO. | BY | DATE

ENGINEER'S SEAL
NEW MEXICO — JUNG-VILLA — 25970 — REGISTERED PROFESSIONAL ENGINEER

NO.	REMARKS	BY	DATE
	DESIGN		
	REVISIONS		

DESIGNED BY: CAT — DATE: October 18, 2022
DRAWN BY: CAT — DATE: October 18, 2022
DWG NAME: MDS MONTAGE 7 BASINS.dwg — PROJ #:
CHECKED BY: SAE — DATE: October 18, 2022

Designed By:
HUITT-ZOLLARS
Huitt-Zollars, Inc. Albuquerque
6501 Americas Pkwy NE, Suite 550
Albuquerque, New Mexico 87110
Phone (505) 883-8114 Fax (505) 883-5022

OCTOBER 28, 2022

TITLE:
BASIN MAP & STORMCAD MONTAGE 7 - MESA DEL SOL

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

City Project No. | Zone Map No. | Sheet Of

EXHIBIT 1

Plotted: 10/31/2022 3:15:11 PM, By:Trujillo, Carie
File:C:\Projects\2020\101 - Montage Unit 7 - Mesa del Sol\05 Design\05.13 Drainage\Hydrology\MDS MONTAGE 7 BASINS.dwg
Last Saved 10/28/2022 5:30:50 PM, ctrujillo

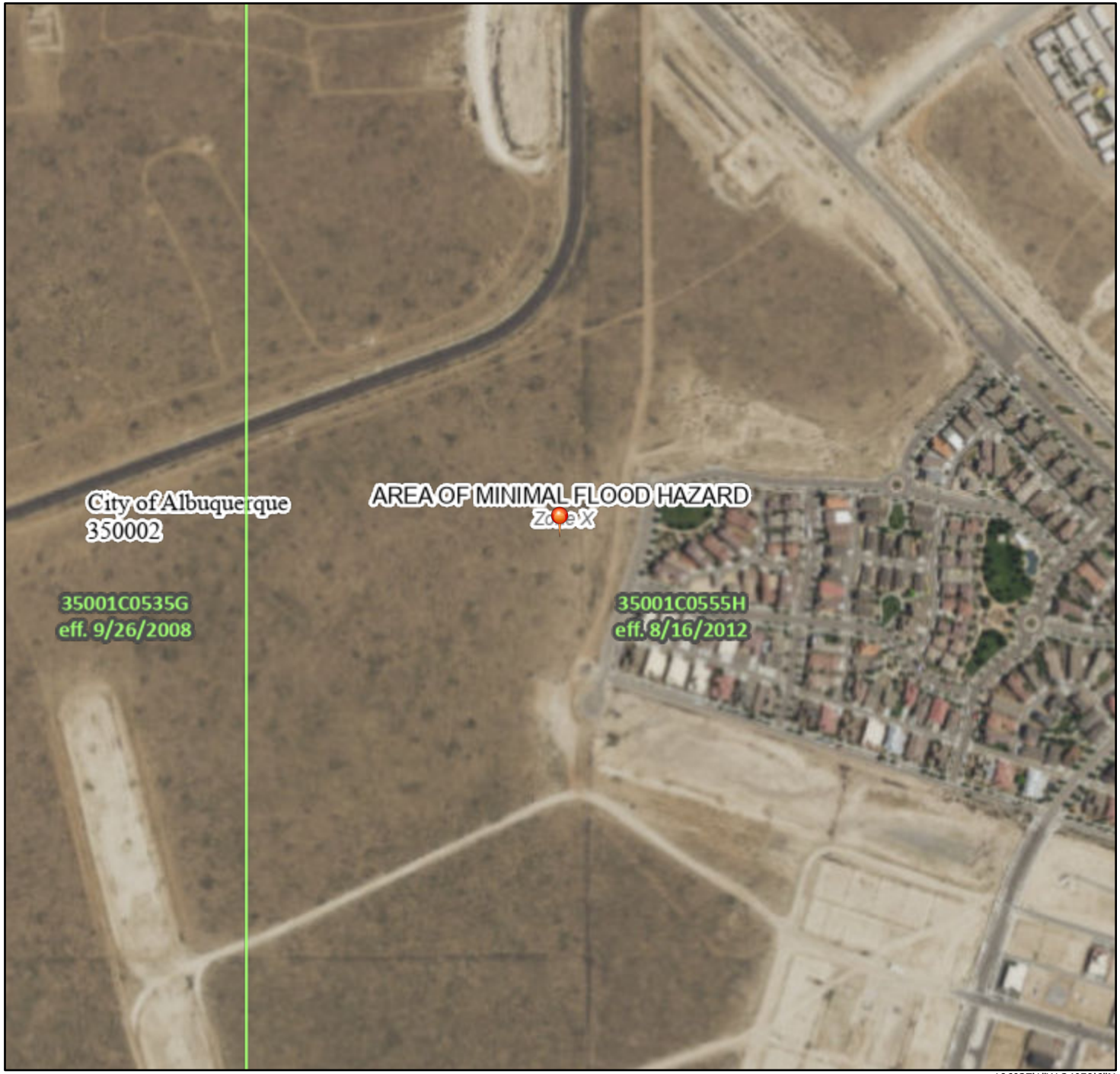
APPENDIX A

FEMA FLOOD INSURANCE RATE MAP

National Flood Hazard Layer FIRMette

FEMA

106°37'38"W 34°59'36"N



106°37'1"W 34°59'6"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/6/2022 at 7:03 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX B

NOAA Atlas Point Precipitation Frequency Estimates

NOAA Atlas 14, Volume 1, Version 5
Location name: Albuquerque, New Mexico, USA*
Latitude: 34.9893°, Longitude: -106.6223°
Elevation: 5304.6 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.179** (0.155-0.207)	**0.232** (0.200-0.268)	**0.310** (0.267-0.358)	**0.370** (0.318-0.426)	**0.453** (0.387-0.520)	**0.516** (0.439-0.593)	**0.583** (0.493-0.670)	**0.654** (0.548-0.750)	**0.748** (0.621-0.860)	**0.823** (0.679-0.946)
10-min	**0.272** (0.236-0.315)	**0.352** (0.304-0.408)	**0.472** (0.406-0.545)	**0.563** (0.484-0.648)	**0.689** (0.589-0.791)	**0.786** (0.668-0.903)	**0.888** (0.750-1.02)	**0.995** (0.833-1.14)	**1.14** (0.945-1.31)	**1.25** (1.03-1.44)
15-min	**0.338** (0.293-0.390)	**0.437** (0.377-0.506)	**0.585** (0.503-0.675)	**0.698** (0.599-0.803)	**0.854** (0.730-0.981)	**0.974** (0.829-1.12)	**1.10** (0.929-1.26)	**1.23** (1.03-1.41)	**1.41** (1.17-1.62)	**1.55** (1.28-1.79)
30-min	**0.455** (0.394-0.525)	**0.589** (0.508-0.681)	**0.787** (0.678-0.909)	**0.940** (0.807-1.08)	**1.15** (0.983-1.32)	**1.31** (1.12-1.51)	**1.48** (1.25-1.70)	**1.66** (1.39-1.90)	**1.90** (1.58-2.19)	**2.09** (1.72-2.40)
60-min	**0.563** (0.488-0.650)	**0.729** (0.629-0.842)	**0.974** (0.839-1.13)	**1.16** (0.999-1.34)	**1.42** (1.22-1.64)	**1.62** (1.38-1.86)	**1.83** (1.55-2.11)	**2.06** (1.72-2.36)	**2.35** (1.95-2.70)	**2.59** (2.13-2.98)
2-hr	**0.640** (0.553-0.753)	**0.819** (0.705-0.964)	**1.08** (0.930-1.27)	**1.29** (1.11-1.51)	**1.58** (1.34-1.84)	**1.82** (1.53-2.11)	**2.06** (1.73-2.40)	**2.32** (1.93-2.69)	**2.68** (2.20-3.11)	**2.97** (2.42-3.45)
3-hr	**0.678** (0.591-0.794)	**0.862** (0.749-1.01)	**1.13** (0.980-1.32)	**1.34** (1.16-1.56)	**1.63** (1.40-1.90)	**1.87** (1.59-2.16)	**2.12** (1.79-2.45)	**2.38** (2.00-2.76)	**2.75** (2.28-3.18)	**3.05** (2.50-3.53)
6-hr	**0.788** (0.688-0.915)	**0.991** (0.868-1.15)	**1.27** (1.12-1.48)	**1.50** (1.31-1.73)	**1.80** (1.56-2.08)	**2.04** (1.76-2.35)	**2.29** (1.96-2.64)	**2.55** (2.17-2.93)	**2.91** (2.45-3.35)	**3.20** (2.67-3.69)
12-hr	**0.875** (0.771-0.994)	**1.10** (0.973-1.25)	**1.39** (1.23-1.58)	**1.62** (1.42-1.84)	**1.93** (1.69-2.19)	**2.17** (1.89-2.45)	**2.42** (2.09-2.73)	**2.67** (2.29-3.02)	**3.01** (2.56-3.42)	**3.29** (2.77-3.74)
24-hr	**0.985** (0.879-1.11)	**1.23** (1.10-1.39)	**1.54** (1.37-1.74)	**1.79** (1.59-2.01)	**2.12** (1.88-2.38)	**2.37** (2.09-2.66)	**2.63** (2.32-2.95)	**2.90** (2.54-3.24)	**3.25** (2.83-3.65)	**3.53** (3.06-3.96)
2-day	**1.05** (0.938-1.17)	**1.31** (1.18-1.46)	**1.63** (1.46-1.82)	**1.88** (1.69-2.09)	**2.22** (1.98-2.47)	**2.48** (2.21-2.76)	**2.75** (2.44-3.05)	**3.02** (2.67-3.35)	**3.38** (2.97-3.76)	**3.65** (3.20-4.07)
3-day	**1.13** (1.03-1.24)	**1.41** (1.28-1.55)	**1.74** (1.58-1.91)	**2.00** (1.82-2.19)	**2.34** (2.13-2.57)	**2.61** (2.36-2.86)	**2.88** (2.60-3.15)	**3.15** (2.83-3.45)	**3.50** (3.14-3.84)	**3.77** (3.37-4.14)
4-day	**1.22** (1.12-1.32)	**1.51** (1.39-1.64)	**1.84** (1.70-2.00)	**2.11** (1.95-2.28)	**2.47** (2.27-2.67)	**2.74** (2.52-2.96)	**3.01** (2.76-3.25)	**3.27** (2.99-3.54)	**3.63** (3.31-3.92)	**3.89** (3.54-4.22)
7-day	**1.40** (1.30-1.52)	**1.74** (1.61-1.88)	**2.11** (1.95-2.28)	**2.40** (2.22-2.59)	**2.78** (2.57-2.99)	**3.07** (2.83-3.30)	**3.35** (3.08-3.60)	**3.61** (3.33-3.89)	**3.96** (3.64-4.26)	**4.21** (3.85-4.54)
10-day	**1.54** (1.43-1.67)	**1.92** (1.77-2.07)	**2.34** (2.17-2.52)	**2.67** (2.48-2.87)	**3.11** (2.88-3.34)	**3.43** (3.17-3.69)	**3.76** (3.47-4.03)	**4.08** (3.75-4.38)	**4.49** (4.12-4.83)	**4.80** (4.38-5.16)
20-day	**1.96** (1.81-2.12)	**2.43** (2.25-2.63)	**2.95** (2.73-3.18)	**3.34** (3.10-3.59)	**3.84** (3.55-4.12)	**4.19** (3.88-4.50)	**4.54** (4.19-4.87)	**4.86** (4.48-5.21)	**5.27** (4.85-5.65)	**5.55** (5.11-5.96)
30-day	**2.34** (2.17-2.52)	**2.90** (2.69-3.12)	**3.49** (3.24-3.74)	**3.92** (3.64-4.20)	**4.46** (4.13-4.77)	**4.85** (4.48-5.18)	**5.21** (4.82-5.57)	**5.55** (5.12-5.93)	**5.95** (5.49-6.36)	**6.23** (5.74-6.66)
45-day	**2.84** (2.64-3.04)	**3.51** (3.27-3.76)	**4.18** (3.90-4.47)	**4.65** (4.34-4.97)	**5.22** (4.88-5.58)	**5.61** (5.24-5.99)	**5.96** (5.57-6.35)	**6.27** (5.85-6.67)	**6.60** (6.17-7.02)	**6.79** (6.37-7.22)
60-day	**3.28** (3.06-3.53)	**4.06** (3.78-4.36)	**4.84** (4.51-5.18)	**5.39** (5.03-5.77)	**6.05** (5.64-6.47)	**6.50** (6.07-6.95)	**6.91** (6.45-7.39)	**7.28** (6.79-7.78)	**7.68** (7.18-8.21)	**7.94** (7.43-8.48)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

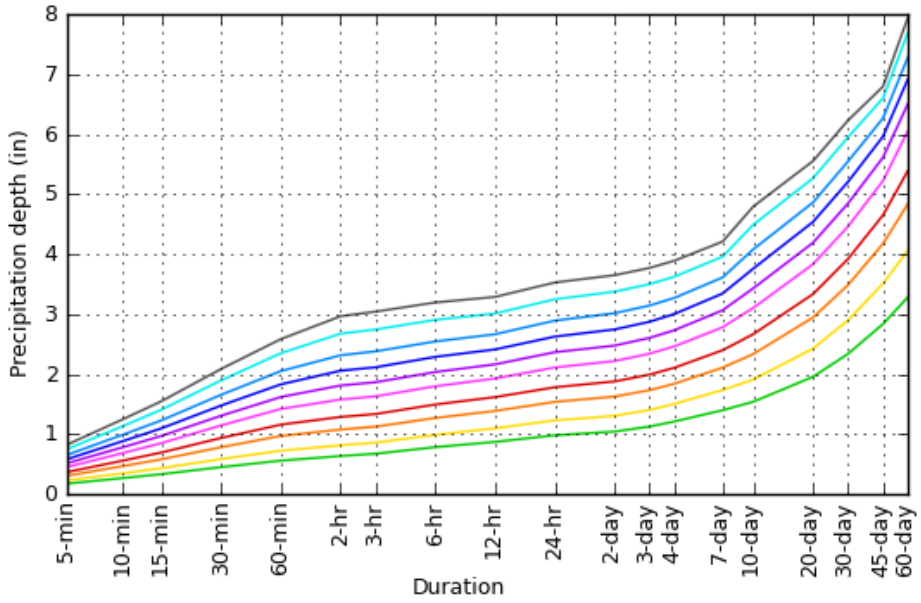
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

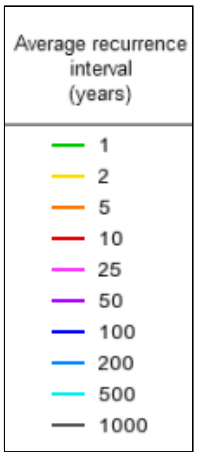
Please refer to NOAA Atlas 14 document for more information.

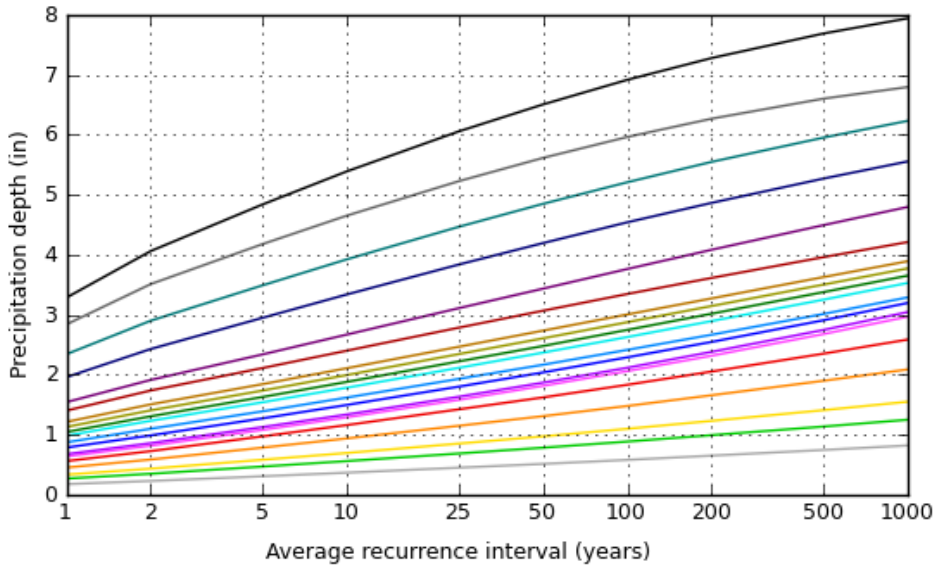
Back to Top

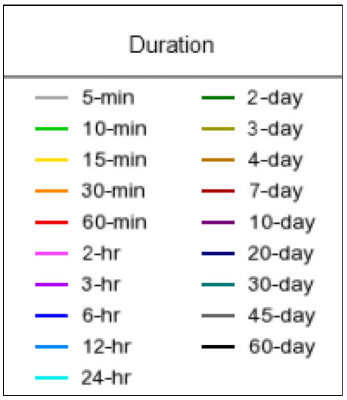
PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 34.9893°, Longitude: -106.6223°









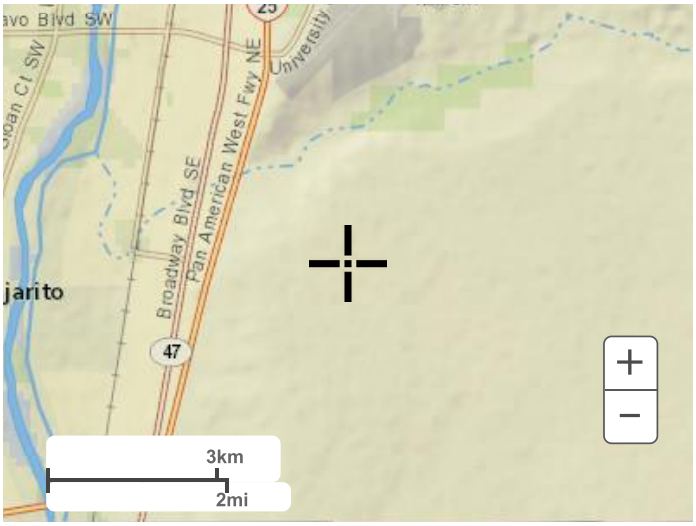
NOAA Atlas 14, Volume 1, Version 5

Created (GMT): Mon Jun 6 23:15:21 2022

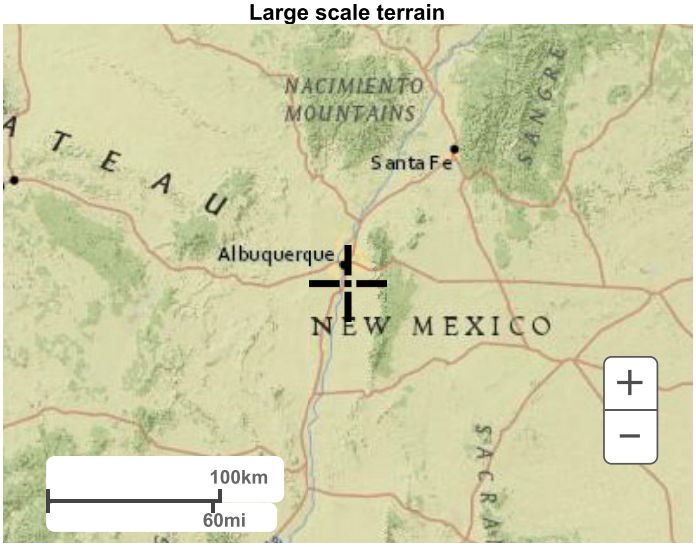
Back to Top

Maps & aerials

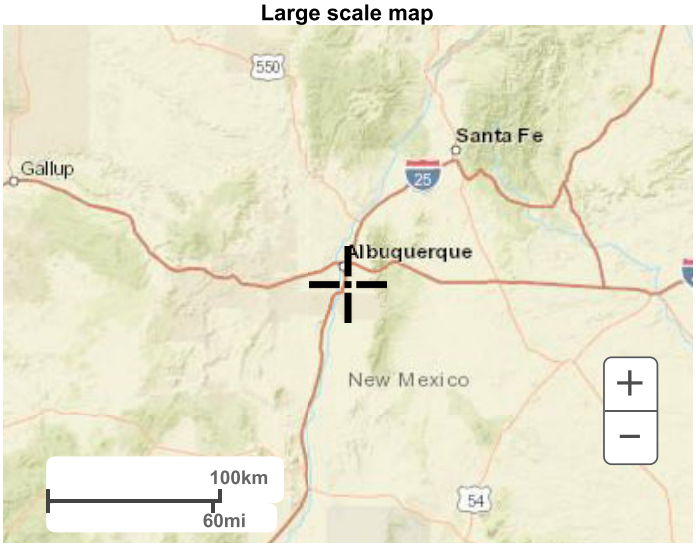
Small scale terrain



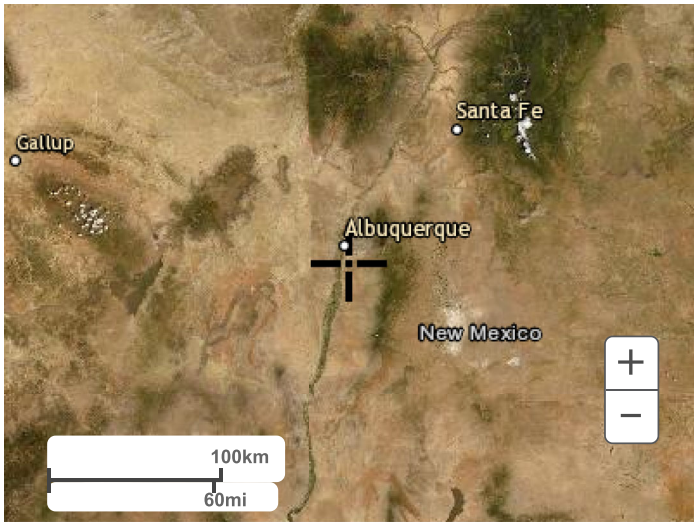
Large scale terrain



Large scale map



Large scale aerial



Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

APPENDIX C

AHYMO Input and Output

```
START                TIME=0.0 CODE=0  LINES=0

*S      MESA DEL SOL MONTAGE 7     OCTOBER 2022   HZI NO. R315530.01
*S--------------------------------------------------------------------------------
*S--------------------------------------------------------------------------------
*S 100 - YEAR RAINFALL    ------------------------------------------------------
RAINFALL            TYPE=-1 RAIN QUAR=0.0 RAIN ONE= 1.83
                    RAIN SIX= 2.29 RAIN DAY=2.63 DT=0.0
*S---------------------------------------------------------------------
*S---------------------------------------------------------------------
*S-------THE FOLLOWING BASINS DRAIN INTO POND 1-----------------------
*S---------------------------------------------------------------------
*S---------------------------------------------------------------------
*S BASIN 100
COMPUTE NM HYD  ID=10 HYD NO=100  DA=0.0029 SQ MI
                PER A=0.0 PER B=15.0 PER C=15.0 PER D=70.0
                    TP=-.1333 HR         MASSRAIN=-1
PRINT HYD       ID=10   CODE=1
*S---------------------------------------------------------------------
*S BASIN 200
COMPUTE NM HYD  ID=20 HYD NO=200  DA=0.0015 SQ MI
                PER A=0.0 PER B=10.5 PER C=10.5 PER D=79.0
                    TP=-.1333 HR         MASSRAIN=-1
PRINT HYD       ID=20   CODE=1
 *S---------------------------------------------------------------------
*S BASIN 300
COMPUTE NM HYD  ID=30 HYD NO=300  DA=0.0016 SQ MI
                PER A=0.0 PER B=33.5 PER C=33.5 PER D=33.0
                    TP=-.1333 HR         MASSRAIN=-1
PRINT HYD       ID=30   CODE=1
 *S---------------------------------------------------------------------
*S BASIN 400
COMPUTE NM HYD  ID=40 HYD NO=400  DA=0.0027 SQ MI
                PER A=0.0 PER B=18.5 PER C=18.5 PER D=63.0
                    TP=-.1333 HR         MASSRAIN=-1
PRINT HYD       ID=40   CODE=1
 *S---------------------------------------------------------------------
*S BASIN 500
COMPUTE NM HYD  ID=50 HYD NO=500  DA=0.0029 SQ MI
                PER A=0.0 PER B=12.0 PER C=12.0 PER D=76.0
                    TP=-.1333 HR         MASSRAIN=-1
PRINT HYD       ID=50   CODE=1
 *S---------------------------------------------------------------------
*S ADD BASINS, 100, 200, 300, 400, 500
ADD HYD              ID=75 HYD=SUM IDi=10 IDii=20
ADD HYD              ID=75 HYD=SUM IDi=75 IDii=30
ADD HYD              ID=75 HYD=SUM IDi=75 IDii=40
ADD HYD              ID=75 HYD=SUM IDi=75 IDii=50
PRINT HYD            ID=75 CODE=1
*S---------------------------------------------------------------------
FINISH
```

AHYMO PROGRAM SUMMARY TABLE (AHYMO-S4) - Ver. S4.02a, Rel: 02a RUN DATE (MON/DAY/YR) =10/27/2022
INPUT FILE = C:\Users\ctrujillo\Desktop\Montage 7 INPUT 4.txt USER NO.= AHYMO-S4TempUser05901704

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION

PAGE = 1

```
START                                                                                                    TIME=      0.00
*S                 MESA DEL SOL MONTAGE 7     OCTOBER 2022   HZI NO. R315530.01
*S-------------------------------------------------------------------------------
*S-------------------------------------------------------------------------------
*S 100 - YEAR RAINFALL    ------------------------------------------------------
RAINFALL  TYPE= 1 NOAA 14                                                                                RAIN6=    2.290
*S---------------------------------------------------------------------
*S---------------------------------------------------------------------
*S-------THE FOLLOWING BASINS DRAIN INTO POND 1-----------------------
*S---------------------------------------------------------------------
*S---------------------------------------------------------------------
*S BASIN 100
COMPUTE NM HYD        100.00   -    10       0.00290         7.35       0.264      1.70914    1.530    3.962 PER IMP=  70.00
*S---------------------------------------------------------------------
*S BASIN 200
COMPUTE NM HYD        200.00   -    20       0.00150         3.96       0.145      1.80757    1.530    4.124 PER IMP=  79.00
*S BASIN 300
COMPUTE NM HYD        300.00   -    30       0.00160         3.43       0.111      1.30446    1.535    3.348 PER IMP=  33.00
*S BASIN 400
COMPUTE NM HYD        400.00   -    40       0.00270         6.64       0.235      1.63258    1.530    3.845 PER IMP=  63.00
*S BASIN 500
COMPUTE NM HYD        500.00   -    50       0.00290         7.54       0.274      1.77476    1.530    4.063 PER IMP=  76.00
*S ADD BASINS, 100, 200, 300, 400, 500
ADD HYD                  SUM 10&20  75       0.00440        11.31       0.409      1.74257    1.530    4.017
ADD HYD                  SUM 75&30  75       0.00600        14.74       0.520      1.62570    1.530    3.838
ADD HYD                  SUM 75&40  75       0.00870        21.38       0.755      1.62780    1.530    3.840
ADD HYD                  SUM 75&50  75       0.01160        28.92       1.030      1.66452    1.530    3.896
*S---------------------------------------------------------------------
FINISH
```

```
    AHYMO PROGRAM (AHYMO-S4)                    - Version: S4.02a - Rel: 02a
         RUN DATE (MON/DAY/YR) = 10/27/2022
         START TIME (HR:MIN:SEC) = 17:34:52     USER NO.= AHYMO-S4TempUser05901704
         INPUT FILE = C:\Users\ctrujillo\Desktop\Montage 7 INPUT 4.txt

START               TIME=0.0 CODE=0  LINES=0

*S                  MESA DEL SOL MONTAGE 7     OCTOBER 2022   HZI NO. R315530.01
*S-------------------------------------------------------------------------
*S-------------------------------------------------------------------------
*S 100 - YEAR RAINFALL    ---------------------------------------------------
RAINFALL            TYPE=-1 RAIN QUAR=0.0 RAIN ONE= 1.83
                    RAIN SIX= 2.29 RAIN DAY=2.63 DT=0.0

               6-HOUR RAINFALL DIST. - BASED ON NOAA ATLAS 14 FOR CONVECTIVE AREAS (NM & AZ) - D1
               DT =   0.005000 HOURS       END TIME =     6.000000 HOURS
*S---------------------------------------------------------------------
*S---------------------------------------------------------------------
*S-------THE FOLLOWING BASINS DRAIN INTO POND 1------------------------
*S---------------------------------------------------------------------
*S---------------------------------------------------------------------
*S BASIN 100
COMPUTE NM HYD      ID=10 HYD NO=100  DA=0.0029 SQ MI
                    PER A=0.0 PER B=15.0 PER C=15.0 PER D=70.0
                    TP=-.1333 HR     MASSRAIN=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =   8.0145    CFS   UNIT VOLUME =   0.9984       B =   526.28      P60 = 1.8300
     AREA =     0.002030 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.005000


     K =  0.118556HR    TP =  0.133300HR    K/TP RATIO =  0.889390     SHAPE CONSTANT, N =  3.987797
     UNIT PEAK =   2.3128    CFS   UNIT VOLUME =   0.9938       B =   354.36      P60 = 1.8300
     AREA =     0.000870 SQ MI    IA =   0.42500 INCHES    INF =   1.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.005000

PRINT HYD           ID=10   CODE=1

                                  PARTIAL HYDROGRAPH   100.00


    RUNOFF VOLUME =     1.70914 INCHES     =       0.2643 ACRE-FEET
    PEAK DISCHARGE RATE =       7.35 CFS  AT   1.530 HOURS   BASIN AREA =  0.0029 SQ. MI.



*S---------------------------------------------------------------------
*S BASIN 200
COMPUTE NM HYD      ID=20 HYD NO=200  DA=0.0015 SQ MI
                    PER A=0.0 PER B=10.5 PER C=10.5 PER D=79.0
                    TP=-.1333 HR     MASSRAIN=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =   4.6784    CFS   UNIT VOLUME =   0.9973       B =   526.28      P60 = 1.8300
     AREA =     0.001185 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.005000


     K =  0.118556HR    TP =  0.133300HR    K/TP RATIO =  0.889390     SHAPE CONSTANT, N =  3.987797
     UNIT PEAK =  0.83739    CFS   UNIT VOLUME =   0.9828       B =   354.36      P60 = 1.8300
     AREA =     0.000315 SQ MI    IA =   0.42500 INCHES    INF =   1.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.005000

PRINT HYD           ID=20   CODE=1

                                  PARTIAL HYDROGRAPH   200.00


    RUNOFF VOLUME =     1.80757 INCHES     =       0.1446 ACRE-FEET
    PEAK DISCHARGE RATE =       3.96 CFS  AT   1.530 HOURS   BASIN AREA =  0.0015 SQ. MI.



 *S---------------------------------------------------------------------
*S BASIN 300
COMPUTE NM HYD      ID=30 HYD NO=300  DA=0.0016 SQ MI
```

```
                    PER A=0.0 PER B=33.5 PER C=33.5 PER D=33.0
                    TP=-.1333 HR     MASSRAIN=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =   2.0846    CFS   UNIT VOLUME =   0.9937       B =   526.28      P60 = 1.8300
     AREA =     0.000528 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.005000


     K =  0.118556HR    TP =  0.133300HR    K/TP RATIO =  0.889390     SHAPE CONSTANT, N =  3.987797
     UNIT PEAK =   2.8498    CFS   UNIT VOLUME =   0.9950       B =   354.36      P60 = 1.8300
     AREA =     0.001072 SQ MI    IA =   0.42500 INCHES    INF =   1.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.005000

PRINT HYD           ID=30   CODE=1

                                      HYDROGRAPH FROM AREA   300.00


    RUNOFF VOLUME =     1.30446 INCHES     =       0.1113 ACRE-FEET
    PEAK DISCHARGE RATE =       3.43 CFS  AT   1.535 HOURS   BASIN AREA =  0.0016 SQ. MI.



 *S--------------------------------------------------------------------
*S BASIN 400
COMPUTE NM HYD      ID=40 HYD NO=400  DA=0.0027 SQ MI
                    PER A=0.0 PER B=18.5 PER C=18.5 PER D=63.0
                    TP=-.1333 HR     MASSRAIN=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =   6.7156    CFS   UNIT VOLUME =   0.9981       B =   526.28      P60 = 1.8300
     AREA =     0.001701 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.005000


     K =  0.118556HR    TP =  0.133300HR    K/TP RATIO =  0.889390     SHAPE CONSTANT, N =  3.987797
     UNIT PEAK =   2.6557    CFS   UNIT VOLUME =   0.9946       B =   354.36      P60 = 1.8300
     AREA =     0.000999 SQ MI    IA =   0.42500 INCHES    INF =   1.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.005000

PRINT HYD           ID=40   CODE=1

                                      HYDROGRAPH FROM AREA   400.00


    RUNOFF VOLUME =     1.63258 INCHES     =       0.2351 ACRE-FEET
    PEAK DISCHARGE RATE =       6.64 CFS  AT   1.530 HOURS   BASIN AREA =  0.0027 SQ. MI.



 *S--------------------------------------------------------------------
*S BASIN 500
COMPUTE NM HYD      ID=50 HYD NO=500  DA=0.0029 SQ MI
                    PER A=0.0 PER B=12.0 PER C=12.0 PER D=76.0
                    TP=-.1333 HR     MASSRAIN=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =   8.7015    CFS   UNIT VOLUME =   0.9985       B =   526.28      P60 = 1.8300
     AREA =     0.002204 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.005000


     K =  0.118556HR    TP =  0.133300HR    K/TP RATIO =  0.889390     SHAPE CONSTANT, N =  3.987797
     UNIT PEAK =   1.8502    CFS   UNIT VOLUME =   0.9922       B =   354.36      P60 = 1.8300
     AREA =     0.000696 SQ MI    IA =   0.42500 INCHES    INF =   1.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.005000

PRINT HYD           ID=50   CODE=1

                                   OUTFLOW HYDROGRAPH RESERVOIR   500.00


    RUNOFF VOLUME =     1.77476 INCHES     =       0.2745 ACRE-FEET
    PEAK DISCHARGE RATE =       7.54 CFS  AT   1.530 HOURS   BASIN AREA =  0.0029 SQ. MI.
```

```
 *S--------------------------------------------------------------------
*S ADD BASINS, 100, 200, 300, 400, 500
ADD HYD              ID=75 HYD=SUM IDi=10 IDii=20
ADD HYD              ID=75 HYD=SUM IDi=75 IDii=30
ADD HYD              ID=75 HYD=SUM IDi=75 IDii=40
ADD HYD              ID=75 HYD=SUM IDi=75 IDii=50
PRINT HYD            ID=75 CODE=1

                                      HYDROGRAPH FROM AREA SUM


    RUNOFF VOLUME =     1.66452 INCHES     =       1.0298 ACRE-FEET
    PEAK DISCHARGE RATE =      28.92 CFS  AT   1.530 HOURS   BASIN AREA =  0.0116 SQ. MI.



*S--------------------------------------------------------------------
FINISH

    NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 17:34:52
```

APPENDIX D

Street Capacity Calculations

Worksheet for Parcel J - Alley w/VG

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data		
Channel Slope	0.500	%
Normal Depth	7.7	in

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.73
0+00	0.23
0+05	0.10
0+07	0.00
0+09	0.13
0+14	0.23
0+14	0.73

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.73)	(0+00, 0.23)	0.013
(0+00, 0.23)	(0+05, 0.10)	0.050
(0+05, 0.10)	(0+09, 0.13)	0.013
(0+09, 0.13)	(0+14, 0.23)	0.050
(0+14, 0.23)	(0+14, 0.73)	0.013

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results		
Discharge	10.96	cfs
Roughness Coefficient	0.042	
Elevation Range	0.0 to 0.7	ft
Flow Area	7.2	ft²
Wetted Perimeter	15.1	ft
Hydraulic Radius	5.7	in
Top Width	14.24	ft
Normal Depth	7.7	in
Critical Depth	4.8	in
Critical Slope	4.126	%
Velocity	1.53	ft/s

Worksheet for Parcel J - Alley w/VG

Results	
Velocity Head	0.04 ft
Specific Energy	0.68 ft
Froude Number	0.379
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	7.7 in
Critical Depth	4.8 in
Channel Slope	0.500 %
Critical Slope	4.126 %

Worksheet for Alley A,B,C,D - 0.5% w 4" Curbs

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Channel Slope	0.500 %
Normal Depth	4.7 in

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.39
0+03	0.33
0+04	0.00
0+05	0.08
0+15	0.18
0+25	0.08
0+26	0.00
0+27	0.33
0+30	0.39

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.39)	(0+30, 0.39)	0.017

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Discharge	14.36 cfs
Roughness Coefficient	0.017
Elevation Range	0.0 to 0.4 ft
Flow Area	6.4 ft²
Wetted Perimeter	29.8 ft
Hydraulic Radius	2.6 in
Top Width	29.73 ft
Normal Depth	4.7 in
Critical Depth	4.3 in
Critical Slope	0.714 %
Velocity	2.23 ft/s
Velocity Head	0.08 ft
Specific Energy	0.47 ft

Worksheet for Alley A,B,C,D - 0.5% w 4" Curbs

Results	
Froude Number	0.843
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	4.7 in
Critical Depth	4.3 in
Channel Slope	0.500 %
Critical Slope	0.714 %

Worksheet for NewHall Dr.

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data		
Channel Slope	0.500	%
Normal Depth	8.0	in

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.67
0+00	0.00
0+02	0.13
0+15	0.38
0+27	0.13
0+29	0.00
0+29	0.67

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.67)	(0+29, 0.67)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results		
Discharge	48.75	cfs
Roughness Coefficient	0.016	
Elevation Range	0.0 to 0.7	ft
Flow Area	13.1	ft²
Wetted Perimeter	30.6	ft
Hydraulic Radius	5.1	in
Top Width	29.25	ft
Normal Depth	8.0	in
Critical Depth	8.0	in
Critical Slope	0.520	%
Velocity	3.73	ft/s
Velocity Head	0.22	ft
Specific Energy	0.89	ft
Froude Number	0.982	
Flow Type	Subcritical	

Worksheet for NewHall Dr.

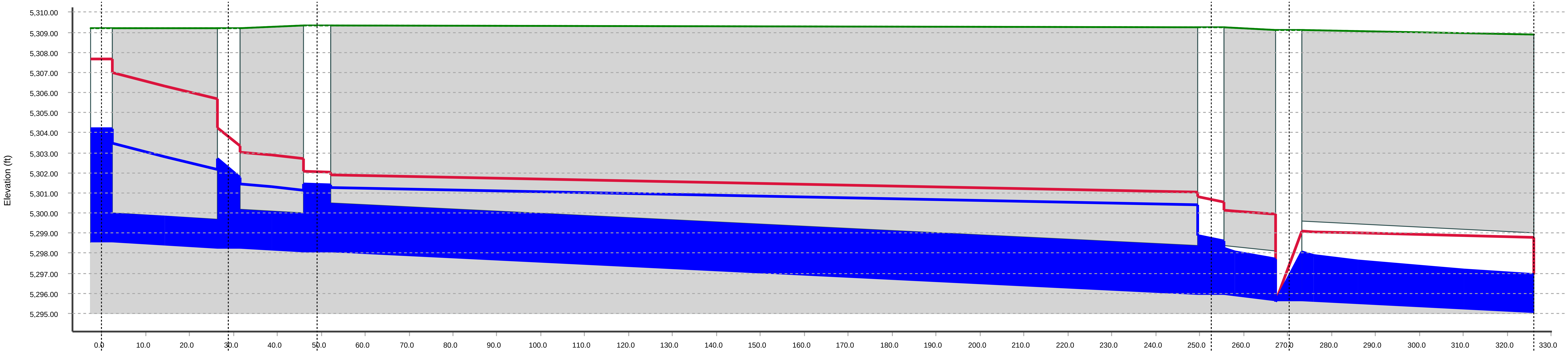
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	8.0 in
Critical Depth	8.0 in
Channel Slope	0.500 %
Critical Slope	0.520 %

APPENDIX E

StormCAD / FlexTable

MONTAGE 7 NEWHALL - Base

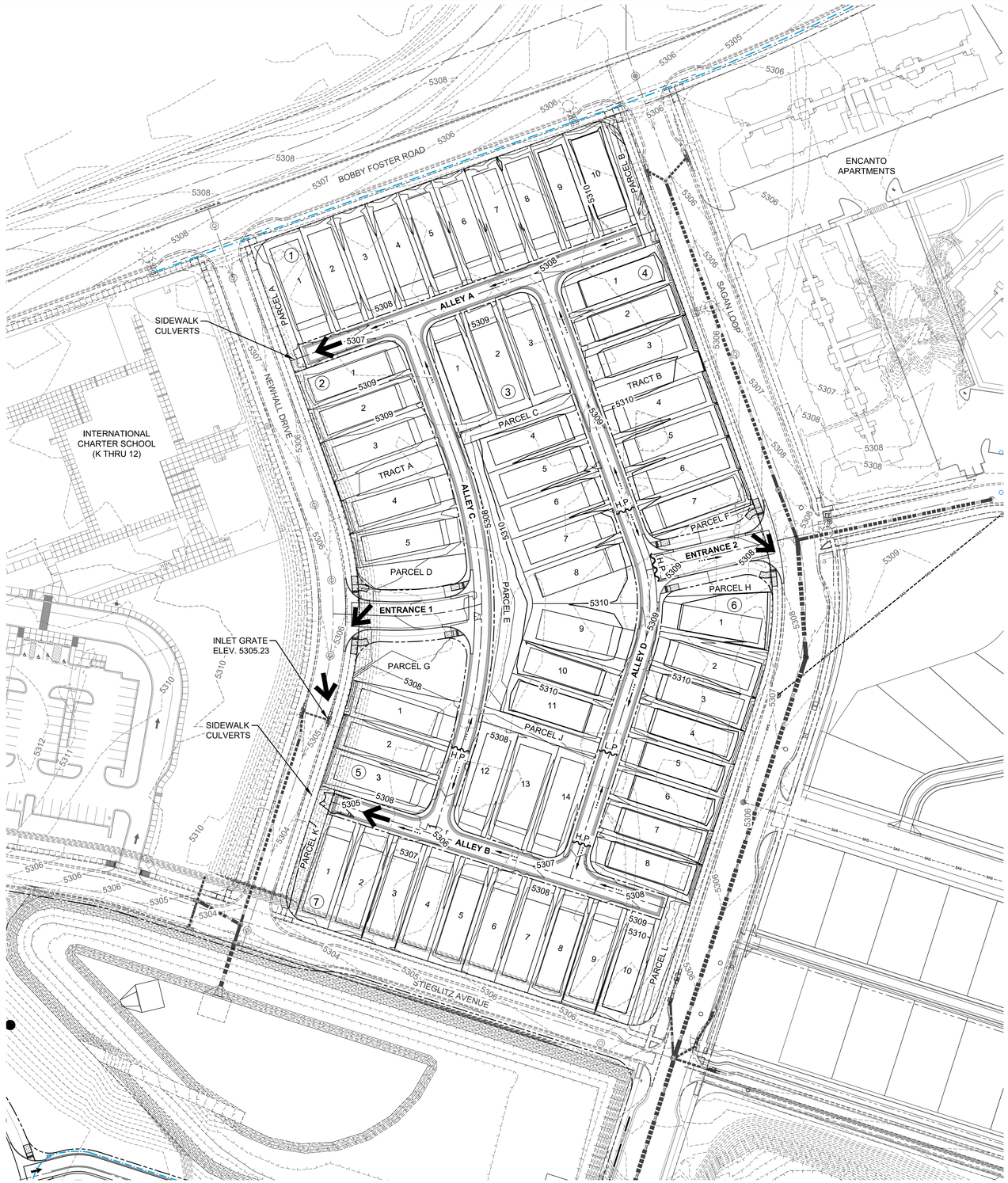


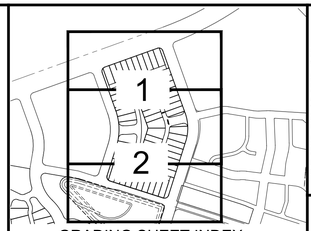
ID\Label	102 \ CO-1	61 \ CO-2	106 \ CO-3	64 \ CO-6	66 \ CO-7
Link Length (ft)	28.9	20.1	203.5	17.8	55.7
Rise (in)\Material	18.0 \	24.0 \ PVC	30.0 \	30.0 \ PVC	48.0 \ PVC
Flow (cfs)	26.55	31.55	31.55	52.85	65.75
Slope (ft/ft)	0.010	0.010	0.010	0.017	0.011

ID\Label	80 \ CB-1	54 \ NEWHALL INLETS	59 \ SDMH1	60 \ SDMH2	56 \ CB-5	65 \ OUTFALL INTO POND 1
Ground (ft)	5309.20	5309.20	5309.34	5309.23	5309.12	5308.88
Invert (ft)	5298.50	5298.20	5298.00	5295.90	5295.60	5295.00
Station (ft)	0.0	28.9	49.1	252.5	270.3	326.0

FlexTable: Conduit Table

Label	Start Node	Stop Node	Diameter (in)	Length (3D) (ft)	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)
CO-1	CB-1	NEWHALL INLETS	18.0	28.9	26.55	15.02	5,298.50	5,298.20	5,309.20	5,309.20	5,303.48	5,302.16
CO-2	NEWHALL INLETS	SDMH1	24.0	20.1	31.55	10.04	5,298.20	5,298.00	5,309.20	5,309.34	5,301.47	5,301.14
CO-3	SDMH1	SDMH2	30.0	203.5	31.55	6.43	5,298.00	5,295.90	5,309.34	5,309.23	5,301.28	5,300.42
CO-4	CB-3	Q FROM SCHOOL SITE	18.0	13.9	21.30	12.05	5,297.60	5,297.00	5,307.00	5,304.86	5,301.05	5,300.57
CO-5	Q FROM SCHOOL SITE	SDMH2	24.0	39.4	21.30	6.78	5,297.00	5,295.90	5,304.86	5,309.23	5,300.74	5,300.37
CO-6	SDMH2	CB-5	30.0	17.8	52.85	14.35	5,295.90	5,295.60	5,309.23	5,309.12	5,298.23	5,297.69
CO-7	CB-5	OUTFALL INTO POND 1	48.0	67.3	65.75	13.00	5,295.60	5,295.00	5,309.12	5,308.88	5,298.05	5,296.94





GRADING SHEET INDEX

LEGEND

5050	EXIST. (INDEX) CONTOUR
5251	EXIST. (INTERMEDIATE) CONTOUR
5040	PROP. (INDEX) CONTOUR
5041	PROP. (INTERMEDIATE) CONTOUR
	WATER BLOCK
	NEW CURB & GUTTER
	FUTURE CURB & GUTTER
XX.XXTP	TOP OF PAVEMENT
XX.XXTC XX.XXFL	TOP OF CURB ELEVATION FLOW LINE ELEVATION
XX.XXTOC	TOP OF CONCRETE
	FLOW PATH
	GRADING LIMITS
	DISCHARGE LOCATION
H.P. L.P.	HIGH POINT LOW POINT

GENERAL NOTES

1. ALL DISTURBED COMMERCIAL LOTS AND NON-RESIDENTIAL LOTS AREAS NOT PROPOSED TO BE IMPROVED SHALL BE STRAW CRIMPED W/ NATIVE SEEDING PER COA SPECIFICATION 1011 & 1012.
2. SEE PLAT FOR LOT DIMENSIONS.
3. SEE DETAIL GX FOR TYPICAL LOT GRADING.
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7. CONTRACTOR SHALL OBTAIN PERMISSION TO GRADE ON PRIVATE PROPERTY. CITY SHALL NOT BE RESPONSIBLE FOR CONTRACTOR TRESPASSING ON PRIVATE PROPERTY

Designed By:
HUITT-ZOLLARS
Huitt-Zollars, Inc. Albuquerque
6501 Americas Pkwy NE, Suite 550
Albuquerque, New Mexico 87110
Phone (505) 883-8114 Fax (505) 883-5022

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

BENCH MARKS
FOUND MONUMENT "15-J12 1986"
STANDARD 3 1/4" ALUMINUM DISC
NEW MEXICO STATE PLANE COORDINATES (CENTRAL ZONE-N.A.D. 1983)
N=1,487,534.543
E=1,511,214.742
ELEV=4955.627 (NAVD 1988)
GROUND TO GRID FACTOR=0.999885508
MAPPING ANGLE=-0°14'53.77"

MICRO-FILM INFORMATION
RECORDED BY DATE
NO.

SURVEY INFORMATION
FIELD NOTES
NO. BY DATE

ENGINEER'S SEAL
A. EDDINGS, NEW MEXICO, 12856, REGISTERED PROFESSIONAL ENGINEER, SCOTT
7/13/22

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	
		DESIGNED BY: SAE	DATE: July 13, 2022
		DRAWN BY: LRT	DATE: July 13, 2022
		DWG NAME: 8-GRAD COMP.dwg	PROJ.#: R315530.01
		CHECKED BY: SAE	DATE: July 13, 2022

HZ

0 60' 120'
SCALE: 1" = 60'

July 13, 2022

MESA DEL SOL
MONTAGE UNIT 7

TITLE:
GRADING COMPOSITE

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

City Project No.	Zone Map No.	Sheet	Of
XXXXXX	R-15-Z, S-15-Z	1	3

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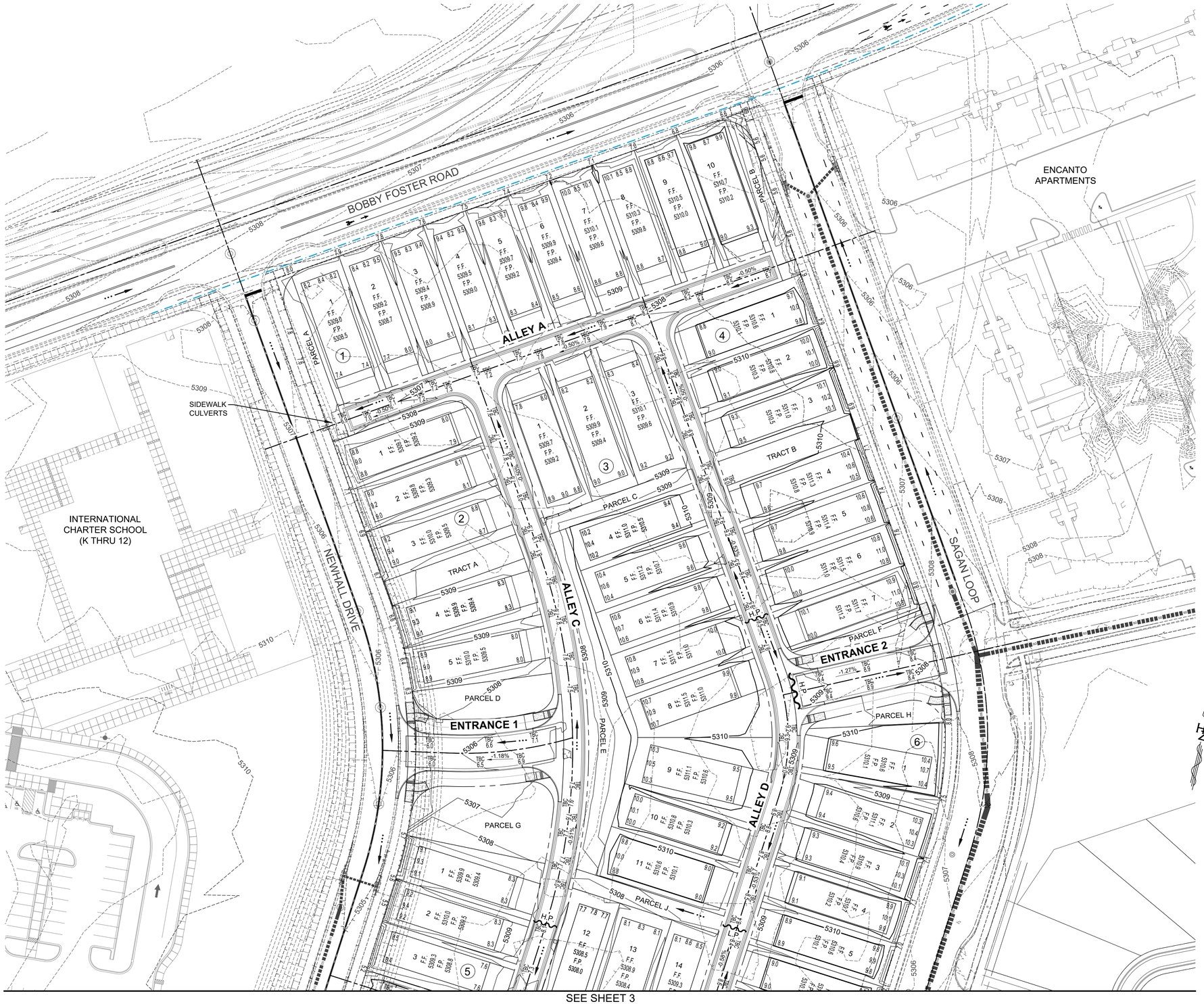

GRADING SHEET INDEX

LEGEND

- EXIST. (INDEX) CONTOUR
- EXIST. (INTERMEDIATE) CONTOUR
- PROP. (INDEX) CONTOUR
- PROP. (INTERMEDIATE) CONTOUR
- WATER BLOCK
- NEW CURB & GUTTER
- FUTURE CURB & GUTTER
- XX.XXTP TOP OF PAVEMENT
- XX.XXTC / XX.XXFL TOP OF CURB ELEVATION / FLOW LINE ELEVATION
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0 40' 80'
SCALE: 1" = 40'

Know what's below. Call before you dig.
TWO WORKING DAYS BEFORE YOU DIG CALL 811 OR 260-1990

Designed By:
HUITT-ZOLLARS
Huitt-Zollars, Inc. Albuquerque
6501 Americas Pkwy NE, Suite 550
Albuquerque, New Mexico 87110
Phone (505) 883-8114 Fax (505) 883-5022

AS BUILT INFORMATION
CONTRACTOR — DATE
WORK STAKED BY — DATE
SURVEY CHECKED BY
ACCEPTANCE BY — DATE
FIELD VERIFICATION BY
DRAWINGS CORRECTED BY — DATE

MICRO-FILM INFORMATION
RECORDED BY — DATE
NO.

BENCH MARKS
FOUND MONUMENT "1S-J12 1986"
STANDARD 2 1/4" ALUMINUM DISC
NEW MEXICO STATE PLANE COORDINATES (CENTRAL ZONE-N.A.D. 1983)
N=1,487,534.543
E=1,511,214.742
ELEV=4955.627 (NAVD 1988)
GROUND TO GRID FACTOR=0.999885508
MAPPING ANGLE= 0°14'53.77"

SURVEY INFORMATION
FIELD NOTES

NO.	DATE	BY	REMARKS
			DESIGN
			REVISIONS

ENGINEER'S SEAL
NEW MEXICO — A. EDDINGS SCOTT — 12556 — PROFESSIONAL ENGINEER — REGISTERED
7/13/22

DESIGNED BY: SAE — DATE: July 13, 2022
DRAWN BY: LRT — DATE: July 13, 2022
DWG NAME: 9-10_GRAD.dwg — PROJ.#: R315530.01
CHECKED BY: SAE — DATE: July 13, 2022

July 13, 2022

MESA DEL SOL
MONTAGE UNIT 7

TITLE:
GRADING PLAN

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

City Project No.: XXXXXX
Zone Map No.: R-15-Z, S-15-Z
Sheet: 2 Of: 3

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SEE SHEET 2

GRADING SHEET INDEX

LEGEND

- EXIST. (INDEX) CONTOUR
- EXIST. (INTERMEDIATE) CONTOUR
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Albuquerque, New Mexico 87110
Phone (505) 883-8114 Fax (505) 883-5022

SURVEY INFORMATION
FIELD NOTES

NO.	BY	DATE

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NEW MEXICO STATE PLANE COORDINATES (CENTRAL ZONE-N.A.D. 1983)
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WORK STAKED BY — DATE
FIELD VERIFICATION BY — DATE
ACCEPTANCE BY — DATE
FIELD VERIFICATION BY — DATE
DRAWINGS CORRECTED BY — DATE

MICRO-FILM INFORMATION
RECORDED BY — DATE
NO.

ENGINEER'S SEAL
A. EDDINGS SCOTT NEW MEXICO 12856 REGISTERED PROFESSIONAL ENGINEER
7/13/22

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	

DESIGNED BY: SAE DATE: July 13, 2022
DRAWN BY: LRT DATE: July 13, 2022
DWG NAME: 9-10_GRAD.dwg PROJ #: R315530.01
CHECKED BY: SAE DATE: July 13, 2022

July 13, 2022

MESA DEL SOL
MONTAGE UNIT 7

TITLE:
GRADING PLAN

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

City Project No. XXXXXX
Zone Map No. R-15-Z, S-15-Z
Sheet 3 Of 3

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