FINAL DRAINAGE REPORT FOR
MOUNTAIN STATES PIPE AND SUPPLY
ELY 631.22 FT OF TRACT 5 AKERS ACRES SUB NO 1, EX THAT PT TO COUNTY BY REC #210051876
7765 ELECTRONIC DRIVE
COLORADO SPRINGS, COLORADO

AUGUST 2020

Prepared For:
MOUNTAIN STATES PIPE AND SUPPLY
Attn: Paul Carroll
7765 Electronic Drive
Colorado Springs, Colorado
719.475.4020

Prepared By:

TERRA NOVA ENGINEERING, INC.
721 S. 23RD STREET
Colorado Springs, CO 80904
719.635.6422

TNE Job No. 1913.00
County Job No. VR204

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DESIGN ENGINEER'S STATEMENT:

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the applicable master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

_____ _____

Dane Frank, P.E. 50207 Date
On behalf of Terra Nova Engineering, Inc.

OWNER/DEVELOPER'S STATEMENT:

I, the owner/developer have read and will comply with all of the requirements specified in this drainage report and plan.

_____ _____

Authorized Signature Date

_____

Printed Name, Title

_____

Business Name

_____

Address

EL PASO COUNTY:

Filed in accordance with the requirements of the Drainage Criteria Manual, Volumes 1 and 2, El Paso County Engineering Criteria Manual and Land Development Code as amended.

_____ _____

Jennifer Irvine, P.E. Date
County Engineer / ECM Administrator

Conditions:

FINAL DRAINAGE REPORT FOR
MOUNTAIN STATES PIPE AND SUPPLY
ELY 631.22 FT OF TRACT 5 AKERS ACRES SUB NO 1, EX THAT PT TO COUNTY BY REC #210051876
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COLORADO SPRINGS, COLORADO

PURPOSE AND JUSTIFICATION

The purpose of this Final Drainage Report is to identify and analyze the existing drainage patterns, determine existing runoff quantities, and analyze the effects of the replat on drainage patterns. This parcel has previously been platted and has previously been studied in:

"Preliminary and Final Drainage Report for TMC Design Corporation", dated December 2011, prepared by Stillwater Engineering.

Please revise this statement to say: Per El Paso County, there is no record on file that this report was approved by the County

Per El Paso County, the above report was never approved by the County.

GENERAL DESCRIPTION

This Final Drainage Report for "MOUNTAIN STATES PIPE AND SUPPLY", located at 7765 Electronic Drive, is an analysis of an approximately 12.15 ac drainage basin. The site is platted as ELY 631.22 FT OF TRACT 5 AKERS ACRES SUB NO 1, EX THAT PT TO COUNTY BY REC #210051876; with the eastern portion of the parcel already developed and the western portion of the parcel undeveloped. No development of changes to the existing drainage conditions are proposed with the replat.

The site is in the southeast quarter of Section 32, Township 13 South, Range 65 West of the 6th Principal Meridian within El Paso County. The parcels are bounded to the north by Electronic Drive, to the east by Marksheffel Road, to the south by LOT 6 AKERS ACRES SUB 1, EX THAT PT CONV TO COUNTY FOR R/W BY REC #210004057, and to the west by WLY 631.22 FT OF TRACT 5 AKERS ACRES SUB NO 1. (See vicinity map, Appendix).

The site lies within the Sand Creek Basin, with storm runoff draining from the southeast corner of the site, and flowing south, then west, before entering Sand Creek.

Please clarify if the flow enters the East Fork Sand Creek and then ultimately joins Sand Creek after traveling south/west.

The site consists of 89% Blakeland loamy sand (hydrologic group "A") and 11% Blendon sandy loam (hydrologic group "B") per the USDA, NRCS web soil survey. The hydrologic group "A" was used to represent the soil types and determine the onsite basin overland flow. (See map in appendix)

The study area consists of roughly half developed land with a structure, paved parking area, paved driveway and turn around, and an existing stormwater pond. The remaining roughly half of the study area is undeveloped and is mostly grass and dirt surfaces, with a small number of trees. The site drains to the southeast, with an average slope of 6.1%.

EXISTING DRAINAGE CONDITIONS

There is one existing building and stormwater pond in the southeast corner of the site. There is also a small drainage swale on the south side of Electronic Drive, which is in the right of way, that prevents runoff flowing south from entering the site. There are 24" RCP culverts in this swale at each driveway to the site.

The existing stormwater pond is a 0.16 ac-ft water quality and detention structure that was designed in the 2011 drainage report. It collects runoff from basin EX-A. The pond has an outlet structure that drains to the public storm sewer system via a private storm pipe that leaves the pond/site to the south. This pond appears to be functioning as designed.

There are four drainage basins, two of which are offsite. See attached Existing Drainage Map (in appendix).

Basin OS-Z is 4.01 acres and drains to Design Point Z along Electronic Drive. This basin is offsite and no flow from it enters the site. Basin P 1S has flows of Q_5 = 7.3 cfs and Q_{100} = 16.5 cfs.

Basin OS-Y is 2.55 acres and drains to Design Point Y at the west side of the site. This basin is offsite and runoff from this basin flows onto the site and into basin EX-B. Basin OS-Y has flows of Q_5 = 2.1 cfs and Q_{100} = 8.2 cfs.

Basin EX-A is 2.54 acres and drains to Design Point A at the existing stormwater pond. After going through the pond, runoff drains through an outlet structure to the public storm sewer system via a private storm pipe that leaves the pond/site to the south. The is also a 18" RCP culvert that carries water under a paved portion of the basin to the pond. Basin EX-A has flows of Q_5 = 3.2 cfs and Q_{100} = 9.5 cfs.

Basin EX-B is 1.91 acres and drains to Design Point B at the south side of the site. Runoff flows off the site and onto the adjacent property. Basin EX-B has flows of Q_5 = 0.9 cfs and Q_{100} = 5.4 cfs.

Please indicate the what the total flows at design point B are as basin OS-Y combines with flows from basin EX-B

PROPOSED DRAINAGE CONDITIONS

As no development or changes to drainage patterns are proposed as part of the replat, the existing and proposed drainage conditions are the same.

HYDROLOGIC CALCULATIONS

Hydrologic calculations were performed using the El Paso County Storm Drainage Design Criteria Manual - Volumes 1 & 2, latest editions. The Rational Method was used to estimate storm water runoff anticipated from design storms with 5-year and 100-year recurrence intervals. The Urban Drainage Criteria Manual was used to calculate the detention and water quality volume.

HYDRAULIC CALCULATIONS

Not applicable.

WATER QUALITY

As no changes to the existing drainage conditions are proposed, no water quality treatment or flood control detention is required. As this report was prepared to accompany a replat, that includes no physical changes to the site, no development or land disturbance is proposed.

If the currently mostly undeveloped proposed Lot 2 is developed, water quality and detention requirements will have to be addressed. If runoff from new development flows into the existing

stormwater pond on proposed Lot 1, the existing pond may need to be retrofitted per the current standards.

EROSION CONTROL

As no grading is proposed, no erosion control measures have been included.

CONSTRUCTION COST OPINION

Not applicable.

Please add the following after fees:
per the Engineering Criteria Manual
Appendix L

DRAINAGE FEES

This site has previously been platted, and the proposed Lot 1 is already developed. The proposed Lot 2 is currently mostly undeveloped, and its impervious area will increase when it is developed, so the County is requiring drainage fees for the proposed Lot 2. The proposed Lot 2 is 2.25 acres and is zoned industrial.

The site is in the Sand Creek Basin. 2020 Drainage fees due prior to final plat recordation are as follows:

FEE TYPE	% IMP.	PARCEL AREA	MOD.	FEE PER IMP. AC.	SUBTOTAL
DRAINAGE FEES:	85% x	2.25 acres x	100% x	$19,698 =	$37,672
BRIDGE FEES:	85% x	2.25 acres x	100% x	$ 8,057 =	$15,409
				TOTAL	**$53,081**

MAINTENANCE

Not applicable.

SUMMARY

Replatting of this site will not adversely affect the surrounding development. The existing and proposed drainage conditions are the same. No grading is proposed as part of this replat. Water quality is not required due to there being no proposed land disturbance.

PREPARED BY:
TERRA NOVA ENGINEERING, INC.

Dane Frank, P.E.
Project Engineer

Jobs//1913.00/Drainage/191300 Drainage Letter.docx

BIBLIOGRAPHY

El Paso County Drainage Criteria Manual-Volumes 1 & 2, latest edition

El Paso County Board Resolution No 15-042 (Adoption of Chapter 6 and Section 3.2.1 Chapter 13 of the City of Colorado Springs Drainage Criteria Manual dated May 2014, Hydrology and Full Spectrum Detention)

Preliminary and Final Drainage Report for TMC Design Corporation, dated December 2011, prepared by Stillwater Engineering

VICINITY MAP

El Paso County - Community: Property Search

Schedule Number: 5332002019

Mountain States Pipe
Vicinity Map

GENERAL LOCATION MAP


Mountain States Pipe
General Location Map - Image Dated Oct 2018
Electronic Dr
SITE
Markshaffel Rd
N
300 ft
Google Earth
© 2018 Google

HYDROLOGIC CALCULATIONS

ELECTRONIC STORAGE
(Area Runoff Coefficient Summary)

EXISTING CONDITIONS

		STREETS / DEVELOPED			*OVERLAND / UNDEVELOPED*			*WEIGHTED*	
BASIN	**TOTAL AREA**	**AREA**	**C_5**	**C_{100}**	**AREA**	**C_5**	**C_{100}**	**C_5**	**C_{100}**
	(Acres)	*(Acres)*			*(Acres)*				
OS-Z	4.01	4.01	0.45	0.59	0.00	0.09	0.36	0.45	0.59
OS-Y	2.55	2.55	0.20	0.44	0.00	0.09	0.36	0.20	0.44
EX-A	2.54	2.54	0.30	0.50	0.00	0.09	0.36	0.30	0.50
EX-B	1.91	1.91	0.12	0.39	0.00	0.09	0.36	0.12	0.39

Note: Basin C values are based on measured impervious values.
Percent impervious values are: 64%, 20%, 37%, and 7%.

Calculated by: DLF
Date: 8/5/2020
Checked by: LD

ELECTRONIC STORAGE
AREA DRAINAGE SUMMARY

EXISTING CONDITIONS

		WEIGHTED		*OVERLAND*				*STREET / CHANNEL FLOW*				T_t	*INTENSITY*		*TOTAL FLOWS*	
BASIN	**AREA TOTAL** *(Acres)*	C_5	C_{100}	C_5	**Length** *(ft)*	**Height** *(ft)*	T_C *(min)*	**Length** *(ft)*	**Slope** *(%)*	**Velocity** *(fps)*	T_t *(min)*	**TOTAL** *(min)*	I_5 *(in/hr)*	I_{100} *(in/hr)*	Q_5 *(c.f.s.)*	Q_{100} *(c.f.s.)*
		** For Calcs See Runoff Summary*														
OS-Z	4.01	0.45	0.59	0.45	300	20.0	6.2	900	6.0%	3.7	4.1	10.3	4.0	7.0	**7.3**	**16.5**
OS-Y	2.55	0.20	0.44	0.20	300	16.6	9.1	0	6.0%	4.9	0.0	9.1	4.2	7.3	**2.1**	**8.2**
EX-A	2.54	0.30	0.50	0.30	300	13.2	8.8	0	4.0%	1.0	0.0	8.8	4.3	7.5	**3.2**	**9.5**
EX-B	1.91	0.12	0.39	0.12	300	18.2	9.6	0	6.0%	4.9	0.0	9.6	4.1	7.2	**0.9**	**5.4**

Calculated by: DLF

Date: 8/5/2020

Checked by: LD

ELECTRONIC STORAGE
PROPOSED SURFACE ROUTING SUMMARY

Design Point(s)	*Contributing Basins*	*Area Ac*	*Flow*	
			Q_5	Q_{100}
Z	OS-Z	4.01	7.3	16.5
Y	OS-Y	2.55	2.1	8.2
A	EX-A	2.54	3.2	9.5
B	EX-B, OS-Y	4.46	3.1	13.6

Calculated by: DLF
Date: 8/5/2020
Checked by: LD

PAGES FROM DECEMBER 2011 DRAINAGE REPORT

NEW DOC

PRELIMINARY AND FINAL DRAINAGE REPORT
FOR
TMC DESIGN CORPORATION

DECEMBER 2011

PREPARED FOR:
TMC DESIGN CORPORATION
COLORADO SPRINGS, CO

stillwater engineering

CONSULTING ENGINEERS AND SURVEYORS

EXISTING DRAINAGE CONDITIONS

The entire area is in general considered light industrial with some unimproved scorched earth. The north "BASIN 2S" drains approximately 5.49 Acres. The total run off for the 10 year event is 7.98 cfs and total runoff for the 100 year is 20.38 cfs. The total volume of water in a 10 year event is 0.659 Acre Feet and the 100 year is 1.685 Acre Feet. BASIN 2S is an offsite flow that enters a ditch that runs along the North of the property. The existing ditch is adequate for these flows, however the ditch does need some manicure work to remove sediment and an attempt must be made to re-acquire control of the vegetation. Doing so will ensure a more consistent clean flow.

Basin 3S is east of the improvements and spans over this property and the next to the west. No meaningful improvements in this basin are proposed. The gravel truck parking area shown on the drawings will at most, improve the drainage situation. Portions of asphalt in this basin have been added to the proposed BASIN P 1S. Thus, no changes have been made to this basin and so no developed flow has been calculated. None the less, BASIN 3S drains approximately 4.0 Acres. The total run off for the 10 year event is 5.81 cfs for the 10 year and the 100 year is 8.50 cfs. The total volume of water coming from this basin is 0.462 Acre Feet for the 10 year and 0.703 Acre Feet for the 100 year.

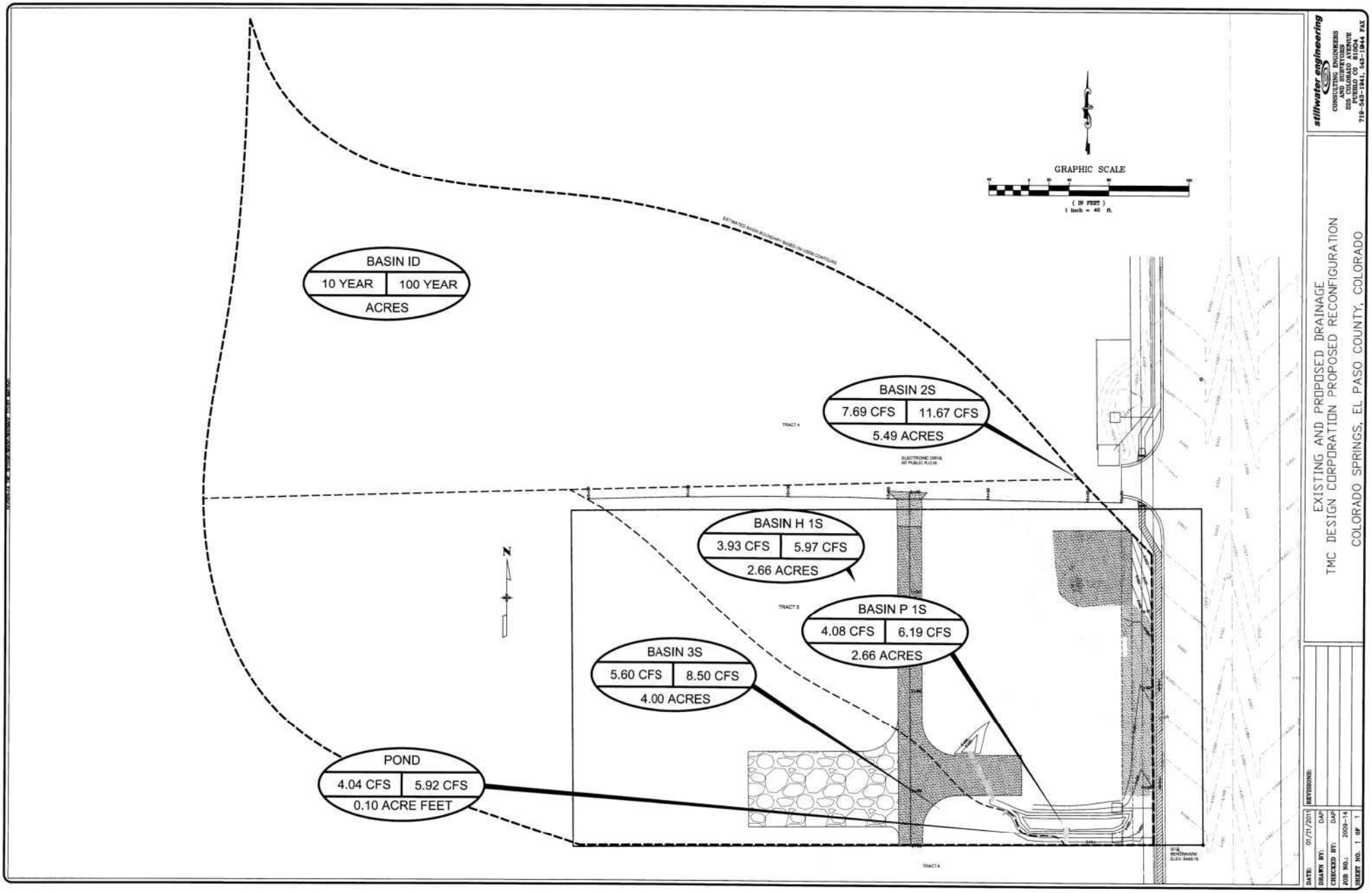
BASIN H 1S Has the existing building and parking area. Area of the building is 8,400 SF. Area of the Existing Parking is 7,800 SF. The area that is not yet developed is 99,800 SF This yields a total basin area of 116,000 SF or 2.66 Acres. Run off for this sub basin is 3.93 cfs for the 10 year and for the 100 year 8.90 cfs. The total volume of water coming from this basin is 0.288 Acre Feet for the 10 year and for the 100 year 0.736 Acre Feet.

PROPOSED DEVELOPED DRAINAGE

The only basin which required a developed flow to be calculated is basin H 1S. The developed basin is named P 1S and represents the asphalt paving being proposed for the site. In addition to the building and parking that is to remain, there shall be an additional 11,000 SF of parking, as well as 13,00 SF of new drive way. The net land that will then be undeveloped is reduced to 75,300 SF. Run off for this basin is 3.53 cfs for the 10 year and for the 100 year 9.03 cfs. The total volume of water coming from this basin is 0.292 Acre Feet for the 10 year and for the 100 year 0.746 Acre Feet.

The 100 year difference is 0.13 cfs. Or a net volume of water change of 0.17 Acre Feet for the 100 year. A detention basin to handle the additional 0.13 cfs is approximately 0.16 Acre Feet. Do to the extreme small size, the detention facility could act as a dual

use as both a water quality pond and a detention pond. A channel should outlet from the pond that is, 1.2 feet in width, and 2 feet tall. An emergency spillway that leads directly to the curb and gutter of Marksheffel from the detention pond should handle the full 9.03 cfs.



stillwater engineering
CONSULTING ENGINEERS AND SURVEYORS
225 SOUTH 21ST STREET
PUEBLO, CO 81004
719-543-1941, 543-1944 FAX

EXISTING AND PROPOSED DRAINAGE
TMC DESIGN CORPORATION PROPOSED RECONFIGURATION
COLORADO SPRINGS, EL PASO COUNTY, COLORADO

DATE:	01/21/2011
DRAWN BY:	DAP
CHECKED BY:	DAP
JOB NO.:	2009-14
SHEET NO.	1 OF 1

REVISIONS:

1/21/11

DRAINAGE MAPS

MOUNTAIN STATES PIPE AND SUPPLY

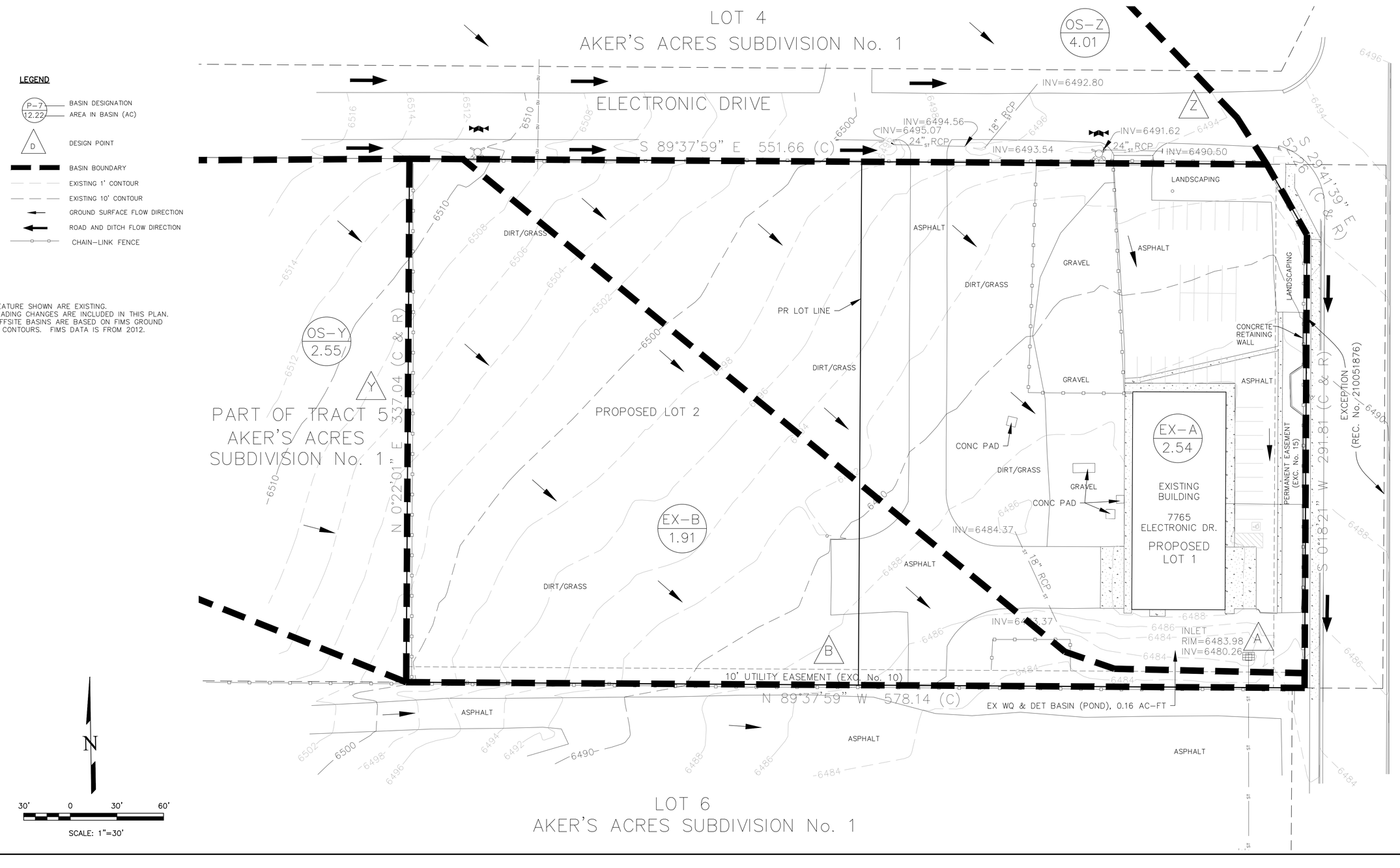
DRAINAGE MAPS

EXISTING DRAINAGE MAP

AUGUST 2020

BASIN SUMMARY

DESIGN POINT	BASIN	AREA (ACRES)	FLOW 5 YR (cfs)	FLOW 100 YR (cfs)
Z	OS–Z	4.01	7.3	16.5
Y	OS–Y	2.55	2.1	8.2
A	EX–A	2.54	3.2	9.5
B	EX–B	1.91	0.9	5.4



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REVISIONS

NO.	DESCRIPTION	DATE

UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, TERRA NOVA ENGINEERING, INC. APPROVES THEIR USE ONLY FOR THE PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.

PREPARED FOR:
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Terra Nova Engineering, Inc. "Creative Civil Engineering Solutions"
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MOUNTAIN STATES PIPE AND SUPPLY

EXISTING DRAINAGE MAP

DESIGNED BY	DLF
DRAWN BY	DLF
CHECKED BY	LD
H–SCALE	AS SHOWN
V–SCALE	N/A
JOB NO.	1913.00
DATE ISSUED	08/05/20
SHEET NO.	1 OF 2

MOUNTAIN STATES PIPE AND SUPPLY

DRAINAGE MAPS

EXISTING OFFSITE BASINS

AUGUST 2020

LEGEND

- P-7 / 12.22 — BASIN DESIGNATION / AREA IN BASIN (AC)
- D — DESIGN POINT
- BASIN BOUNDARY
- EXISTING 1' CONTOUR
- EXISTING 10' CONTOUR
- GROUND SURFACE FLOW DIRECTION
- ROAD AND DITCH FLOW DIRECTION
- CHAIN-LINK FENCE

Please provide a basin summary table with the design points and Q's as done on the existing drainage map.

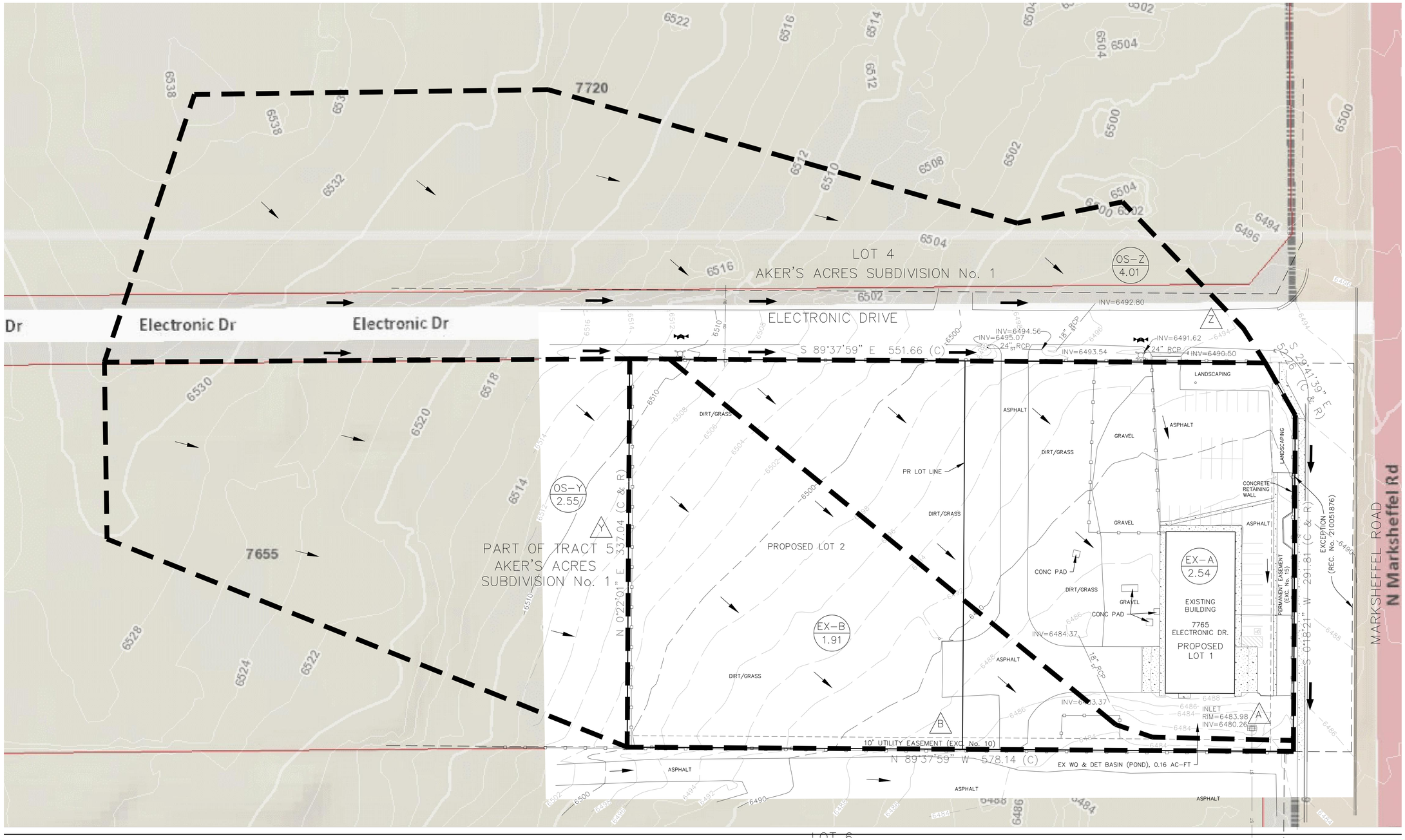
NOTES

1. ALL FEATURE SHOWN ARE EXISTING.
2. NO GRADING CHANGES ARE INCLUDED IN THIS PLAN.
3. THE OFFSITE BASINS ARE BASED ON FIMS GROUND SURFACE CONTOURS. FIMS DATA IS FROM 2012.

N

40' 0 40' 80'

SCALE: 1"=40'



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MOUNTAIN STATES PIPE AND SUPPLY

EXISTING OFFSITE BASINS

DESIGNED BY	DLF
DRAWN BY	DLF
CHECKED BY	LD
H-SCALE	AS SHOWN
V-SCALE	N/A
JOB NO.	1913.00
DATE ISSUED	08/05/20
SHEET NO.	2 OF 2

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