DRAINAGE LETTER
FOR
19580 FOUR WINDS WAY

FEBRUARY 2022

Prepared for:

THE MAYNARD COMPANY
1364 OLD CEDAR GROVE
MONUMENT, CO 80132

Prepared By:

CATAMOUNT ENGINEERING
321 W. Henrietta Ave, Suite A
Woodland Park, CO 80863
719-426-2124

PCD FILE NO's:

CDR225

Please sign and stamp

DRAINAGE LETTER FOR 19580 FOUR WINDS WAY

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 the criteria established for drainage reports and said report is in conformity with the 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.

Certification Statement:
This report and plan for the preliminary and final drainage design for the 19584 FOUR WINDS WAY was prepared by me (or under my direct supervision) in accordance with the provisions of City of Colorado Springs/El Paso County Drainage Criteria Manual Volumes 1 and 2 Drainage Design and Technical Criteria for the owners thereof. I understand that El Paso County does not and will not assume liability for drainage facilities designed by others.

_____ _____
David L. Mijares, Colorado PE #40510 Date
For and on behalf of Catamount Engineering

Developer's Statement:
I, the developer have read and will comply with all of the requirements specified in this drainage report and plan.

THE MAYNARD COMPANY hereby certifies that the drainage facilities for 19580 FOUR WINDS WAY shall be constructed according to the design presented in this report. I understand that El Paso County does not and will not assume liability for the drainage facilities designed and or certified by my engineer and that the El Paso County reviews drainage plans pursuant to Colorado Revised Statues, Title 30, Article 28; but cannot, on behalf of 19580 FOUR WINDS WAY, guarantee that final drainage design review will absolve THE MAYNARD GROUP and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

THE MAYNARD GROUP
Business Name

By: _____

Title: _____

Address: 1364 OLD CEDAR GROVE.

MONUMENT, CO 80132

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

_____ _____
Jennifer Irvine, PE Date
County Engineer/ECM Administrator

Conditions:

Provide a table of contents.

DRAINAGE LETTER FOR 19580 FOUR WINDS WAY

PURPOSE

The purpose of this drainage report is to identify existing drainage patterns, quantify developed storm water runoff, and establish outfall scenarios from the proposed development of the single-family platted lot. Development of the lot required earthwork in excess of 500 CY and a drainage letter is required to accompany the grading plan.

GENERAL LOCATION AND DESCRIPTION

The subject 31,722 square feet consists of a platted residential lot zoned R-4 identified as Lot 168 Top O the Moor II subdivision. The lot is located within Section 1, Township 11 South, Range 67 West of the 6th principal meridian in El Paso County. The parcel is bounded on all sides by platted residential lots within the Top O the Moor II subdivision. Access to the parcel is from existing 20' access easement bordering this parcel and the easterly Lot 167 to Four Winds Way (Public ROW). The parcel has been previously graded to allow for homesite development.

The parcel is located within the Dirty Woman Creek drainage. The parcel sheet flows south onto adjacent residential lots at slopes between 7% and 33%.

Please add detail on Soils Report i.e date and author

Existing soils on the site consist of Kettle gravelly loam, hydrologic soil group B (100.0%) as determined by the Natural Resources Conservation Service Web Soil Survey. The site is sparsely vegetated with native grasses. Moderate shrub and tree cover are evident.

No portion of the site lies within an F.E.M.A. designated floodplain per FIRM 08041C0277 G, effective December 07, 2018. A firmette exhibiting the parcel has been included in the appendix of this report.

Mention previous drainage report from 1967.

EXISTING DRAINAGE CONDITIONS

No existing studies on the site or overall subdivision or basin have been identified. The parcel was developed as a flag lot with stem access to Four Winds Way is sits higher than existing residences to the South. A ridge is evident on the north line of the parcel and no significant offsite runoff enters the parcel.

What about the ditch/ravine that ran through the site? Discuss.

Basin OS-1 (0.02 Acres, Q_5=0.0 cfs, Q_{100}=0.1 cfs) consists of that portion of the access easement north of the parcel that sheet flow southwest and across the parcel to adjacent southwesterly lot 174.

Basin OS-2 (0.14 Acres, Q_5=0.2 cfs, Q_{100}=0.6 cfs) consists of that portion of the access easement north and east of the parcel that flow east to a low point just west of Four Winds Way and into

Show page numbers at the bottom of report pages.

Under existing conditions please add line that original drainage report is filed under PCD File # SP67005 dated 27 APR 1967 R Kieth Hook & Associates

adjacent lot 167. Basin OS-2 has been previously graded and contains a gravel roadway access to the subject parcel.

Basin EX1 (0.17 Acres, Q_5=0.1 cfs, Q_{100}=0.5 cfs) consists of that portion of Lot 1 that sheet flows southwest to adjacent lot 174. Portions of the lot have been previously graded in anticipation of home construction.

Basin EX2 (0.54 Acres, Q_5=0.2 cfs, Q_{100}=1.6 cfs) consists of that portion of Lot 1 that sheet flows south to adjacent lot 173. Portions of the lot have been previously graded in anticipation of home construction.

Discuss the ravine that went through these basins pre-disturbance and how/where the runoff that was tributary to that ravine will now be conveyed around the site. There is concern that the runoff now does not follow the historic/designed path.

DEVELOPED DRAINAGE BASINS

The lot has been previously graded to accommodate house construction. The developed drainage basin design reflects increases in impervious area based on house location and paved driveway construction. Offsite Basins OS1 and OS2 have been revised to reflect increase in impervious area for construction of paved driveway rather than existing paved drive; however grading is not proposed to change.

gravel? unpaved?

Basin OS-1 (0.02 Acres, Q_5=0.0 cfs, Q_{100}=0.1 cfs) consists of that portion of the access easement north of the parcel that sheet flow southwest and across the parcel to adjacent southwesterly lot 174. The basin was modeled as containing an additional 0.002 acres of paved driveway. No increase in runoff from historic analysis is proposed in Basin OS-1.

Basin OS-2 (0.14 Acres, Q_5=0.4 cfs, Q_{100}=0.8 cfs) consists of that portion of the access easement north and east of the parcel that flow east to a low point just west of Four Winds Way and into adjacent lot 167. Basin OS-2 was modeled as containing 0.085 acres of paved driveway replacing the existing gravel driveway. Basin OS-2 exhibits an increase in flows of 0.3 cfs in the minor storm and 0.3 cfs in the major storm event with impervious area increase due to paving.

Basin A1 (0.17 Acres, Q_5=0.1 cfs, Q_{100}=0.5 cfs) consists of that portion of Lot 1 that sheet flows southwest to adjacent lot 174. The area is proposed to keep native cover or be planted with erosion control cover. No increase in impervious area is proposed in Basin A1. No increase in runoff from historic analysis is proposed in Basin A1.

remove period.

Basin A2 (0.54 Acres, Q_5=0.5 cfs, Q_{100}=2.1 cfs) consists of that portion of Lot 1 to be developed with residential construction. that sheet flows south to adjacent lot 173. Portions of the lot have been previously graded in anticipation of home construction. The basin was modeled with inclusion of 0.02 acres of proposed paved driveway and 0.06 acres of proposed building footprint. Basin A2 exhibits an increase in flow of 0.3 cfs in the minor storm event and 0.5 cfs in the major storm event.

The rational methodology was utilized in analyzing on-site basins for development of on-site improvements. The minor increase in impervious area due to driveway and homesite development within the 31,772 square foot lot would not substantially impact historic drainage patterns. Detention is not typically pursued in small single family existing lot home construction.

As no existing analysis or preconstruction topography was available analysis and comparison of existing to developed flows is solely based on anticipated changes in impervious surface materials.

See Appendix for Calculations.

pervious?

WATER QUALITY/4-STEP PROCESS

The development addresses Low Impact Development strategies primarily through the utilization of large impervious areas and utilization of landscape swales receiving runoff generated within impervious roadways.

Step 1-Employ Runoff Reduction Practices
Impervious areas generated within the development will flow across pervious disconnected areas prior to offsite discharge.

Step2-Stabilize Drainageway
The unnamed tributaries of Dirty Woman Creek receiving parcel runoff are not directly adjacent to the parcel and reduced runoff due to substantial conveyance across both onsite and offsite pervious area will mitigate minor increases in impervious area with single homesite development and not affect the drainageways.

Step3-Provide Water Quality Capture Volume
Permanent water quality facility is not proposed for development of single existing platted homesite. The impervious area of proposed paved driveways and residence are identified as disconnected impervious areas draining to and conveyed across receiving impervious areas.

Step4-Consider Need for Industrial and Commercial BMP's
A Grading, Erosion Control, and Stormwater Quality Plan and narrative have been submitted concurrently for the development and will be subject to county approval prior to any soil disturbance. The erosion control plan included specific source control BMP's as well as defined overall site management practices for the construction period. No industrial or Commercial density development is proposed.

COST ESTIMATE

No drainage improvements are proposed with development of 5-acre residential lots.

DRAINAGE FEE CALCULATION

No platting is proposed with development of single family residence on an existing platted lot.

DRAINAGE METHODOLOGY

This drainage report was prepared in accordance to the criteria established in the El Paso County Drainage Criteria Manual Volumes 1 and 2, as revised May 2014.

The rational method for drainage basin study areas of less than 100 acres was utilized in the on-site analysis. For the Rational Method, flows were calculated for the 2, 5, 10, 25, 50, and 100-year recurrence intervals. The average runoff coefficients, 'C' values, are taken from Table 6-6 and the Intensity-Duration-Frequency curves are taken from Figure 6-5 of the City Drainage Criteria Manual. Time of concentration for overland flow and storm drain or gutter flow are calculated per Section 3.2 of the City Drainage Criteria Manual. Calculations for the Rational Method are shown in the Appendix of this report.

SUMMARY

Development of a homesite on the existing platted lot (168, Top O the Moor II) consists of a single residence and driveway improvements with minor increases in impervious areas consistent with surrounding development. The development will not adversely affect downstream properties or facilities.

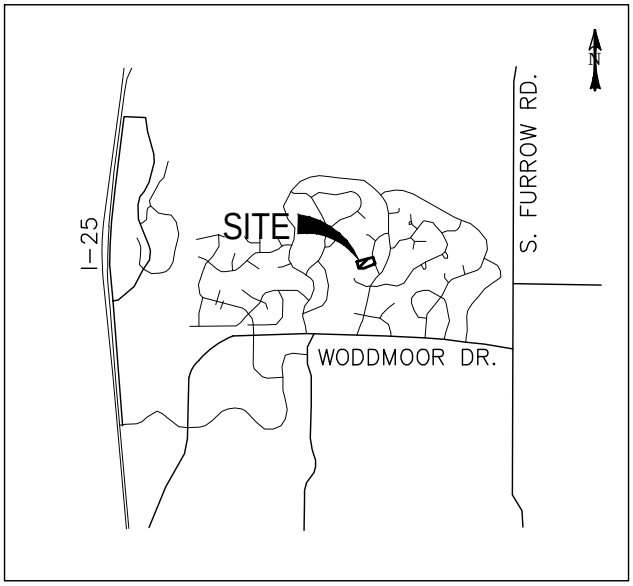
REFERENCES:

County of El Paso Drainage Criteria Manual Volumes 1 and 2, revised May 2014

Flood Insurance rate map 08041C00277 G, December 07. 2018

Natural Resources Conservation Service Web Soil Survey

APPENDIX



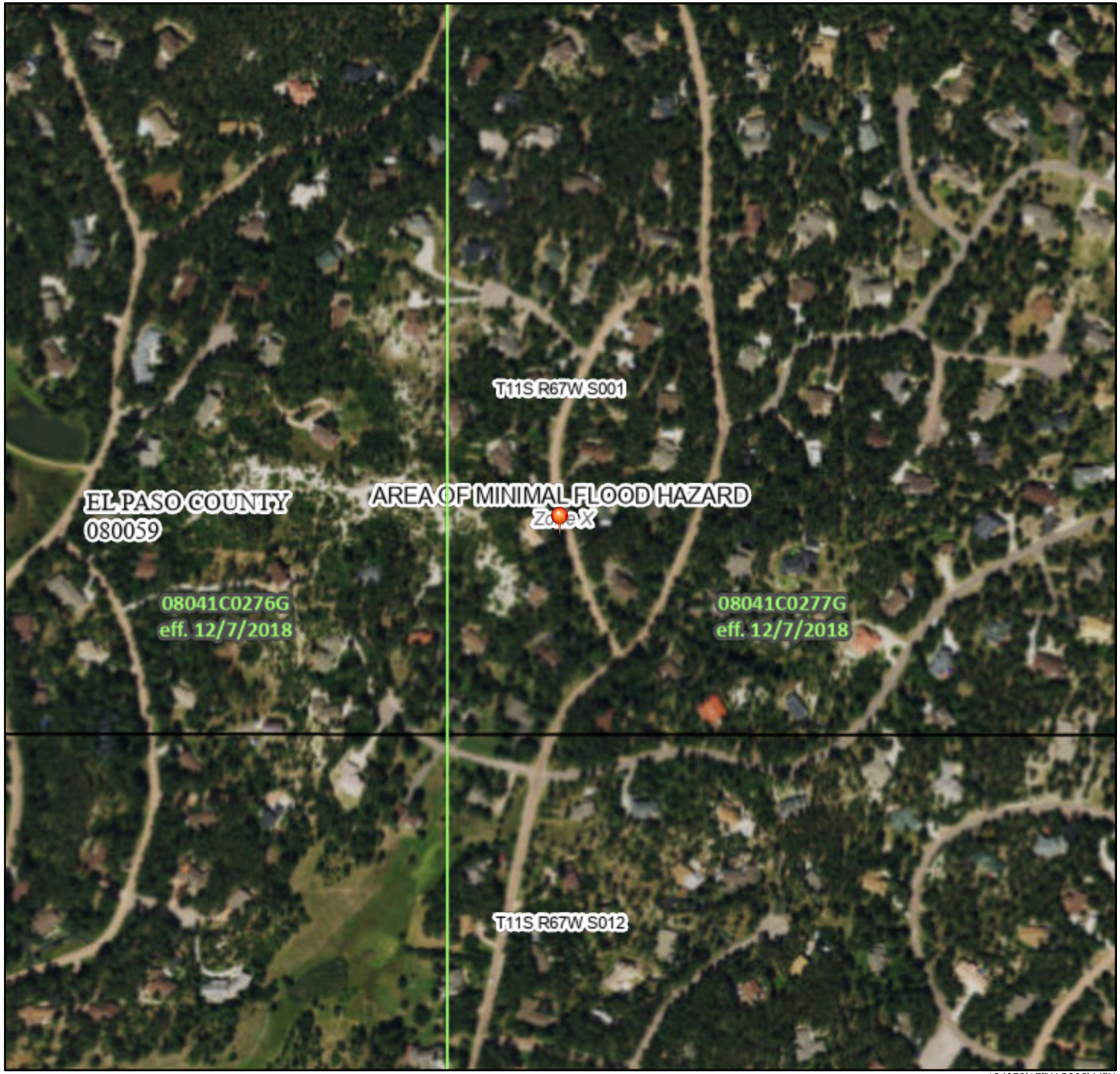
VICINITY MAP
SCALE: N.T.S.

CATAMOUNT ENGINEERING PO BOX 692 DIVIDE, CO 80814 (719) 426-2124	19580 FOUR WINDS WAY	SCALE: N/A	DATE: 11/03/20
	VICINITY MAP	JOB NO.: **21-337**	SHEET: 1 OF 1

National Flood Hazard Layer FIRMette

FEMA

104°50'52"W 39°7'12"N



104°50'15"W 39°6'44"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

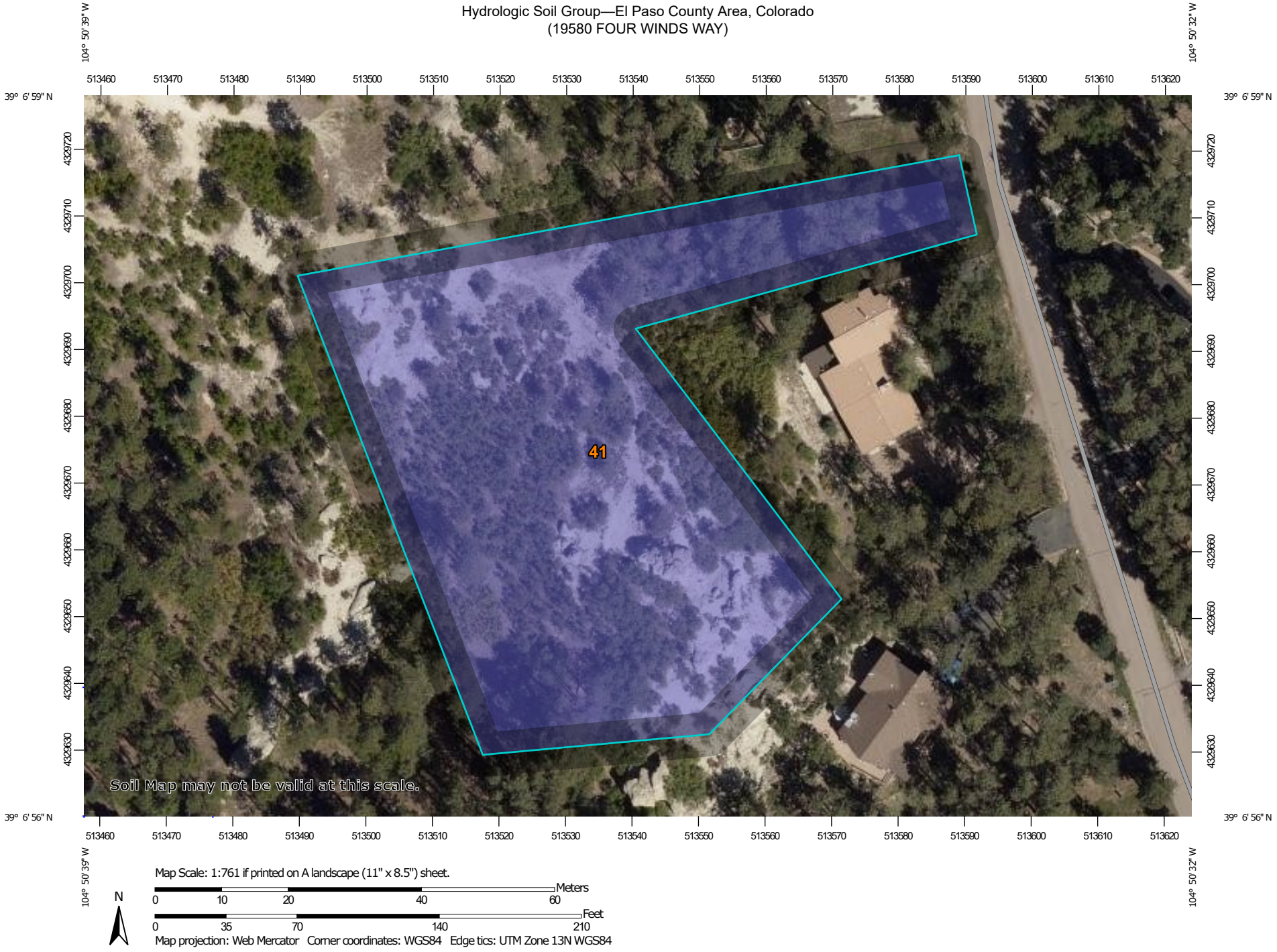
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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 2/28/2022 at 11:45 AM 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.

Hydrologic Soil Group—El Paso County Area, Colorado
(19580 FOUR WINDS WAY)



Map Scale: 1:761 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 10 20 40 60

Feet
0 35 70 140 210

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 19, Aug 31, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 19, 2018—Sep 23, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
41	Kettle gravelly loamy sand, 8 to 40 percent slopes	B	1.2	100.0%
Totals for Area of Interest			**1.2**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

EXISTING HYDROLOGY

								CONVEYANCE TC								TT	INTENSITY						TOTAL FLOWS					
BASIN	**AREA TOTAL (Acres)**	**C_2**	**C_5**	**C_{10}**	**C_{25}**	**C_{50}**	**C_{100}**	**Length (ft)**	**Height (ft)**	**TI (min)**	**Length (ft)**	**Height (ft)**	**C_V**	**Slope (%)**	**Velocity (fps)**	**TC (min)**	**TOTAL (min)**	**I_2 (in/hr)**	**I_5 (in/hr)**	**I_{10} (in/hr)**	**I_{25} (in/hr)**	**I_{50} (in/hr)**	**I_{100} (in/hr)**	**Q_2 (c.f.s.)**	**Q_5 (c.f.s.)**	**Q_{10} (c.f.s.)**	**Q_{25} (c.f.s.)**	**Q_{50} (c.f.s.)**	**Q_{100} (c.f.s.)**
OS-1	0.02		**0.09**				**0.36**	77	11	7.2	0	0				0.0	7.2		4.6				7.7		**0.0**				**0.1**
undeveloped	0.09						0.36																					
OS-2	0.14		**0.38**				**0.55**	69	9	7.1	160	22	10	13.8%	3.7	0.7	7.8		4.5				7.6		**0.2**				**0.6**
undeveloped	0.06		0.09				0.36																					
gravel	0.08		0.59				0.70																					
EX1	0.17		**0.09**				**0.36**	75	14	6.5	108	18	7	16.7%	2.9	0.6	7.2		4.6				7.8		**0.1**				**0.5**
undeveloped	0.17		0.09				0.36																					
EX-2	0.54		**0.09**				**0.36**	59	14	5.4	183	28	7	15.3%	2.7	1.1	6.5		4.8				8.0		**0.2**				**1.6**
undeveloped	0.54		0.09				0.36																					

Calculated by: DLM

Date: 2/28/2022

PROPOSED HYDROLOGY

								CONVEYANCE TC							TT	INTENSITY						TOTAL FLOWS					
BASIN	**AREA TOTAL (Acres)**	**C_2**	**C_5**	**C_{10}**	**C_{25}**	**C_{50}**	**C_{100}**	**Length (ft)**	**Height (ft)**	**TI (min)**	**Length (ft)**	**Height (ft)**	**C_V**	**Slope (%)**	**Velocity (fps)**	**TC (min)**	**TOTAL (min)**	**I_2 (in/hr)**	**I_5 (in/hr)**	**I_{10} (in/hr)**	**I_{25} (in/hr)**	**I_{50} (in/hr)**	**I_{100} (in/hr)**	**Q_2 (c.f.s.)**	**Q_5 (c.f.s.)**	**Q_{10} (c.f.s.)**	**Q_{25} (c.f.s.)**	**Q_{50} (c.f.s.)**	**Q_{100} (c.f.s.)**
OS-1	0.02		**0.09**				**0.36**	77	11	7.2	0	0				0.0	7.2		4.6				7.7		**0.0**				**0.1**
undeveloped	0.018		0.09				0.36																					
paved	0.002		0.90				0.96																					
OS-2	0.14		**0.58**				**0.72**	69	9	7.1	160	22	20	13.8%	7.4	0.4	7.4		4.6				7.7		**0.4**				**0.8**
undeveloped	0.055		0.09				0.36																					
paved	0.085		0.90				0.96																					
A1	0.17		**0.08**				**0.35**	75	14	6.5	108	18	7	16.7%	2.9	0.6	7.2		4.6				7.8		**0.1**				**0.5**
landscape	0.17		0.08				0.35																					
A2	0.54		**0.20**				**0.48**	41	7	5.0	215	35	10	16.3%	4.0	0.9	5.9		4.9				8.3		**0.5**				**2.1**
landscape	0.54		0.08				0.35																					
paved	0.02		0.90				0.96																					
roof	0.06		0.73				0.81																					

Calculated by: DLM

Date: 2/28/2022

DRAINAGE MAPS

Notate date and source of topo survey.

This should include the ditch/ravine area that was filled in with soil recently.

If this topo does not exist (in publically available sources that show historic conditions for example), since site grading has already occurred, please still add a note to this map explaining that the topo is the same shown on the subsequent Proposed Conditions map and why. But then make sure that you include a detailed description and discussion of the pre-disturbance topo and drainage conditions in the report text above, per my comment on pdf page 4 above.

Show flow direction arrows.

This area appears to flow to the same location as OS2. Expand limits of OS2 to include all areas that are part of that basin.

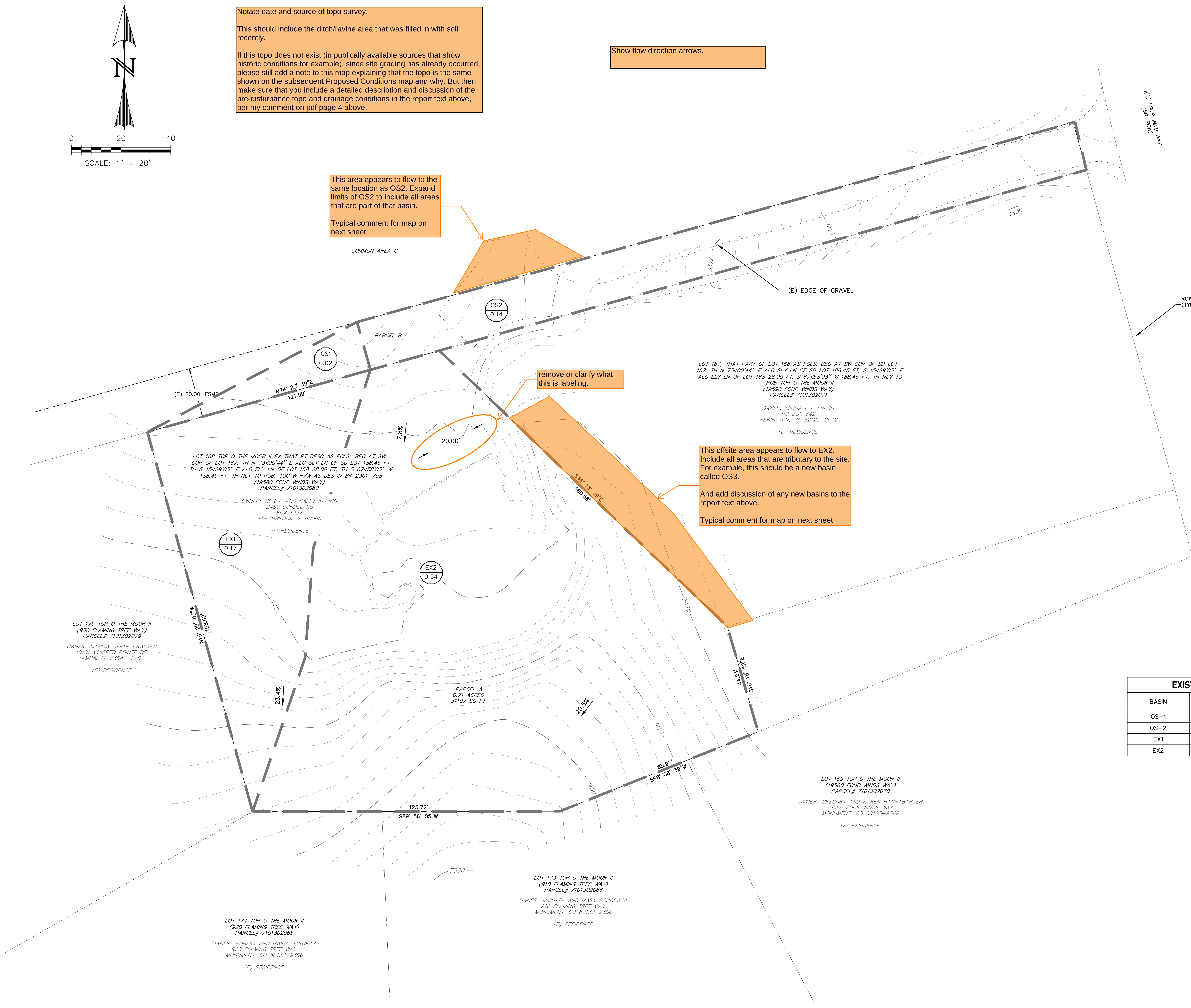
Typical comment for map on next sheet.

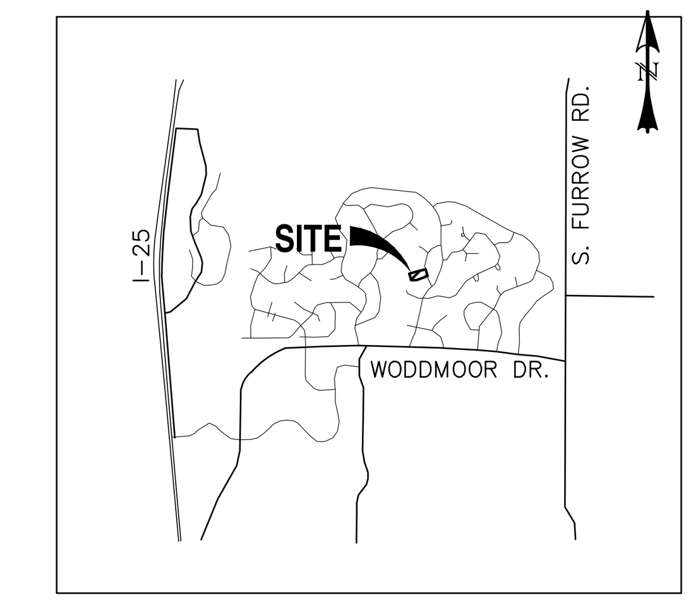
remove or clarify what this is labeling.

This offsite area appears to flow to EX2. Include all areas that are tributary to the site. For example, this should be a new basin called OS3.

And add discussion of any new basins to the report text above.

Typical comment for map on next sheet.





VICINITY MAP
SCALE: N.T.S.

EXISTING DRAINAGE BASINS			
BASIN	AREA (ACRES)	Q5 (CFS)	Q100 (CFS)
OS-1	0.02	0.0	0.1
OS-2	0.14	0.2	0.6
EX1	0.17	0.1	0.5
EX2	0.54	0.2	1.6

LEGEND

EXISTING	(E)
PROPOSED	(P)
BOUNDARY	
RIGHT-OF-WAY	
LOT LINE	
EASEMENT	
(E) CONTOUR, INDEX	6820
(E) CONTOUR	
(P) CONTOUR, INDEX	6820
(P) CONTOUR	

REV.	DESCRIPTION	DATE

Know what's below. Call 72 hours before you dig.
For more details visit: www.call811.com

PREPARED FOR:
THE MAYNARD COMPANY
1364 OLD CEDAR GROVE
MONUMENT, CO 80132

CATAMOUNT ENGINEERING
321 W. HENRIETTA AVE PO BOX 221 WOODLAND PARK, CO 80866 (719)426-2124

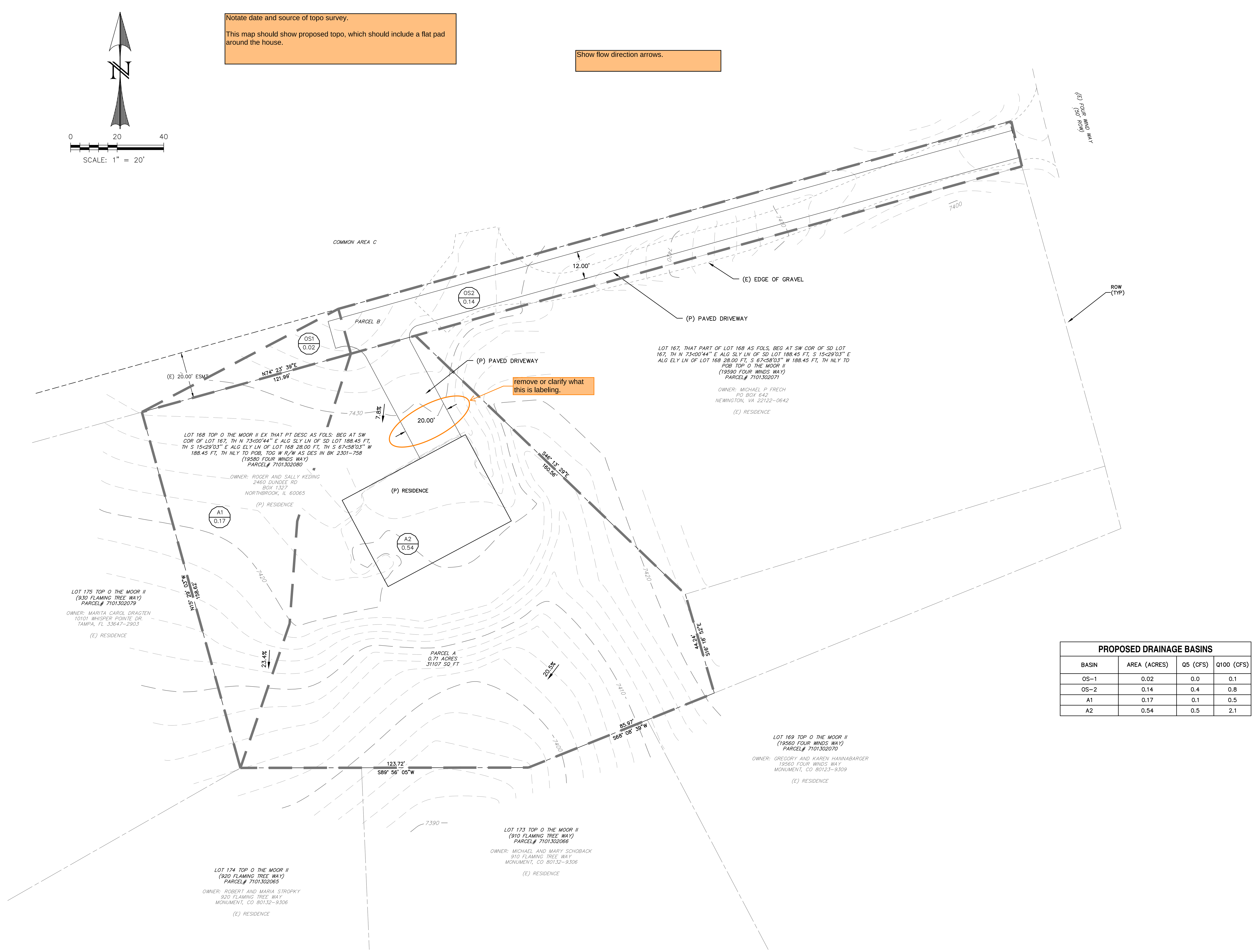
19584 FOUR WINDS WAY
MONUMENT, CO 80132
EXISTING DRAINAGE PLAN

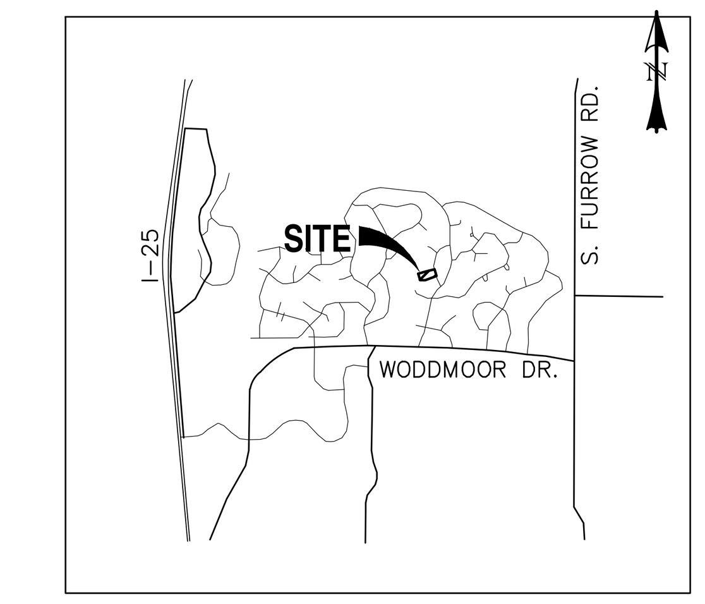
DESIGNED BY: DLM	DRAWN BY: SLP
SCALE: 1"=20'	DATE: 02/17/22
JOB NUMBER	SHEET
21-337	1 OF 2

Notate date and source of topo survey.

This map should show proposed topo, which should include a flat pad around the house.

Show flow direction arrows.





VICINITY MAP
SCALE: N.T.S.

PROPOSED DRAINAGE BASINS

BASIN	AREA (ACRES)	Q5 (CFS)	Q100 (CFS)
OS-1	0.02	0.0	0.1
OS-2	0.14	0.4	0.8
A1	0.17	0.1	0.5
A2	0.54	0.5	2.1

LEGEND

EXISTING	(E)
PROPOSED	(P)
BOUNDARY	
RIGHT-OF-WAY	
LOT LINE	
EASEMENT	
(E) CONTOUR, INDEX	6820
(E) CONTOUR	
(P) CONTOUR, INDEX	6820
(P) CONTOUR	

REV.	DESCRIPTION	DATE

PREPARED FOR:
THE MAYNARD COMPANY
1364 OLD CEDAR GROVE
MONUMENT, CO 80132

CATAMOUNT ENGINEERING
321 W. HENRIETTA AVE PO BOX 221 WOODLAND PARK, CO 80866 (719)426-2124

19584 FOUR WINDS WAY
MONUMENT, CO 80132
PROPOSED DRAINAGE PLAN

DESIGNED BY: DLM	DRAWN BY: SLP
SCALE: 1"=20'	DATE: 02/17/22
JOB NUMBER	SHEET
21-337	2 OF 2