

CROSSROADS CHAPEL BUILDING ADDITION

840 Northgate Boulevard

Colorado Springs, CO

PPR2135

DRAINAGE REPORT

Strategic Land Solutions, Inc. JN: 20-0033-01

Report Date/History: March 29, 2021

Revised: February 02, 2022

Prepared for:

CROSSROADS CHAPEL, SBC

Pastor D.L. Mitchell

840 Northgate Boulevard

Colorado Springs, CO 80921

Phone (719) 495-3200

Email office@crossroadssbc.com

Prepared by:

Robert J. Palmer, P.E., as President

Strategic Land Solutions, Inc.

2595 Ponderosa Road

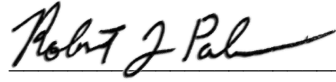
Franktown, CO 80116

Phone (720) 384-7661

Email rpalmer@strategicls.net

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.



Robert J. Palmer Colorado P.E. 36320



02/03/2022

Date

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.

D. L. Mitchell - Pastor

Date

*Crossroads Chapel, SBC
840 Northgate Boulevard
Colorado Springs, CO 80921*

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:



Strategic Land Solutions, Inc.

Civil Engineering • Land Planning • Entitlements

Wednesday – February 02, 2022

Sent Via: ☐ 1st Class ☐ FEDEX ☐ Courier ☐ Hand Deliver
☐ Facsimile to: ☒ Deliver Email
to:

EL PASO COUNTY PLANNING & COMMUNITY DEVELOPMENT

2880 International circle,
Colorado Springs, CO **80910**

Attention: El Paso County Engineering

Re: Drainage Letter (PPR2135)

CROSSROADS CHAPEL SBC

840 North Gate Boulevard
Colorado Springs, CO

SLS JN: 20-0033-01

To whom it may concern:

Crossroads Chapel SBS is currently planning a 3,200 square foot addition to their existing facility. As part of this project an existing 2,500 S.F. of building space is being removed for a net increase of 700 S.F. of impervious area. Additionally, a small portion of the existing parking lot will be paved as requested by El Paso County Planning.

The proposed addition consists of a new building connected to the existing buildings by an enclosed corridor. The building addition will replace two existing modular buildings, which will be removed exposing unpaved pervious area. The proposed building and the existing modular buildings are located within the same drainage basin, so the net increase in impervious area of the drainage basin is approximately 700 S.F. Furthermore, the existing drainage basins will not be altered beyond what is described in the letter, and the outfall location will not change.

Evaluating the site for the difference in impervious shows that the proposed improvements will increase site runoff 0.89 CFS during the 10-year reoccurring storm, and 1.07 CFS for the 100-year reoccurring storm. That equates to a 6.80% increase in runoff for the 10-year reoccurring storm, and a 4.00% increase for the 100-year reoccurring storm. Furthermore, the increase in runoff is limited to Basin A, which drains to an existing inlet, and Basin B, which drains to Northgate Boulevard. Therefore, there is no expected increase in runoff to the adjacent residences, and the proposed improvements should not have a negative impact on the existing drainage facilities serving the site.

The proposed site meets the four-step process shown in chapter 4.0 of the Drainage Criteria Manual Volume 2 and the Engineering Criteria Manual Appendix I section 1.7.1.A as follows.

Step 1 (Reduces Pavement Area)

The proposed site only utilizes paved areas in the main sidewalks, ADA parking, the main access aisle, and a few highly used parking spaces. Most of the parking area utilizes a porous surface to allow infiltration of runoff. As shown in the calculations included in the appendix the site overall impervious percentage is only 7.01%.

Step 2 (Porous Pavement)

As described above, impervious pavement is only used in high traffic area. Being a church, most of the parking and suite uses are only used once or twice a week. Therefore, most of the parking lot, along with several access paths, utilize crushed asphalt and crusher fines as a surface material. The result is a site with an imperviousness of 7.01%.

Step 3 (Grass Buffers)

The entire site, except for a portion of Basin A, is tributary to native landscaping prior to discharging to the adjacent streets and storm water capture facilities. Furthermore, the site drainage does not simply pass over a small area of landscaping, but rather passes over large areas of native grasses allowing for infiltration.

Step 4 (Grass Swales)

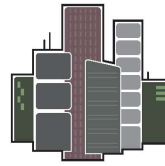
As described above, the entire site except for a portion of Basin A, is tributary to native landscaping prior to discharging to the adjacent streets and storm water capture facilities. Furthermore, the existing native areas contain stabilized swales, which further allows for infiltration prior to discharging. The result

2595 Ponderosa Road – Franktown, CO 80116

ROBERT PALMER, PE: 720.384.7661 phone • rpalmer@strategicls.com • WEBSITE: <http://www.strategicls.net>

file: c:\s\projects\2020-projects\church\docs\drainage\2021-03-26-drainage letter-scb church.doc

Ms. Lupe Packman
Drainage Letter
Wednesday – February 02, 2022
Page 2



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is a site with an average 10-year runoff coefficient of 0.30, and an average 100-year runoff coefficient of 0.39. A completely undeveloped site would have a an average 10-year runoff coefficient of 0.25, and an average 100-year runoff coefficient of 0.35, so the proposed site runoff coefficients are only slightly higher than an undeveloped site.

As described in this drainage letter, The Crossroads Chapel SBS is planning to remove two modular buildings and replace them with a new building connected to the existing buildings by an enclosed corridor. As part of this project none of the existing drainage patterns will be modified, and the expected increase in runoff is statistically insignificant. Therefore, the project will have no measurable adverse effects on the downstream drainage facilities nor the surrounding developments.

If you have questions regarding what is proposed, please feel free to call me. Thank you!

Sincerely,

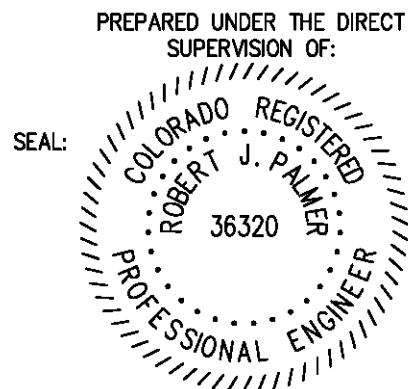
STRATEGIC LAND SOLUTIONS, INC.

A handwritten signature in black ink that reads "Robert J. Palmer". The signature is fluid and cursive.

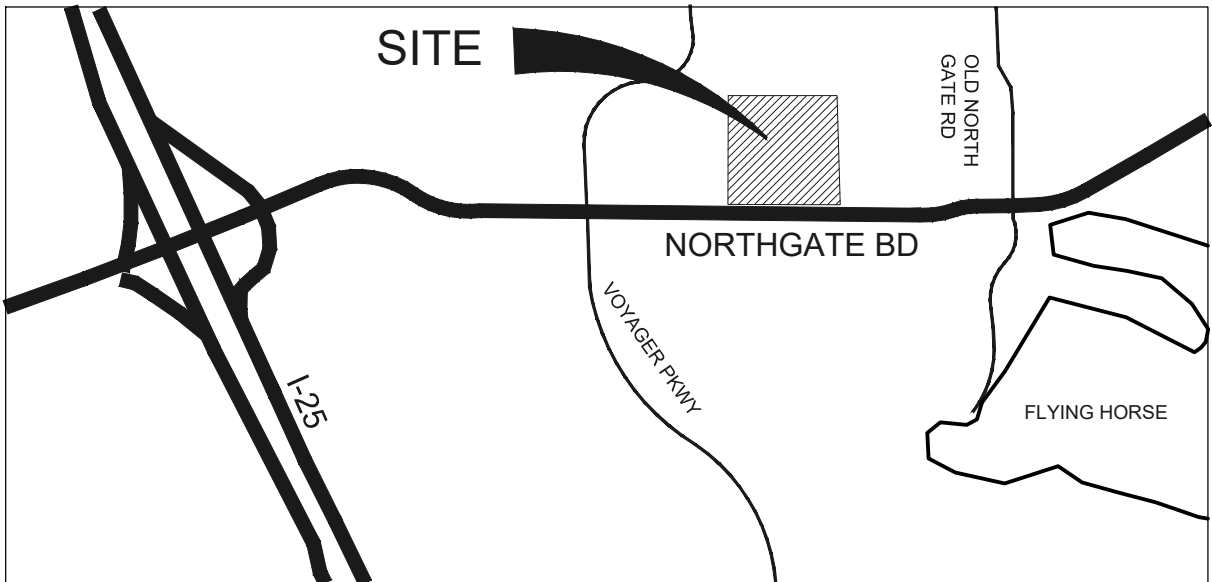
Robert J. Palmer, PE (CO, NM, AZ, WY, MT)
President for SLS, Inc. A Colorado Corporation

Attachments: As noted above.

cc: Pastor DL Mitchell via: office@crossroadsbc.com

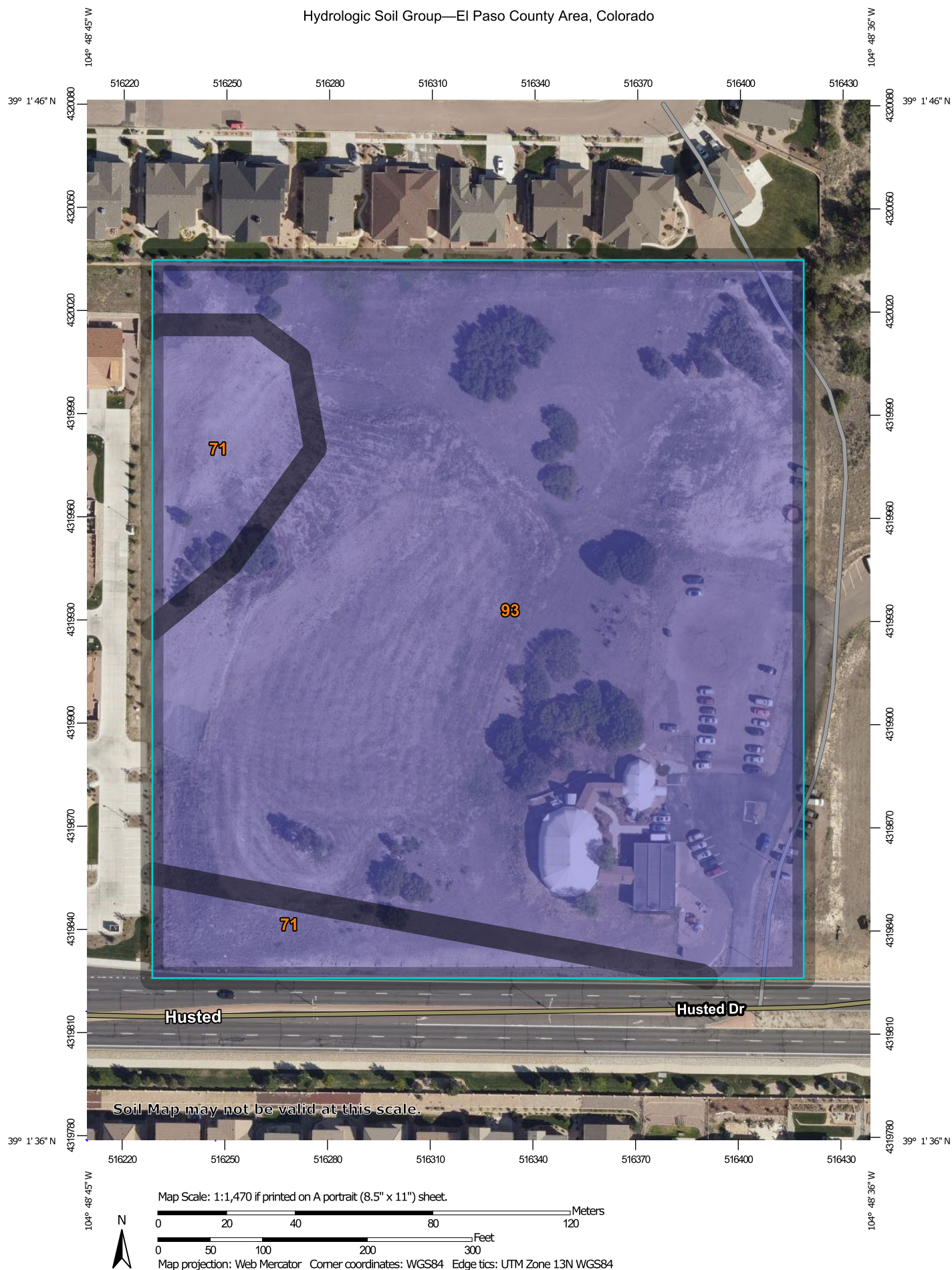


BY Robert J. Palmer, PE
Licensed Professional Engineer (CO PE #36320),
AS PRESIDENT FOR STRATEGIC LAND SOLUTIONS, INC.



VICINITY MAP
NOT TO SCALE

Hydrologic Soil Group—El Paso County Area, Colorado




**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

3/29/2021
Page 1 of 4









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


Water Features


 Streams and Canals


Transportation

 Rails


 Interstate Highways

 US Routes


 Major Roads

 Local Roads


Background

 Aerial Photography


C

 C


C/D

 C/D

D

 D

Not rated or not available

 Not rated or not available

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 18, Jun 5, 2020

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
71	Pring coarse sandy loam, 3 to 8 percent slopes	B	1.4	13.7%
93	Tomah-Crowfoot complex, 8 to 15 percent slopes	B	8.5	86.3%
Totals for Area of Interest			9.9	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.

Crossroads Chapel SBC - 840 North Gate Boulevard - Colorado Springs, CO
LAND USAGE FOR EACH SUB-BASIN

LAND USAGE	PERCENT IMPERVIOUS (%)	10-YR RUNOFF COEFF. C ₁₀	100-YR RUNOFF COEFF. C ₁₀₀	AREA						SUM OF AREA (ACRE)
				A	B	C	D			
LANDSCAPE	0	0.25	0.35	6.136	1.346	0.254	1.564			9.300
ROOF	90	0.90	0.95	0.177	0.049					0.226
DRIVES AND WALKS (IMPERVIOUS)	100	0.90	0.95	0.203	0.296					0.499
Total				6.516	1.691	0.254	1.5640	0.0000	0.0000	10.0250

COMPOSITE % IMPERVIOUSNESS AND RUNOFF COEFFICIENTS

SUB-BASIN	EFFECTIVE % IMPERVIOUS		COMPOSITE C ₁₀	COMPOSITE C ₁₀₀	AREA acres
BASIN A	5.56		0.29	0.38	6.516
BASIN B	20.11		0.38	0.47	1.691
BASIN C	0.00		0.25	0.35	0.254
BASIN D	0.00		0.25	0.35	1.564
TOTAL PROPOSED	7.01		0.30	0.39	10.03

9.350
0.226
0.450
10.026

Crossroads Chapel SBC - 840 North Gate Boulevard - Colorado Springs, CO
LAND USAGE FOR EACH EXISTING SUB-BASIN

LAND USAGE	PERCENT IMPERVIOUS (%)	5-YR RUNOFF COEFF. C10	100-YR RUNOFF COEFF. C100	AREA						SUM OF AREA (ACRE)
				E1	E2	E3	E4			
LANDSCAPE	0	0.25	0.35	6.330	1.360	0.254	1.564			9.508
ROOF	90	0.90	0.95	0.085	0.036					0.120
DRIVES AND WALKS (IMPERVIOUS)	100	0.90	0.95	0.101	0.296					0.397
Total				6.516	1.691	0.254	1.5640	0.0000	0.0000	10.0248

COMPOSITE % IMPERVIOUSNESS AND RUNOFF COEFFICIENTS

SUB-BASIN	EFFECTIVE % IMPERVIOUS		COMPOSITE C10	COMPOSITE C100	AREA acres
BASIN E1	2.72		0.27	0.37	6.516
BASIN E2	19.39		0.38	0.47	1.691
BASIN E3	0.00		0.25	0.35	0.254
BASIN E4	0.00		0.25	0.35	1.564
TOTAL EXISTING	5.04		0.28	0.38	10.02

9.350
0.226
0.450
10.026

TIME OF CONCENTRATION YEAR

SUBDIVISION: Crossroads Chapel SBC - 840 North Gate Boulevard - Colorado Springs, CO

CALCULATED BY: Robert Palmer

DATE: 03/29/21

$$t_c = t_i + t_t$$

[illegible]

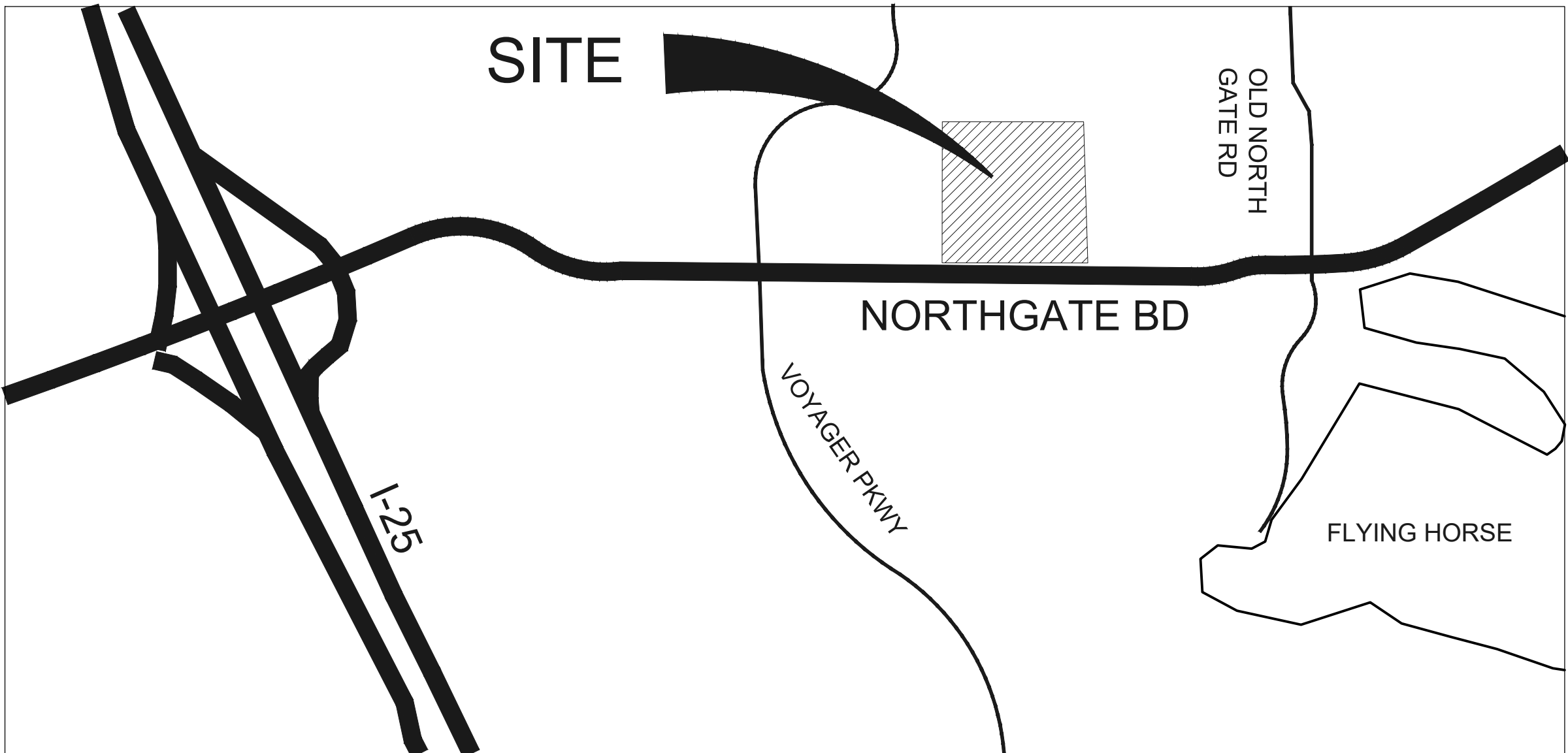
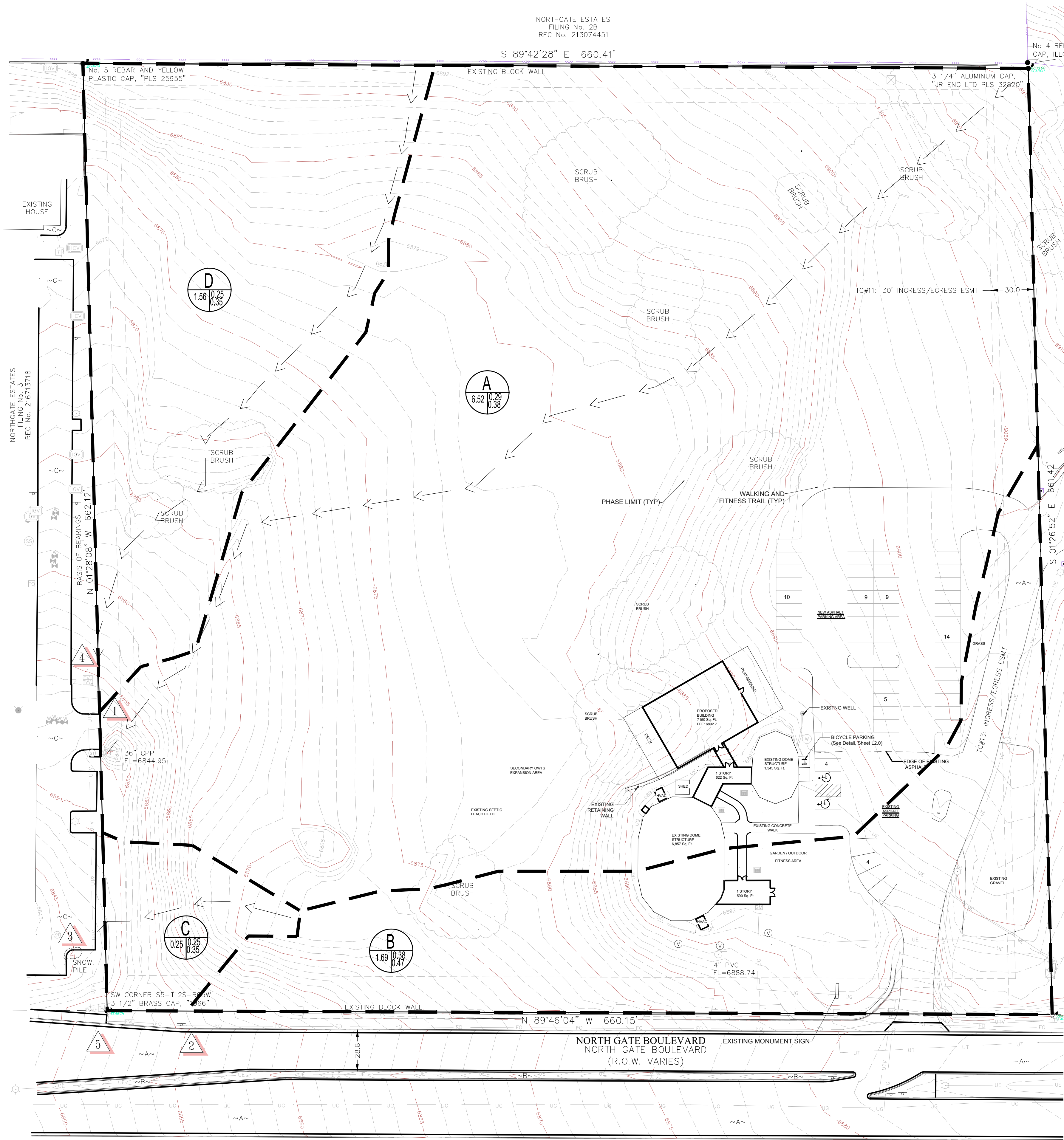
STORM DRAINAGE DESIGN AND TECHNICAL CRITERIA

DESIGN STORM: 10-Yr

[illegible]

DESIGN STORM: 100-Yr

[illegible]



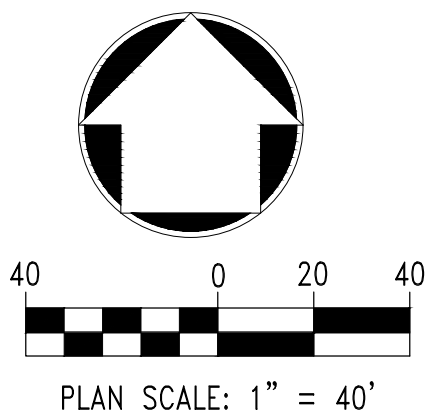
VICINITY MAP
NOT TO SCALE

PROPOSED SUMMARY RUNOFF TABLE

DESIGN PT	CONTRIBUTING BASINS / AREA (acres)	10-YEAR RUNOFF (cfs)	100-YEAR PEAK RUNOFF (cfs)	100-YEAR INCREASED RUNOFF (cfs)
1	A/6.516	8.63	17.56	0.82
2	B/1.691	3.01	5.67	0.10
3	C/0.254	0.37	0.80	0.00
4	D/1.564	1.96	4.19	0.00
5	TOTAL SITE/10.02	13.97	27.80	1.07

LEGEND

- TC CALCULATIONS
- BASIN LIMITS
- DESIGN POINT
- BASIN DESIGNATION
- 10YR COMPOSITE 'C'
- 100YR COMPOSITE 'C'



PREPARED UNDER THE DIRECT SUPERVISION OF:

SEAL: [Professional Engineer Seal]

BY Robert J. Palmer, PE
Licensed Professional Engineer (CO PE #36320)
AS PRESIDENT FOR STRATEGIC LAND SOLUTIONS, INC.

PCD File No PPR2039

REVISIONS:

1st	Comments 2-24-21

Strategic Land Solutions, Inc.
Civil Engineering, Land Planning, and Consulting
2595 PONDEROSA ROAD
FRANKTOWN, CO 80116
rpalmer@strategicland.net
Robert J. Palmer, PE
President

CROSSROADS CHAPEL
COLORADO SPRINGS, CO

PROPOSED DRAINAGE

PROJ. NO.:
DATE: 03/29/21
SCALE: See Sheet
DRAWN: JRO
CHKD BY: NAM
SHEET DR-2